

**The elements of bandaging and the treatment of fractures and dislocations
/ by William Rankin.**

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THE ELEMENTS OF
BANDAGING
FRACTURES & DISLOCATIONS

WILLIAM RANKIN

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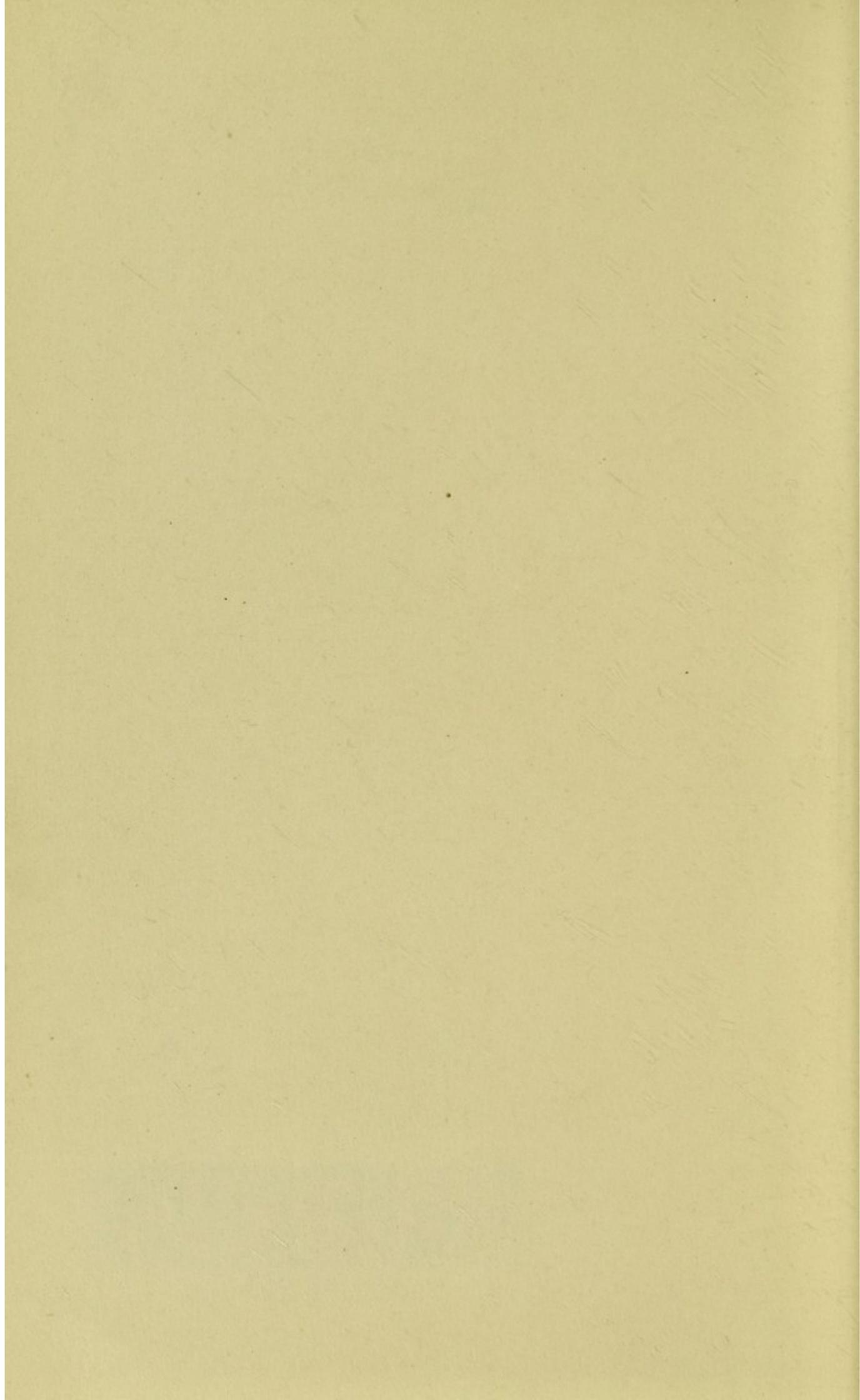
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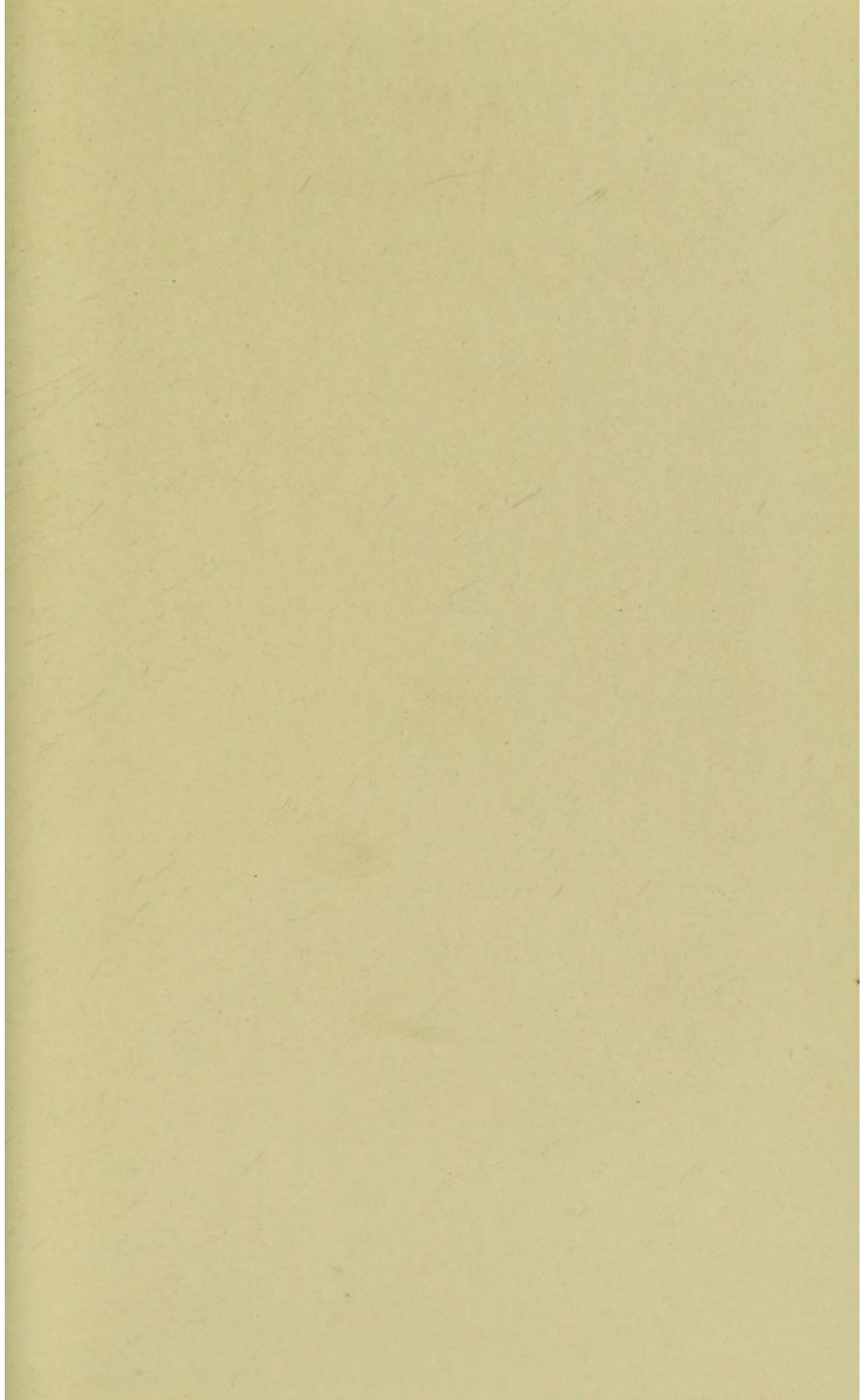


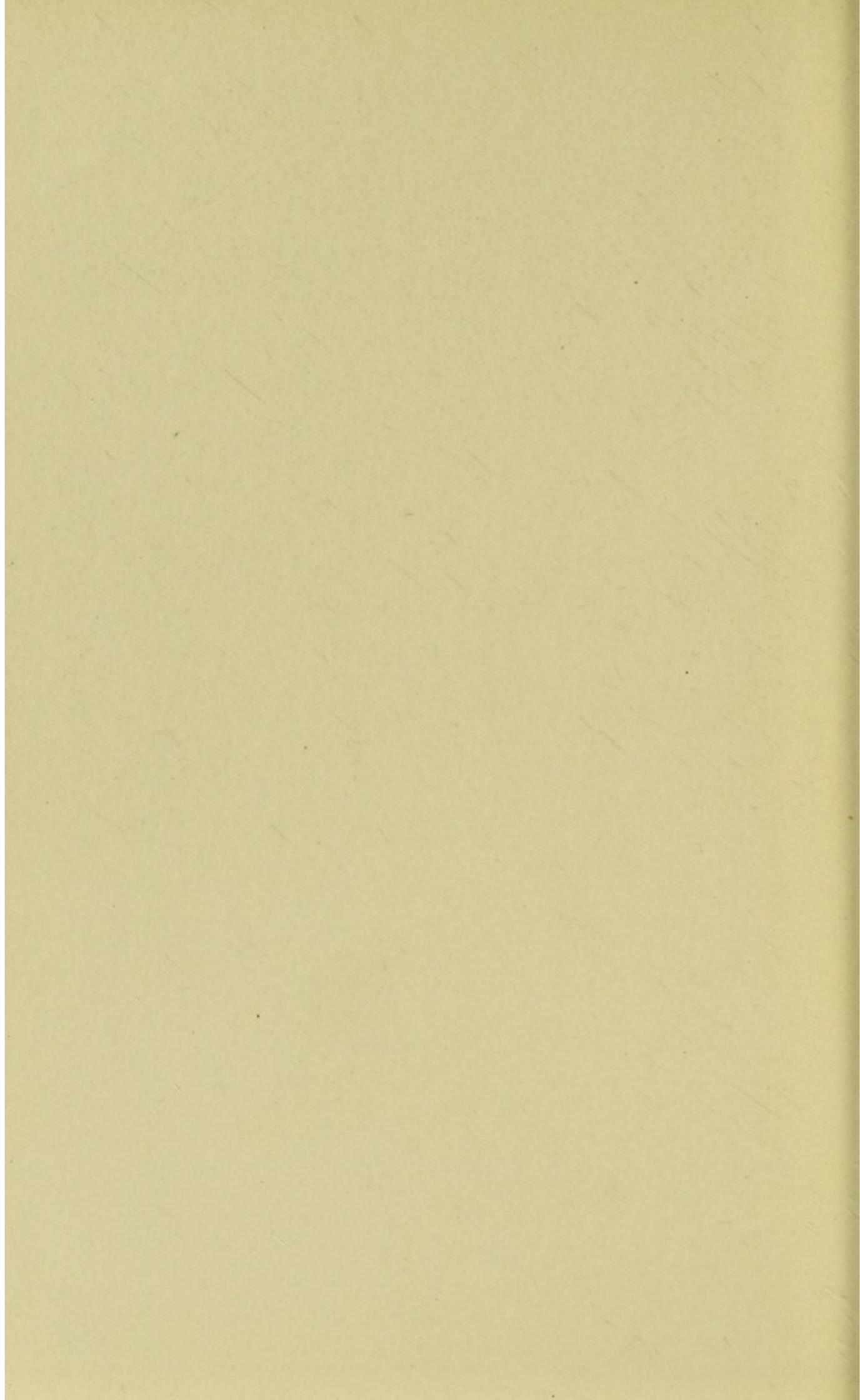
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THE ELEMENTS OF
BANDAGING
AND THE TREATMENT OF
FRACTURES AND DISLOCATIONS

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THE ELEMENTS OF
BANDAGING
AND THE TREATMENT OF
**FRACTURES AND
DISLOCATIONS**

BY

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WITH SIXTY-EIGHT ORIGINAL ILLUSTRATIONS

LONDON

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INTRODUCTION

THESE notes are based on demonstrations given to students preparing for the practical portion of their Final Examination. They deal essentially with details which are not handily found in most text-books, and are intended for those whose experience is limited. Greatest stress is laid on the commonest conditions and on the everyday complications. Simplicity is aimed at, but every procedure and method detailed is one which has proved most satisfactory in practice, and few bad results will have to be deplored where cases are treated as herein laid down.

Emphasis is laid on the necessity for and value of ANÆSTHESIA in the diagnosis and treatment of fractures and dislocations. Most men are averse to the giving of pain to a fellow-man, and unless this element of dread of giving pain is entirely eliminated,

it is almost certain that in the majority of cases the examination will be incomplete and, of necessity, the treatment will be defective. This cannot be too strongly insisted on; an anæsthetic is routine practice in every properly conducted surgical clinique whenever required, and ought to be so in general practice. I have to thank Dr. ALEX. MACLENNAN for several photographs, and I am fortunate in having had Mr. A. K. MAXWELL'S help in preparing the illustrations. I have also to express my indebtedness to Dr. J. H. NICOLL, in whose wards at the Western Infirmary of Glasgow my experience has for the most part been gained.

WILLIAM RANKIN.

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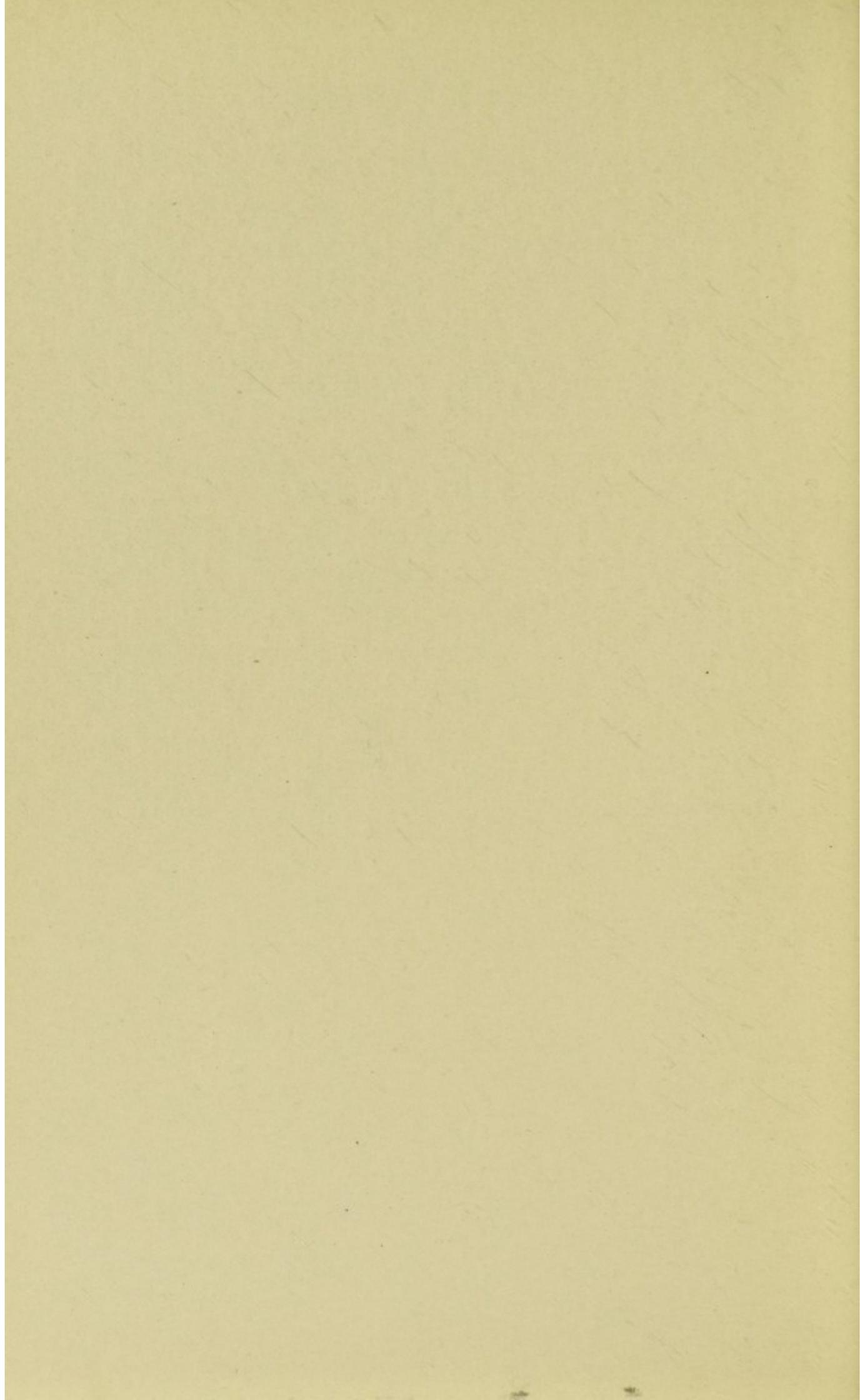
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NOTES ON BANDAGING, FRACTURES AND DISLOCATIONS.

PART I.—ON BANDAGING.

THE fine art of bandaging is no longer a necessity, since (1) so few cases require dressing after operation ; (2) dressings are more conveniently fixed by means of adhesive strapping ; (3) every one recognises the advantages of the soft gauze bandage, which can be applied without reverses, and which adapts itself comfortably and readily to the parts of the body where the stiffer bandages are not easy of application.

However, the use of the stiffer material bandage is often enough required, and

therefore the student must master the two methods of applying it satisfactorily—

(a) By making use of “REVERSES.”

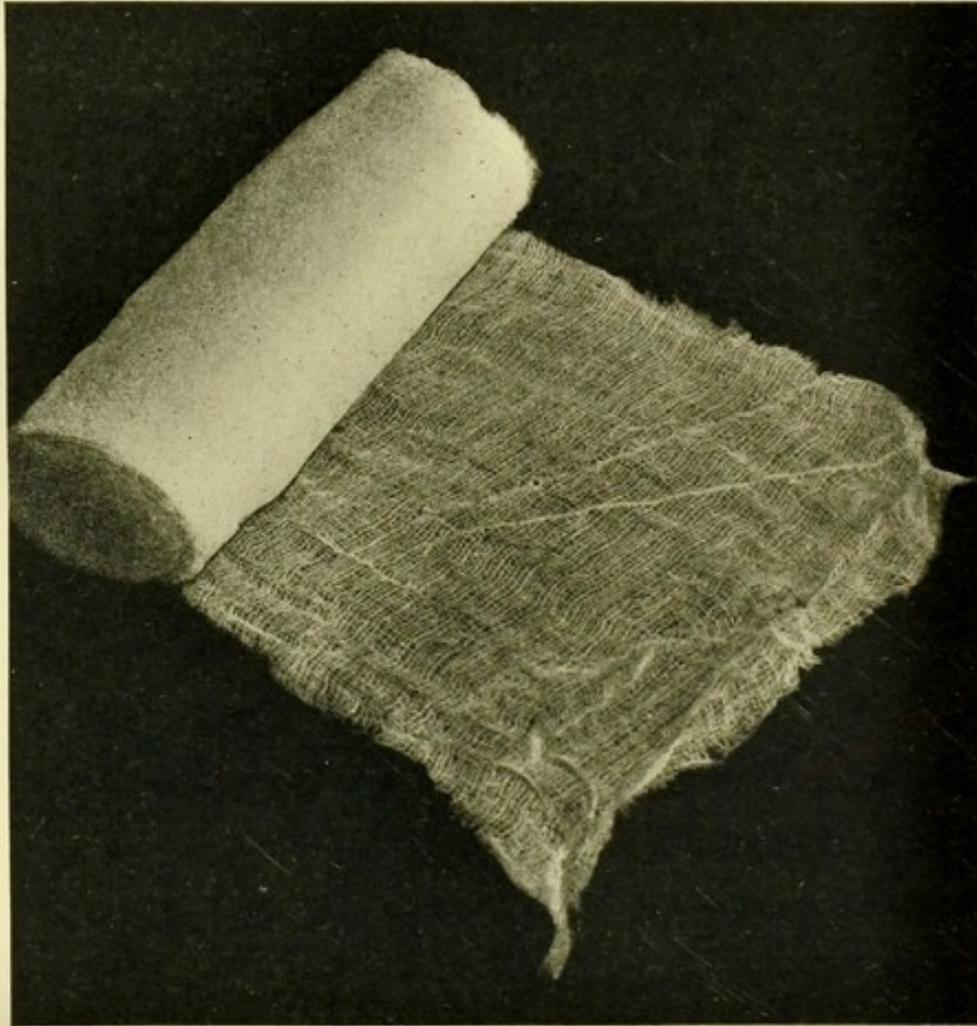


FIG. 1.—Soft Gauze Bandage.

(b) By using the “Figure of 8” procedure.

Nothing but practice will enable the student to fix on a bandage properly, sufficiently firm, but not too tight.

RULES.

1. Cleanse the part to be bandaged with spirit, and then dust it over with some powder.

2. No two skin surfaces are to be allowed to remain in contact. They must be separated by a piece of lint or wool, otherwise an eczematous condition of the skin will develop. Note this when bandaging the hand or the foot.

3. Use a bandage of the proper width.

4. Stand on the side being bandaged, and face the patient, except when bandaging a hand, a foot, or a stump.

5. Pad all the prominent points.

6. Commence at the periphery, except when bandaging a hand, a foot, or a stump ; fix the bandage by a horizontal turn or two, and apply it from within outwards over the front of the limb, putting the outer side of the bandage next the skin.

7. Make each turn progress upward by the same amount, and have the points of crossing, or the reverses, all in the same straight line, preferably the middle line in front, where they can at once be seen.

8. Place the knot or the pin which

finishes off the bandage clear of any bony point and in full view.

9. Let there be a certain amount of

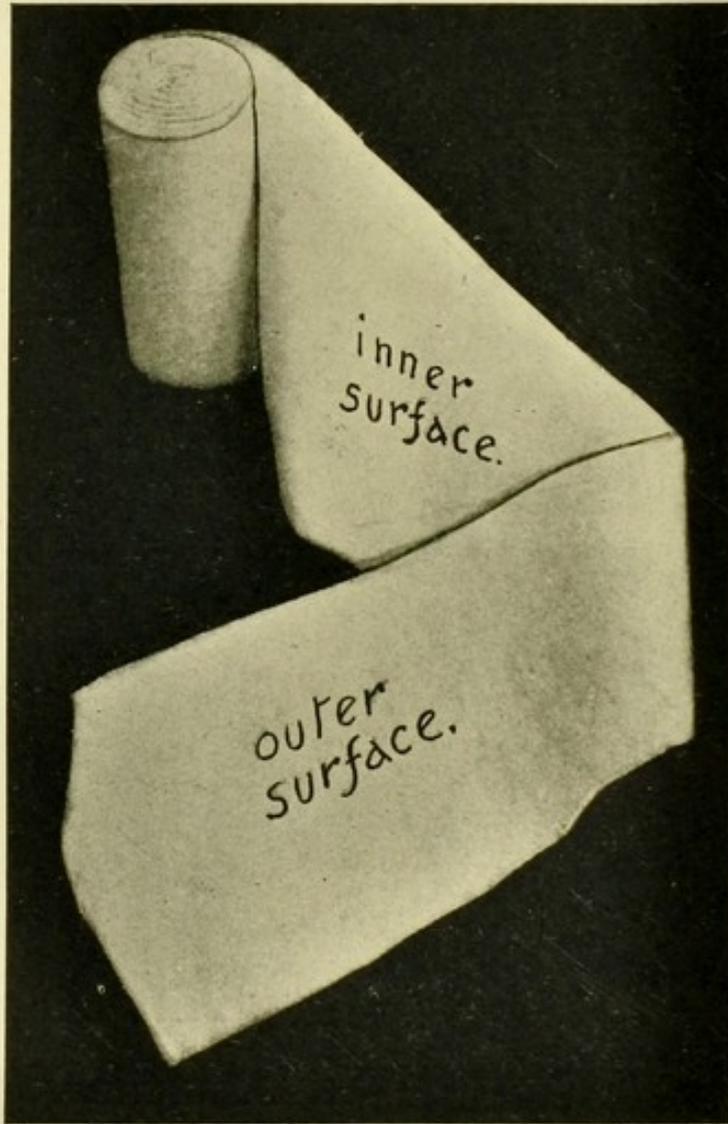


FIG. 2.—Calico Bandage.

