

A report on thirty-seven cases of tuberculous disease of the hip-joint, for which excision of the joint was performed in thirty-six cases / by Bilton Pollard and C.F. Marshall.

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14.
A REPORT ON
Thirty-seven Cases of Tuberculous
Disease of the Hip-joint,

FOR WHICH EXCISION of the JOINT WAS PERFORMED
IN THIRTY-SIX CASES

BY

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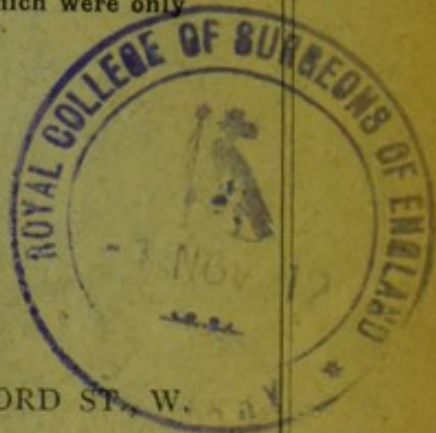
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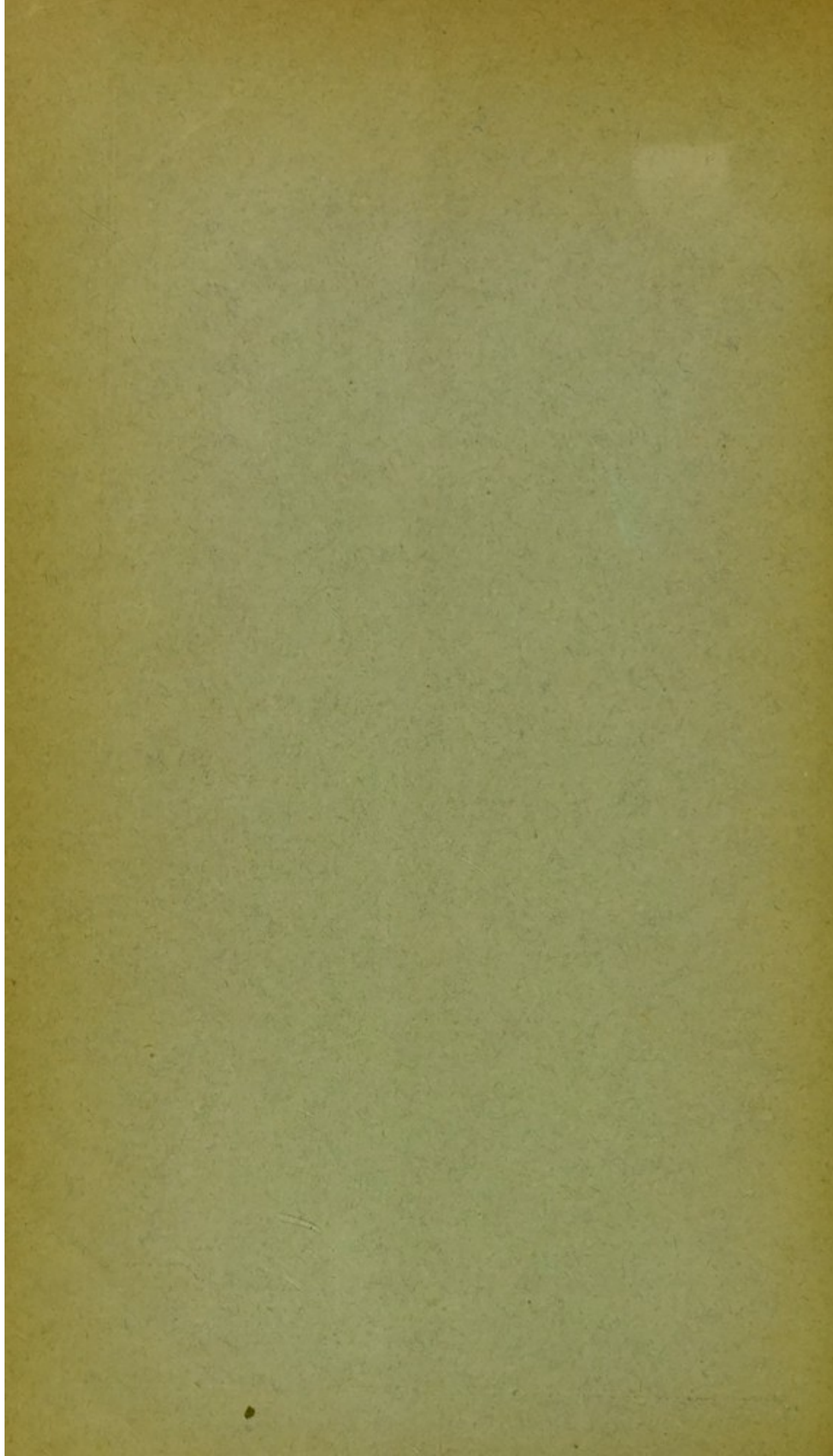
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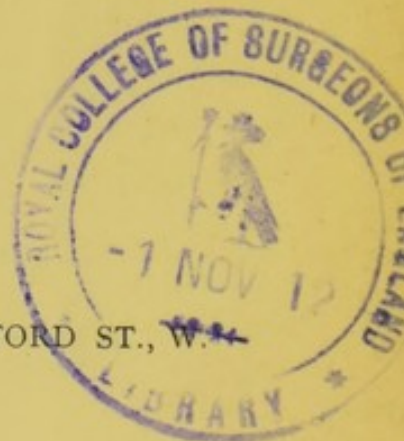
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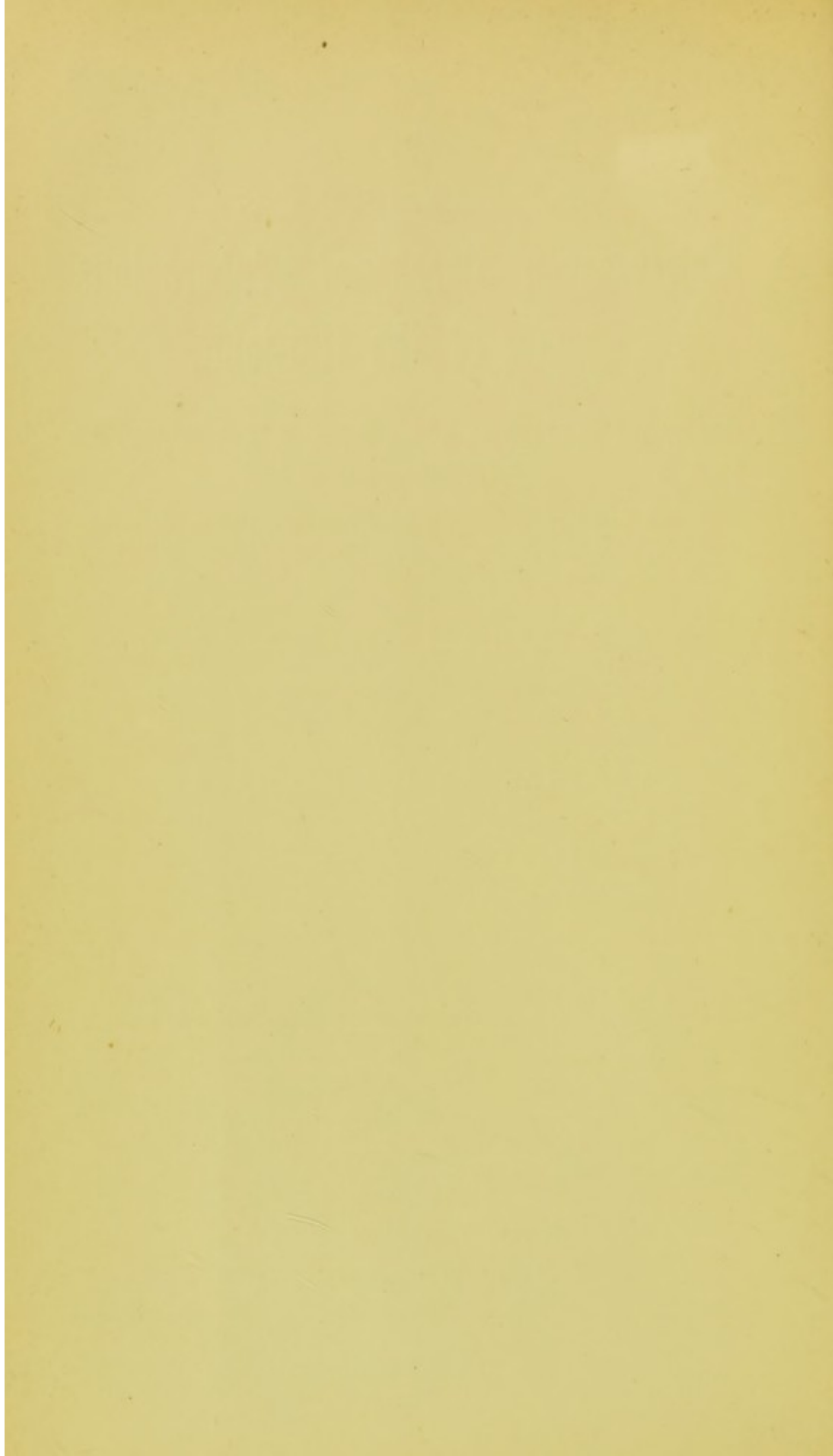
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INTRODUCTION.