“ spare ” or “ slack ” between the portion of the bandage in contact with the limb and the “ drum.” This enables one to

make a reverse or to lay the bandage exactly where one wishes it to lie, and thereafter to tighten it up to the proper degree of tension without the field of operation being obscured and the procedure being hampered by the hand holding the bandage.

If these simple rules be attended to, the student will easily master the art of applying a bandage made of stiff material.

Whether the bandage be applied with reverses, or by the

“figure of 8” procedure, the end result is apparently the same.

The “figure of 8” method requires more bandage, since the upper loops are all covered over by the advancing lower loops.



FIG. 3.—Calico Bandage.

Each method is right, and it is a matter of individual preference which ought to be used.

As regards the application of the "Figure of 8," one simply disregards the flapping lower edge of each upper loop. They will all be covered in by the advancing lower loops, and one's attention is confined to laying the ascending and descending lower edges in their proper places, parallel to the preceding edges, and to getting the proper degree of tension applied. It is the outer side of the bandage that is next the skin during the whole procedure, and the lower edge alone is involved in the production of the line of crossings.

The bandage applied with Reverses takes up less material. In this case both series of parallel lines have alternating upper and lower edges of the bandage showing, and the outer and inner surfaces are also alternately next the skin. This can be readily demonstrated by dipping one end of a bandage in some coloured fluid before applying it.

This method is probably the more difficult.

SUMMARY OF THE STEPS.

1. Fix the bandage by a horizontal turn or two, then bring it from within outwards over the front of the limb with a sufficient

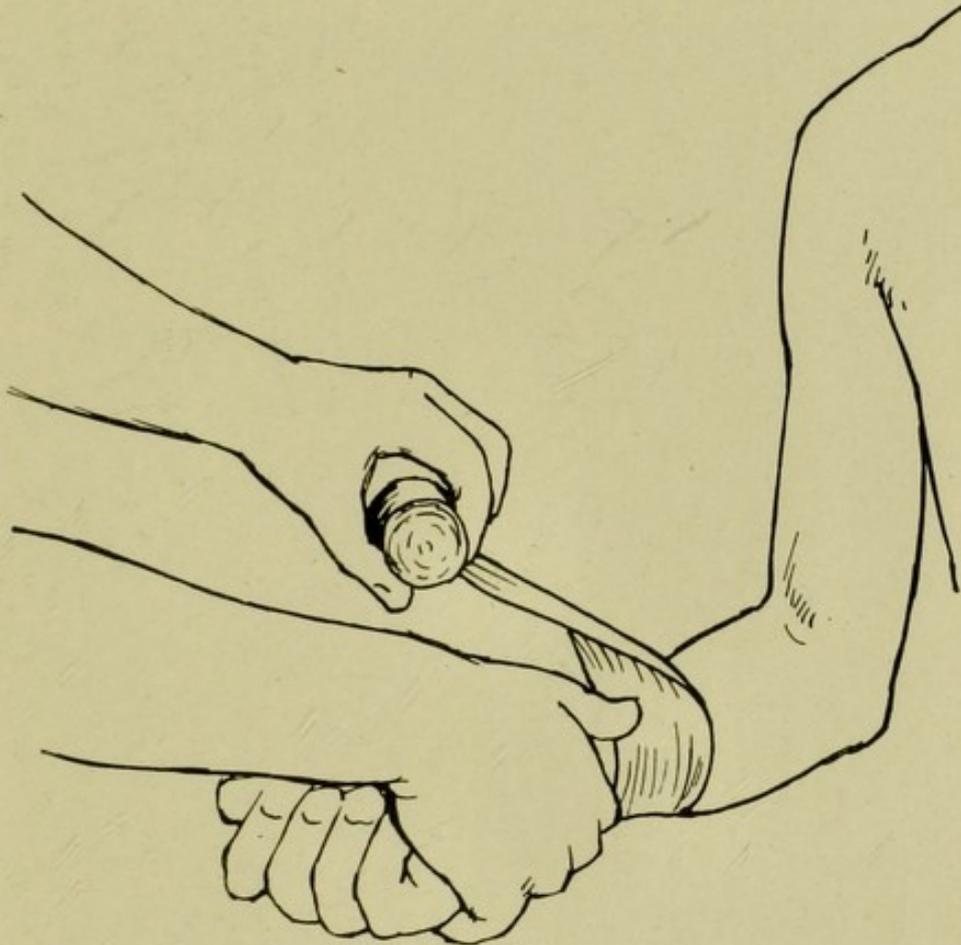


FIG. 4.—Placing the Thumb : making a Reverse.

pull on it to get a smooth, firm application, and placing the edge of the bandage sloping obliquely upwards and outwards, or, later, parallel to the preceding edges.

2. Place the thumb in position on the

edge which is lower and in the middle line of the limb in front.

3. Make the reverse.

4. Lay the descending edge sloping down-

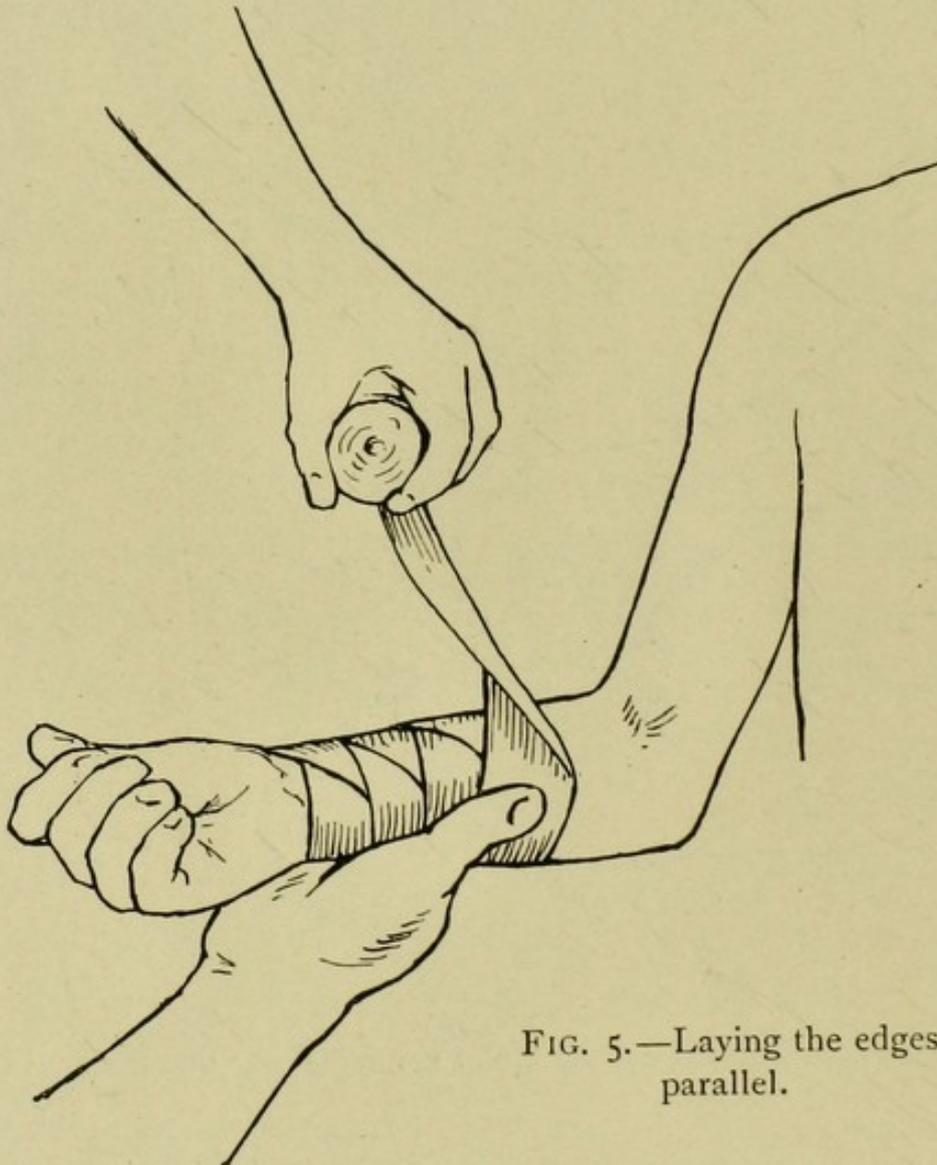


FIG. 5.—Laying the edges parallel.

ward and outward, or, later, parallel to the preceding one.

5. Tighten up the slack to the proper degree of tension.

6. Carry the bandage round the outer side and the back of the limb and transfer it to the other hand.

7. Let out a little more slack.

Again transfer the bandage to the hand



FIG. 6.—Soft Gauze Head Bandage.

first used and recommence the process. The left hand does more work in bandaging a right limb. The right hand does more work in bandaging a left limb.

All points of possible pressure where pressure sores might arise are to be covered with a good thick layer of Gamgee tissue. Note this especially with reference to the heel, the malleoli at the ankle, the head of the fibula, the great trochanter of the

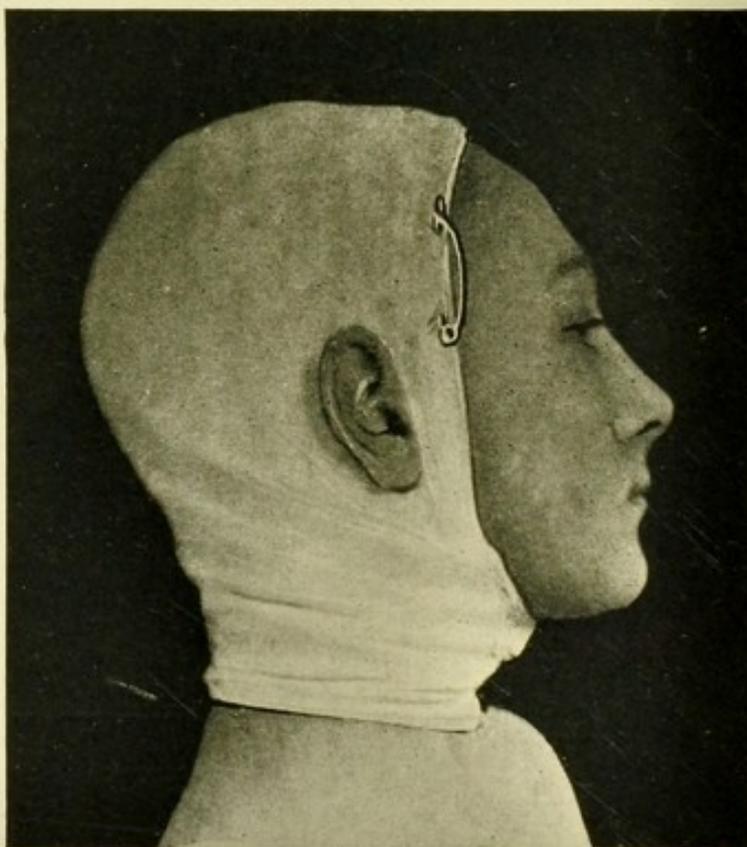


FIG. 7.—Soft Gauze Head Bandage.

femur, the anterior superior spine of the ilium, the sacrum and the epicondyles of the humerus.

All the fancy bandages formerly required for fingers, stumps, ankles, and heads are

now antiquated, rendered obsolete by the comfortable, readily applied, soft gauze bandage. It is absurd that a knowledge of them should be required of students at examinations.

The application of the soft gauze bandage to the head presents little difficulty. A bandage is chosen about 6 inches wide, and four sets of turns which overlap one another are made in whatever order comes most handily, till the vertex is completely covered in. The turns may be



FIG. 8.—Four-tailed Bandage. Note the position of the knot—well forward.

described as vertical, vertical oblique, horizontal, and horizontal oblique. The oblique turns pass from the chin to the supra-occipital region, and from the forehead to the sub-occipital region.

The edges of the horizontal and of the vertical oblique turns which at first cover in the eyes and the mouth are then pulled back into position and fixed there by safety-pins or with a running stitch, and, when the ears have been liberated, the end re-

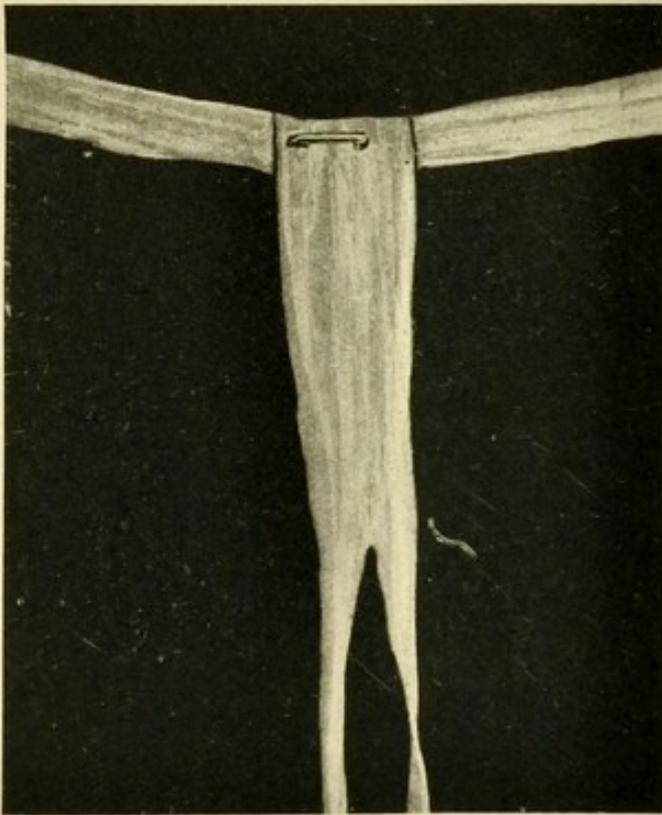


FIG. 9.—T-shaped Bandage.

sult appears as shown in the photographs. For ease of application and because of its comfort from the patient's point of view, this head bandage surpasses all others.

The hand-made bandages are at present superior to those obtainable in the market.

The four-tailed bandage, the T-shaped bandage, and the triangular bandage are often used, and the student must be familiar with them.

The **FOUR-TAILED BANDAGE** is used to retain dressings in position on the chin, and to support the lower jaw after it has been fractured or dislocated.

It is usually made of a four-inch calico bandage, and the diagram shows clearly the method of application. Note the aperture for the point of the chin, and that the four ends are tied off well forward on the crown of the head, where they can cause

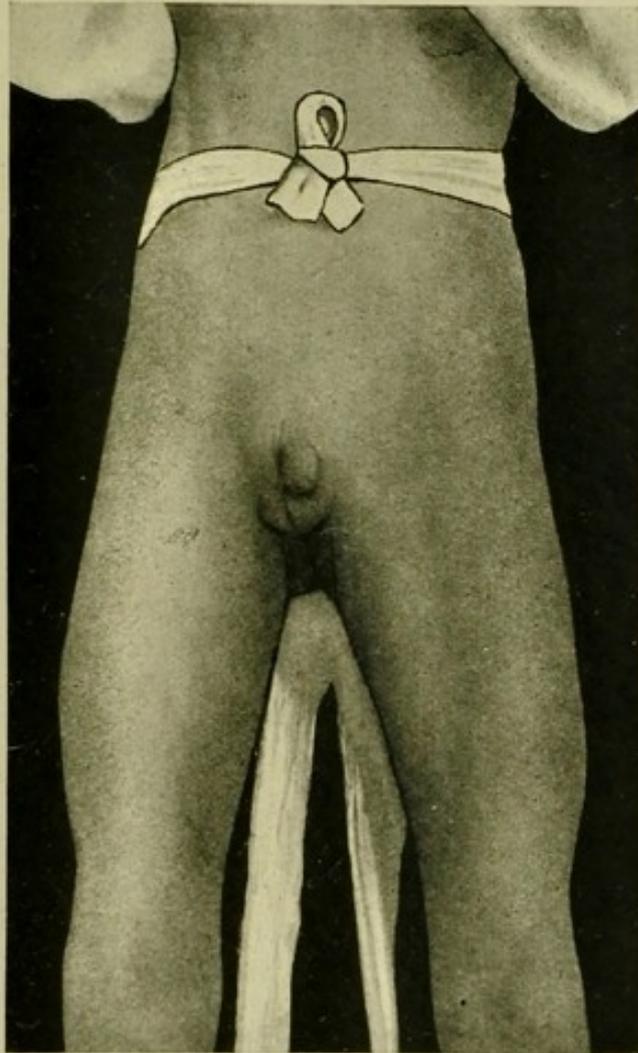


FIG. 10.—T-shaped Bandage.

the patient no discomfort when he is lying down.

The **T-SHAPED BANDAGE** is unequalled for keeping dressings well applied in the

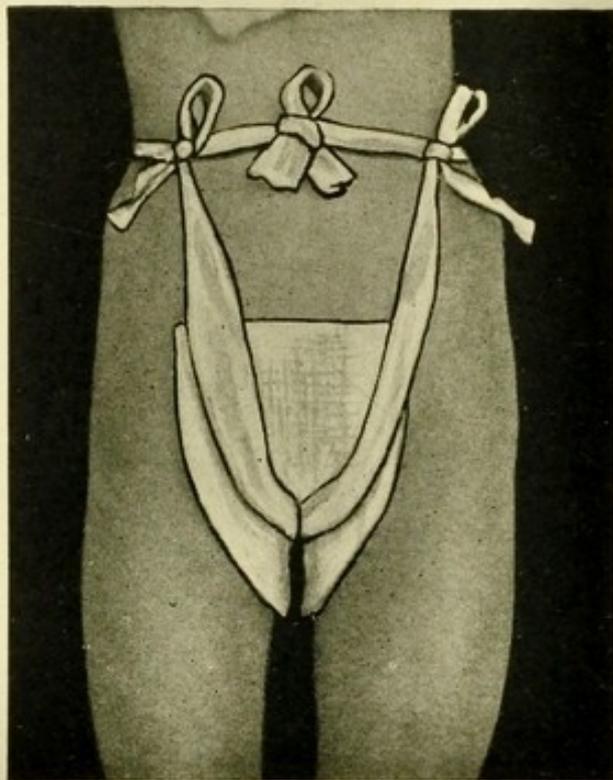


FIG. 11.—T-shaped Bandage. Fixing Dressing in Perineum.



FIG. 13.—Long Sling—Stage 1.

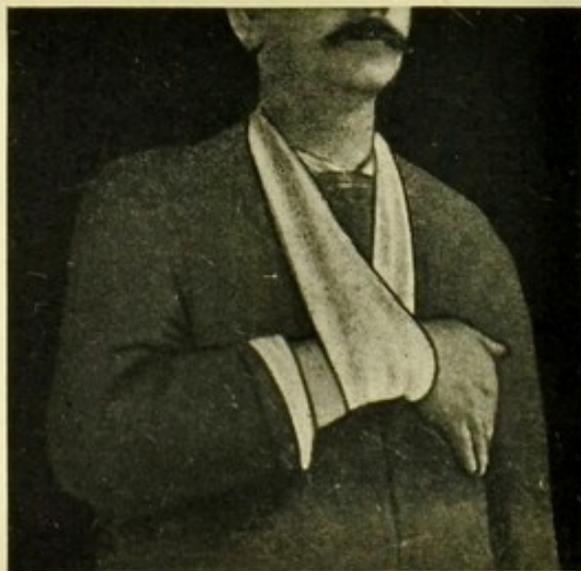


FIG. 12.—Short Sling.

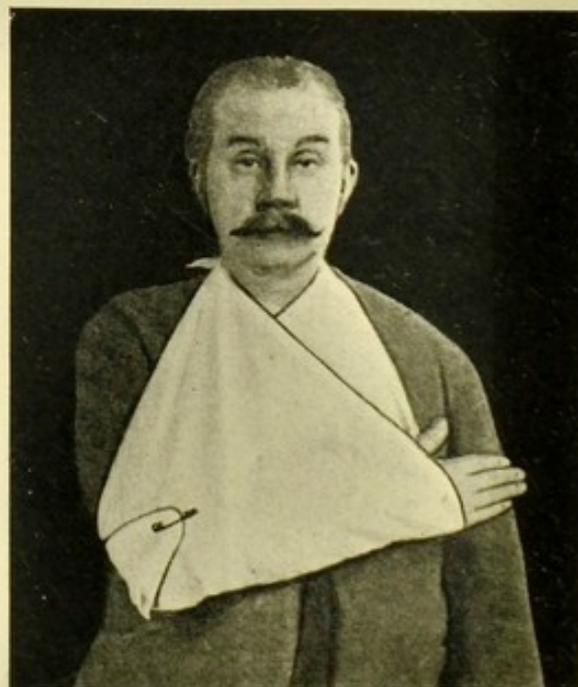


FIG. 14.—Long Sling—Stage 2. Elbow the lowest point.

perineum. The horizontal arms are first tied, and then the vertical limb is pulled taut before the ends are tied off, as shown in the diagram.

Those who are interested in what can be done with **TRIANGULAR BANDAGES** in covering in almost any part of the body are referred to books on bandaging.

In ordinary practice the triangular bandage is used mostly as a **SLING**, a **LONG SLING** or a **SHORT SLING**. In making a short sling the bandage is simply folded up, and the illustrations show how each form is applied. The long sling supports the weight of the whole shoulder girdle, pulls it upward; the short sling supports the wrist alone. Extension can still be applied at the elbow while the short sling is in use.

A "figure of 8" bandage applied at the shoulder or at the hip-joint is called a "**SPICA**." In applying the spica at the shoulder, let the arm be slightly abducted; and in applying it at the hip, let the thigh be slightly flexed. The illustrations show the end results obtained by following the rules already laid down.

When bandaging a hand, fingers, a foot,

or an amputation stump, a special method is applied, with slight modifications for each case. One generally has one's back toward the patient at the beginning of the procedure. A commencement is made not

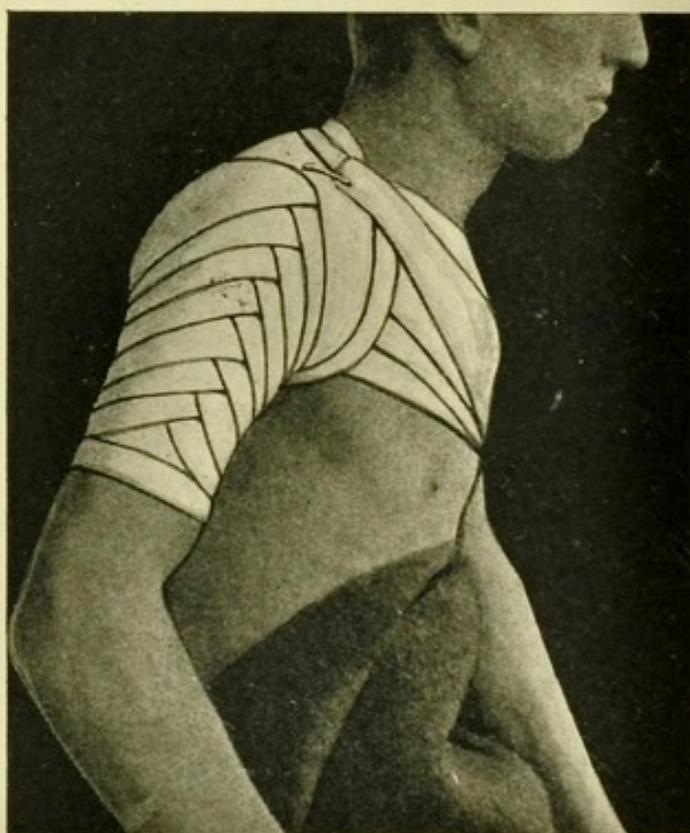


Fig. 15.—“Spica” of Shoulder.

at the periphery, but on the proximal side of the part to be bandaged; at the wrist or at the ankle in the case of the hand or the foot, and 8 or 10 inches up the limb in the case of an amputation stump.

Take the case of the toes as illustrative

of the method. A couple of horizontal turns above the ankle-joint serve to fix the bandage. The third turn passes

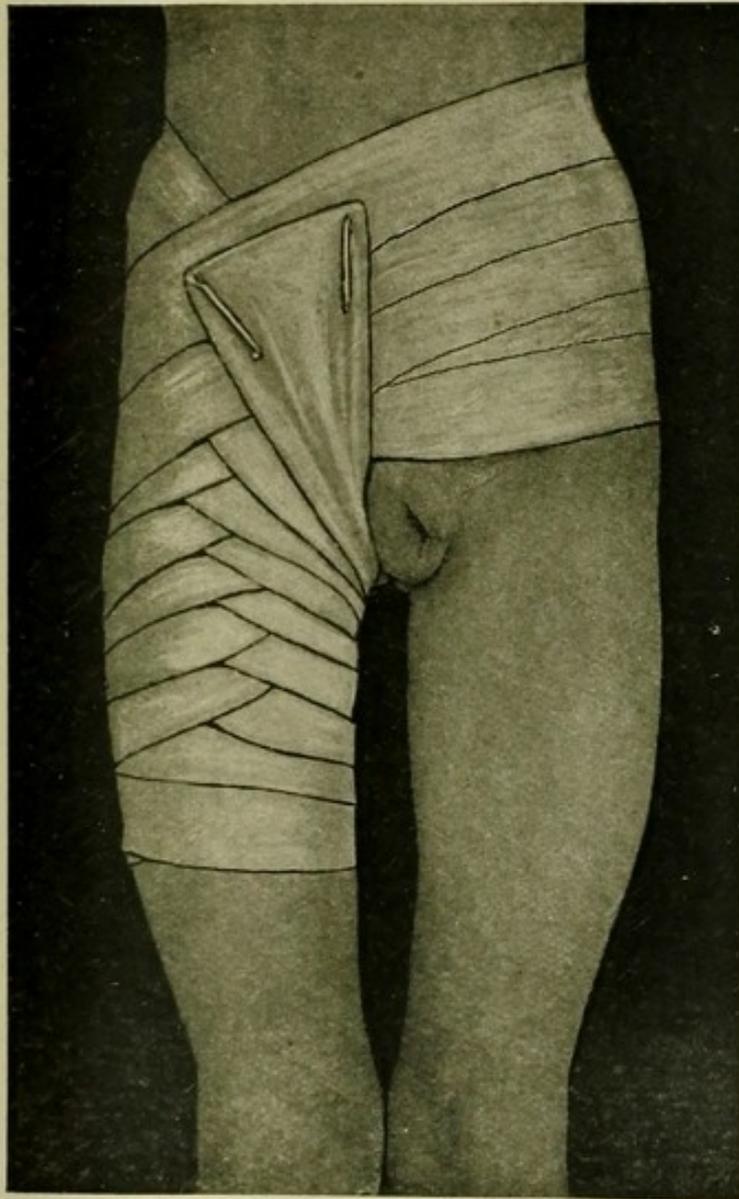


FIG. 16.—“Spica” of Hip.

obliquely across the front of the ankle and encircles the middle region of the foot. The drum of the bandage is then slipped

underneath the third oblique turn to give another fixation point, and a series of "loops" is made, each passing over the toes to beyond the middle of the sole of the foot, and being there reflected back over

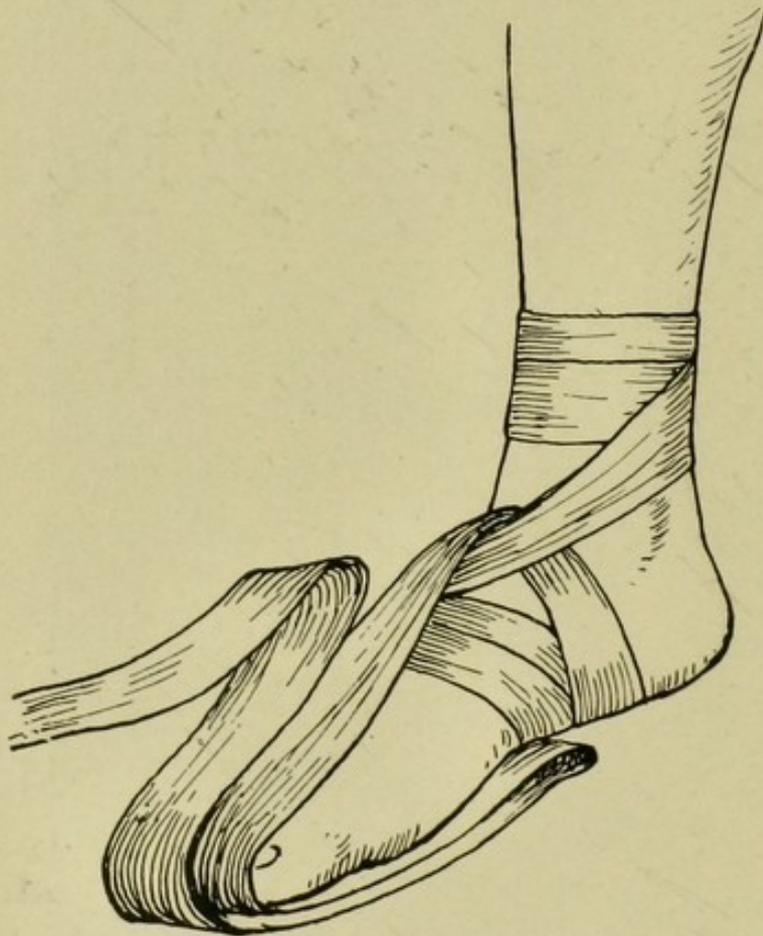


FIG. 17.—"Loops" covering in Toes.

the toes to the starting-point on the dorsum. Sufficient "loops" are made to cover the whole breadth of the toes, and then having tucked in the edges beneath a horizontal turn which just reaches to the ends of the

toes, one changes one's position, faces the patient, and commences an ordinary bandage, progressing centripetally. Before one reaches the ankle all the “ loops ” are covered in, and the bandage is fixed off by an oblique turn across the ankle and a turn or two above it.

The ELBOW must be bandaged in the position in which it is intended that it shall remain, flexed or straight. Never try to flex the elbow and to fix it in this position after it has been bandaged in the straight position ; the circulation will most certainly be interfered with.



FIG. 18.—Foot Bandage completed. “ Loops ” covered in.

Beware of applying bandages too tightly. Gangrene, pressure sores, or ischæmic paralysis may follow. If the patient complains that the bandages are too tight, note

the colour of the part distal to the bandage, test the arterial pulse there, and the capillary circulation under the nails, and,

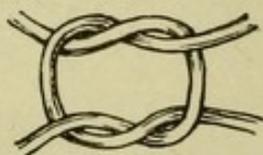


FIG. 19.—Granny Knot.

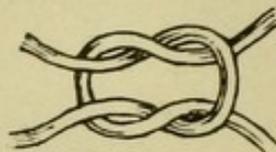


FIG. 20.—Reef Knot.

if the evidence is in the least doubtful, loosen the bandages at once. The criterion is the patient's comfort.

A knowledge of the "knots" illustrated will prove useful:—

GRANNY KNOT.

REEF KNOT.

METHOD OF FIXING TIES.

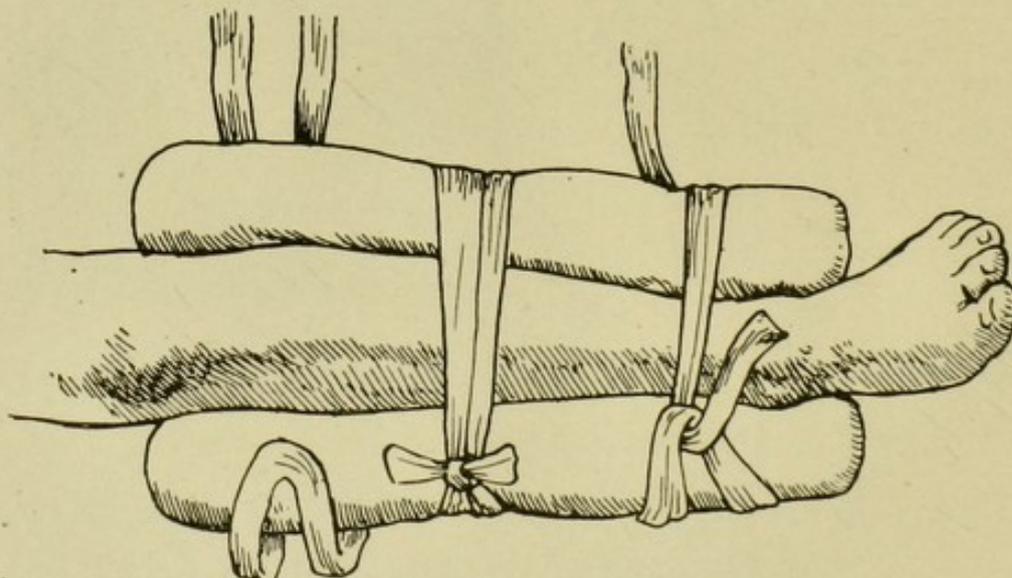


FIG. 21.—Method of Fixing Ties.

The CLOVE HITCH.—The clove hitch is

useful for the temporary application of extension. A good thick layer of Gamgee tissue should be placed next the skin before the hitch is pulled tight. The assistant who is applying the extension is able to get a better pull than if he were grasping the limb, and at the same time he is less in the way.

The simplest method of making the hitch is to make a couple of loops as one would do in coiling up a piece of rope, and then to slide the second loop behind the first one without any twisting. A reference to the diagram will make this clear.

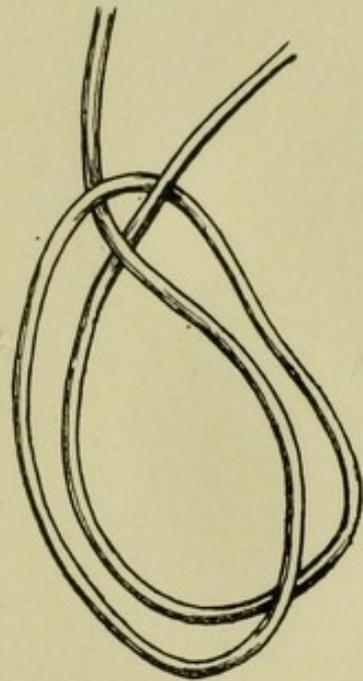


FIG. 22.—Clove Hitch.

PART II.—FRACTURES.

ARMAMENTARIUM.

THE Armamentarium of the practitioner for the treatment of simple fractures :—

METHYLATED SPIRITS.

A RAZOR.

DUSTING POWDER.

ADHESIVE PLASTER. The old extension plaster is seldom used. LEUCOPLAST has proved the least irritating and most satisfactory, but the ideal material for the application of extension is not yet available.

SOFT GAUZE BANDAGES.

STIFF GAUZE BANDAGES.

CALICO BANDAGES.

LINT.

GAMGEE TISSUE.

GOOCH SPLINTING.

PLASTER OF PARIS BANDAGES.

SPLINTS (to be made for each case as required).

A CROSS PIECE OR TWO.

SAND-BAGS of various sizes.

STIRRUPS.

WINDOW CORD.

PULLEYS.

WEIGHTS.

BLOCKS.

A CAGE OR TWO.

With such an outfit practically any simple fracture can be treated.

GENERAL CONSIDERATIONS.

Every practitioner ought to have at hand a supply of plaster of Paris bandages. It is better to buy the bandages ready made, and of those on the market the **LEICESTER PERFECT BANDAGE** is a most satisfactory

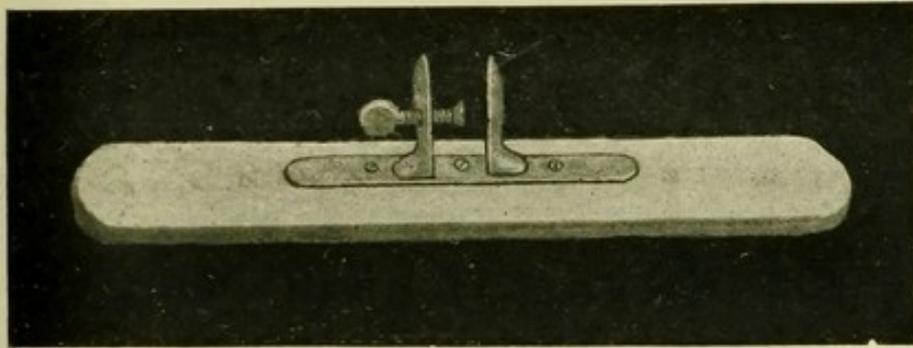


FIG. 23.—Cross Piece for steadying Splint.

one and will fulfil every requirement if used according to the instructions given.

The part to be bandaged should be prepared by being cleansed with spirit and then dried and dusted over with some powder.

Small pads should be placed over all bony prominences, and all the parts to be included in the bandage should be covered with two or three layers of soft gauze

bandage. The old-fashioned flannel band-

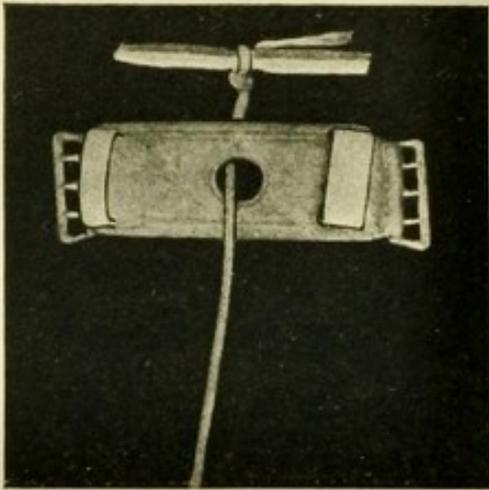


FIG. 24.—Stirrup.

age should be discarded altogether; it has too many disadvantages.

The plaster bandage tightens up a little as it sets, and so it must not be wound on firmly, but be smoothly applied by the pressure of its own weight, though without slackness. The upper and lower limits of the bandage should be overlapped by a layer of lint, so that no sharp edge will remain, and the finger should be run round between the skin and the lint to slightly evert the edges. The plaster may be strengthened, and less need be used if one or two thin strips of willow lath are inserted during the course of its application.

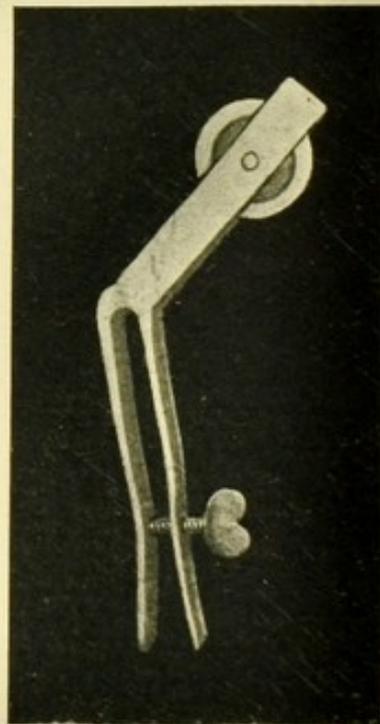


FIG. 25.—Pulley.

When the surface has been smoothed and is dry, the date should be written on.

TEMPORARY SPLINTS are advisable where an injured person has to be taken some distance to home or to hospital; but it is not necessary, once a patient is safely in bed, to immediately apply splints. This is a point in regard to which public opinion is not educated. It pays to keep the site of injury exposed at rest between sand-bags, to prevent movement, and for forty-eight hours to apply fomentations.

One cannot estimate the amount of swelling which will take place, nor can one tell in which case large vesicles will appear, and if splints are immediately applied without waiting for the appearance and commencing abatement of the swelling,

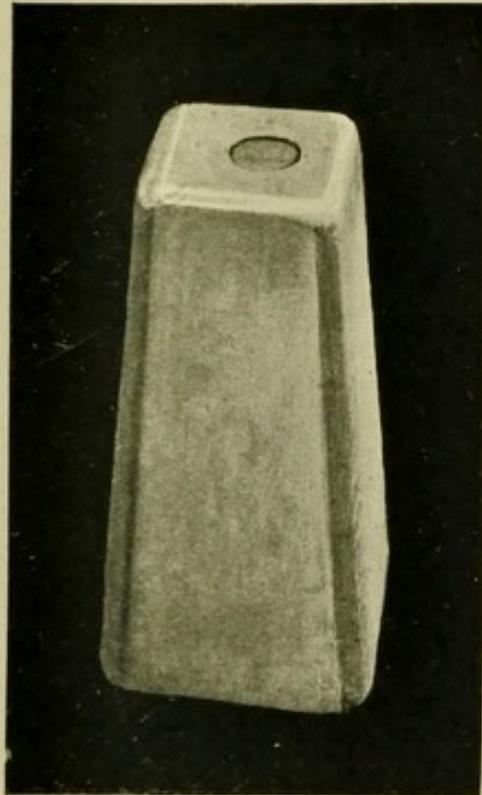


FIG. 26.—Block.

then the increasing discomfort of the patient will demand the taking down of the splints if a catastrophe is to be averted.

The proper line of treatment, then, for simple fractures is to treat any shock from which the patient may be suffering, to give a sedative if necessary, and, having placed the limb in a comfortable position and used sand-bags and ties to keep it there, to aid in the dissipation of the swelling which always appears, by means of fomentations, and two or three days later to proceed to the proper splinting, making use of an anæsthetic.

The X-RAYS and X-RAY PHOTOGRAPHS are invaluable in the modern diagnosis and treatment of fractures, but they are not indispensable, and compared in value with a general anæsthetic they clearly take a second place. The student and the general practitioner, away out of the range of an X-ray installation, should have no doubts about this.

One might almost say that for the proper

diagnosis and treatment of fractures AN ANÆSTHETIC ought to be used in every case where its use is not contraindicated from the patient's point of view. Then when good relaxation is obtained, if the practitioner gets good crepitus, apparently correct measurements, and a normal appearance so far as the eye can judge after the fragments have been manipulated into position, he may anticipate a very large proportion of "perfect" results.

The great majority of bad results which come to hospital for further treatment are cases which were not examined or fixed up under an anæsthetic when first treated.

Where there is danger of a spicule of bone projecting through the skin, and so of a simple fracture being converted into a compound one, the area should be sterilised, probably best by the iodine method which causes the patient no distress, and then covered over with sterile gauze. Manipulation without or with an anæsthetic should be carried out at once to obviate the danger; for a slough is almost certain to form if the condition is clamant, and the

fracture will then also be transferred into the more dangerous category.

Always compare the damaged side with the sound side in any doubtful case.

Examine for nerve lesions the first time the patient is seen, especially in fractures of the upper limb.

The late appearance of marked ecchymosis is suggestive of persistent oozing from gaping unretracted bone vessels.

Gooch is probably the best material to have at hand for making splints for emergency work.

When making a splint or having a splint made see that exact measurements are first taken and that the splint conforms to them, otherwise the patient cannot be comfortable.

Instructions will be given in each case for proper measurements. The edges and corners of the splints are to be rounded off, and the surfaces must be free from rough places and projecting points of nails.

The splint is to be padded smoothly and evenly, and with extra pads opposite all possible pressure points. The padding is to be fixed to the splint by means of a loose, soft gauze bandage. The best material to use for padding is Gamgee tissue. Wool wears thin at places, gets lumpy, and is altogether unsatisfactory. Tow is an abomination when used for this purpose.

When two or more splints are being used they must be held by an assistant in

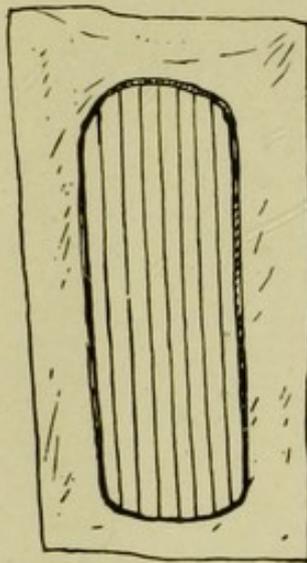


FIG. 27.—Gooch Splint prepared and Gamgee Padding.

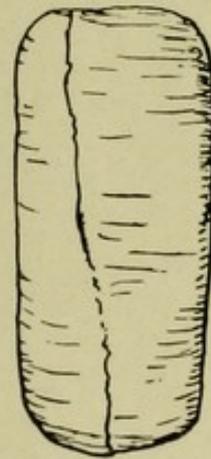


FIG. 28.—Splint ready for use.

their proper position whilst the ties which are to keep them in that position are being fixed.

The centre tie is first made fast and then the end ones. If the splints have been properly padded and held in position while the ties are being fixed, the three ties do all the fixation required, and the bandage

put on over all is more for ornament than for use. The knots of the ties should be all in a line, accessible and resting against the splint, not against the patient's limb.

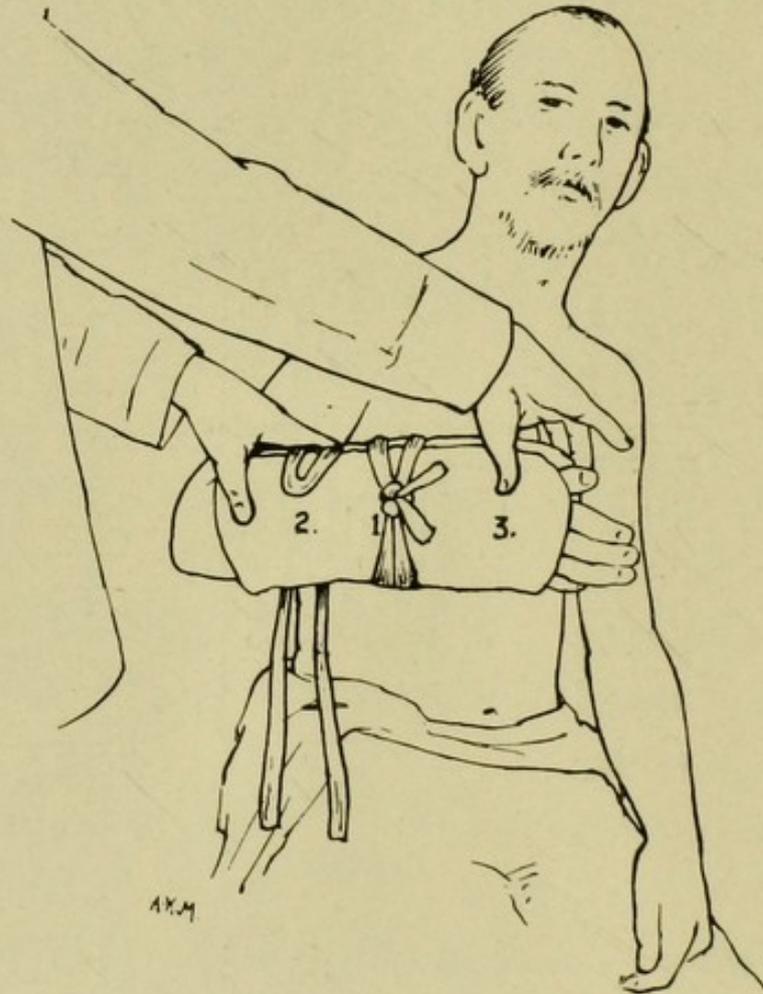


FIG. 29.—Splints being held in position whilst Ties are being fixed.

FRACTURES OF THE HAND AND WRIST.

Fractures of Phalanges.—These are common, and are usually the result of direct violence. The patient gives a clear story of the accident. Pain, redness

(ecchymosis), and swelling are present; therefore, the condition may be carelessly diagnosed as a whitlow. To incise the finger is to court disaster by converting a simple fracture into a compound one.