THE treatment of tuberculous disease of the hip-joint after it has advanced to suppuration is regulated by two main schools of thought. One considers it best merely to open and drain the abscesses as soon as they are detected. The other recommends that the abscesses should not only be opened, but that they should be cleared of tubercular material, and that the tubercular growth should also be thoroughly extirpated from the joint, notwithstanding the fact that, in order to do so, it is usually necessary to remove the head of the femur. The relative merits of two methods of treatment have been much discussed in recent years, but the advocates of the rival plans are still, so far as we know, unconvinced by the arguments of the other side. *A priori* arguments and general impressions in regard to results will not carry conviction on a subject of this kind. Mere tabular statements of the results are also insufficient. The

opponents of a particular method of treatment should be so completely supplied with the facts that they may estimate its merits and demerits for themselves. Such a report should deal with consecutive cases, which have been under treatment in sufficiently recent times to allow of at least the majority of them being traced; for it is surely just as reasonable to assume that untraced cases either are or have been under treatment at other hospitals, or even that they are dead, as it is to assume that all or the majority of them are cured because they have not applied for further treatment. Nothing further can be said of untraced cases than that they spoil the returns. Having these views in mind, we have not delayed our investigations to a time when the report might suffer conspicuously from untraced cases. This report deals with all the cases of tuberculous disease of the hip-joint which have been operated upon by one of us during the last six years. By making inquiries in the localities where the children used to live we have traced several cases which would otherwise have escaped us. We have only failed to find two patients.* We have prepared abstracts of the notes of all the cases. These, though of necessity short, include, it is hoped, all the important facts in regard to them. The condition of the children when last seen is pretty fully stated, and engravings, executed from photographs, are appended to the reports of the cases when the children have left off their splints and are going about, their wounds being healed. In order to avoid repetition in the reports of individual cases, we shall first of all describe the plan of operation which was followed.

DESCRIPTION OF OPERATION.

The abscess, which almost always was found situated beneath the sartorius and tensor vaginae femoris muscles, was first freely opened by an incision between these muscles and thoroughly scraped and scrubbed with sponges in order to remove the tubercular growth. The lower part of the abscess was then plugged, whilst the sinus which led into the joint, and which was usually found just above the neck of the femur in the angle between it and the great trochanter, was enlarged sufficiently to give exit to the pus and tubercular debris from the joint and to admit the finger.

* One of these has been found since this paper was published.

If the head of the femur was diseased, as it invariably was, the neck of the bone was divided with an Adams' saw and the separated head was raised from the joint with a curved elevator and removed. Care was always taken to divide no more of the Y-ligament than was necessary in order to remove the head of the femur, for it was considered that this ligament was one of the chief agents in limiting the inevitable displacement of the trochanter upwards. The cavity of the joint was then very thoroughly scraped with a sharp spoon and in some cases tubercular tissue was cut away with scissors. In the earlier cases repeated scrubbing with sponges was relied upon for the removal of the tubercular debris, but in the later cases the cavity of the joint was flushed out with water sterilised by boiling alone, or, in addition, by perchloride of mercury in the proportion of 1 in 4,000 either through Mr. Barker's flushing spoon or through a piece of rubber tubing. The cavity of the joint was then dried and the wound being held open, a careful examination was made for any remaining tubercular growth with the aid of a strong light thrown into the cavity from a forehead mirror. By this means in a few cases tubercular foci were seen which would otherwise have escaped detection. Iodoform was applied to the joint and the cavity was tightly packed with sponges. After the stitches had been inserted the sponges were removed and the limb held in abduction. The sutures were then tied. In some of the cases a tube was inserted, but in others, following Mr. Barker's lead, no provision was made for drainage. In order to leave the cavity as dry as possible firm pressure was kept up about the joint until the dressing had been securely fixed with a moderately tight bandage. A double Thomas's splint made so as to maintain abduction of the limb was then applied. In the earlier cases the tube was not entirely removed for some weeks, in those about the middle of the series no tube was used, and in the later cases a tube was employed for about twenty-four hours. Immediate excision was not resorted to unless extensive and general disease of the joint was found. In some of the cases it was decided to deal with them as thoroughly as possible without excision, so as to give them a chance of healing without destroying the natural support of the joint. In all these cases, with the exception of one, which is not included in this series, it was judged best to excise the joint at a later date, on account of the unsatisfactory progress of the case.

The series of cases here reported refer to thirty-six patients. In one case both hip-joints were excised. We have, therefore, to do with thirty-seven radical operations for the removal of tuberculous disease from the hip-joint. Eight of the patients, or 21.6 per cent., are known to be dead. The mortality directly dependent on the operation was 10.8 per cent. (four patients). Of the remaining four cases two died of intercurrent affections altogether unconnected with tuberculosis, and two died from other tubercular complications. There remain for consideration twenty-nine cases. Of these twenty-seven have been followed up; two could not be found. The report has, therefore, to do chiefly with twenty-seven cases. Seventeen of these are now healed, and are now going about without splints. They

are subsequently referred to as completed cases. The remaining ten cases are still wearing Thomas's splints. Four of these appear to be soundly healed; six have a sinus. After the reports of the individual cases we propose to give an analysis of them under several headings, in order to bring into relief the points, both favourable and unfavourable, which appear to us to be the most important and instructive.



FIG. 1.

COMPLETED CASES.

CASE 1.—*C. R*—, aged 9 years. Disease of the right hip began at 8 years of age. No cause was assigned. There had been no previous treatment. The patient was admitted to hospital one year after the onset of the disease with a large abscess behind the trochanter. The limb was adducted and everted but not flexed. The joint was excised through a posterior incision. The head of the femur and the trochanter were found diseased, and the

head of the femur and part of the trochanter were removed; the wound was drained with tubes. The temperature was

normal throughout. The wound healed by primary union, except at the tube tracks; these healed by granulation two months after operation. There was a recurrence of the disease two years after the operation, the splint having been discarded for nine months. Carious bone was removed from the trochanter. The second and third secondary operations were performed six and ten months after the recurrence, and there was no further bone disease. The fourth secondary operation was performed eleven months after recurrence, an iliac abscess being opened. The fifth secondary operation was fifteen months after recurrence, with no further bone disease. The wound finally healed one year and four months after recurrence, and three years and seven months after excision. A



FIG. 2.

double Thomas's splint was worn for nine months after excision, and a single Thomas's splint for six months more. The splint was resumed after recurrence, and left off sixteen months after final healing. When the patient was last seen, five years and three months after excision (three years and three months after recurrence), the splint had been left off six months. The general health was fairly good. The real shortening was two inches, but the apparent shortening was only half an inch, the difference being due to abduction. The limb could be flexed to 10° and extended to the vertical. The patient walks easily with the aid of a stick. (Fig. 1.)

CASE 2.—*R. B*—, aged 7 years. Disease of the left hip began at 7 years of age; no cause assigned; treated previously with Thomas's splint for six months; again by weight extension five weeks before admission. Admitted to hospital fifteen months after onset of disease with abscess over trochanter. Limb was flexed and adducted and rotated inwards. Joint excised by anterior incision; head of femur much diseased; head and part of neck of femur removed; drained with tube. Temperature normal. Healed

in three months; no recurrence of bone disease. Small sinus scraped four months after excision. Finally healed five months after excision. Single Thomas's splint worn for twelve months after excision, and then left off without sanction. When last seen, five years and two months after excision, and four years and nine months after healing, splint had been left off four years and two months. Joint quite sound; real shortening two inches. General health fairly good. Joint could be flexed to 90°

and extended to vertical. (N.B.—This patient developed disease of the other hip about four years and a half after excision of the first hip; this was treated at the Evelina Hospital, where the head and neck of the femur were removed. Owing to this the apparent shortening could not be taken, and the patient could not walk without crutches; but with them and a patten on the left foot she could get about comfortably. (Fig. 2.)

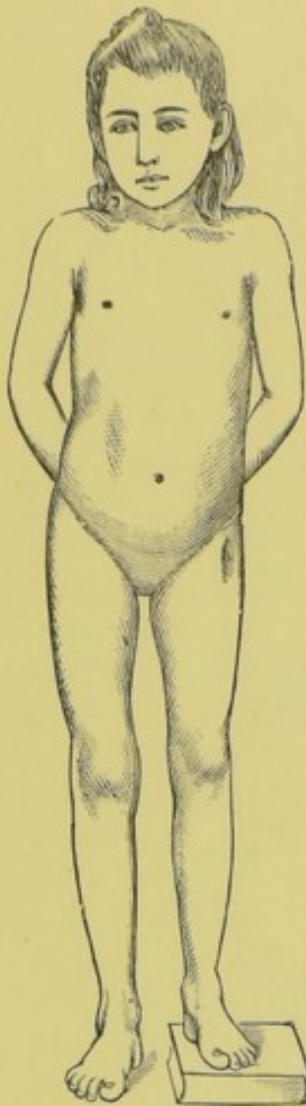


FIG. 3.