The diagnosis is made then from the history, the appearance, and the presence

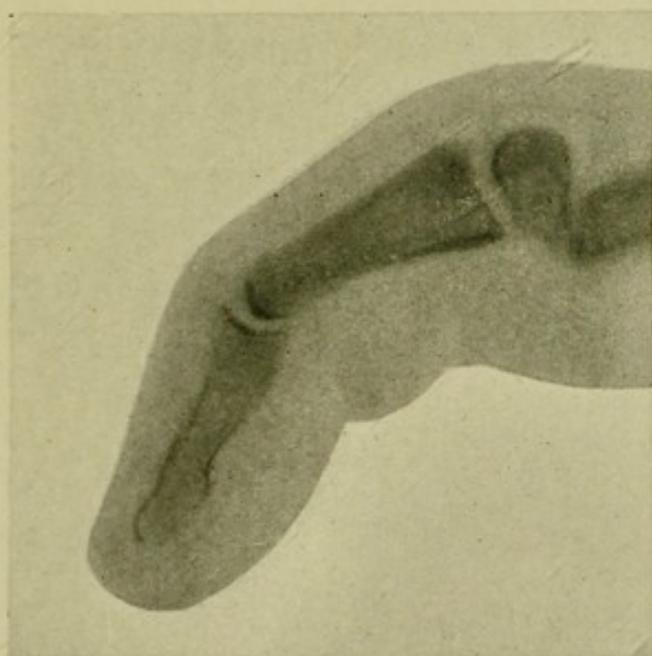


FIG. 30.—Fracture simulating Dislocation.

of crepitus. An X-ray photograph is also useful when the fracture is near one of the joints, as the condition then may simulate a dislocation.

Treatment.—It is usually easy to correct the deformity by manipulation. An anæsthetic is advisable where there is any

difficulty. When good position is obtained, prepare the skin and splint the finger :—

(1) On an anterior gouch splint ; or
(2) on a soft metal gutter splint ; or (3)
without apparatus, by making use of the
adjoining finger or fingers as lateral splints.

Splint the finger for from two to three weeks, but not longer, lest stiffness should result. Complicated apparatus for keeping up extension are generally futile and unnecessary if the primary displacement has been properly overcome.

Fractures of Metacarpals.—These cases are common, and the diagnosis is not always easy. There may be little displacement, and where one suspects a fracture its presence may be later confirmed by ecchymosis and callus formation. There are two tests for doubtful cases :—

(a) Pressure transmitted along the rigid straight finger towards the hand. This elicits pain at the site of fracture. Tenderness at the painful spot confirms the diagnosis.

(b) The appearance of the hand when the fingers are flexed. There is difficulty in closing the hand firmly, and there is a

marked depression of the knuckle corresponding to the fractured metacarpal bone.

Treatment.—Manipulation with or without an anæsthetic so as to get the line of the knuckles correct, thus making certain that there is no projection of bone towards the palm of the hand. The fragments are to be re-

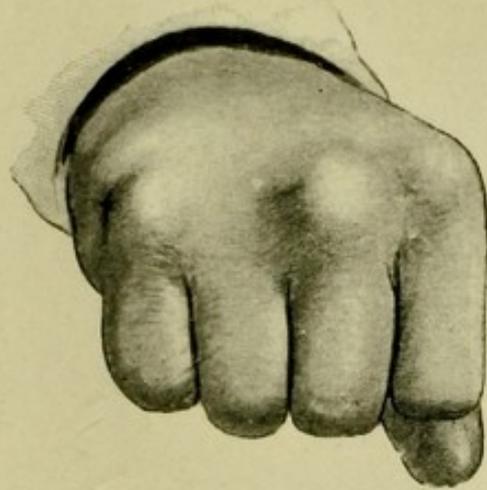


FIG. 31.—Fractured Metacarpal.

tained in position by means of a roller bandage

grasped by the fingers and pushed up into the palm. The hand must first have been carefully prepared. Over all a firm bandage is applied, to be

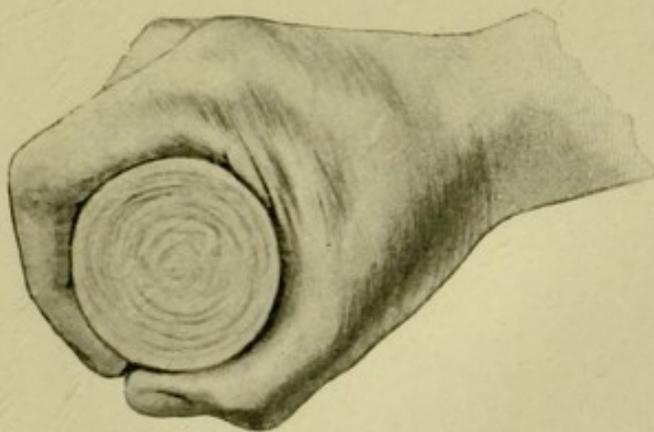


FIG. 32 —Hand bandaged round Roller Bandage.

renewed once or twice during the next two or three weeks.

Bennett's Fracture.—A fracture of the

base of the thumb metacarpal, which is frequently mistaken for a bad sprain of the thumb. Where crepitus is obtained, or where an X-ray photograph or the appearance of much ecchymosis confirms the diagnosis, the thumb should be fixed up in a position of extreme abduction, either on a splint shaped so as to produce this effect, or else in a casing of plaster of Paris applied while the thumb is held in the desired position.

The fracture apparatus should not be removed till the end of the third week, and then massage, manipulation, and bathing in hot water should be commenced.

Fractures of Carpal Bones.—These are not uncommon. The SCAPHOID is the one most frequently damaged. Displacement of the fragments may lead to deformity about the wrist and cause nerve lesions from pressure. Such cases demand open operation early. Most cases are passed over as bad sprains of the wrist, and where there is any suspicion an X-ray photograph ought to be obtained. Both wrists ought to be taken on the same plate and in the same position. This allows of comparison

and excludes certain well-known errors. The best position in which to have the photograph taken is with the hand pronated and carried as well as possible over towards the ulna. This is especially useful with reference to fractures of the Scaphoid. It produces the widest possible separation of the fragments if there be a fracture.

Tenderness and crepitus obtained in the "anatomist's snuff-box" indicate a fracture of the Scaphoid.

The treatment in uncomplicated cases is to fix the hand on a pistol or other splint, pronated and carried as far as possible towards the radial side of the forearm. When pain persists after many weeks and the function of the wrist is much impaired, open operation is indicated with removal of the fractured bone entirely or in part.

Colles' Fracture.—This very common fracture is usually obtained by a heavy fall on the heel of the outstretched hand. The RADIUS is fractured at a point within an inch and a half of its lower end, and the lower fragment is carried upwards (along the line of the radius), and backwards. There results a tilting of the hand towards

the radial side of the forearm. The upward displacement often produces an impaction, the hard, dense lower end of the upper fragment being driven into the cancellous lower fragment.

There is quite commonly a fracture of the styloid process of the ulna or a rupture of the ligaments in its neighbourhood. Even where impaction takes place there is usually a typical deformity, the "SILVER FORK" DEFORMITY produced by the dorsal

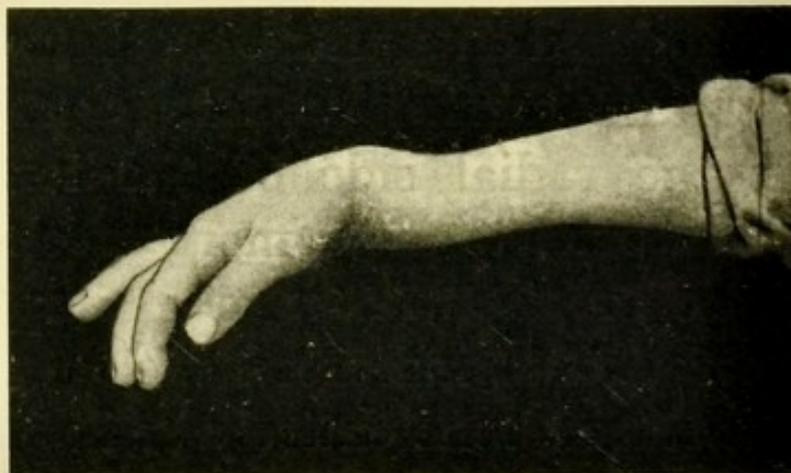


FIG. 33.—Colles' Fracture.

projection of the lower fragment and the palmar projection of the lower end of the upper fragment. When there is any doubt test the relative positions of the radial and ulnar styloid processes; normally the radial one is at a slightly lower level than the

ulnar one. Where a fracture is present the radial styloid is carried upward along with the lower fragment, and so the relationship differs from that on the sound side.

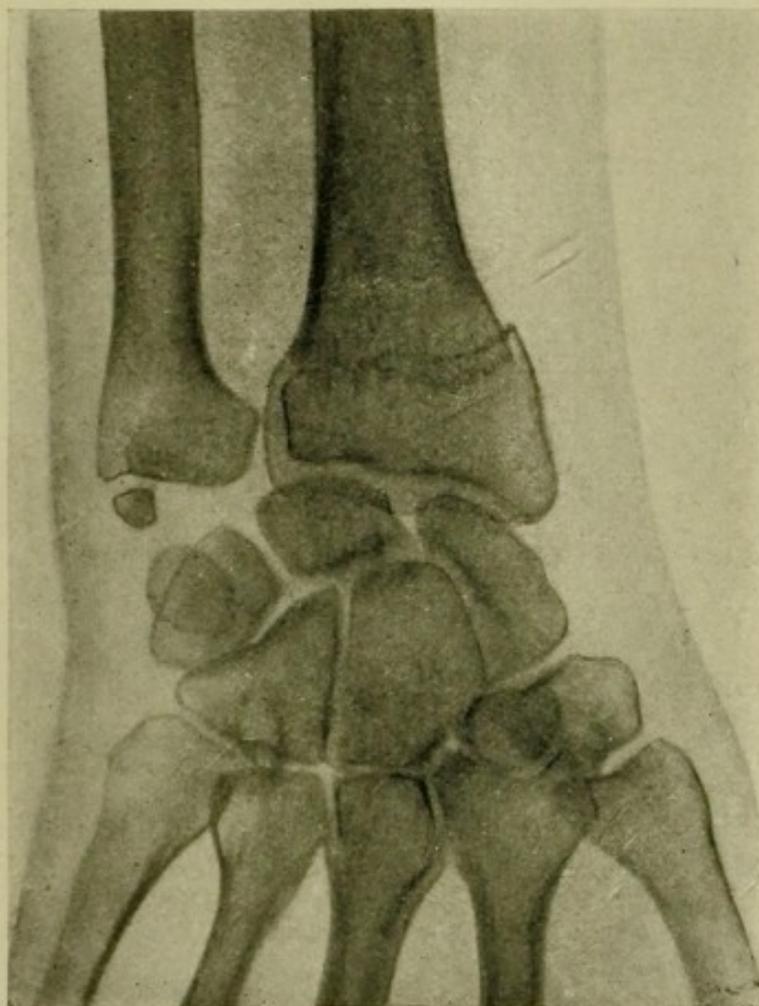


FIG. 34.—Impacted Colles' Fracture.

In all cases, for diagnosis and for treatment, an anæsthetic is desirable and almost imperative.

Let the part be fomented and kept at rest for three or four days till the swelling

subsides, and then, having had the patient anæsthetised, proceed to correct the deformity.

1. Overcome the upward displacement of the lower fragment by extension.

2. Correct the radial displacement of the hand by traction towards the ulnar side whilst extension is also being applied.

3. Manipulate the dorsally displaced fragment into position.

One may require to use a Thomas' wrench to get proper reduction of an impacted Colles'.

It required great violence to produce the deformity, and, fortunately, when once it is thoroughly overcome, there is little tendency for the displacement to recur.

Further treatment is based on this fact and on the great desirability of not permitting the fingers to stiffen as the result of too long retention in splints.

Carr's splint has become a fetish in these cases, and it tempts practitioners to fix up the arm without having first thoroughly reduced the deformity. It should therefore be thrown aside as it does not possess supreme advantages.

If the patient be under daily observation let the arm and forearm be comfortably bandaged to the side and let the wrist be suspended across a short sling. The desired tilt of the hand towards the ulnar side of the arm will thus be obtained and maintained. At night a binder may be applied over all so as to prevent undue movement of the hand.

A Colles' fracture so treated will give a good result in a minimum time, and there is no danger of the fingers becoming stiff.

When the patient is only seen once a week or so some fixation apparatus had better be applied. Use two light well-padded splints, not necessarily reaching so far up the arm, but made and applied according to the instructions given in detail under the treatment of fracture of both bones of the forearm. The splints ought to be taken down once a week, and reapplied after massage. They may be left off after three weeks.

This line of treatment will give good results in a class of case where too often one sees as an end result an unsightly appearance and impaired function.

Nothing is so important in these cases as thorough reduction of the deformity under an anæsthetic within a week of the accident.

Chauffeur's Fracture.—A fracture of the

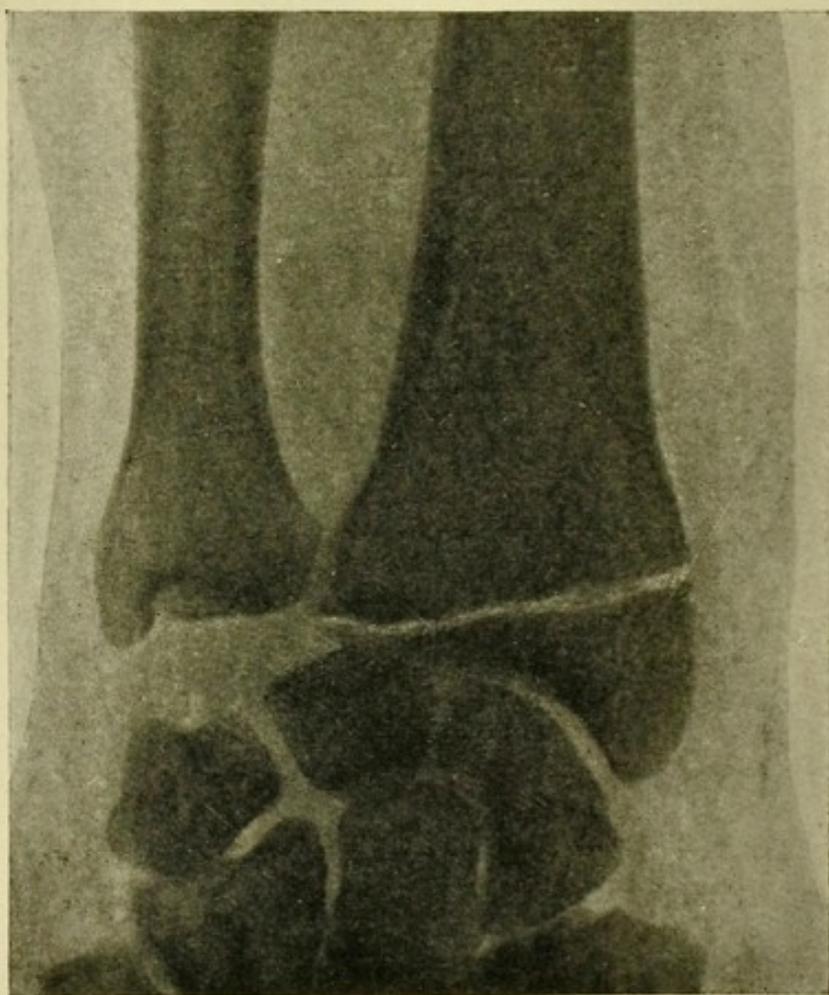


FIG. 35.—Chauffeur's Fracture.

lower radial expansion got by direct violence. Treat with splints as directed in the case of a COLLES' fracture. A CARR'S splint is altogether contraindicated. The diagram shows this clearly, as its use

would lead to wide separation at the line of fracture.

FRACTURES OF THE FOREARM.

A fracture of one bone is not a serious affair. It is usually got by direct violence. The uninjured bone acts as a lateral splint, and if the arm is comfortably fixed as for a fracture of both bones, healing takes place without much trouble in a few weeks.

Where the fracture in the **RADIUS** is situated higher than the insertion of the pronator radii teres muscle, it may be necessary to fix the arm up in a position of complete supination, since the lower fragment will be completely pronated, while the upper fragment will be supinated. The greater is brought into line with the lesser, since one cannot overcome the action of the supinator brevis muscle as one can that of the pronators. A posterior rectangular splint with an anterior splint for the forearm is the proper apparatus for the treatment of such a case.

A fracture of the head of the radius

is probably best treated by early open operation.

Suspect a fracture of the CORONOID PROCESS when a dislocation of the elbow recurs easily after reduction. Treat the condition by fixing the arm up in a position of full flexion after reduction of the dislocation.

A fracture of the OLECRANON is best treated by means of a long anterior splint. One may try to bring the small fragment down into place by means of adhesive trapping or a "figure of 8" bandage, but if when the arm is fully extended there is a definite gap which cannot thus be overcome, then the proper line of treatment is open operation if bony union is to be obtained.

Fixation apparatus may be discarded after the fourth week, but no violent effort to flex the elbow should be permitted for a few weeks longer.

FRACTURE OF BOTH BONES OF THE ARM requires most careful consideration, since cross union, non-union, and vicious union are too frequent end results.

RULES.

1. Apply the splints when the arm is in a position of semi-pronation. The bones are then farthest apart.

2. Avoid all lateral compression which will tend to push the bones into close apposition. Effect this by—

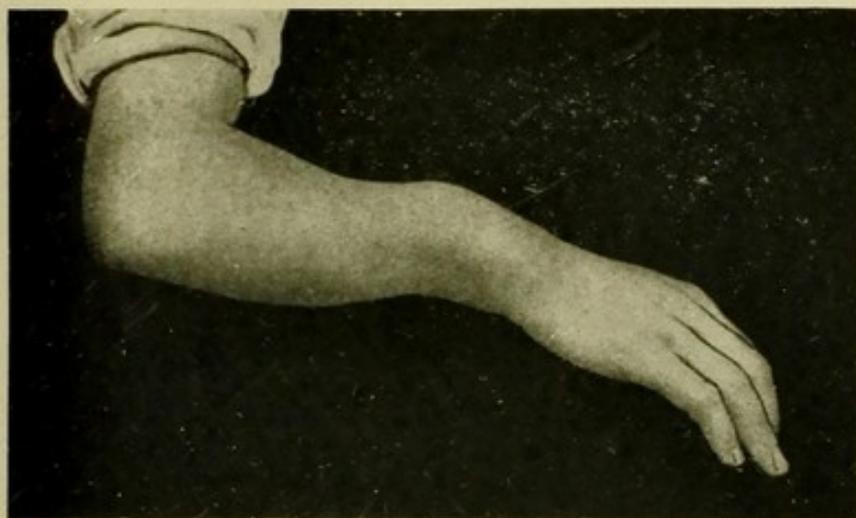


FIG. 36.—Vicious Union. Fracture of both bones.

(a) using rigid splints ;

(b) making the breadth of the splints greater than the greatest breadth of the arm. Then the ties and bandages will pass from one splint to the other without touching the arm.

3. The length of the splints :—

The outer splint when padded is to reach

from the external epicondyle of the humerus to the line of the knuckles.

The inner splint when padded is to reach from just in front of the bend of the elbow (so as to allow of free movement at the joint) to the middle of the palm of the hand.

The fingers are thus left free and can be constantly exercised.

The rule is to take these two measurements and allow from half an inch to an inch according to the length of the arm.

4. All the edges and corners of the splints are to be rounded off.

5. The splints are padded with a good smooth overlapping layer of Gamgee tissue fixed to the splints by a soft gauze bandage.

The Gamgee should be previously well puffed out (by heat).

6. When all deformity has been reduced and the arm looks exactly like the sound one, the splints are to be placed in position and held there steadily by an assistant while the ties are being fixed.

7. The ties should be made of calico and are to be firmly fixed, the middle one first, then the top one, and finally the lowest

one. If the splints are properly padded there is little fear of making the ties too tight.¹ If the splints are held carelessly while the ties are being fixed, the upper edges of the splints will tend to approach, or the lower edges will slope towards one another and the splints will not lie parallel as they ought to do.

8. Over all fix a neat calico bandage and give the patient a long sling.

Remove the splints in ten or fourteen days, and thereafter once a week for massage and refixation after the skin has been attended to.

One should get good healing in from four to six weeks, and thereafter the splints may be discarded.

FRACTURES OF THE UPPER ARM.

Fractures at the lower end of the humerus and separation of epiphyses there, are common, and they give much trouble.

One or other condyle may be knocked off or the line of fracture may be T-shaped or V-shaped.

¹ The knots of the ties should be all in a line, easily got at, and against one of the splints.

The line of the joint surface becomes altered, and

if the inner epicondyle slips upward, or) a CUBITUS
if the outer epicondyle slips downward,) VARUS results.

while

if the inner epicondyle slips downward,) a CUBITUS
or if the outer epicondyle slips upward,) VALGUS results.



FIG. 37.—Fracture dislocation elbow.

An ugly elbow with impaired usefulness, the so-called “gun-stock” arm, is the conclusion of such a case.

Further, a small loose fragment may slip in between the articular surfaces and produce a locking of the joint, and a like interference with free flexion and extension may result from excessive callus formation leading to a filling up of the olecranon and coronoid fossæ.

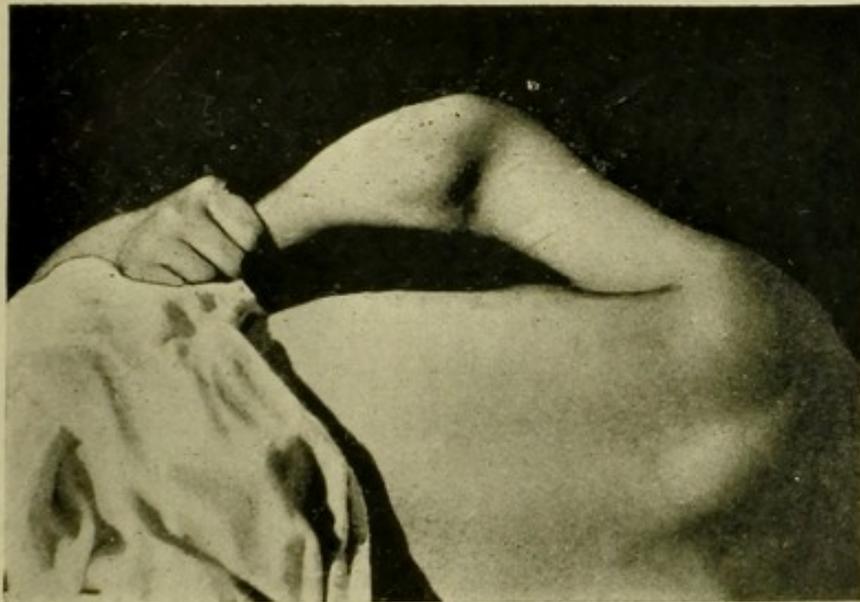


FIG. 38.—Fracture dislocation elbow.

It is important, therefore, in these cases that a most complete examination should be made, and this cannot be done unless the patient is anæsthetised and a complete relaxation obtained. When this is done, if it is possible to fully extend the arm and by manipulation at the elbow to get it into an apparently normal position, and if

thereafter it is possible to fully flex the arm up to an acute angle, then in every such case a good result as regards function and appearance will be obtained if the arm is fixed up by means of plaster of Paris bandages in a position of extreme flexion of the elbow-joint, with the forearm supinated and so kept for four or five weeks. This procedure should not be carried out for a few days after the injury, till the swelling is commencing to abate ; and one must pay particular attention to the radial pulse, which will be at once affected if the flexion be too extreme, or if too many layers of gauze be allowed to slip into the bend of the elbow. The gauze bandage is to be applied with the arm already flexed. If, however, it becomes clear on manipulation that there is a small loose fragment in the joint, then the case is one for open operation.

Where the fracture is a T-shaped one or a simple transverse one, there is usually a backward dislocation of the condyles and the forearm, while the lower end of the humerus projects forward. Backward traction must therefore be applied to the

lower end of the humerus while the arm is being extended, and then flexed, for, unless that is done, good flexion cannot be obtained. If, however, after applying traction as directed, flexion to the required extent can then be obtained, one may be certain that the forward displacement is overcome, and that the parts are in relatively good position; and one may then proceed to encase the arm in plaster.

If the fracture be a "flexion fracture," the line of fracture running from behind obliquely forward and upward, then flexion will tend to produce separation of the fragments, and such a fracture would more properly be treated in a position of extension.

In regard to fractures of the lower end of the humerus, it is most true that there is no line of treatment proper to every fracture, and each individual case requires individual treatment. Examination under an anæsthetic will, however, at once eliminate those cases to which the usual line of treatment in the position of marked flexion is inapplicable.

Good healing is usually obtained in

about six weeks. It may be necessary after a few weeks more to anæsthetise the patient for passive movement of the elbow-joint, but this need not be done too soon, and it is better to get the elbow gradually extended by making the patient carry weights.

All fractures of the **SHAFT** of the **Humerus**, and of the **SURGICAL NECK** of the **HUMERUS**, should be treated by means of a **MIDDELDORPF'S TRIANGLE**. Every student and practitioner should be perfectly familiar with this most useful apparatus. It will give a good result in every case where it is properly applied. It is most comfortable in spite of its cumbersome appearance, and the patient while wearing it is able to walk, to sit, and to lie down without discomfort when the splint fits properly. It fixes the shoulder and elbow-joints, and fulfils every canon required of a satisfactory apparatus.

The proper measurements are arrived at thus. (Make them on the sound side.)

The patient sits towards the edge of a chair, with the tips of the fingers touching

the chair and the hand applied to the body between the crest of the ilium and the great trochanter of the femur. The side of the chest, the inner aspect of the upper arm, and the front of the forearm down to the wrist then form the boundaries of the triangular space into which the padded triangle is to fit.

Take the measurements accordingly, and allow a little for the padding. One is more apt to make the triangle too big than too small.

(*a*) From the lower border of the pectoral ridge, when the arm is in position, to the point at which the heel of the hand is in contact with the body.

(*b*) From the lower border of the pectoral ridge, when the arm is in position, to a point where the biceps tendon is felt standing out as a ridge in front of the elbow-joint.

(*c*) From the bend of the elbow to the heel of the hand.

The side of the triangle next the body is prolonged several inches so as to let the hand rest against it.

Such a triangle can be used for either side. Sometimes holes are drilled for the

attachment of the ties, and they are convenient, though not necessary.

The splint is padded with Gamgee tissue, and a double layer is placed over the angle which presses into the axilla.

Ties are made of a calico bandage, and

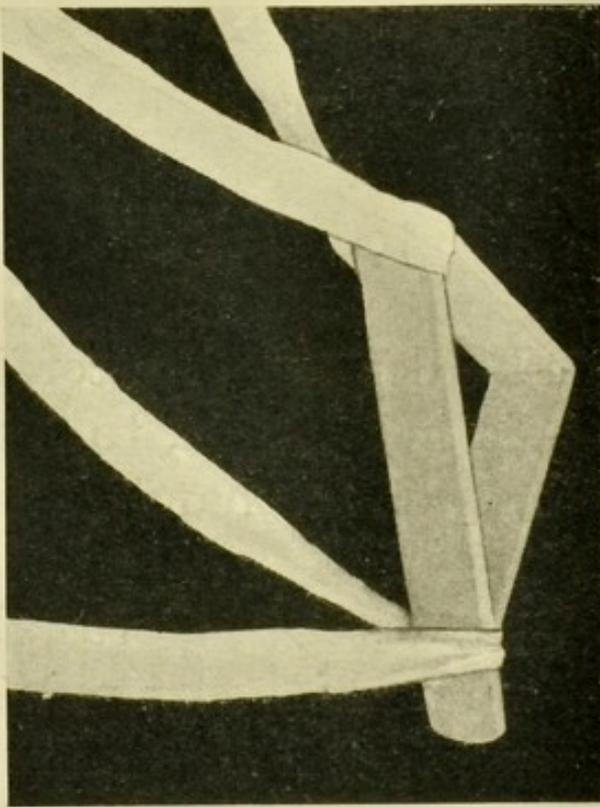


FIG. 39.—Middeldorpf's Triangle with ties.

are attached to the splint at the axillary angle and at the prolongation beneath the hand.

The ties may be applied either before the splint is padded, or after.

The upper tie crosses like a "figure of 8" over the prox-

imal shoulder (protected by a layer of Gamgee tissue), and is tied in the opposite axilla, likewise protected.

The lower tie is carried up across to the distal shoulder, and knotted there over a piece of protecting Gamgee tissue.

A narrow binder or a broad calico bandage is then wound round horizontally, drawing the base of the triangle into close apposition with the body.

When the apparatus has been thus applied, and the arm laid over it, the fragments of the humerus are manipulated into good position, and an outer splint of gooch, padded and with the oil-cloth side next the arm, is laid over the region of the fracture. It is fixed by means of three ties, and thus the immobilisation of the upper arm is completed. A bandage is applied over all, and a second one is used to keep the fore-arm and hand in apposition with the splint. This bandage can be removed as often as one wishes for massage of the forearm and movement of the elbow-joint, without disturbing the fixation apparatus of the

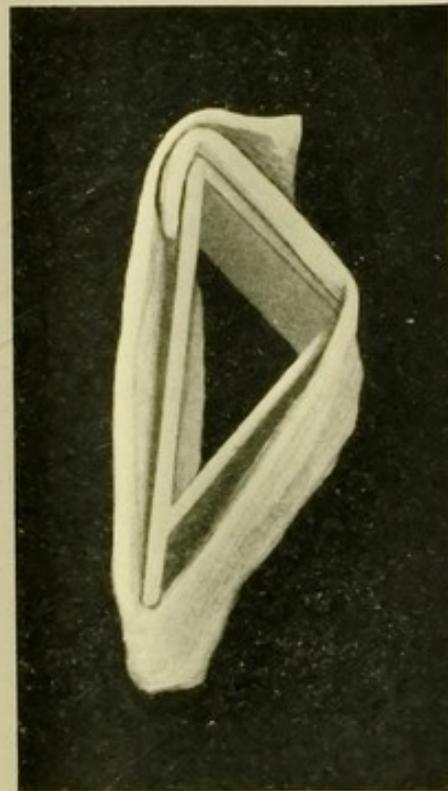


FIG. 40.—Middelдорpf's Triangle properly padded.

humerus. The fingers are free all the time and can be constantly exercised.

Good union is usually obtained in from five to seven weeks, and thereafter the splint may be left off.

In examining every case of fracture of

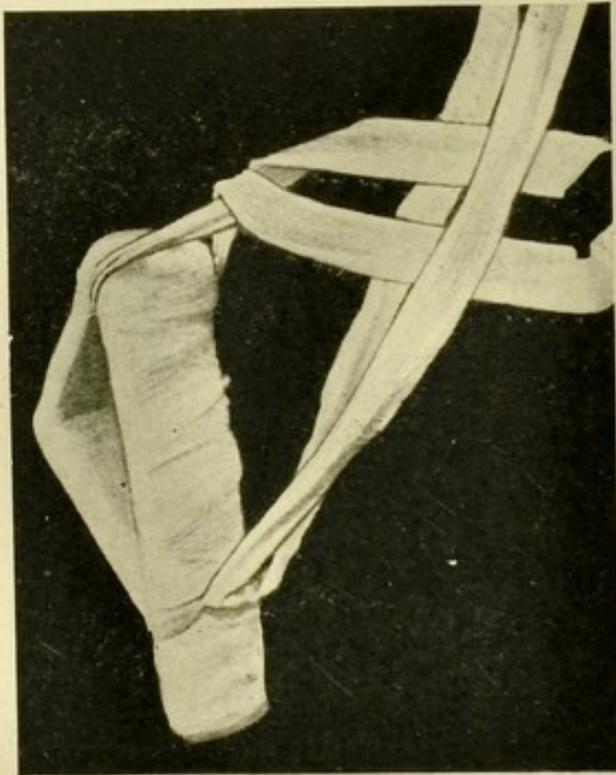


FIG. 41.—Middeldorpf's Triangle ready for use.

the humerus, make sure of the condition of the musculo-spiral nerve the first time the case is seen.

Fractures of the ANATOMICAL NECK of the Humerus must not be treated with a Middeldorpf's triangle, as the presence

of the angle in the axilla will tend to separate the head from the shaft. These fractures should be treated by—

1. Shaving the axilla and cleansing it.
2. Applying a protecting layer of lint over the chest wall.

3. Closely binding the upper arm, the forearm, and the hand to the chest wall.

4. Fixing a poro-plastic or a plaster of Paris shoulder-cap and keeping the part at rest for four to six weeks. Movement

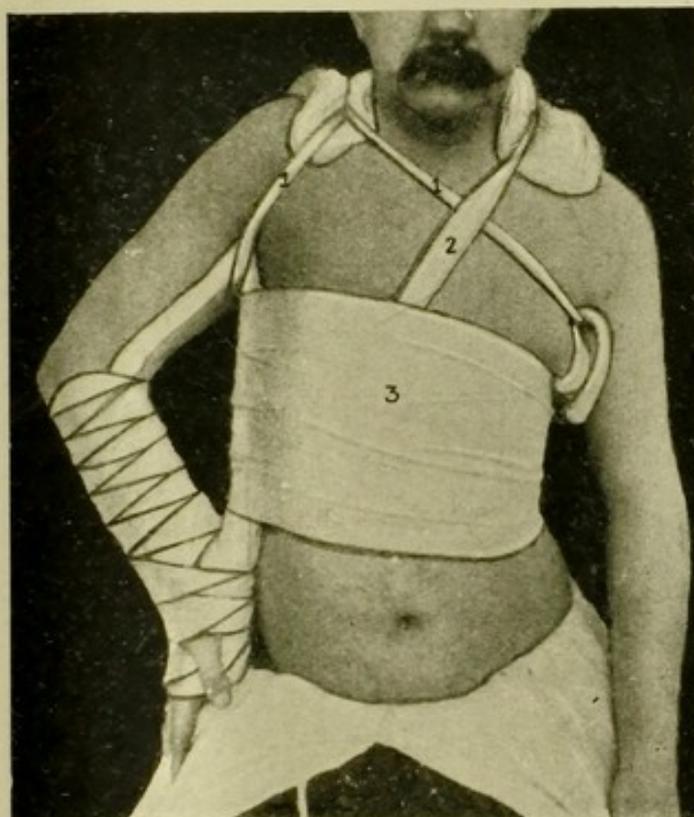


FIG. 42.—Stage 1 of application.

of the elbow and massage of the forearm may be commenced in the third week.

Where good crepitus has been obtained before the application of this method, one may anticipate a good result ; but if crepitus

cannot be got, the case should be referred to a surgeon for X-ray examination and open operation, if it be found that there is a complete rotation of the head, which is

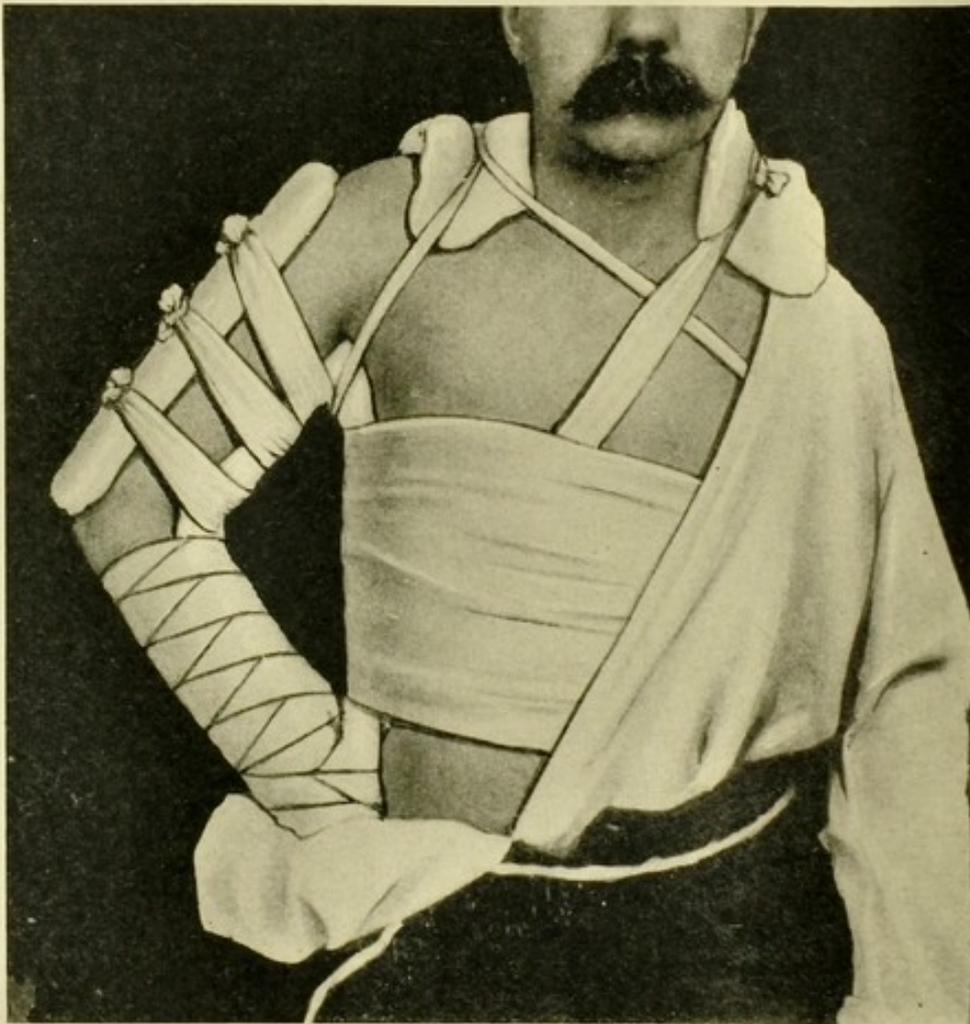


FIG. 43.—Stage 2 of application.

then cut off from all blood supply, and acts as a loose foreign body in the joint.

Fractures of the SCAPULA are to be treated by immobilisation of the whole

shoulder girdle and upper arm with firm bandages, except in the case of fracture of the neck of the bone, which should be referred to a surgeon for more special

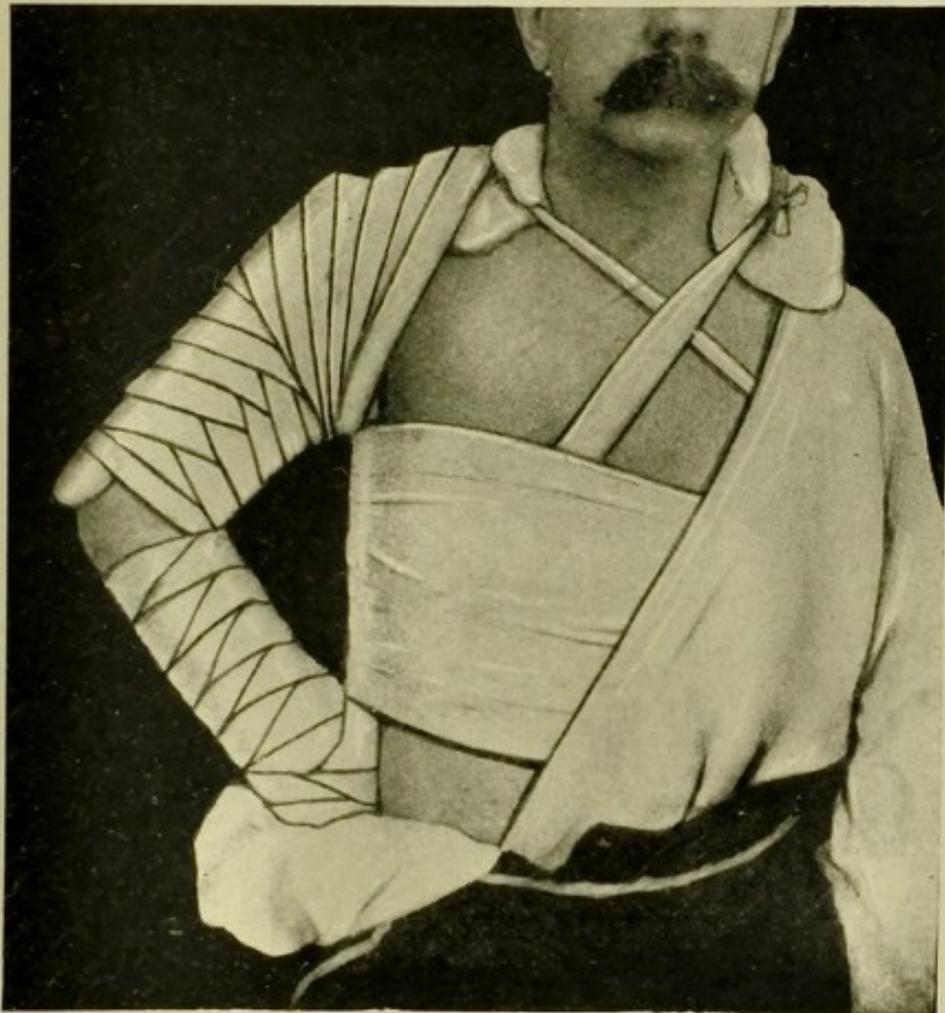


FIG. 44.—Stage 3 of application.

treatment, as it is not easy to get a good result in these cases.

Fractures of RIBS are common, and the injury is usually produced by direct vio-

lence. In cases of severe crushing accidents, however, fractures by indirect violence do occur. They are usually uncomplicated, and the symptoms are pain, tenderness, and inability to take a deep inspiration. The pain and the tenderness are elicited either by palpation of the individual ribs, or by applying antero-posterior pressure to the chest. This will produce pain referred to the site of the fracture, and palpation will elicit tenderness there and confirm the presence of any existing fracture.

In severer cases where the rib has been comminuted and spicules have penetrated the lung, serious complications may arise, *e.g.* hæmoptysis, pneumothorax, surgical emphysema, pleuritic friction, etc. There may be great respiratory distress, and it may be necessary to administer oxygen and stimulants or even to do a paracentesis thoracis in order to lessen the intra-thoracic tension.

In an ordinary uncomplicated case the proper treatment is to immobilise the injured side of the chest so as to limit the respiratory excursus and so prevent move-

ment at the site of fracture. This is best effected by strapping the chest wall with adhesive strapping, and the proper method of procedure is as follows :—

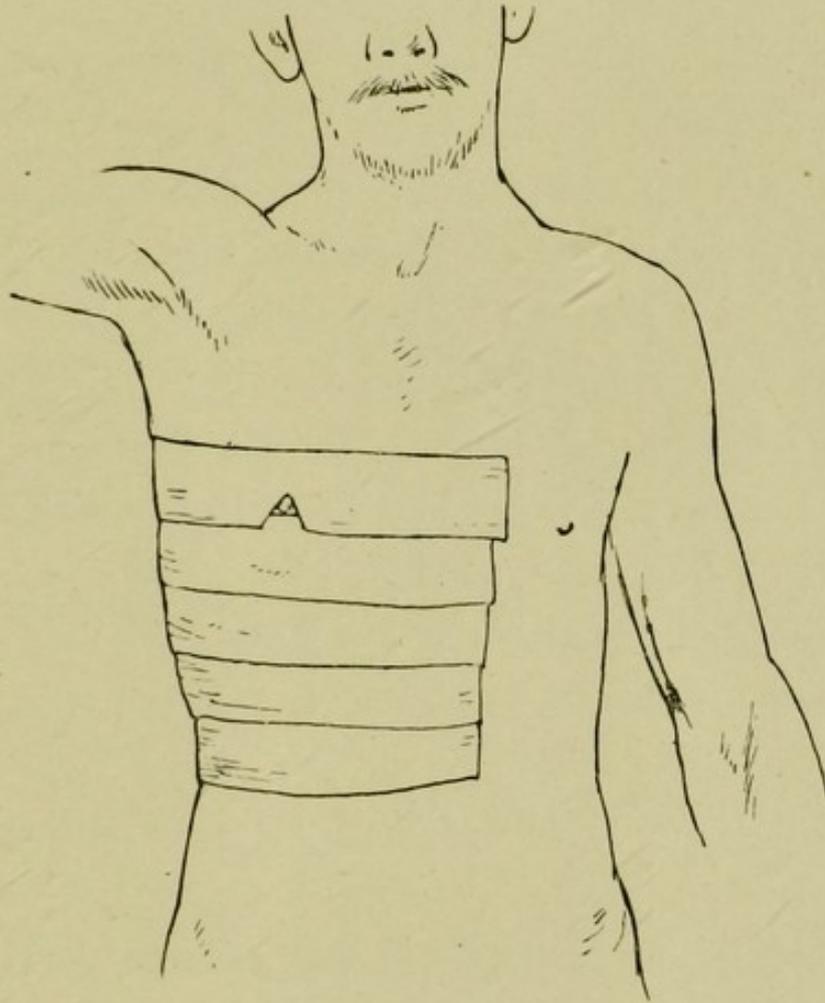


FIG. 45.—Strapping applied to side of chest.

Cut strips of plaster, each long enough to overlap the middle line of the body in front and behind ; six strips should be enough, each 2 inches broad.

Ask the patient to elevate his arms, to

take an inspiration and then to expire deeply. At each full expiration apply a strip of plaster, commencing below at the level of the costal margin and working up till the highest strip reaches the borders of the axilla. Make the strips imbricate, each one covering a half of the one below it. Leave an aperture for the nipple.

The point is to immobilise the side of the chest, not simply to apply one or two strips as a support to the broken rib. The usual result of this fixation is to give the patient immediate relief, and to enable him to move about, to breathe, and to sleep comfortably. The strapping should be kept on for three or four weeks.

Fractures of the Clavicle are extremely common.

When the fracture is obtained by direct violence it is often comminuted and is frequently complicated (injuries to the cords of the brachial plexus and to the subclavian vessels).

The fracture is more commonly obtained by indirect violence, such as a fall on the outstretched hand or on the point of the

shoulder, or an upward jerk to the outstretched arm, such as is given to a child in lifting it up a step. These fractures are usually simple, and in children are often subperiosteal, and they have a common site, namely, the junction of the outer one-third with the inner two-thirds; where the two curves of the clavicle meet at the thinnest rounded portion of the bone.

If a child has been suddenly lifted off its feet by the arm, and thereafter refuses to move the arm, always make sure that the clavicle has not been broken.

The typical attitude of a man who has a fractured clavicle is a forward and lateral inclination of the head toward the injured side and with the hand of the sound side supporting the elbow of the injured side. He is making an effort to relax the pull of the sterno-mastoid muscle, and is supporting the weight of the shoulder girdle which is tending to displace the outer fragment.

Often the signs are obscure, and only a careful comparison of the two sides and an X-ray photograph will settle the matter.

PAIN, DEFORMITY, CREPITUS, and ECCHYMO-SIS are the usual signs. The inner frag-

ment is little displaced, but there is an upward pull by the sterno-mastoid muscle.

The outer fragment tends to be markedly displaced—

DOWNWARDS by the weight of the arm.

FORWARDS) by the pull of the pectorals and

INWARDS) other shoulder girdle muscles.

Treatment.—It may be easy to get the fragments to lie in good position ; it may be extremely difficult.

In the difficult cases try the dorsal decubitus on a hard mattress without any head pillow and with the shoulders well braced back. Short of open treatment, no other method is so likely to give a good result in a very bad case ; the patient should be kept in bed for at least a fortnight.

In less severe cases, where the parts come into fair position when the shoulders are braced back, make use of a modified SAYRE'S method.

1. Shave and cleanse the axilla and lay a sheet of lint across the chest wall.

2. Place a pad in the axilla. Enclose the pad in a triangular bandage and tie it as shown in the diagram.

3. Slip a loop of adhesive plaster, with the non-adhesive side next the skin, up the arm to the level of the insertion of the deltoid muscle, and then carry the strip of plaster (unwinding it from the roll of

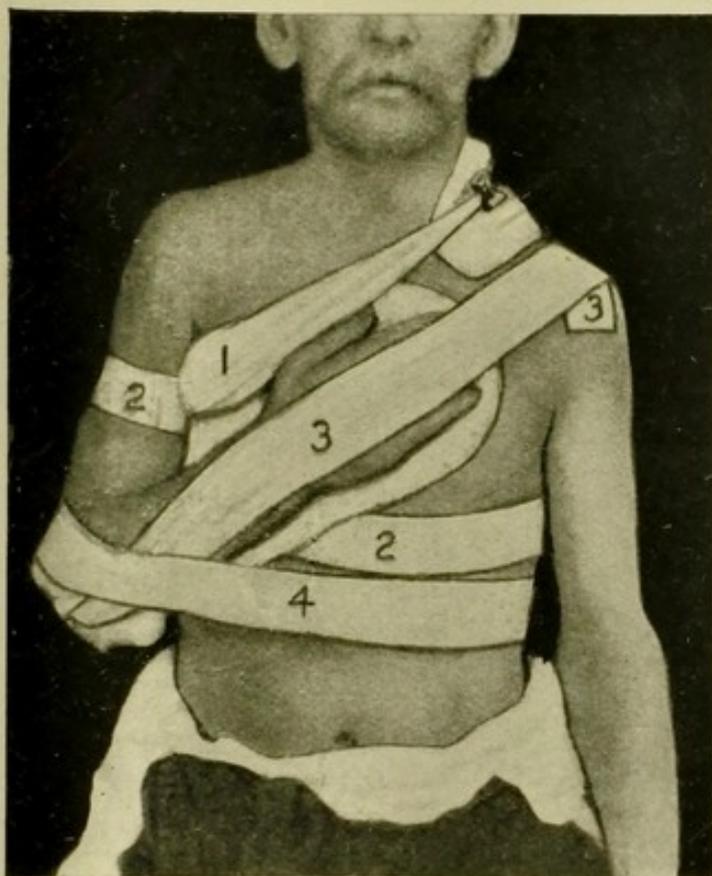


FIG. 46.—Modified "Sayre's" method.

plaster as one proceeds) right round the body and to beyond the middle line behind, so bracing the shoulder well back and overcoming the droop forward.