CASE 3.—*E. M*—, aged 6 years. Disease of the left hip began at 5 years of age after a fall; treated with weight extension for two months before operation. Admitted to hospital ten months after onset of disease with a posterior abscess. Limb was then flexed to 30° and adducted 20° ; no shortening. The abscess was opened and drained six weeks before excision. The abscess track did not heal. Joint excised by anterior incision. Head of femur carious, and removed. Acetabulum only superficially affected. Drained for five weeks. Temperature irregular for three weeks after excision. Healed in seven weeks. Two small secondary

operations, one consisting in scraping granulations, the other aspiration of an abscess three and eight months after excision. No recurrence of bone disease. Finally healed about nine months after excision. Splint worn for one year and ten months after excision. When last seen, four years and four months after excision, or three years and

seven months after final healing, the splint had been left on about two years and a half. General health good; joint sound; real shortening two inches, apparent shortening one inch and a half; firm fibrous union at an angle of 45° ; flexion compensated for by lordosis; difference in apparent and real shortening due to slight abduction. Walking good on toes without support. (Fig. 3.)

CASE 4.—*T. M*—, aged 3 years. Disease of the left hip began at the age of $2\frac{3}{4}$ years, after an injury to leg. Previously treated with plaster-of-Paris for three months, and afterwards with weight extension.

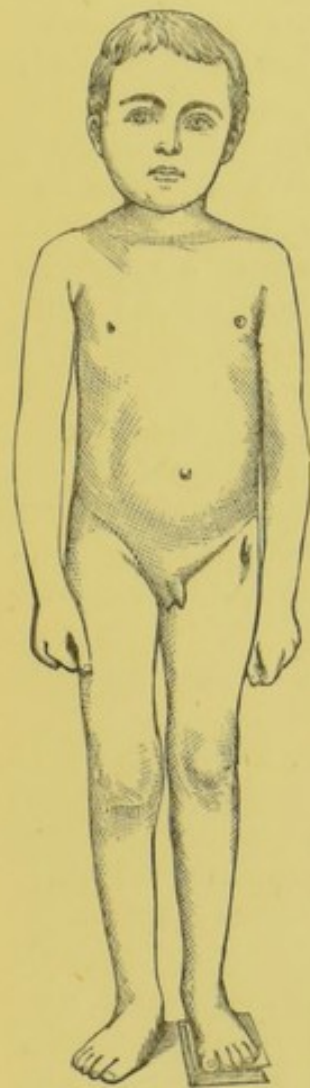


FIG. 4.

Admitted nine months after onset of disease with abscess in front of joint. Limb was flexed and inverted; joint excised by anterior incision; head and neck of femur diseased and acetabulum perforated. Head and part of neck of femur removed with a loose sequestrum from acetabulum; no drainage; temperature normal on eighth day; healed by primary union; recurrence three months after excision. Two secondary operations were done three and nine months after excision. Sequestrum removed from acetabulum at the first of these; no further bone disease at the second. Third secondary operation performed a year and ten months after excision; small carious spot in acetabulum. Finally healed one year and eleven months after excision. When last seen, three years and four months after excision, or one year and five months after final healing, splint had been left off eight months. General health good, and joint quite sound; real shortening one inch; apparent shortening one inch; no displacement of limb; joint allows flexion to 90° , and extension to vertical. Walks easily on sole of foot without support. (Fig. 4.)

CASE 5.—*A. P.*—, aged 5 years. Disease of the left hip began at 4 years of age; no cause assigned; no previous treatment. The patient was admitted to

hospital a year after the onset of the disease with an abscess in front of the joint; joint excised through anterior incision; head of femur disintegrated; acetabulum and root of trochanter diseased; head and part of neck removed and trochanter scraped; drained with two tubes; temperature rarely above 101° . Healed by primary union, except at tube track; recurrence fourteen months after excision. Four secondary operations—fourteen, sixteen, eighteen, and eighteen months and a half after excision. At the second of these there was fresh bone disease in the trochanter and upper end of the neck of the femur, with two small sequestra. There was no further bone disease at the last two operations. Wound finally healed about six

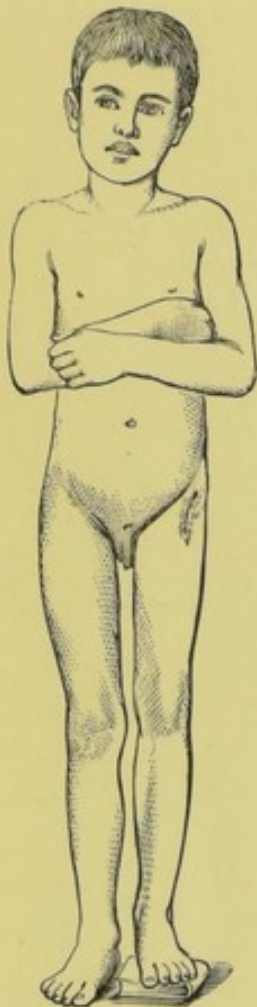


FIG. 5.

months after recurrence, and a year and eight months after excision. A Thomas's splint was worn for two years and six months. When last seen, three years and four months after excision, or a year and eight months after final healing, the splint had been left off eleven months. General health good and joint sound; real shortening an inch and three-quarters; apparent shortening an inch and a quarter, the difference being due to slight abduction. The limb could be flexed to 30° and extended to the vertical without movement of spine. Walks easily on toes without support, and can run about with other children. (Fig. 5.)

CASE 6.—*W. B*—, aged 5 years. Disease of the right hip began at 3 years of age; no cause assigned; previous treatment by weight extension for three months, followed by Thomas's splint for fifteen months. Admitted to hospital two years after onset of disease with abscess in front of and on outer side of joint. Joint excised by anterior incision; head of femur destroyed and upper part of neck carious; remains of head

and part of neck of femur removed; drainage for five weeks. Temperature never above 101° ; drainage track did not heal; recurrence; two secondary operations, four and thirteen months after excision; carious bone

removed at each. Wound finally healed fifteen months after excision; a Thomas's splint worn for one year and nine months after excision. When last seen, two years and six months after excision, or one year and three

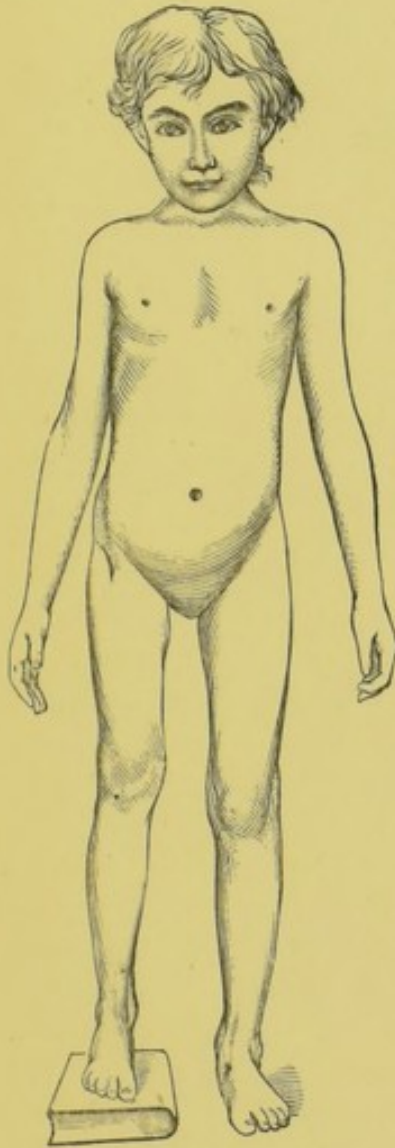


FIG. 6.

months after final healing, splint had been left off nine months; general health good; joint sound; real shortening two inches and a quarter, apparent shortening one inch and three-quarters, difference being due to slight abduction; limb was flexed at an angle of 10° ; joint allowed slight flexion and abduction. Walking good on sole of foot. (Fig. 6.)

CASE 7.—*C. K*—, aged 8 years. Disease of left hip began at 6 years of age; no cause assigned. Treated for nearly two years with a single Thomas's splint. Admitted to hospital two years after onset of disease with an abscess in front of joint. Limb was shortened three-quarters of an inch, adducted and everted slightly, but not flexed; joint excised by anterior incision; head and neck of femur diseased, acetabulum denuded of cartilage, but not very carious; head and neck of femur removed. Wound drained with two tubes for six weeks and a half; temperature only once above 101° ; primary union except at tube tracks; no recurrence of bone disease, but

residual abscess opened one year and eight months after excision, child having then left off splint five months previously. A double Thomas's splint was worn for seven months after excision, and a single Thomas's for eight months more. When last seen, two years and six months after excision, the splint had been left off about a year. General health fair. Real shortening one inch and a quarter; apparent shortening one inch; the difference being due to slight abduction. Joint firmly anky-

losed in good position; no movement independent of pelvis. Walks on sole of foot, preferably with the aid of a stick, but can walk well without it. (Fig. 7.)

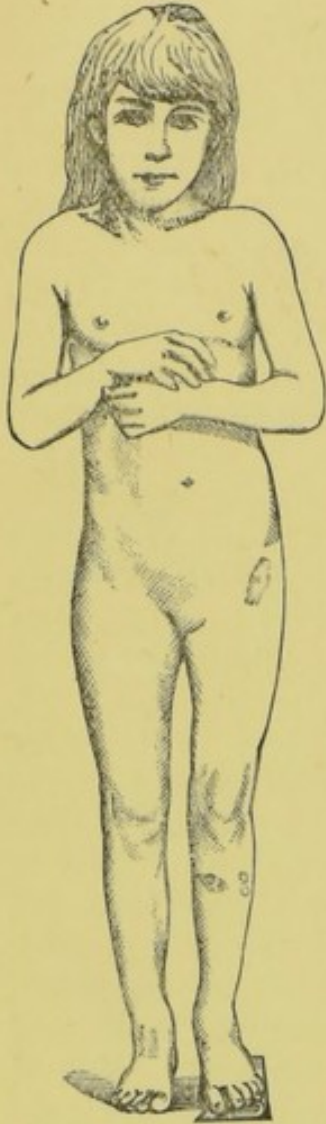


FIG. 7.

CASE 8.—*L. A*—, aged 9 years. Excision of both hip-joints. Disease of the left hip began at 8 years of age. No cause assigned. Treated with weight extension and double Thomas's splint before operation. Admitted to hospital one year after onset of disease with an anterior abscess. Limb in good position. Joint excised by anterior incision; head of femur carious, acetabulum affected superficially; head of femur removed; no drainage; temperature below 100° after third day. Primary union in three weeks; no recurrence or secondary operations. Wound finally healed three weeks after excision. Disease of right hip began insidiously while a double Thomas's splint was being worn; it was only noticed a month before excision. Joint excised by anterior incision three months and a half after first excision; head and neck of femur carious and most of head absorbed, acetabulum superficially diseased; head and neck of femur removed and a tubercular focus in trochanter scraped; no drainage. Temperature normal on eighth day. Primary union in three weeks; recurrence in scar six weeks after excision; no further bone disease. One secondary operation. Wound finally healed thirteen weeks after excision. A double Thomas's splint was worn for a considerable time after the operations (exact time not known). When last seen, two years and five months after the first excision, two years and one month after second excision, and one year and ten months after final healing of second excision, the patient's general health was good in spite of the fact that she also had spinal caries, for which prolonged treatment had been

necessary. Both joints were quite sound. Left limb: Real shortening, estimated, by relation of trochanter to Nélaton's line, two inches: joint allows flexion to 60° and extension to the vertical, also abduction to 45° and slight adduction. Right limb: Real shortening one inch and three-quarters; joint allows flexion to 30° and extension to the vertical, also slight adduction. The patient can walk slowly on the soles of the feet without any support. (Fig. 8.)

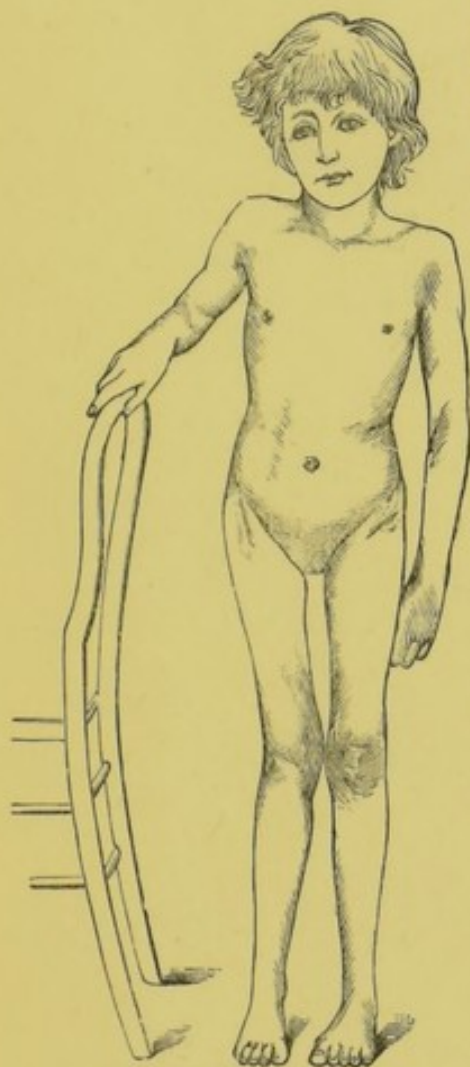


FIG. 8.

CASE 9.—*A. C*—, aged 6 years. Disease of right hip began at 4 years of age. No cause assigned. Previously treated with Thomas's splint. Admitted to hospital two years and a-half after onset of disease with an anterior abscess. This was opened and drained thirteen months before excision. As the sinus did not heal, the joint was excised by anterior incision. Head of femur nearly destroyed; acetabulum superficially diseased; remains of head and part of neck of femur and a sequestrum re-

moved; drained with tube; temperature never above 101.2° ; wound healed by primary union except at tube track. Three secondary operations, three, four and six months after excision. Further bone disease at the first of these only. Wound finally healed eight months after excision. A Thomas's splint was worn for about one year and eight months. When last seen, two years and five months after excision, or one year and nine months after final healing, splint had been left off about nine months. The boy had not gained much flesh, but his general health was good. Joint firmly ankylosed at an angle of 15° flexion; real shortening one inch and a-half, apparent shortening one inch and a-half. Walking good on sole of

foot without support. An interesting point in connection with this case is the fact that signs of phthisis appeared at the right apex nine months after final healing, but when last seen (nine months after leaving off splint) no sign of phthisis was detected. (Fig. 9.)



FIG. 9.

one inch and a half. Walking good on toes without support. (Fig. 10.)

CASE 11.—*C. N*—, aged 8 years. Disease of right hip, said to have begun when the child was eighteen months old. Admitted six years and a-half (?) after onset of disease with a large abscess over right buttock and a discharging sinus over trochanter; limb was shortened one inch; flexed and adducted; joint excised by posterior incision; head and neck of femur destroyed; trochanter and acetabulum extensively diseased; trochanter and remains of neck removed; drained with tube; wound did not heal. Five secondary operations, one, three, four, five and twelve months after excision; at the second of these the joint was re-opened from behind and more of

trochanter sawn off. The other operations consisted in the scraping of sinuses and treatment of fresh abscesses.

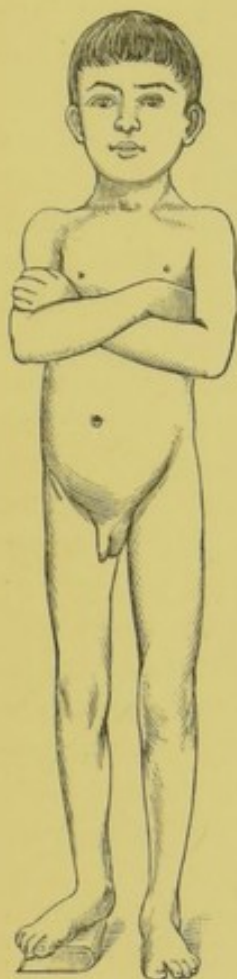


FIG. 10.

Wound finally healed thirteen months after excision. Temperature irregular all through till last operation. Splint worn for one year and three months after operation. When last seen, one year and eleven months after excision, or ten months after final healing, splint had been left off eight months. General health good. Joint sound; actual shortening three inches and a-half, apparent shortening two inches; difference due to abduction. Limb can be flexed to 30° and extended to vertical. Walking good on toes without support. (Fig 11.)

CASE 11.—*N. E*—, aged 3 years. Disease of left hip began at 2 years of age after a fall. The patient was treated from an early date with a double Thomas's splint. Admitted to hospital eighteen months after the onset of the disease with a discharging sinus at the upper and the outer part of the thigh. The limb was everted, but otherwise in good position. The joint was excised through the anterior incision; head of femur, trochanter, acetabulum and os pubis in front of acetabulum were all diseased. The head and neck of

the femur, with a loose sequestrum, were removed; drained with tube. Temperature irregular, but rarely over 100°F . The tube track did not heal. First secondary operation with removal of carious bone in the eighth week after excision; wound healed in six weeks. Recurrence. Second secondary operation eight months after excision; femur healthy, acetabulum carious; wound finally healed ten months after excision. A double Thomas's splint worn for seven months after excision, and single Thomas's splint for twelve months more. When the patient was last seen, one year and ten months after the excision, or one year after the final healing, the splint had been left off for three months. The child was in robust health and the limb not wasted at all. Scars firm; real shortening one inch, apparent shortening half an inch, the difference being

due to slight abduction. Limb could be extended to the vertical and flexed through 45° without movement of spine. Walks fairly well on sole of foot without any support. (Fig 12.)

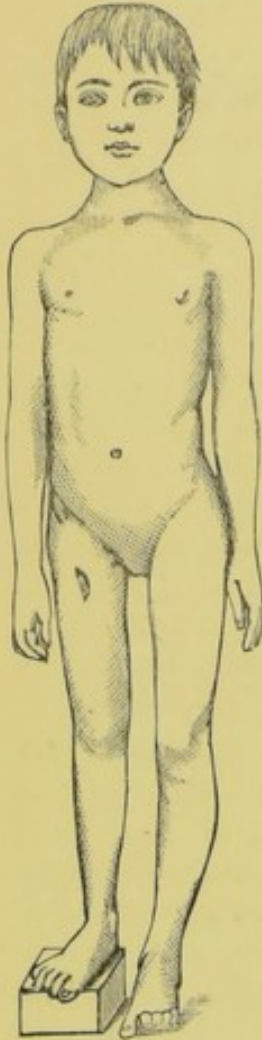


FIG. 11.