4. A second strip is placed, commencing over the opposite shoulder, coming ob-

liquely down the back and turning over the tip of the elbow (protected by a pad of lint or Gamgee), to run up along the arm and hand resting on the chest wall and terminate beyond the point from which it started.

5. A third band encircles the body and the tip of the elbow, drawing the tip of the elbow well in towards the chest wall. This helps to overcome the inward displacement of the outer fragment, since it levers out the shoulder girdle ; the axillary pad acting as the fulcrum. The band must not be placed at a higher level than that which gives it a good grip.

Make certain as to the circulation at the wrist.

The fixation should be maintained for three weeks.

In children it is usually sufficient to bind the arm and the hand to the chest wall for two weeks with bandages. Adhesive strapping must not be used, as the skin is too tender.

Neuralgia of the terminations of the descending superficial cervical nerves is sometimes a late complication, and follows

on their involvement in callus and dense adhesions.

FRACTURES OF THE FOOT.

Inasmuch as the weight of the body is carried on the heel, the outer side of the foot and the ball of the great toe, it follows that fractures of the phalanges of the toes are of little importance, and treatment consists in keeping the foot at rest for a week or two. This is best effected by immobilising it in a light plaster of Paris sheath. A persistently painful toe may later require amputation.

A fracture of the first phalanx of the great toe may, however, give much trouble if there be a downward displacement of the end of either fragment, and attention must be paid to thoroughly correcting any such deformity before the part is immobilised, or an open operation for the removal of the projecting bone will later be required before the patient is able to walk without pain.

Metatarsals.—Fractures of the metatarsal bones are common, as the result of crushing accidents or of heavy objects falling on the dorsum of the foot.

No serious impairment of function will result if it be ascertained that there is no fragment or spicule of bone projecting downward towards the sole.

☞ The best line of treatment is to give an anæsthetic, manipulate the foot into a position of marked **PES CAVUS**, and immobilise it in a casing of plaster of Paris. The fixation apparatus should be kept on for three or four weeks.

Fracture of the fifth metatarsal usually results from a kick on the outer side of the foot, and immobilisation in a “**VARUS**” position should be carried out.

Tarsal Bones.—Fractures of these bones, with the exception of the astragalus and the calcaneum, require no further treatment, where there is no marked deformity from a partial dislocation, than the immobilisation of the foot in a light plaster of Paris sheath for a few weeks.

Astragalus.—Fractures of the astragalus may later lead to a stiff and painful joint, and ought to be referred to a surgeon for X-ray examination, and open operation if that be thought advisable. Excision of a

comminuted astragalus gives a much better end result than is usually obtained from any other line of treatment.

Os Calcis.—Fracture of the os calcis may lead to a painful heel later, if there has been much displacement of the fragments; and, where there seems reason to suspect this, the case should be referred to a surgeon.

The simpler cases are to be treated by the immobilisation of the foot and ankle in a plaster of Paris sheath for a few weeks.

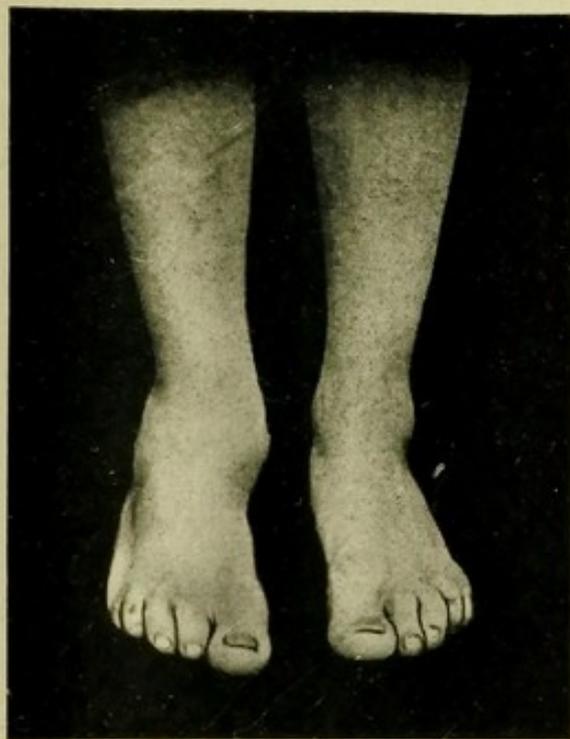


FIG. 47.—Pott's Fracture. A neglected case.

FRACTURES OF THE LEG.

Pott's Fracture.—This is a very common injury, and it should be suspected in every case where a patient has violently “gone over” on the ankle or has had a bad “sprain” of the ankle, especially if after

two or three days there is evidence of much ecchymosis on the dorsum of the outer side of the foot, along the outer edge of the foot and along the line of the peronei tendons.

The fracture takes place within 3 inches of the tip of the malleolus of the fibula, and is often accompanied by a tear of the internal lateral ligaments of the ankle-joint, or by a fracture of the tip of the internal malleolus.

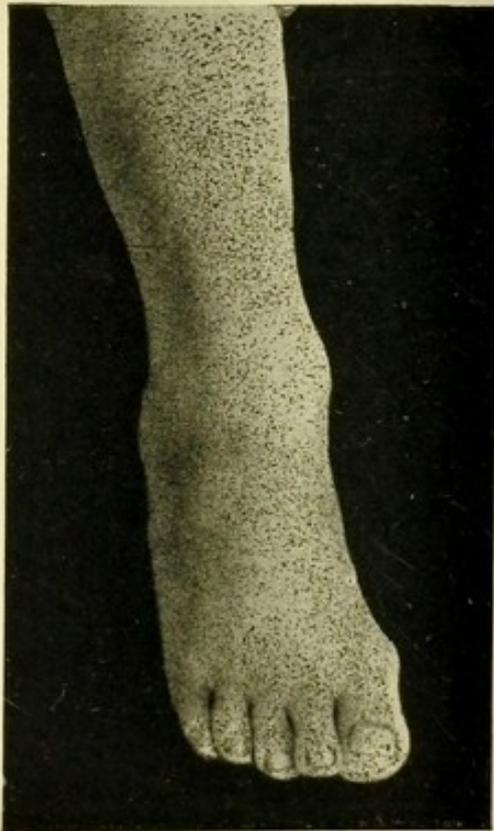


FIG. 48.—Pott's Fracture.
Outward displacement.

A patient with a Pott's fracture is often able to walk fairly well when the fracture is just through the tip of

the malleolus and there is no displacement of the foot outwards, since the weight of the body is transmitted through the TIBIA and the ASTRAGALUS. In the typical case, however, the line of fracture is higher than the tibio-fibular articulation,

and there is a marked tilting inwards of the upper end of the lower fragment. When, in addition, there is a definite lesion on the inner side of the ankle, there results a marked outward displacement of the foot, which is also everted. There is also a tendency to backward displacement of the foot. It is then almost impossible for the patient to put any weight on the foot, even if pain did not make walking out of the question.

The foot should be immobilised between sand-bags for three or four days and fomented till the swelling has commenced to disappear. The patient should then be anæsthetised, and the deformity should be most thoroughly corrected by inversion of the foot and manipulation at the site of the fracture.

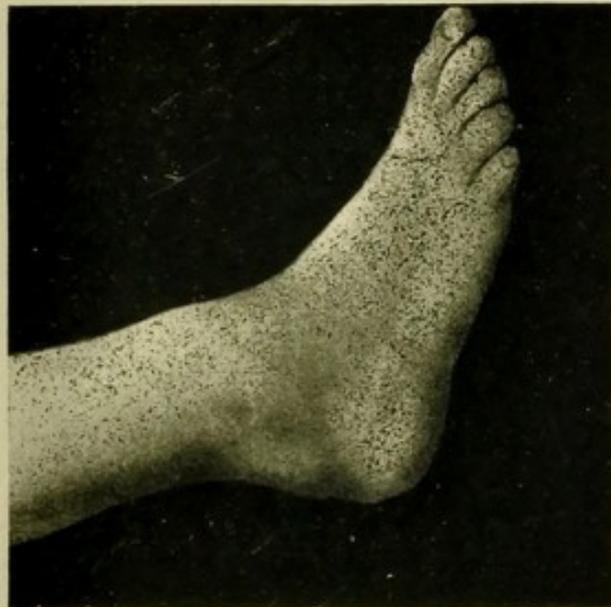


FIG. 49.—Pott's Fracture.
Backward displacement.

The fibula at the site of the lesion is almost subcutaneous, and there should be little difficulty in satisfying oneself that the deformity has been properly overcome.

Probably the best line of treatment is to

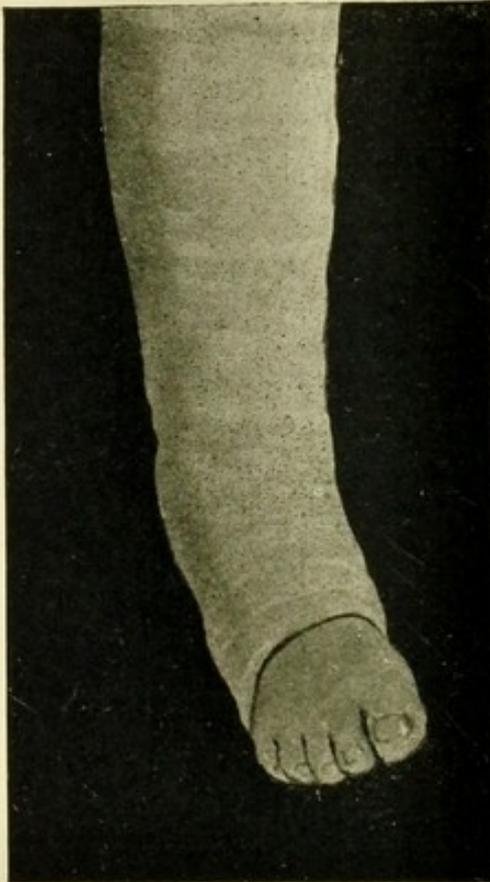


FIG. 50.—Foot well inverted.

fix the foot, ankle, and leg in a plaster of Paris sheath whilst it is held in proper position after reduction of the deformity.

Attention is to be paid to three points:—

1. That marked inversion of the foot is to be maintained till the plaster sets.

2. That the toes are not to be allowed to point. The angle

which the foot forms with the line of the leg is to be as near a right angle as possible, otherwise there will be contracture of the *TENDO ACHILLES*, and difficulty later on in getting the heel to the ground. Further, unless this point is attended to,

one cannot be sure that all backward displacement of the foot is corrected.

The plaster is left on from four to six

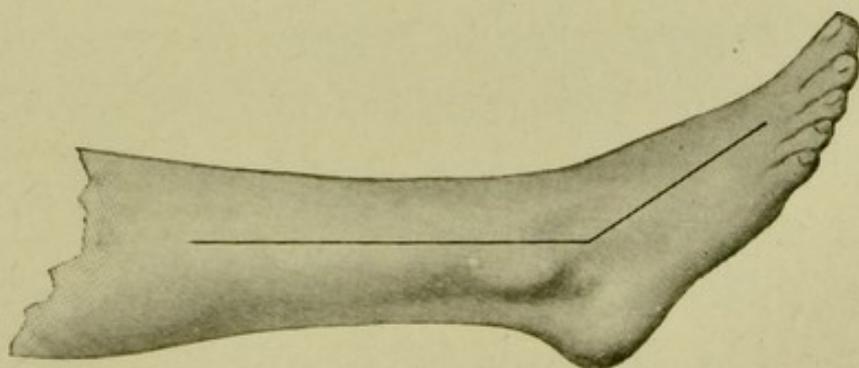


FIG. 51.—Wrong position. Toes pointing.

weeks, and good results will be obtained if these instructions are properly carried out. The patient is able to move about freely in

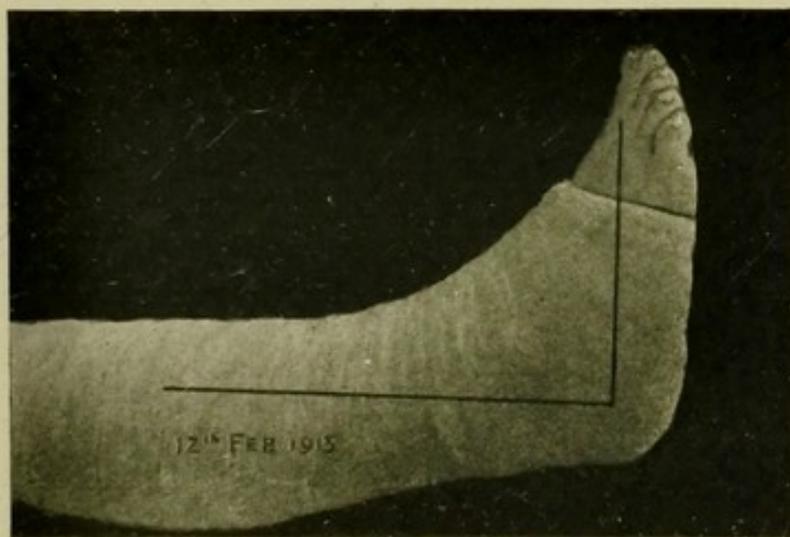


FIG. 52.—Correct position. No pointing of toes.

bed, to get up in a very few days, and to get about with the help of crutches very soon.

When, however, splints are demanded, the best known and those which give the best results are the "HALF-BOX" splint and "DUPUYTREN'S" splint.

"HALF-BOX" splint.—The diagram fully illustrates the apparatus.

The outer side of the splint reaches from the middle of the thigh to 6 or 8 inches beyond the foot-piece, which is placed at right angles to it and to the posterior side

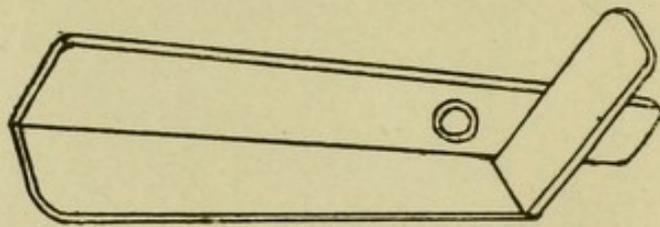


FIG. 53.—"Half-Box" Splint.

of the splint. The posterior side reaches up as far as the outer side.

This ensures fixation of the knee, which is desirable when pointing of the toes is not made an impossibility, as it is when plaster has been applied.

The splint is padded with extra pads opposite the head of the fibula and below the heel. A small firm bran bag or roll of Gamgee is then placed between the foot-piece and the aperture for the malleolus. The result is that when the leg is placed in the splint a definite inversion of the foot

is produced, and it is exaggerated when the bandages are applied. The only difficulty is to keep the outer side of the foot firmly against the foot-piece; this requires the undivided attention of one assistant, as there is a very great tendency for the heel to slip away up, producing the undesired pointing of the toes.

“DUPUYTREN’S” splint is a good emergency splint. It should extend from a little above the level of the knee to 4 or 5 inches

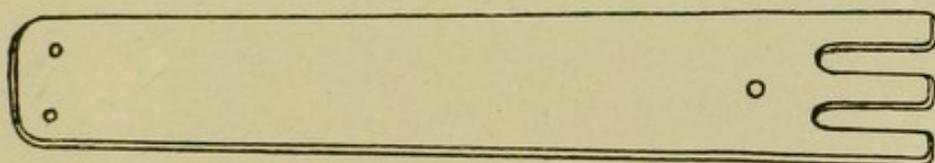


FIG. 54.—“Dupuytren’s” Splint.

beyond the sole of the foot. The padding can be made of a firmly rolled-up towel. The splint is placed on the inner aspect of the leg, and the pad must not reach below the base of the internal malleolus. When the leg has been bound to the splint by calico bandages, fixation of the foot to the fingers of the splint produces a marked inversion. One must so sling the foot as also to correct any backward displacement.

Fractures of Both Bones of the leg are to

be treated by the use of a half-box splint ; no pad, however, is now placed between the aperture for the malleolus and the foot-piece, as in a Pott's fracture, but the same care is required in seeing that the sole of the foot is kept closely applied to the foot-piece ; this is a matter of no small difficulty and requires the undivided attention of one assistant. There must not be a piece let

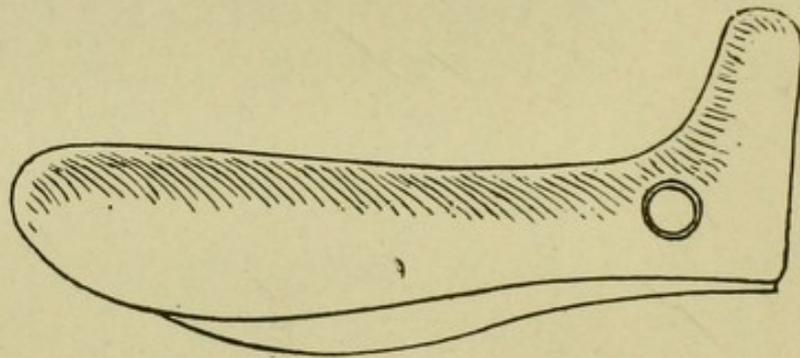


FIG. 55.—Cline's Splint.

out for the heel in a half-box splint. The tendency in these cases is for a backward displacement of the foot to occur, and a splint made with a heel aperture simply invites the occurrence of a bad result.

For these cases also, CLINE'S splint is a useful enough apparatus, inasmuch as it prevents the backward displacement which one desires to avoid.

Fractures of the Fibula are usually simple

and require no further treatment beyond rest till pain has passed off; though, if the fracture is high up, one must be certain that there is no injury to the peroneal nerve.

Fractures of the Patella.—Fractures of the patella are usually the result of muscular violence. The line of fracture is through the junction of the upper two-thirds with the lower one-third. There is usually a wide separation of the fragments due to spasm of the quadriceps. Where good crepitus cannot be obtained, it probably means that there is an intervening layer of fibrous tissue between the broken ends. Such a condition may arise as the result of the incurling of the edges of the capsule of the patella, which has been much overstretched before it gave way. In such a case open operation is required early. Where good crepitus is obtained one may endeavour to pull down the upper fragment and hold it in firm apposition with the lower. Many ingenious bandages and elastic devices are used for this purpose, and they are mostly uncomfortable and useless. As a temporary splint, a posterior

straight splint with a firm circular bandage just above the upper fragment will be found most satisfactory; but probably these cases, if in young persons, should also be submitted to operation. It is a great mistake to allow good fibrous union to occur and then later to send a patient for open operation.

Malgaigne's Hooks may give a brilliant success, but they may also lead to septic arthritis of the knee-joint, and so their application is not advisable except in the hands of a surgeon.

A comminuted fracture of the patella is as a rule the result of direct violence. In these cases there is less danger of fibrous union, and one must select those which are to be submitted to operation; one will be guided by the amount of effusion, the presence of a dislocated fragment, etc.

Extension Apparatus.

This is used in the treatment of fractures of the femur, alone or with LISTON'S splint, and the method of application is as follows:—

The limb is shaved and cleansed with spirit and then well dried. The head of

the fibula is protected by a pad of lint, and a roll of lint of several layers of thickness is bandaged over the malleoli, just ABOVE the ankle, so as to produce in that neighbourhood a slight divergence of the plaster bands and thus prevent the formation of pressure sores.

Two strips of adhesive plaster (3 inches broad) are cut each 8 inches to 12 inches longer than the length of the limb on its inner aspect.

The lower ends are folded over so as to present no sticky surface. The two strips are fixed to the leg by means of a third strip which is wound round the leg from

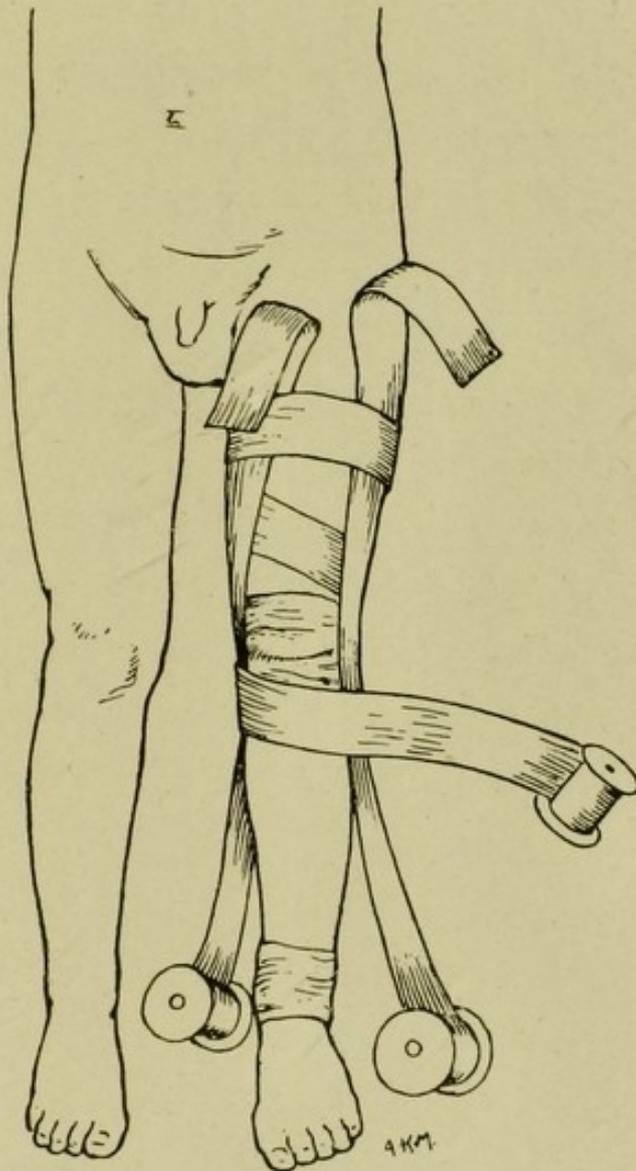


FIG. 56.—Application of Extension.
Stage I.

above downwards in a loose spiral, the alternate circuits being above the plaster or between it and the skin. The highest up circuit is made as far up the leg as possible, leaving 4 to 6 inches of the upper ends of the lateral strips free in order that they may be reflected and inter-wound with the covering bandage to increase the grip.

If one lacks assistants to hold the strips close to the leg, or a little out from it as may be required, it is probably easier not to cut the strips, but to unwind them, as one always does the spiral strip, directly from the rolls of plaster as one proceeds. It is difficult to keep the edges from incurling. One therefore requires to have ready for use three rolls of plaster.

LEUCOPLAST has been found the least irritating variety of plaster, though the "stuff" is hardly strong enough to support the heavy weights now used.

A soft gauze bandage is put on next, and a neat calico bandage is applied over all.

Note especially that the plaster is carried up the leg as far as possible, not just to below the site of the fracture, as used formerly to be the practice.

When the plaster strips have been applied the rest of the apparatus required is used as shown in the diagrams.

The weights now used are much greater than those used formerly. From twenty-five to fifty pounds are used in adults. When the counter pull of the exhausted muscles is overcome and they are quite limp, the ends of the bone will tend to come into their proper position.

After three or four weeks, when callus is beginning to form, one may commence to reduce the weights, and this with frequent massage of the limb will keep the muscles from losing all tone.