CASE 13.—*W. R*—, aged 9 years. Disease of right hip began at 7 years of age. No cause assigned. Admitted to hospital two years after the onset of the disease with an anterior and an iliac abscess; limb was shortened one inch and a-half, flexed to 45° , adducted and rotated inwards. The joint was excised through an anterior incision; head and neck of femur carious and dislocated backwards; acetabulum covered with granulations; head and neck of femur removed and iliac abscess found to communicate with joint over brim of pelvis; drained for twenty-four hours; temperature never above 100.4° . Wound healed by primary union with a firm scar four weeks after operation; no secondary operations; but the patient was re-admitted shortly afterwards for paralysis of the flexor muscles of the foot and anæsthesia, supposed to be due to pressure of the splint on the sciatic nerve; a Thomas's splint worn for about eighteen months. When the child was last seen, one year and ten months after the

operation, the splint had been left off for about four months. The child was in good health; scar firm and joint firmly ankylosed in good position without any flexion; real shortening one inch and a half, apparent shortening not made out, owing to foot being in a state of equinus caused by paralysis mentioned above. Walks easily without any support. (Fig. 13.)

CASE 14.—*E. S*—, aged 11 years. Disease of right hip began at 7 years of age after a fall. The patient was treated for some time with weight extension and splint. Admitted to hospital four years after onset of disease with abscess in front of joint. The limb was shortened one inch and a-half, flexed considerably and slightly adducted. Joint excised by anterior incision; head and neck of femur

diseased; acetabulum superficially diseased; head and neck of femur removed; drained for nine days; tempera-

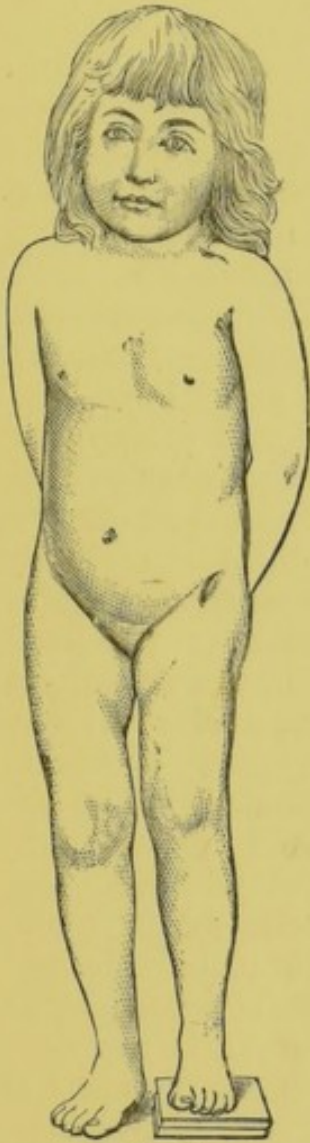


FIG. 12.

ture never above 100.6° ; primary union, except at tube track, which healed four weeks after excision; no recurrence of bone disease, but a small abscess, apparently residual in nature, opened fourteen months after excision. A Thomas's splint worn for thirteen months after excision. When the patient was last seen, a year and nine months after the operation, the splint had been left off eight months. General health fairly good; joint firm; real shortening three inches, apparent shortening two inches and a-quarter, the difference being due to slight abduction; limb could be flexed to 45° and extended to the vertical without movement of spine. Walks on sole of foot without support. (Fig. 14.)

CASE 15.—*M. B*—, aged 5 years. Disease of left hip began at 2 years of age. No cause assigned; no treatment before operation. Admitted to hospital three years after the onset of disease with a sinus on the outer side of the thigh. The limb was shortened two inches; flexed 20° ; adducted and rotated inwards. Joint excised by anterior incision; acetabulum obliterated by fibrous tissue; head of femur

and most of neck destroyed; sequestrum, consisting of head of femur, removed and joint scraped (operation more an arthrectomy than an excision); no drainage; temperature normal after second week. Wound healed completely. Two secondary scrapings were done two and five months after the first operation; no further recurrence of bone disease; wound finally healed in six months. A double Thomas's splint was worn for fifteen months after the excision. When last seen, one year and six months after the operation, or twelve months after the final healing, the splint had been left off three months. General health good; joint sound; real shortening two inches, apparent

shortening one and one-eighth inch, the difference being due to slight abduction ; slight mobility of joint. The child did not walk well, but the difficulty in locomotion was dependent more upon weakness of the knee and ankle of the healthy limb than upon deformity of the one which had been diseased.

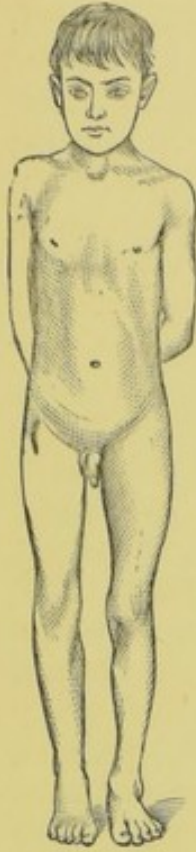


FIG. 13.

CASE 16.—*F. S*—, aged four years and 9 months. Disease of right hip began at 2 years of age. No cause assigned. The patient was treated with a single Thomas's splint for about a year, and a double Thomas's for six months more before operation. Admitted to hospital two years and three-quarters after the onset of the disease with a large anterior abscess. The limb was then everted and shortened one inch. Joint excised by anterior incision ; head of femur denuded of cartilage and carious ; section of the head showed disease commencing in the epiphysial cartilage and spreading to the surface at one point ; acetabulum also extensively diseased ; head of femur removed ; wound drained for thirty-six hours ; temperature never high ; wound healed by primary union in three weeks. A Thomas's splint (first double, afterwards single) was worn for twelve months. When the child was last seen, twelve months after the excision, the splint had just been left off. General health was good and the hip-joint and scar were quite sound ; real shortening one inch and a-quarter, apparent shortening one inch and one-eighth ; slight movements of flexion and abduction could be made. This case was too recent to estimate the powers of locomotion.

CASES SOUNDLY HEALED, BUT STILL ON SPLINTS.

Edith T—, aged 7 years. Disease of right hip began at 2 years of age. No cause assigned. Treated with weight extension for three weeks before operation. Previously patient had been treated elsewhere with weight extension for a year, and Thomas's splint for four months,

after onset of disease; after this she walked on limb for two and a half years.



FIG. 14.

Admitted five years after onset of disease with abscess behind trochanter. Limb was then flexed about 20° , and shortened three-quarters of an inch. Joint excised by anterior incision. Head of femur and acetabulum extensively diseased. Head of femur removed in carious fragments. Drained for forty-eight hours. Temperature nearly normal. Healed by primary union three weeks after operation.

When last seen, four months after operation, patient was wearing a Thomas's splint. General health good. Scars and joint sound.

Richard U—, aged 5 years. Disease of right hip began at 3 years of age after a fall. Treated with weight extension and Thomas's splint for about two years before operation. Admitted two years after onset of disease with an abscess in front and on outer side of joint. Limb was then flexed about 20° and somewhat inverted and adducted. Joint excised by anterior incision. Head of femur and acetabulum extensively diseased. Head of femur removed.

Drained for forty-eight hours. Temperature irregular. A sinus remained unhealed, and was drained. One secondary operation, with removal of carious bone from acetabulum, two months after excision. Finally healed three and a half months after excision. When last seen, ten months after excision and six and a half months after final healing, the hip was sound and free from swelling. The scar was depressed. The boy's general health was very good. He was still wearing a double Thomas's splint.

Charles M—, aged 8 years. Disease of left hip began at 6 years of age. No cause assigned. Treated with a single Thomas's splint for several months before operation. Admitted two years after onset of disease with an anterior abscess. Limb was then abducted and rotated out slightly, and shortened a quarter of an inch. Joint ex-

cised by anterior incision. Head of femur very carious, and contained a calcified tubercular sequestrum. On section, disease was found to have commenced in the epiphyseal cartilage. Acetabulum superficially affected. Head of femur removed. No drainage. Temperature high for a few days. One spot did not heal, and sinus was scraped two months after excision. No recurrence of bone disease. Finally healed four months after excision. Still wears a double Thomas's splint. Scars and joint sound, and general health good when last seen, six months after excision.

Henry S—, aged 10 years. Disease of right hip began at 9 years of age after an injury. Treated before operation with single Thomas's splint for four months. Admitted one year after onset of disease with anterior abscess. Limb was then shortened one inch. Joint was opened and scraped two months before excision, but no bone removed. Disease recurred a month after this with high fever, and two months after first operation joint was excised by anterior operation. Head of femur contained a carious cavity with two calcified sequestra. Acetabulum extensively diseased. Head of femur removed. Drained. Temperature low for a fortnight; after this it rose with formation of a fresh abscess behind trochanter, which was drained one month after excision. When last seen, about a year after excision, general health was very good. The scars were sound and deeply depressed.

CASES NOT TRACED.

Thomas B—, aged 11 years. Disease of right hip began at about 9 years of age after a fall. Treated before operation with Thomas's splint for six months. Admitted two years after onset of disease with an abscess which extended from great trochanter to inner side of femoral vessels. Limb slightly flexed and everted, but not shortened. Joint excised by anterior incision, and abscess found to extend across the limb beneath the femoral vessels. Head of femur denuded of cartilage and very carious; acetabulum also diseased. Head of femur removed. No drainage. Temperature never above 101°. Healed by primary union in three weeks, but some swelling continued in Scarpas triangle; this was opened two weeks later, and found to be due to blood clot, which occupied the diverti-

culum of the original abscess cavity. This was evacuated, and the wound healed by primary union. Two secondary operations four and seven months after excision. The first of these dealt with an abscess; at the second fresh bone disease was found in the acetabulum. Finally healed eight months after excision. Double Thomas's splint worn for two months, and a single one for six months more. Further history of case not known, as child could not be traced.

Harry M—, aged 4 years. Disease of left hip began at three years of age. No cause assigned. Treated with weight extension for four months and single Thomas's splint for six months before operation. Admitted about a year after onset of disease with an anterior abscess. Joint excised by anterior incision. Head of femur carious and was removed; acetabulum contained two sequestra. Drained with tubes. Temperature irregular for eight weeks, afterwards normal. Healed in four months. Recurrence six months after excision. Three secondary operations—six, eight, and twelve months after excision. Operations consisted in scraping sinuses; no recurrence of bone disease. Finally healed about thirteen months after excision. Further history of the case not known, as the child could not be found.*

CASES NOT YET HEALED.

Thomas S—, aged $8\frac{1}{2}$ years. Disease of left hip began at 7 years of age. No cause assigned. Treated for some time before operation with weight extension. Admitted sixteen months after onset of disease with much general swelling about joint. Limb was then much flexed and somewhat adducted. Three months later there was a large abscess at front and outer side of joint. Joint excised by anterior incision. Head of femur carious and dislocated backwards. Acetabulum only superficially affected. Head and part of neck of femur removed. No drainage. Temperature only once above 101° . Healed by primary union in three weeks. Recurrence in scar two years after excision. No further bone disease detected. Patient had

* November 30th, 1892. This patient was seen to-day. It is rather more than five years since his hip was excised. It has remained sound since the last operation. Real shortening one inch and three-quarters; apparent shortening one inch and a-half; movement at joint free in all directions. Boy walks well on sole of foot. He is in robust health.

then left off his splint for fourteen months, and had been running about in the interval; limb was then firmly ankylosed with one and a half inches shortening. Second recurrence three years and four months after excision, or one year and four months after first recurrence. Recurrence of disease in anterior scar and a large abscess behind trochanter; fresh disease extensively affecting trochanter and remains of neck of femur, which were removed by posterior incision. Acetabulum filled with fibrous tissue. Drained by tubes. When last seen two months after last operation the posterior wound had healed, but there was still a small sinus in the anterior scar.

Thomas B—, aged 7 years. Disease of right hip began at an unknown date. No cause assigned. Admitted with an abscess on outer side of joint. This was opened and drained two months before excision, but as it did not heal the joint was excised by anterior incision. Head and neck of femur carious, and were removed. Acetabulum superficially diseased. Drained by tubes. A sinus remained unhealed and was scraped five months after excision. Date of final healing unknown.

This patient had also tubercular disease of the left shoulder, left elbow, right knee, and left ankle joints. The knee was first treated by arthrectomy. Ten days later the ankle was scraped; two months after this the hip abscess was scraped, and the joint excised two months later. Two months after this the ankle was excised, and during the following month the elbow was excised. The shoulder was not operated upon. The joints all healed soundly except the hip and the shoulder. Three years after excision of the hip his mother stated that there was a small sinus which occasionally discharged from the old scar. The boy could not be induced to have this scraped, and refused operation, and this is not remarkable, considering what he had gone through before, having had six operations in seven months, including excision of three joints and arthrectomy of a fourth.

John A—, aged 8 years.—Disease of right hip began at 6 years of age. No cause assigned. Treated with single Thomas's splint for one year before operation. Admitted two years after onset of disease with abscess in front of trochanter. Limb was then shortened three-quarters of an inch and everted, but not flexed. Joint excised by anterior incision. Head and neck of femur carious, and acetabulum

perforated. Head and neck of femur removed and acetabulum gouged. Drained for eighteen hours. Temperature never above 101° . Healed by primary union in three weeks. Ten months after excision small abscess on outer side aspirated, washed out with sublimate lotion, and injected with iodoform emulsion. Recurrence one year and nine months after excision. Abscess over trochanter. Further disease in trochanter, from which several loose pieces of calcified tubercular bone were removed. When last seen, one year and ten months after excision and one month after recurrence, wound had nearly healed.

James L—Disease of the right hip began at 7 years of age. No cause assigned. Treated for six weeks with weight extension before operation. Admitted three months after onset of disease with abscess in front and to outer side of joint. Limb was then flexed about 45° , adducted and rotated in, and femur dislocated backwards. *Operation* (1).—Partial arthrectomy by anterior incision. Neck of femur and trochanter carious. Head of femur and acetabulum apparently healthy. Diseased bone scraped, but joint not excised. Drained for four days. Temperature irregular. Healed by primary union in three weeks. Recurrence, with abscess in situation of old scar, two months after first operation. *Operation* (2).—Anterior excision. Recurrence of disease in neck and trochanter. Acetabulum superficially affected. Head of femur very carious beneath the cartilage. Head and neck of femur and part of trochanter removed; drained. Temperature irregular for a week afterwards, but below 100° . Wound did not heal. Two secondary operations six weeks and ten weeks after excision. More carious bone removed at each operation. Healed four and a-half months after excision. Further recurrence one year and eight months after excision. Abscess discharged spontaneously, but wound not healing it was scraped two months later. Disease was limited to upper part of femur, from which tubercular sequestra were removed. When last seen, about a month after last operation, wound had almost healed.

Frederic W—, aged 4 years. Disease of left hip began at two years of age after a fall. Treated before operation with a double Thomas's splint for some time. Admitted about thirteen months after onset of disease with anterior abscess. Limb was then slightly flexed and abducted, but not shortened. Joint excised by anterior incision. Head of femur and

acetabulum denuded of cartilage. Head of femur removed. Drained for twenty hours. Temperature only once above 101° . Healed by primary union in three weeks. Recurrence. More carious bone removed from trochanter and neck of femur. When last seen, about a year after excision, there was a small sinus.

James S—, aged 9 years. Disease of right hip began at 7 years of age. No cause assigned. Treated before operation with a Thomas's splint for five months, and weight extension for one month before this. Admitted about two years after onset of disease with an abscess in front and to outer side of joint. Limb was then slightly flexed and everted. Joint excised by anterior incision. Head of femur and acetabulum diseased. Head of femur removed. Drained for thirty-six hours. Temperature irregular. Small sinus remained unhealed; this was re-scraped three months after excision, and more carious bone removed from acetabulum and neck of femur. When last seen, about six and a-half months after excision, the hip appeared to be sound, but there was a very small sinus covered with a scab.

CASES WHICH DIED.

George G—, aged 6 years. No notes obtained of history of disease, &c. Admitted with anterior abscess. Joint excised by anterior incision. Head of femur and acetabulum carious. Head of femur removed. Drained with tubes. Temperature irregular: varied from 101° to 104° . Wound did not heal. Died from exhaustion eight days after operation. Patient was in a weak and unhealthy condition before operation, and at the necropsy caseous lumbar glands were found, and an abscess in front of the bodies of the cervical vertebræ.

Mary C—, aged 4 years. Disease of left hip began at 2 years of age. No cause assigned. Admitted two years after onset of disease with an iliac abscess, and also abscess over trochanter. Joint excised by posterior incision. Iliac abscess opened separately, and found to communicate with joint through psoas bursa. Sequestrum removed. Drained with tubes. Died from collapse sixteen hours after operation.

Eliza S—, aged 10 years. No notes concerning previous history of case found. Admitted with an anterior

abscess. Child ill nourished and sickly. Hip adducted 40° and shortened one-third of an inch. Joint excised by anterior incision. Head and neck of femur diseased. Head and part of neck removed. The child bore the operation well until the joint was flushed with hot water, the temperature of which was not taken. The water was hotter than it should have been, but the finger of the operator was kept in the wound whilst the water was flowing. The child's pulse at the time suddenly failed, and death occurred three hours after the operation.

Florence B—, aged $6\frac{1}{2}$ years. Disease of right hip began at 5 years of age. No cause assigned. Treated before operation by weight extension, and afterwards by Thomas's splint. Admitted eighteen months after onset of disease with an abscess in front of and on outer side of joint. Limb was then flexed to 30° , slightly adducted and rotated out. Joint excised by anterior incision. Head of femur disintegrated. Acetabulum carious. Head of femur removed. Drained with tube. Temperature irregular for five weeks. Primary union except at tube track, which healed five weeks after excising. Nine weeks after excision a sinus formed, and was found to lead to acetabulum, which was scraped. Nine months after excision there was still a small sinus. Child died eleven months after excision from heart disease, from which she had been suffering for several years.

Jonathan H—, aged $5\frac{1}{4}$ years. Died two days after excision. Death supposed to be due to iodoform poisoning, iodoform emulsion having been used at the operation. [No notes of this case could be found, and no *post-mortem* was allowed.]

Louisa M—, aged 8 years. Disease of left hip began at an unknown date. No cause known. Treated with weight extension for two months before operation. Admitted with a sinus below the groin. Limb was then flexed and adducted. Joint excised by posterior incision. Head and neck of femur carious and were removed. Drained with tubes. Temperature irregular. Wounds did not heal. Four secondary operations at two, two and a-half, three and a-half, and four and a-half months after excision. At the first of these an iliac abscess was opened and drained and a sequestrum removed from the old wound; the others consisted in scraping sinuses. Healed about eight months after excision. Recurrence two years and eleven months after ex-

cision. Carious bone removed. Finally healed three years after excision. Limb was then flexed and adducted, and shortened one and a-half inches. About six months after this the child died at home from "abscess in the brain."