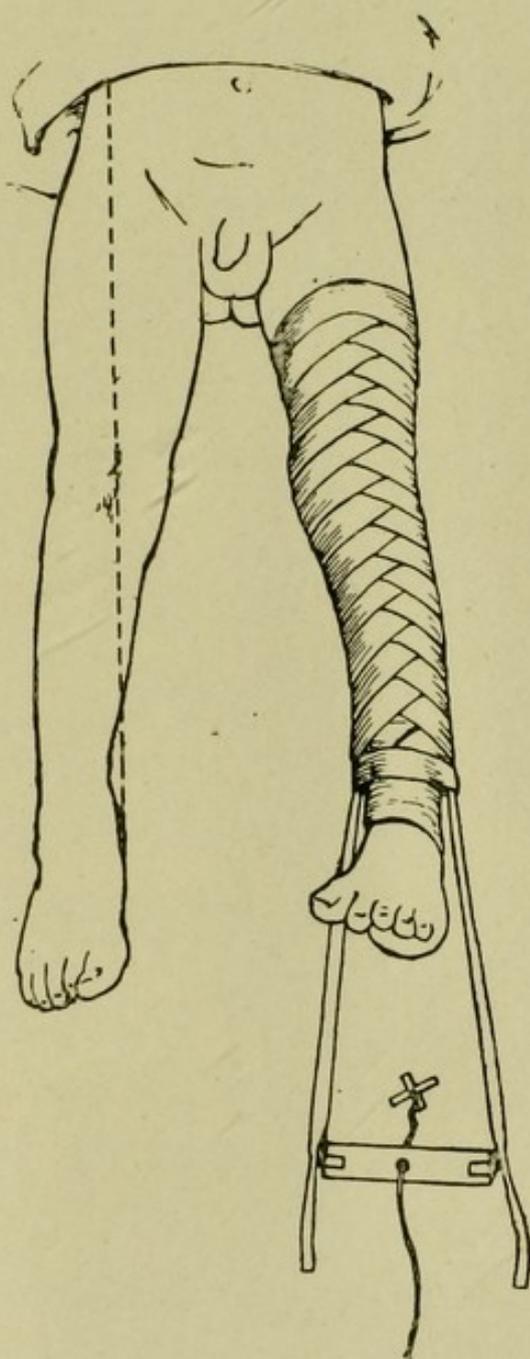


FIG. 57.—Application of Extension.
Stage 2.

The elevation of the foot of the bed on blocks permits of the weight of the patient being used as a counter extension. The blocks should be about 12 inches high.

It is necessary that boards, or a door in an emergency, should be placed beneath the mattress when it is not a sufficiently hard one. Proper treatment cannot be obtained on a spring mattress or on a feather bed.

Fracture beds have specially devised mattresses to obviate the difficulty of having to use a bed pan.

FRACTURES OF THE FEMUR.

In fractures of the lower end of the femur there tends to be a tilting backwards of the upper end of the lower fragment, produced by the pull of the heads of the gastrocnemius muscle.

In fractures of the upper third of the shaft of the femur the lower end of the upper fragment tends to be tilted forward by the pull of the ilio psoas muscle.

For the treatment of these displacements double inclined plane splints have been devised, but they will not be considered

here, as extension apparatus properly applied will overcome the pull of any muscles and can therefore be used in these cases. When the patient is anæsthetised and the muscles relaxed, the practitioner can note that the deformity has disappeared, and he should try to get crepitus and so prove to himself that the bone ends have come together; thereafter, when extension is

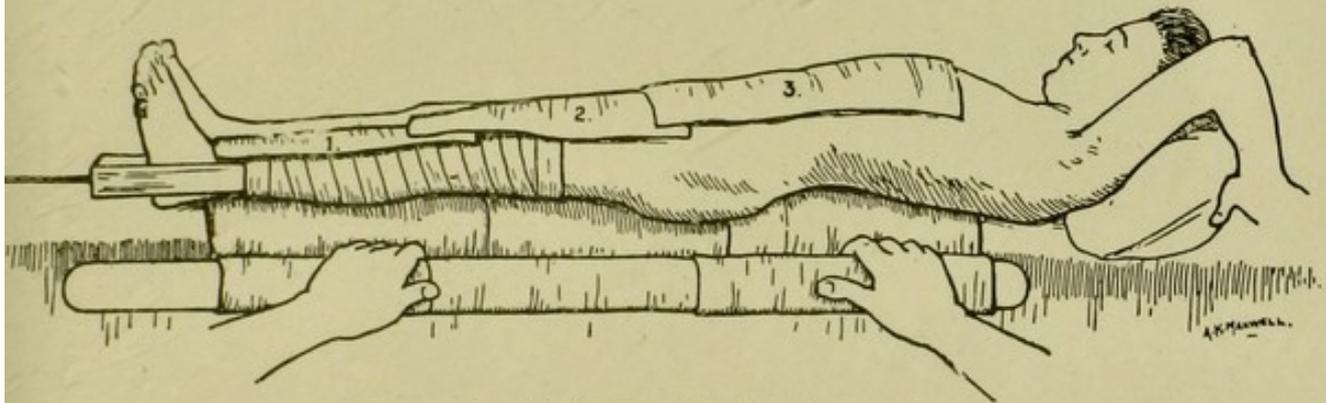


FIG. 58.—Enfolding Splint in towels.

completed, the muscles will have little chance of reproducing the tilting.

LISTON'S long splint extends from the axilla to 10 or 12 inches beyond the sole of the foot. It is put in position after extension has been applied. A layer of Gamgee is used to fill up the space between the chest wall and the splint, and is carried over the end of the splint to protect the axilla.

Three towels or binders of firm, unyielding material are wound on to the splint, the first extending from the ankle to the knee, the second from the knee to the perineum, and the third surrounding the body from the level of the great trochanters to the borders of the axillæ.

The best method of procedure is to place the towels in position below and to the inner side of the leg and the thigh and below the body, each towel at its proper level. Leave on the inner side of the limb just sufficient to allow of the limb being easily surrounded, and so the greater portion of the towels will hang over the edge of the bed or table. The splint is then taken and enfolded in the towels, rolled up in them so that when it comes to lie close up against the body it is well enfolded, and each towel passing down the outer side of the splint turns beneath it to pass below the limb and the body to the free border, which is now ready to be pulled up taut and to draw the limb into close apposition with the splint. The towels, like bandages, are pulled from within outwards over the front of the limb, and then are fixed by means of

tacks, nails, or safety-pins to the upper border of the splint or to the towels surrounding the splint. One usually so arranges it that the body binder slightly overlaps the thigh towel, and that the thigh towel slightly overlaps the leg one, simply for the appearance.

It is necessary to use towels and binders

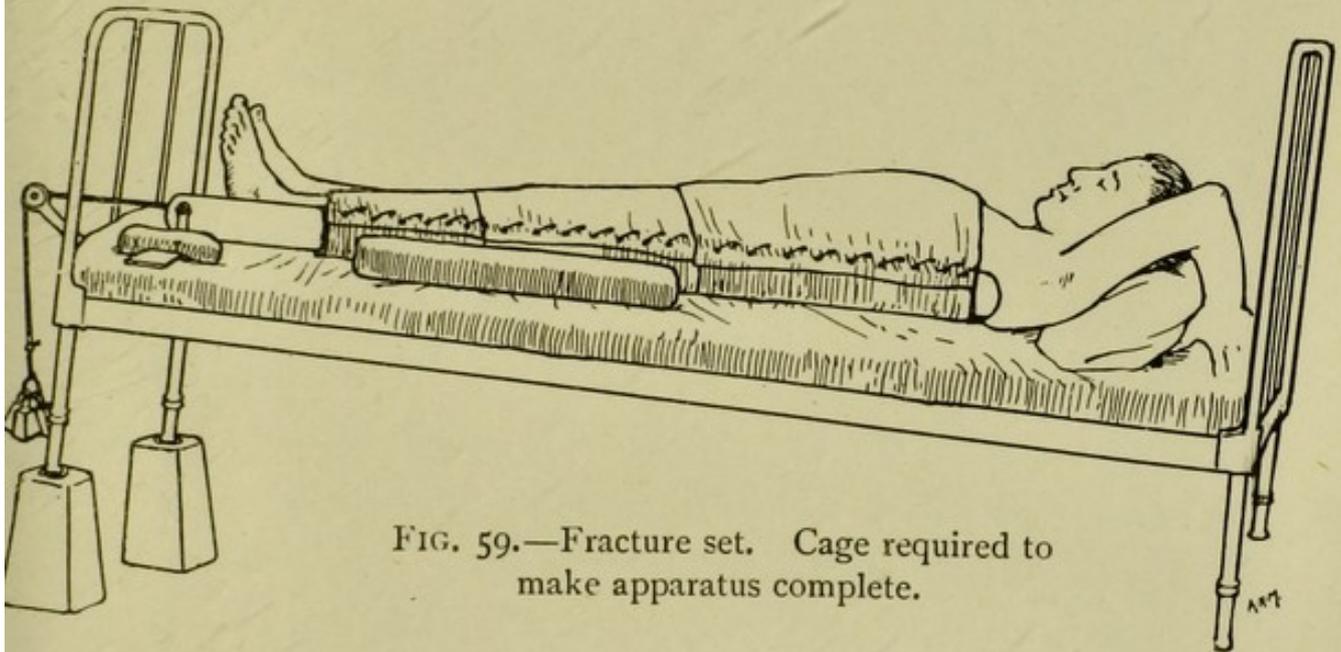


FIG. 59.—Fracture set. Cage required to make apparatus complete.

of firm, unyielding material, otherwise one will have to be constantly tightening them up. There is no padding placed between the limb and the towels as a rule, and so one must take care not to pull the towels up so tightly as to interfere with the circulation.

Be sure that the splint is not pushed too far up into the axilla before nailing the

towels down to the splint, and use a cross-piece and sand-bags to prevent rotation.

There is a tendency to produce a slight eversion of the limb, and it is necessary to satisfy oneself that this has not occurred. Observe the position of the patella.

The treatment of fractures of the femur by extension and LISTON'S long splint is the best for oblique and spiral fractures where there is marked shortening or displacement of the bone ends. Approximate measurements can be obtained without disturbing the apparatus, and so one can be pretty sure of a good result.

The apparatus should be kept on till the eighth or tenth week, and thereafter massage and movement of the knee-joint should be carried out daily. Good firm union should be obtained by the eighth to the tenth week, and the patient may then be allowed to get up and to move about with the aid of crutches. It will be over two to four months more, before the limb can be used with any degree of freedom.

The times stated refer to adult patients of average build and weight, but heavy men, and many working men, who are

getting compensation, require longer periods for convalescence after union has occurred.

The times are correspondingly shorter for children and lightly built persons.

Where the fracture is about the middle of the thigh and probably transverse, with little shortening or displacement, and where good crepitus is readily got, the treatment may be by means of a long osteotomy splint.

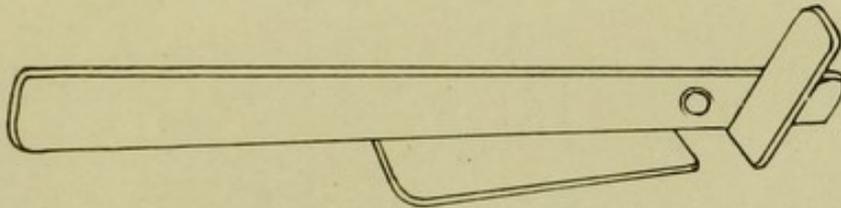


FIG. 60.—Long Osteotomy Splint.

The splint is smoothly padded with Gamgee tissue and the limb comfortably bandaged to it. An anterior gooch splint is put over the site of the fracture and a binder is used to keep the splint in apposition with the chest wall.

The measurements.—The outer side extends from the axilla to well beyond the sole of the foot.

The posterior piece from the gluteal fold

to the level of the tip of the internal malleolus.

The foot-piece is fixed at right angles to the line of the leg, leaving the gap for the heel as depicted in the diagram.

On the outer side a gap is left opposite the external malleolus.

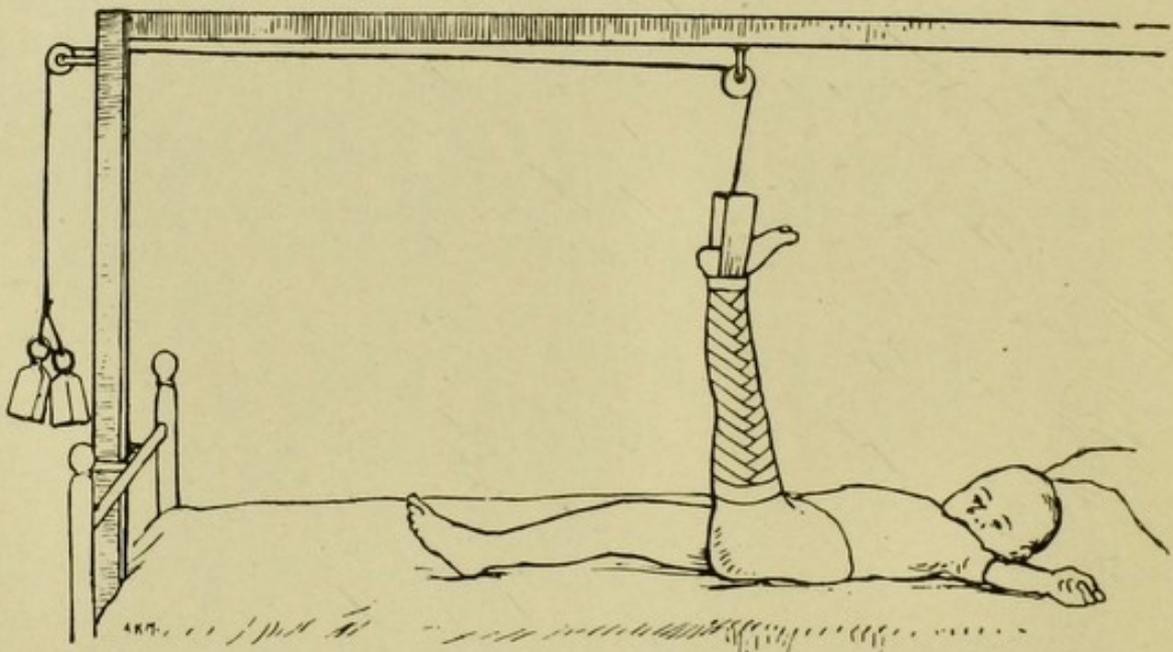


FIG. 61.—Vertical Extension.

Fracture of the femur in children may be treated by means of vertical extension, as shown in the illustration; or with the extension apparatus applied to both legs.

Very good results may be obtained by the immediate fixation of the leg in plaster of Paris, so arranged as to transmit the

pressure of the weight of the body from the crest of the ilium to the supra-malleolar region. This is a great score from the child's point of view, as he can be out of bed in three or four days, and in less than ten days most children can get about extremely well without the aid of crutches or sticks.

This method is applicable to all children up to the age of twelve or thirteen years.

FRACTURES OF THE NECK OF THE FEMUR.

The old time division of fractures into intracapsular and extracapsular fractures of the neck of the femur is quite artificial, since the line of fracture is very seldom completely within or without the capsule ; inasmuch, however, as it indicates that there are *two* types of fracture occurring in *two* types of patients for which *two* definite lines of treatment may be required, the division is a good one to retain.

EXTRACAPSULAR FRACTURE
occurs in young muscular people, from direct, great violence, and impaction is common.

INTRACAPSULAR FRACTURE
1. occurs in old people,
2. from indirect often trivial violence,
3. and impaction is rare.

The diagnosis is made from certain measurements as compared with those on the sound side.

First one notes that there is marked eversion of the limb. The length of the limb is measured, from the anterior superior spine of the ilium to the tip of the internal

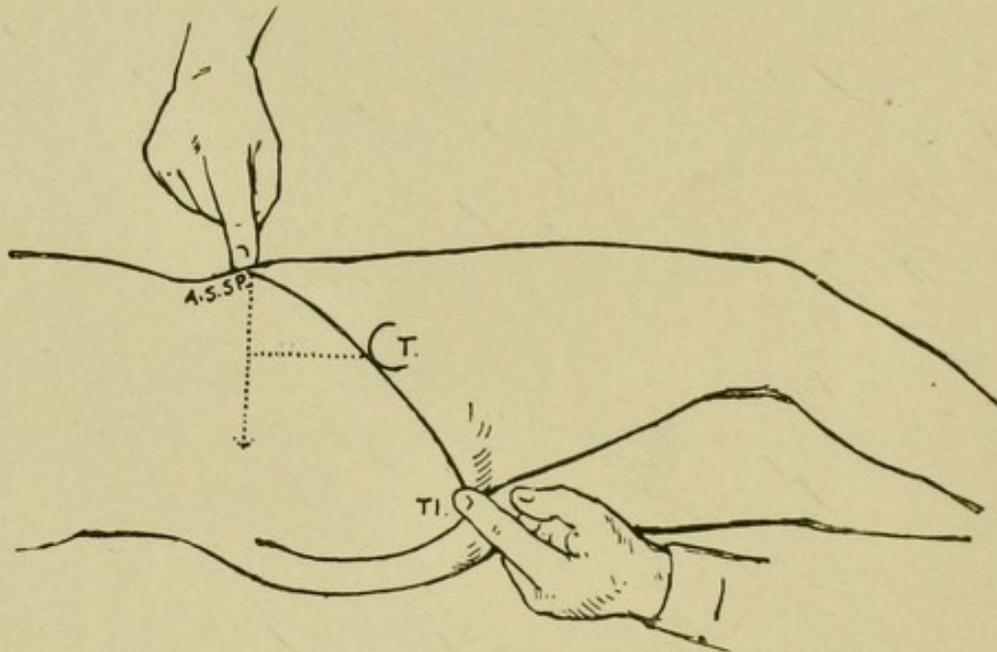


FIG. 62.—Nélaton's Line and Bryant's Triangle.

malleolus, and for comparative measurements, the sound limb should be laid in relatively the same posture of marked eversion.

NÉLATON'S LINE is marked on the skin. It is the line joining the anterior superior spine with the ischial tuberosity. Normally the highest point of the great

trochanter of the femur touches this line, but in the cases under consideration this relationship no longer exists, the great trochanter is at a higher level than the LINE.

In the same way the base of BRYANT'S TRIANGLE is shortened.

BRYANT'S TRIANGLE is mapped out when the patient is lying down. A line is drawn joining the anterior superior spine with the highest point of the great trochanter.

A vertical line is dropped from the anterior superior spine across the buttock and down towards the bed.

A third line is dropped perpendicular to this line from the tip of the great trochanter, and this is the base of the triangle which is now mapped out. Naturally, therefore, where the great trochanter is displaced upwards, there is a shortening of this line. Of course, the triangles must be mapped out on both sides before one can express an opinion.

Still a further test is to note whether the normal "arc of rotation" of the great trochanter is lost. Normally, when the leg is rotated, the trochanter moves round

the arc of a circle of which the centre is at the acetabulum, and of which the radius is the neck and head of the femur; but when there is a fracture and no impaction, all rotation on manipulation is round the axis of the shaft of the femur.

The occurrence of crepitus in the course of the manipulations whilst the measurements are being made, clinches the diagnosis. When impaction is present and eversion is very slight the measurements and manipulations may not lead to a certain diagnosis, and there an X-ray photograph would be invaluable. A suspected case ought to be treated as a case, and the diagnosis will be cleared up in a week or two.

The extracapsular fractures are best treated by extension and Liston's splint, special attention being paid to the correction of the eversion.

In typical cases of intracapsular fracture the general condition of the patient is of much greater importance as regards the prolongation of life than the local condition. Elderly, feeble people, if treated like the

younger and more robust, will develop bed sores, pneumonia, cerebral œdema, cardiac failure, and thrombosis very easily. One dare not apply extension apparatus. One cannot always keep the patient in the dorsal decubitus.

Fixation apparatus should be in the nature of long sand-bags fixed by firm ties, keeping the limb from everting, and, if possible, in a position of abduction.

The appearance of any complication must be guarded against by the use of stimulants, drugs, and special attention to the condition of the skin, and in some cases all retaining apparatus must be discarded and the patient be propped up in bed.

The patient's friends must be warned of the difficulty in obtaining a good result in these cases and be prepared for the patient having to use one or two crutches during the rest of life.

All fractures of the femur, except in children and lightly-built adults, are serious injuries. Good results are not to be obtained without the expenditure of much time and trouble over the case.

FRACTURE OF THE PELVIS.

This is usually the result of a bad crushing accident. The signs may be obvious, or it may be only the appearance of a complication which confirms one's suspicion. A rectal examination may aid in the making of the diagnosis.

A fracture where a spicule of bone penetrates the bowel or the bladder or the urethra is a compound fracture, and therefore of much more serious import.

The great danger in these cases is injury to the urethra, which may be torn across or lacerated in the neighbourhood of the triangular ligament; if in front of it, there will be an extravasation of urine into the tissues of the perineum and a visible and palpable cellulitis will soon be produced; if the laceration is behind the triangular ligament, then the extravasation will be into the tissue behind the symphysis in the pre-vesical space of RETZIUS and a localised abscess will form, which will not become obvious for some days. Tenderness over the pubis, high temperature, and the dribbling of foul pus along the

urethra will point to a diagnosis in these cases.

One's chief anxiety in a case where one suspects a fracture of the pelvis, then, is as to the condition of the urethra.

Laceration may take place after the injury has been received, in the course of transferring the patient to his home or to hospital. Care must accordingly be taken to move the patient about as little as possible. Where no apparatus is available, a door or any other broad and sufficiently long piece of wood should be slid beneath the patient where he lies, and he should be removed on this improvised stretcher. On no account should he be allowed to sit up or to attempt to rise. A soft pad of some kind should be placed beneath the sacrum, and a binder, sheet, or broad bandage encircling splint and patient, and fixed at the level of the pelvis, should be used to keep the patient from rolling to one or other side. The knees should also be tied together.

The bed on which the patient is to lie should have a firm mattress. Before the patient is slid off the stretcher on to it his

clothes should be cut off, and a broad, firm, unyielding binder should be placed round the pelvis ; the knees too should be closely tied together.

A patient so removed will have received little further damage than the original injury.

One must then without delay proceed to investigate the state of the urethra.

If blood has been issuing from the urethra there must be a laceration somewhere, but, whether or not, on no account ask or allow the patient to pass urine. Use every aseptic and antiseptic precaution—wash the hands, cleanse the meatus, use a sterile lubricant, use a sterile, soft rubber catheter (or a gum elastic one, but on no account a metal one), and then pass the catheter slowly and gently. Rather give the patient morphia and wait a few hours for the arrival of proper catheters, etc., than let a patient take the risk of having a doubtful instrument passed into the bladder.

Where blood has come from the meatus, if the site of the laceration be safely passed and the bladder entered, there will issue a

stream of clear urine, and one can presume that the bladder is uninjured.

Where a stream of dark bloody urine with clots is obtained, there is evidence that the bladder has been involved.

In either case the catheter should be tied in position ; in the first case for a few days, and one may have the good fortune to get the urethral laceration to heal without any extravasation of urine—it must constantly be watched for, however ; while in the second case the bladder ought to be opened suprapubically and drained freely, lest rupture into the peritoneal cavity should ensue, or a pelvic cellulitis develop.

When the catheter has certainly reached the bladder and only a very little blood-stained urine is obtained some hours after the injury has been received, one must suspect that there is already a communication with the peritoneal cavity, and abdominal exploration must be arranged for without delay.

When no blood has been passed per urethram, and clear urine is got from the bladder, then presumably there is no

injury to urethra or bladder, and no catheter need be tied in.

Seven or eight weeks in bed should be insisted on in extensive uncomplicated cases. The complicated cases may require as many months before recovery.

There are, of course, many fractures of the false pelvis, where the crest or the anterior superior spine of the ilium is the part injured. These simple fractures, which do not implicate the weight-carrying portion of the pelvis, do not demand such serious consideration.

FRACTURES OF THE SKULL.

These cases are serious and cause much anxiety.

The patient is usually collapsed and concussed.