Rebecca P—, aged 4 years. Disease of right hip began at 4 years of age. No cause assigned. Treated before operation with single Thomas's splint. Admitted three months after onset of disease with abscess in front of joint and over trochanter. Limb was then flexed to 45° , adducted 30° , and shortened one and a-half inches. Joint excised by anterior incision. Head of femur and acetabulum carious. Head of femur removed. No drainage. Temperature rose to 104° on second day, and suppuration occurred. On the seventh day after excision wound was re-opened and drained. Temperature still kept high, and five weeks after excision wound was enlarged, and an abscess found behind trochanter, which was removed and the abscess drained. Nine weeks after excision, as temperature was still high, wound was re-explored, but found healthy. Shortly after this symptoms of meningitis supervened, and patient died of tubercular meningitis eleven weeks after excision.

George C—, aged 3 years. Disease of left hip began at 8 years of age. No cause assigned. Treated with weight extension for seven weeks and single Thomas's splint for two months before operation. Admitted five months after onset of disease with an anterior abscess. Limb in good position. Joint opened by anterior incision. Acetabulum carious; femur healthy; tubercular granulations filling joint. None of femur was removed, but joint was scraped. Drained for forty-eight hours. Temperature normal on tenth day. Healed by primary union three weeks after operation. Died from diphtheria four and a-half weeks after operation.

GENERAL STATISTICS OF ALL CASES.

Age at onset of disease.—In one case the age at onset was between 1 and 2 years; between 2 and 3 years of age there were seven cases; between 3 and 4 years four cases; between 4 and 5 years three cases; between 5 and 6 years three cases; between 6 and 7 years four cases; between

7 and 8 years five cases ; between 8 and 9 years three cases ; between 9 and 10 years two cases ; in five cases the date was unknown.

Side affected.—The right hip was affected in nineteen cases, the left in sixteen cases, and in two cases the side affected was not recorded.

Cause assigned for exciting onset of disease.—In ten of the thirty-seven cases the disease was assigned to a fall or blow on the hip ; in one case the disease appeared whilst a double Thomas's splint was being worn on account of disease of the other hip.

Duration of disease before operation.—This was from three to six months in five cases ; between six and twelve months in eight cases ; between one and two years in fourteen cases ; between two and three years in two cases ; between three and four years in one case ; between four and five years in one case ; and between five and six years in one case. In the majority of cases therefore the duration of disease before operation was between six months and two years ; in five cases the duration was unknown.

Situation of abscess.—In twenty-nine cases the abscess was situated anteriorly to the great trochanter ; in fifteen of these it was altogether in front ; in fourteen it was partly anterior and partly to the outer side of the hip ; in three cases the abscess was behind the great trochanter ; in one case the situation is not recorded. Two cases had also an iliac abscess, which was found to communicate with the joint through the psoas bursa. Four cases had discharging sinuses before the operation ; three of these were situated anteriorly and one posteriorly. The sinus leading from the superficial abscess to the joint was usually found just above the neck of the femur. The abscess had apparently burst from the joint at the posterior part of the capsule, and had subsequently passed forwards owing to the resistance being least in that direction. In one case the sinus passed directly backwards to the joint through the Y-ligament.

6. *Extent of disease at time of operation.*—In the large majority of cases—viz., thirty-five—the head of the femur and the acetabulum were denuded of cartilage and the bone carious to a greater or less extent at the time of operation. In five cases the trochanter was also diseased ; in one case the acetabulum only was affected ; in one case the head of the femur was removed as a sequestrum.

7. *Nature of operation.*—In the large majority of cases

the anterior operation was performed, posterior excision being done in only four cases. Of the thirty-three anterior operations two were of the nature of an arthrectomy—viz. : (1) the case in which the acetabulum only was diseased; and (2) the case in which the head of the femur was removed as a sequestrum. In five cases an operation was performed previously to excision; in three of these the operation consisted in simply opening, scraping and draining the abscess; in the other two cases a partial arthrectomy was attempted.

Period of primary healing.—Five cases died before the wounds healed. Of the remaining thirty-two cases, the wounds in twelve healed by primary union in three or four weeks, and in six more healed by primary union except at the tube track, which granulated in two or three weeks more without suppuration. This makes a total of eighteen cases, or nearly 50 per cent. of all cases in which the wound practically healed by primary union. These cases will be considered separately later on. In the other fourteen cases the period of primary healing was from three to fifteen months after excision.

Recurrence of disease.—In twenty-six of the thirty-two cases recurrence of disease took place; no recurrence took place in six cases up to the time when last seen (it must be mentioned that one of the six died of diphtheria in four weeks and a half after excision). In other words, about 81 per cent. recurred and about 19 per cent. did not recur. In the twenty-six cases which recurred there was further bone disease in twelve cases, or 37.5 per cent. of the total number of cases (thirty-two).

Secondary operations.—These were required in the twenty-six cases which recurred, but in fourteen of them, in which no recurrence of bone disease took place, the operations were of a simple nature as a rule, and caused but little further pain or trouble to the child. However, in all cases the previous excision of the joint facilitated the secondary operations, for the situation and extent of the former disease were known, or, in other words, the geography of the joint had been learned beforehand. Recurrent disease quickly showed itself at the excision scar, and abscesses, instead of burrowing about and giving rise to sinuses in several situations, came to the surface along the track of the operation wound. This is a point to which we attach importance. A single sinus which leads directly to the joint readily admits

of thorough treatment, whilst, if there are many and long sinuses passing amongst important structures, it is extremely difficult and often impossible to disinfect them. Consequently, when excision is performed late in the course of the disease and as a last resource, the wound quickly gets infected from the septic sinuses, and prolonged and often fatal suppuration takes place.

Influence of the operation on the general health.—Excluding, of course, the cases which died, all the patients were considerably improved in their general health after the operation, and were as a rule quickly relieved from the pain from which they had previously suffered. In only one case of the thirty-seven did general infection (tuberculous meningitis) ensue after the operation. One patient developed phthisis soon after his hip was excised, but when last seen, some nine months after he had left off his splint, no signs of phthisis could be detected, and, though still thin, the boy had decidedly improved in general health. In no case did any sign of amyloid disease appear; and, as may be seen from the detailed reports of the cases, amputation was required in none of them, although in several there was extensive pelvic disease.

The fatal cases.—The mortality directly due to the operation has been greater than it ought to be. Four, or 10.8 per cent., of the cases died soon after they had been operated upon. In two of the cases death was due to shock; with greater care these deaths might not have occurred. The death of one child was most probably due to too hot water being used for irrigation. The water was very hot, but it was not too hot to be borne by the operator's finger, which was kept in the wound all the time the water was flowing. The pulse, which had previously been fairly good, failed at once, and notwithstanding the most persevering efforts to counteract it, intense collapse supervened and the child died in three hours. This patient was the first on whom we used boiled-water flushing. In another case the operation was too prolonged, owing to an iliac abscess being dealt with at the same time. The child did not rally from the shock of the operation and died in sixteen hours after it. In another case, of which the full notes are unfortunately lost, the death is entered as due to iodoform poisoning. In the absence of the notes our recollection of this case is imperfect, but if the entry upon which we rely is correct, we feel that the cause of death was one

which should have been avoided. The fourth patient died from collapse on the eighth day after the operation. He was also suffering from spinal caries, and was in a weak and very unhealthy condition before the operation. Four other patients are dead. In two cases death resulted from affections in no way connected with disease of the hip—viz., severe and long-standing heart disease in one, and diphtheria in the other. One patient died of tuberculous meningitis eleven weeks after the hip was excised. The wound had not healed; it had not been drained in the first instance, and a tube had to be inserted later on owing to distension of the wound with inflammatory exudation. The fourth patient died three years and a half after the excision, the hip being soundly healed at that time. We are informed by the child's mother that death was attributed to abscess in the brain.

STATISTICS OF THE COMPLETED CASES.

For convenience of reference we have given below the statistics of these cases in a tabular form. We shall here deal with the main points more in detail.

1. *Period of healing*.—Primary union (including cases in which the tube track healed by granulation shortly after primary union of the rest of the wound) occurred in eleven out of the seventeen cases. Of these, four remained permanently healed and had no secondary operations, and four others remained healed for more than a year after excision before recurrence occurred. In addition to these we may add two cases (T. S—— and J. A——) which also healed by primary union and remained healed for two years and one year and nine months respectively before recurrence, thus making a total of ten cases which healed by primary union, and remained sound for a year or more. The date of first healing in the other cases was from three to fifteen months, as shown in the table. The period of final healing of course varies much according to the date of recurrence; this is given in each case in the table below.

2. *Recurrence of disease*.—In a total of twenty cases (including the seventeen completed cases and three others which remained healed for more than a year after primary healing) recurrence of disease occurred in sixteen; in nine

of these further bone disease was found ; in the others the bones were not further affected. In five cases there was only one secondary operation ; in five cases there were two, in three cases three, in two cases four, and in one case five secondary operations. It will be seen by referring to the table that those cases which had most secondary operations performed were as a rule the cases in which further bone disease occurred.

3. *Real shortening*.—In the seventeen completed cases the actual shortening was between one and two inches in nine cases, two inches in five cases, two and a quarter inches in one case, three inches in one case, and three and a half inches in one case. The average shortening is 1.85 inches. In the two cases which have three inches shortening, part of the trochanter was removed.

4. *Apparent shortening*.—This, as seen in the table, was as a rule less than the actual shortening, the difference being due to slight abduction of the limb and descent of the pelvis on the affected side. The average apparent shortening is 1.3 inches.

5. *Condition of joint*.—In two cases there was immobility of the joint, in four cases there was scarcely any mobility, in the remaining eleven cases there was more or less free mobility.

STATISTICS SHOWING THE EFFECTS OF FLUSHING AND DRAINAGE OF THE JOINT.

We shall here endeavour to show what bearing these points have on the time of primary and final healing. Cases admitted with sinuses are not included.

1. *Flushing*.—The treatment was adopted in twelve excisions, Mr. Barker's flushing curette being as a rule the apparatus used. In these, primary union occurred in seven cases. One case died from shock after the operation. The remaining four cases were healed in three and a half, four and a half, twelve, and six and a half months respectively. Four of the flushed cases had no recurrence of disease up to the time when last seen ; one of the four cases is that which died of diphtheria ; three other cases remained sound for thirteen, fifteen, and twenty months respectively before recurrence ; the remaining four cases are as yet too

recent to consider in regard to final healing. The effect of flushing is therefore favourable as regards the primary healing of the wound, seven cases out of twelve having healed by primary union, whereas only eleven out of twenty-five healed by first intention when flushing was not resorted to. Recurrence of disease appears to occur frequently whatever method of treatment be adopted.

2. *Drainage*.—In order to consider the effect of drainage on the primary healing of the wound we may divide the cases into (*a*) those which were not drained, (*b*) those which were drained for from eighteen to forty-eight hours, (*c*) those which were drained for longer periods. As before, cases with sinuses are not included. Seven cases were not drained; of these, five healed by primary union. Eight cases were drained for from eighteen to forty-eight hours; of these, six healed by primary union. Thirteen cases were drained for periods varying from four days to several weeks; of these, seven healed by primary union, with granulation of the tube track without suppuration. In short, healing by primary union occurred in 71.4 per cent. of cases not drained; in 75 per cent. of cases drained up to forty-eight hours; while 53 per cent. of cases drained for longer periods healed nearly by primary union. Cases therefore appear to heal almost equally well whether drained or not up to forty-eight hours, but there is a disadvantage in keeping up drainage for a longer period.

STATISTICS OF CASES WHICH HEALED BY PRIMARY UNION.

Of the eighteen cases which healed by primary union, including those cases in which the tube track healed shortly afterwards by granulation without suppuration, in a clinical sense, four remained sound permanently and had no secondary operations; these cases were seen last two years and five months, two years, one year and eleven months, and twelve months respectively after excision. One other case remained sound up to the time it was last seen, but this was too early for the possibility of recurrence to be excluded. Six more cases remained sound for periods between one and two years. One case died early from an intercurrent affection. In the twelve cases in which recurrence

took place there was further bone disease in only five cases. The table of these cases shows the date of recurrence after primary healing, the date of final healing, reckoned from the date of excision, and the number of secondary operations. The final results in those cases which are completed will be found by referring to the table of completed cases. The following conclusions may be drawn :—1. The primary healing must have been fairly complete and by no means limited to the superficial tissues in the majority of the cases, for the hips appeared to be quite sound and the scars continued healthy for many months, even in the cases where disease subsequently recurred. 2. That it is desirable to secure primary union if possible, not only in order to prevent the risks of septic suppuration, but also with a view to the better subsequent progress of the case. Fifteen of the cases are sufficiently advanced to be considered in regard to recurrence of the disease; five, or one-third of them, had further disease of bone. With these may be contrasted fourteen cases which did not heal by first intention; seven, or half of them, had further disease of bone.

COMPARATIVE RESULTS OF EARLY AND LATE OPERATIONS.

In order to elucidate this point we have studied twenty cases which were operated on more than a year ago, more recent cases being excluded; cases which died and those admitted with sinuses are also excluded. The duration of the disease before operation is stated in each case in the two tables, the one of cases which healed by primary union, the other of completed cases. By referring to the former table it will be seen that the duration has little if any influence on the primary healing, as the list includes cases of various durations, from five months up to five years. Also, by referring to both tables, it is difficult to show that the duration of disease has much bearing on the final results. It should, however, be borne in mind that whether the case had progressed slowly or rapidly the same indications for operation were observed—viz., the presence of a superficial abscess and extensive disease of the joint—and that in none of the cases were the soft tissues riddled with septic

sinuses, such as are often found in advanced cases, which have been inefficiently treated in the earlier stages of the disease.

CONCLUSION.

We believe that the cases recorded and analysed above afford an average sample of the results which are obtainable by the mode of treatment which was employed. The immediate mortality, however, we believe to be higher than it ought to be, and higher too than it would be found to be if a larger number of cases were analysed. The results, if considered from all points of view, appear to us to be much less encouraging than the advocates of the methods followed were led to anticipate would be the case. But, whilst making this admission, we feel that no other plan of treatment can offer better results in similar cases—similar not only in regard to the stage to which the disease had progressed, but similar also in regard to the social position of the patients.

TABLE OF CASES WHICH HEALED BY PRIMARY UNION.

			Date of recurrence, reckoned from healing.	Date of final healing.	Number of secondary operations.	Drained or not.	Flushed or not.	Duration of disease before operation.
L. A.	...	...	3 weeks	13 weeks	1	o	o	1 year and 4 months
L. A.	...	...	o	—	o	o	o	1 year
G. P.	...	...	o	—	o	Drained 4 weeks	o	5 months
W. R.	...	...	o	—	o	Drained 24 hours	Flushed	2 years
E. T.	...	...	o	—	o	Drained 48 hours	Flushed	5 years
F. S.	...	...	o	—	o	Drained 36 hours	Flushed	2 years and 9 months
G. C.	...	...	o	—	o	Drained 48 hours	Flushed	5 months
E. M.	...	...	6 weeks	9 months	2	Drained 5 weeks	o	10 months
T. M.	...	...	2 months*	1 year and 11 months	3	o	o	9 months
C. K.	...	...	1 year and 6 months	1 year and 9 months	1	Drained 6½ weeks	o	2 years
C. R.	...	...	1 year and 10 months	3 years and 7 months	4	Drained	o	1 year
A. P.	...	...	1 year and 2 months*	1 year and 8 months	4	Drained	o	1 year
J. A.	...	...	1 year and 8 months*	—	1	Drained 18 hours	Flushed	2 years
T. S.	...	...	1 year and 11 months*	Not quite healed	2	o	o	1 year and 4 months
T. B.	...	...	6 months*	8 months	2	o	o	2 years
F. W.	...	...	8 months	Not quite healed	1	Drained 20 hours	Flushed	13 months
E. S.	...	...	1 year and 1 month	1 year and 3 months	1	Drained 9 days	Flushed	4 years
F. B.	...	...	4 weeks	—	1	Drained 4 weeks	o	1 year and 6 months

* Recurrence of bone disease.

TABLE OF COMPLETED CASES.

	Duration of disease before operation.		Date of primary healing.		Date of recurrence.*		Number of secondary operations.		Real Shorten- ing.		Apparent Shorten- ing.		Condition of joint.	Length of time without splint.	Time when last seen.					
	Yrs.	Mths.	Yrs.	Mths.	Yrs.	Mths.	Yrs.	Mths.	Ins.	Ins.	Ins.	Ins.		Yrs.	Mths.	Yrs.	Mths.	Yrs.	Mths.	Yrs.
C. R.	1	—	8	—	1	10	3	7	2	2	1	1	Free mobility	—	6	5	3	1	11	1
R. B.	1	3	—	3	—	1	—	5	2	2	—	1	Free mobility	4	—	5	2	4	9	4
E. M.	—	10	7	—	6 weeks	—	9	—	2	2	1	1	Firm union	2	6	4	4	3	7	3
T. M.	—	9	3	—	2†	1	11	8	1	1	1	1	Free mobility	—	8	3	4	1	5	1
A. P.	1	—	6	—	2†	1	8	—	1	1	1	1	Free mobility	—	11	3	4	1	8	1
W. B.	2	—	—	15	—	4†	15	—	2	2	1	1	Firm union	—	—	2	4	1	3	1
C. K.	2	—	7	—	1	6	9	—	1	1	1	1	Firm union	—	9	2	6	1	3	1
L. A.	1	—	3	—	None	—	3 weeks	8	2	2	—	1	Free mobility	1	—	2	6	—	9	—
A. C.	—	6	—	8	—	3†	—	—	1	1	1	1	Firm union	—	9	2	5	2	4	2
L. A.	1	4	3	—	3 weeks	13 weeks	—	—	1	1	—	1	Free mobility	—	—	2	5	1	9	1
G. P.	—	5	5	—	None	5 weeks	—	—	1	1	1	1	Firm union	—	11	2	1	1	10	1
C. N.	6 (?)	—	—	13	—	13†	3	—	3	3	2	2	Free mobility	—	8	1	—	—	11	1
N. E.	1	6	14	—	—	6†	10	—	1	1	1	1	Free mobility	—	—	1	11	—	10	—
W. R.	2	—	4	—	None	—	—	—	1	1	—	1	Firm union	—	3	1	10	1	—	1
E. S.	4	—	4	—	—	13	4 weeks	—	3	3	—	2	Free mobility	—	4	1	10	1	9	1
M. B.	3	—	—	6	—	2	3	—	2	2	2	1	Free mobility	—	8	1	9	—	6	—
F. S.	2	9	3	—	None	—	3 weeks	—	1	1	1	1	Mobility.	—	3	1	6	1	—	1
														1 week	—	1	—	—	11	—

* Date of recurrence is calculated from period of primary healing, except where there was recurrence before primary healing.
† Recurrence in bone.