Always get a clear story of the accident if possible, and if great violence has been applied, rather have a doubtful case explored than treat it expectantly, though the outward signs may only be a small scalp wound or a small hæmatoma, for a small piece of bone may be depressed, while the surface signs seem very trivial.

Never probe a scalp wound, unless with a sterile probe after the region of the wound has been thoroughly sterilised.

Remember that the hard edge of a hæmatoma and the dip into the soft, central, fluid part may mislead one into diagnosing a depressed fracture. An incision made under proper conditions, and with preparations made for trephining if that should be found necessary, will in these cases do no harm ; therefore have all doubtful cases explored.

The cases for expectant treatment are accordingly those in which one is perfectly satisfied that there is no depression and that there is no concealed hæmorrhage taking place, also those fractures of the base for which operation is impossible. The line of treatment to be pursued by the practitioner in such cases where the diagnosis has been made from indirect evidence such as hæmorrhage, ecchymosis, escape of cerebral fluid or damage to nerves, is to put the patient to bed in a quiet, darkened room, to shave the head, to give a smart purge, to cleanse and keep clean the external auditory meatus when the fracture

is the common one of the middle fossa of the skull and to keep an outlook for the appearance of the commencement of compression from internal hæmorrhage, which may require operative treatment.

FRACTURES OF THE BONES OF THE FACE.

Where there is marked deformity, these fractures require the administration of an anæsthetic and the elevation or manipulation into position of some displaced fragment.

Fractures of the LOWER JAW should be fixed up by the aid of a four-tailed bandage, and special attention is to be given to the prevention of oral sepsis. The mouth tends to get into a filthy condition if means are not taken to prevent it doing so. Where fixation is unsatisfactory or difficult to maintain by the use of a four-tailed bandage or of a moulded plaster of Paris splint, it will be best to refer the case to a surgeon for open operation.

FRACTURES OF THE SPINE.

These cases require special nursing and can seldom be treated satisfactorily in a

patient's home. The occurrence of cystitis and of bed sores makes the case an exceedingly difficult one to nurse. Few cases are suitable for operation, and most terminate in rapid death.

PART III.—DISLOCATIONS.

It requires considerable violence to produce a dislocation.

The head of the bone travels along a definite path before it comes to rest.

The muscles in the neighbourhood are in a state of spasm. This muscular spasm is the force which has to be overcome before one is able to make the head of the bone retrace its path. The rigid edges of a strong capsule gripping the neck of a bone may act as a factor in preventing reduction of the expanded head, but rotation and manipulation usually suffice to overcome their resistance.

The proper method of obtaining complete muscular relaxation is the administration of an anæsthetic.

It follows, therefore, that the most simple and scientific method of reducing a dislocation is to have the part thoroughly

relaxed by means of an anæsthetic, and then to endeavour to make the dislocated head retrace the path along which it came. This has special reference to dislocation of the shoulder, and of the hip, but the rule should be applied generally. Only thus can one hope to prevent the appalling complications to nerves and to blood vessels which are constantly turning up at hospital in cases of dislocations treated outside heroically without the use of an anæsthetic. Treatment which leads commonly to such complications as paralysis and the rupture of blood vessels should have no place in modern surgery. There is no urgency in 90 per cent. of these cases ; it would not matter though the dislocation remained unreduced for several days, and certainly it is better to bear discomfort for a few hours than to be crippled for months.

Of course, dislocations can be reduced without anæsthetics ; any brute of sufficient physique who has a little knowledge can manage it ; the question is whether he would permit it to be carried out on his own person or in the case of one of his near relatives.

Under an anæsthetic every recent dislocation can be easily and painlessly reduced, and it therefore verges on malpraxis to use antiquated methods requiring the exhibition of strength on the part of the operator and entailing agony to most patients.

All the diagrams of pulleys and slings and of middle-aged whiskered gentlemen violently reducing dislocations of the shoulder by that awful "heel in the axilla" method ought to be dismissed for ever from surgical text-books; they perpetuate barbarism.

If to the general principles of obtaining complete relaxation and trying to make the head of the bone retrace its path, one adds a third, namely, to commence by exaggerating slightly the existing deformity or the posture of the limb, then one is fully equipped for the proper treatment of any dislocation, provided one has sufficient knowledge of the anatomical relationships of the parts and of the path along which the head has travelled.

The diagnosis of a dislocation usually presents little difficulty. Comparison with

the sound side after one has marked out the bony points and landmarks in the neighbourhood will give a clear guidance in any doubtful case.

Dislocations at an INTERPHALANGEAL JOINT are not uncommon. Reduction is usually easy by means of simple extension,

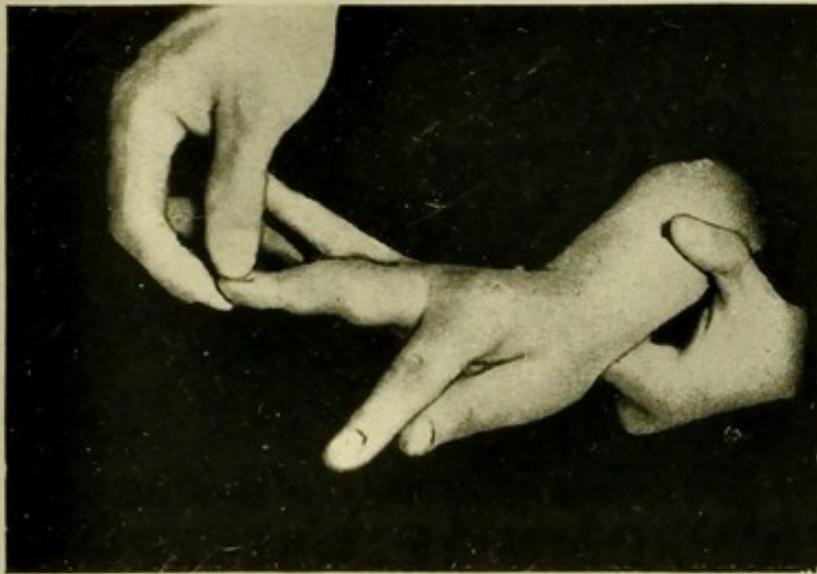


FIG. 63.—Dislocation at Interphalangeal Joint.

but if the tear in the capsule be a small one a certain amount of rotation in addition to extension may be necessary in order to get the dislocated end slipped back into position. The difficulty is much increased after a few days, and so the case should be treated without delay.

Rest thereafter for ten days, and then

massage, bathing in hot water, and manipulation.

Dislocation at the METACARPO-PHALAN-GEAL joint of the THUMB is common; the base of the first phalanx is displaced on to the dorsum of the head of the metacarpal bone.

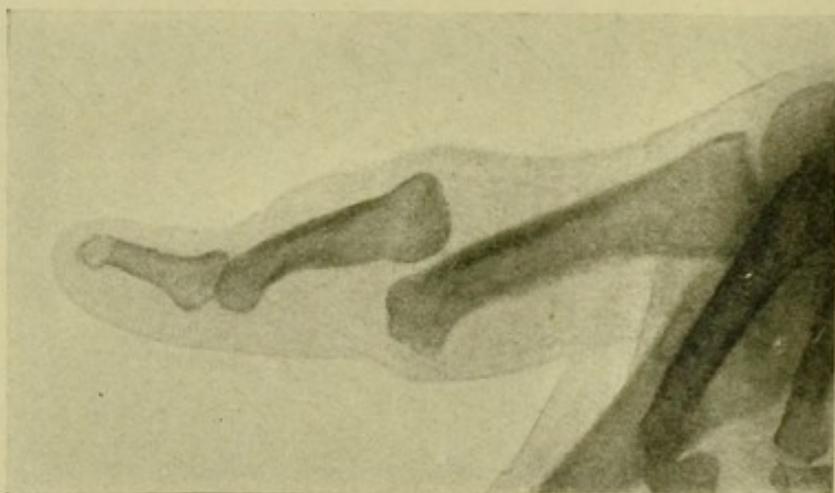


FIG. 64.—X-ray photo of Dislocation.

Reduction is notoriously difficult in some cases.

(a) From the interposition of the torn edges of the capsule.

(b) From the interposition of a sesamoid bone.

(c) From the gripping of the neck of the metacarpal bone between the tendons of the short flexor muscles of the thumb and of the flexor longus hallucis muscle,

all of which are in a state of spasm. Where there has been considerable laceration of tissue, reduction may be easily effected by extension and rotation, but in difficult cases the usual method of procedure is to produce a state of hyperextension of the joint, so that the phalanx is at a right angle or at an acute angle with the line of the

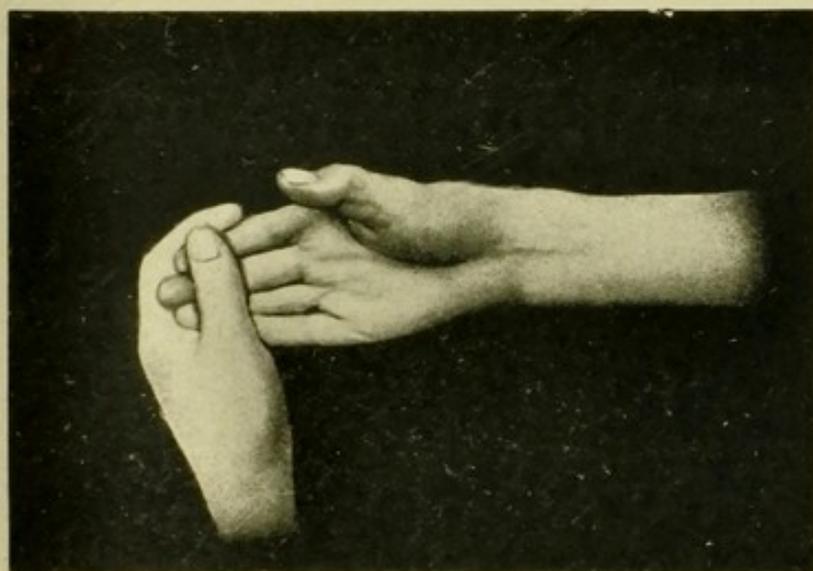


FIG. 65.—Dislocated Thumb.

metacarpal to slide it forward then, and, with a sudden movement of flexion, to pull the articular surfaces into contact. This is usually easily effected when the patient is anæsthetised, and if it fails open operation will be necessary.

The thumb should be fixed up and kept at rest for the next two weeks.

The common dislocation at the ELBOW is a backward one of both bones. The condition is usually obvious. It is impossible to extend the elbow fully, the lower end of the humerus forms a forward projection, and a gap can be felt between the tip of the olecranon and the back of the humerus.

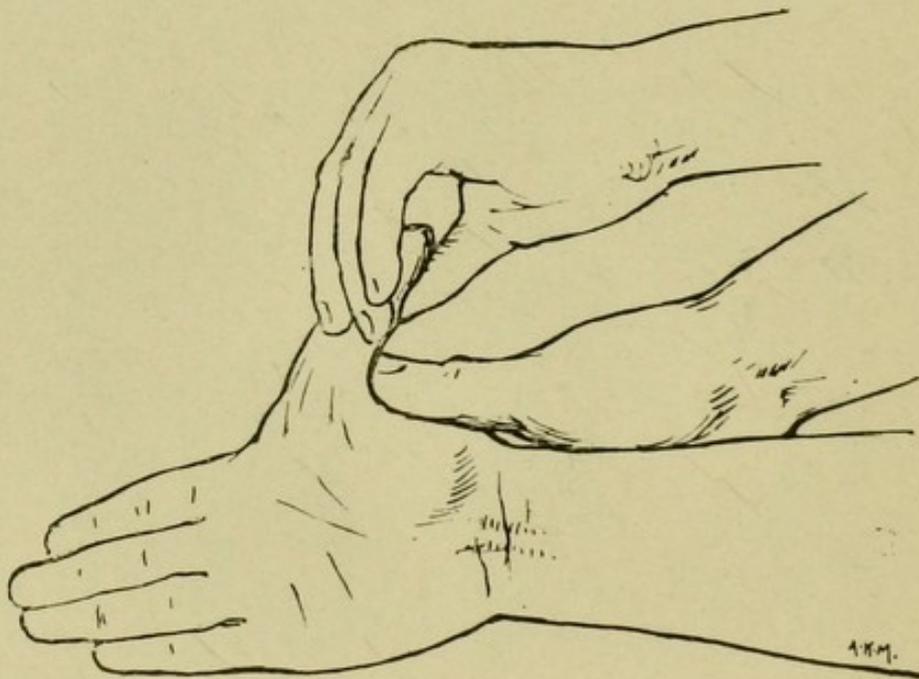


FIG. 66.—Method of Reduction.

In examining any abnormal condition about the region of the elbow, map out three points: (*a*) The internal epicondyle; (*b*) the external epicondyle; (*c*) the tip of the olecranon.

Place both arms in the same attitude and compare the relative positions of the

three points to one another, as contrasted with the relative position of the three points on the uninjured side.

In a normal arm in the position of full extension the three points are in the same straight line. During flexion a triangle is formed, and the triangles on both sides are usually similar.

When the dislocation is easily reduced, and then slips back as easily, one may be certain that there is also a fracture of the coronoid process.

The usual line of treatment is to place a knee in the bend of the elbow, to push hard against the upper part of the forearm, and, having thus disengaged the bone ends, to apply traction and flex the arm into its proper position. The procedure is usually easy; and when the parts have once gone back into place, often with a loud snap, it is unlikely that dislocation will recur in an uncomplicated case. Fixation of the arm in a position of right angles, making use of any light splint to effect it, is all the treatment necessary, and the splints need not be kept on for more than three weeks.

Where there has been a fracture of the

coronoid also, it is advised to fix the arm up in a position of full flexion and to use plaster of Paris to maintain the position. It will be well to leave the plaster on for from four to six weeks.

Dislocation of the SHOULDER is very common, and the usual form is the sub-coracoid one. The injury is obtained by indirect violence, and the head leaves the joint at the lowest and weakest part of the capsule.

Signs.

1. Flattening of the deltoid.
2. Prominence of the acromion.
3. A hollow below the acromion.
4. A change in the direction of the axis of the humerus.
5. Inability to touch the side of the chest with the elbow while the hand is placed on the opposite shoulder.
6. The depth and girth of the axilla are increased.
7. A straight edge can at the same time touch the tip of the acromion and the external epicondyle of the humerus.

8. A bulging is visible and palpable in the subcoracoid region.

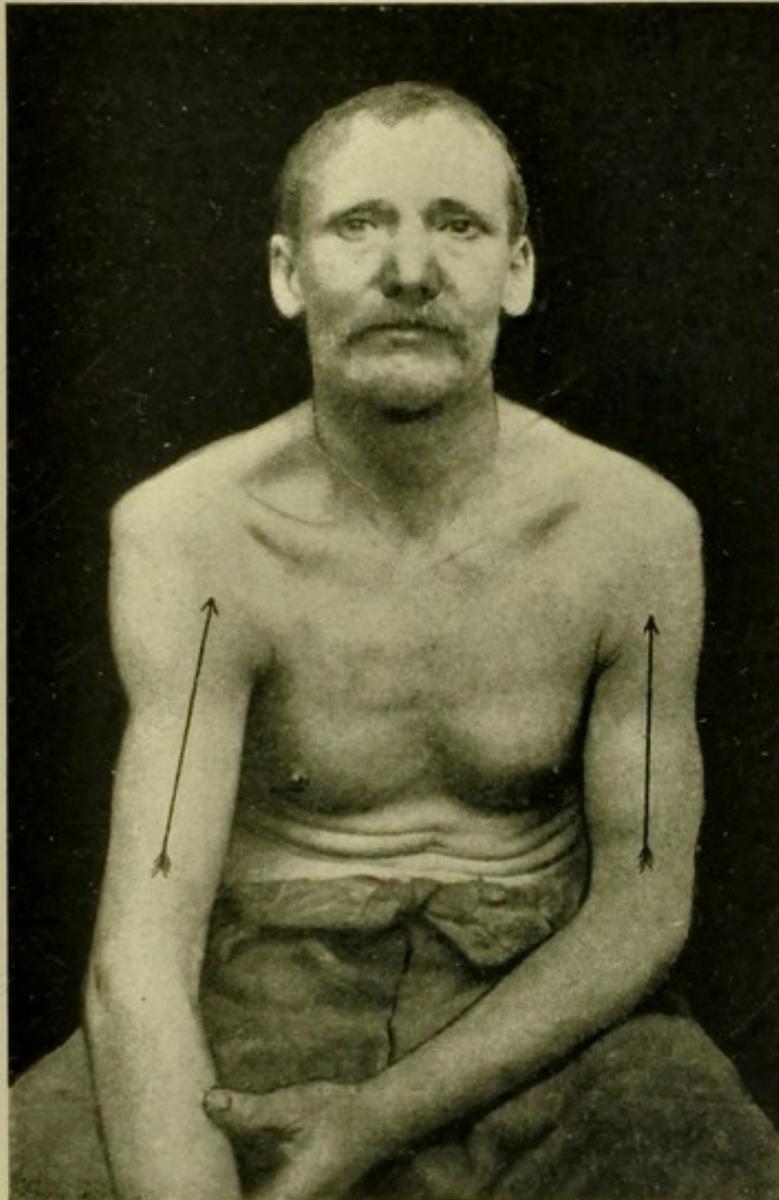


FIG. 67.—Dislocated Shoulder.

Reduction under an anæsthetic is usually extremely easy. Get the arm abducted to a right angle or a little farther and a fair

amount of traction put on it, and at the same time slight rotatory movements. While this is being done push or pull the head of the bone well up into the axilla, using the hands alone to do so, and during the course of manipulation it will find the gap in the capsule and slip back into position. This line of treatment is absolutely

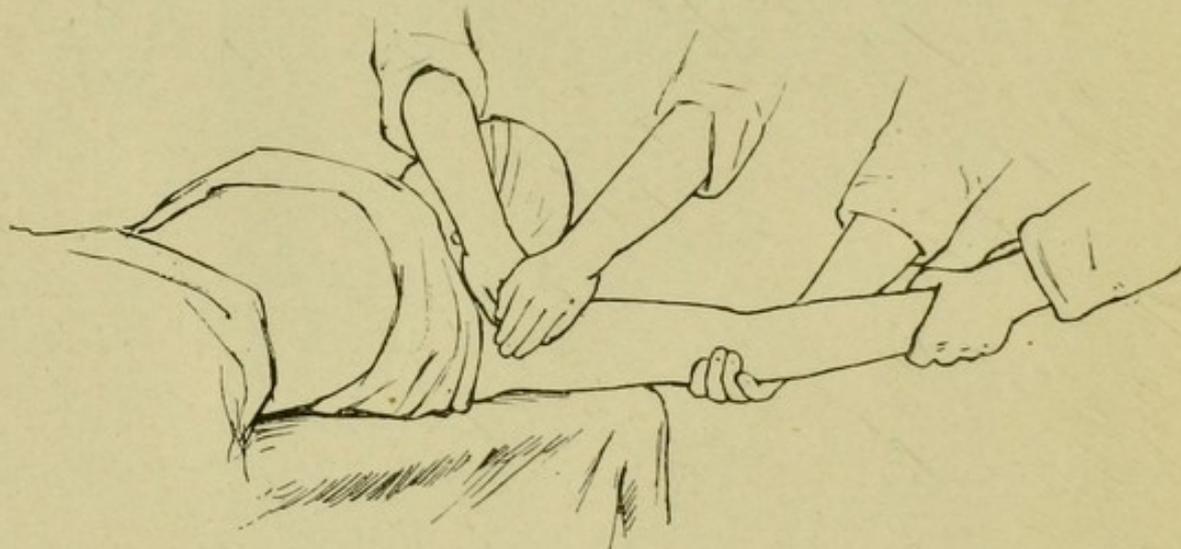


FIG. 68.—Method of reducing Dislocation.

devoid of danger to the axillary structures, and never fails when it is properly carried out.

The axilla should then be well treated with spirit and dusting powder, and the arm, forearm, and hand should be bandaged to the chest wall; a piece of lint must of course be placed between the skin

surfaces. So fix the bandages as to permit of the forearm being massaged and the elbow-joint moved without disturbing the shoulder-joint and upper arm.

After two weeks all retaining apparatus may be discarded except a sling; and massage and manipulation, especially abduction, must be commenced.

Dislocations of the bones of the FOOT are not common.

Dislocation of a TARSAL bone will usually require operation.

Dislocations of the FOOT WITH THE AS-TRAGALUS, need to be differentiated from SUBASTRAGALOID dislocations. If traction and manipulation under an anæsthetic do not suffice to reduce the dislocation, then the case must be submitted to operation.

These dislocations are frequently accompanied by fracture of some of the bones, especially the leg bones, and so if possible the cases should be submitted to X-ray examination. A case which has to be sent some distance to have this done should have the foot well enveloped in Gamgee tissue and then surrounded by a light casing of

plaster of Paris. It can then come to no harm during a journey, and the patient is not so cramped as he would be if the foot were fixed in splints.

Dislocations of the **KNEE** are rare, and the reduction presents little difficulty as a rule when the patient has been anæsthetised.

Dislocations of the **HIP** are not common, are fairly easily recognised, and are not always easy of reduction.

The "ligamentum teres" is always torn; the capsule is always torn, but the "Y-shaped ligament of Bigelow" remains intact, and if one makes a model of it with a calico bandage, and attaches it to a pelvic bone and to a femur, a short time spent in studying the range of movement permitted to the head of the bone will enable one to comprehend the displacements of the head of the bone, the paths along which it must have travelled to reach the resting-points, and the proper method of going about the reduction of the various forms. The capsule is almost always torn at its lowest and weakest part, and there the head has

its point of exit; but where the dislocation has been produced by a heavy weight falling on the sacral region, whilst the patient was in a stooping position, the head of the bone may be shot through a tear in the upper part of the capsule. The history is therefore of great importance, as reduction in such a case would be properly effected through traction and rotation, but without any circumduction.

The most common type is the dislocation on to the dorsum ilii, and the leg lies in a position of flexion, adduction, and rotation inwards, whilst measurements, "NÉLATON'S LINE, etc.," show considerable shortening. The head is also palpable in its new position.

Treatment.—Anæsthetise the patient, and when the muscles are completely relaxed follow the general principles already laid down.

Flex the leg well up.	Adduct it well.	} Exaggerate the existing position.
	Invert it markedly.	
Circumduct the leg outwards.	Evert it.	} Make the head of the bone re-parallel with the sound limb.
	Extend it, bringing it down	

This procedure brings the head of the bone round the rim of the acetabulum, and when

it comes opposite the tear in the capsule it generally slips in, often with a loud click.

The more rare form is dislocation on to the pubis. In this case the head is palpable in its new position, and the leg lies in a position of slight flexion, abduction, and external rotation. Here again, follow the general principles. The correcting movement will in this case be circumduction inwards, with inversion of the flexed limb and then extension down parallel to the sound limb.

It cannot be said that these procedures are always easy, since most of the cases occur in well-developed, muscular men, but they are infinitely easier than any other method described, and are seldom followed by any of the bad results appearing after the application of methods which necessitate the use of much force and require the aid of apparatus, or of several assistants. One seldom meets a case which cannot be tackled single-handed, provided always that the anæsthetic is being properly administered.

Rest in bed with fixation apparatus for three to four weeks.

THE JAW.

A dislocation of the jaw is most easily produced during the course of anæsthesia, and more dislocations are produced thus than one ever meets with in practice. When the condition is met with it has usually occurred during the course of yawning or of violent sneezing.

There is never the slightest difficulty in reducing the dislocation produced during the course of anæsthesia, whilst in other cases, spasm of the masseter muscles, pain, and nervousness all combine to prevent an easy reduction. There are many descriptions and diagrams in text-books of the proper method of tackling these cases, and, in the wrestling match which usually ensues, the innocent practitioner or student gets his thumbs well bitten if he succeeds in effecting a reduction, however well he may know theoretically how to prevent this happening.

The proper method of reducing a dislocation of the jaw is to lightly anæsthetise the patient, and then, when the spasm of the masseter muscles is relaxed, firm de-

pression applied well back in the region of the molars, whilst the chin is pulled forwards and upwards, will reduce those cases which do not reduce themselves.

The jaw should thereafter be fixed up with a four-tailed bandage, and only very limited movement should be allowed for the next two or three weeks.



