available give an almost complete absence of observed tuberculosis in the first two or three weeks of life, the numbers increasing slowly, and then rapidly as the age advances. It is the same with calves. The absence of an inherited latent tuberculosis is further shown by the facts relating to the guinea pig, the young of which animal, when the mother is tuberculous, is almost never tuberculous, and if reared apart does not become so. Bang's experience with calves is the same. As regards an inherited tissue tendency, we have the facts above mentioned and others of a more general nature, such as the great mortality among healthy people when exposed to intense infection, and also in healthy animals under the same circumstances, and the manner in which the disease has been shown to overrun new populations when freshly introduced among them. Indeed, it would almost seem that infected populations possessed a certain degree of tissue immunity. This conception is strengthened by the large proportion of recoveries from phthisis which we now know to exist, coupled with the temporary refractoriness to tuberculin which is set up after a short course of inoculation. If the recent announcement of the isolation in Koch's laboratory of an immunising body in the bodies of tubercle bacilli be confirmed, this view would be much strengthened. There would remain in that case only the inheritance by the children of tuberculous persons of a weak physique.

Another subject of much importance is the diagnosis of the disease. We have already valuable and much-needed aids in a correct appreciation of commencing tuberculo- sis. Where a discharge exists we have microscopical examination of the discharge and the extremely delicate test of inoculation, which, however, can only be made in a pathological laboratory. We have also in non-febrile conditions the use of minimal doses of tuberculin, the danger of which is probably not great and which may even be to some extent curative. Finally, we learn from Professor De'epine's paper in the *Medical Chronicle* of April that we may look for a test similar to that now employed for typhoid fever. It would thus seem that we are approaching a period when no error need exist even about living persons, and when, therefore, we may proceed with increased confidence in our preventive measures.

Manchester.

THE PRESENT ASPECT OF THE TREATMENT OF CONGENITAL DISPLACEMENT OF THE HIP.

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THE treatment of this disabling deformity is one that at present exercises the minds of surgeons considerably, because hitherto no particular method has been found to be uniformly successful, and at this time the subject is passing through a transition stage. It is now felt by those who have most experience of the treatment of this affection that operative measures in a wide sense are very far from attaining satisfactory results, and there is, so to speak, a throw-back of opinion in favour of the treatment first initiated by Paci—namely, forcible reduction and the maintenance of the limb in the abducted position. Before going into details it will be advisable, first, to review the various phases through which treatment has passed. There is, however, one considerable difficulty in deciding which is the appropriate treatment for cases, and that is the comparative scarcity of specimens in museums from which to gain definite conclusions. But it would seem that certain factors are always present at birth in truly congenital cases—namely, the acetabulum is, as a rule, in its normal position, though abnormal in shape, being triangular, oval, or elongated, yet very seldom absent.

In early cases, notably those described by Lockwood, the cartilaginous rim is wanting and the mass of fat at the fundus of the acetabulum, the gland of Havers, is much hypertrophied. When the cotyloid border is defective the cavity is almost continuous with a flattened surface on the

iliac bone, sometimes covered with cartilage, indicating the new position taken by the displaced head. The head of the femur is round, or irregular, or flattened. In some cases it is said to have been absent even at birth, but this fact is not well authenticated. The neck is short and conical, and forms an angle rather less obtuse than normal with the diaphysis. The round ligament is flattened and slender, or in many cases is absent. The capsule is elongated, thinned, its capacity much increased, and sometimes it is distended with fluid. There is often considerable displacement of muscles, and Lockwood has stated that those which surround the joint participate in the disturbance of position, the obturator externus and quadratus femoris being dragged upwards by the ascent of the head of the femur. The ilio-psoas lies in a deep groove which is situated just below, and internal to, the anterior inferior spine of the ilium, and the tendon of the psoas winds backwards in an exaggerated way to reach the lesser trochanter. Such are the appearances often seen, and the points to be recognised at this early period of life are the abnormal shape of the acetabulum, its shallowness, and the frequent deficiency of the cartilaginous rim around it. In children who have walked the acetabulum is seen to remain small, shallow, and triangular. Above and posterior to it and around the new socket there is sometimes found a growth of bone, which forms a partial rim for the new socket and to which the capsular ligament is attached. The neck of the femur may be shortened or absent, and then the head is supported directly by the shaft, but in other cases the neck is still quite distinct, and an important point is the change in its direction. In cases in which the displacement is dorsal the neck is, as it were, bent backwards; in cases of anterior displacement it is bent forwards, so that it no longer forms a proper angle with the shaft. This is an important point in the question of treatment by manipulative measures, as in some cases, while it is quite possible to get the head in a good position, the whole limb and the foot remain turned outwards or inwards, as the case may be. The capsule is elongated, dilated and in some cases thinned, while in others it is much thickened. It sometimes has a curious hour-glass shape and its cavity is constricted about the middle. The muscles are stated to be contracted considerably, and their contraction in some cases forms a distinct hindrance to reposition of the head of the bone. In adult life these changes are much exaggerated, but Bradford and Lovett remark that the new cavity on which the head of the femur rests is often deep enough to form a good support. The pressure of the head of the femur in its new position causes absorption of the periosteum and redundant joint-capsule in that place, and the capsule finds a new attachment in the osteophytes thrown out to form an upper rim to the new cavity in favourable cases. Muscular contractures around the joint are best seen in adults, and they are no doubt due to the abnormal position of the head of the femur and to the slight flexion and rotation of the thighs. Considerable shortening is found in the psoas and iliacus and in the peri-trochanteric muscles, while the adductors and internal rotators are affected in an equal degree. Such, then, in brief, are the essential departures from the normal which are found at birth, during childhood, and in adult life.

The methods of treatment of congenital displacement of the hip are three—namely: (1) extension, either in the recumbent position or by apparatus; (2) operative measures; and (3) forcible reduction.

1. *Extension, either in the recumbent position or by apparatus*—This is the oldest form of treatment, and among its advocates are Pravaz, Buckminster Brown, and William Adams. But to Buckminster Brown should be ascribed the credit of having from the first treated cases in this way with considerable success. He subjected his patient, a little girl, aged four years, to complete recumbency with extension for thirteen months and then allowed her to get about for a year in an apparatus by which she could imitate the movements of walking without bearing the weight on the legs. At the end of two years and three months the trochanters were in place, lordosis had disappeared, and the child was able to run about normally. Unfortunately, the patient, when seen nine years after the conclusion of treatment, had lapsed. In this country Mr. William Adams has advocated this method of treatment, and his experiences are recorded.¹ But, unfortunately, we are not told that the patients were able to get about ultimately

¹ Brit. Med. Jour., Feb. 22nd, 1890

without apparatus of any kind. I have tried recumbency with extension in two cases with much promise of success, but at present the patients are getting about and walking with an extension apparatus on, and I am waiting until the apparatus has been off for a year before reporting the cases. Sometimes, where it is not possible to submit the patients to prolonged recumbency, I advise the following modification of this treatment—namely, the use of weight-extension at night and the wearing of an extension-instrument by day, the patient being allowed to walk about at will. This plan is very useful in children under four years of age, but is not successful in older children.

2. *Operative measures.*—Those most in use are Hoffa's and Lorenz's. The details of Hoffa's operation are sufficiently well known; it is very severe when carried to its full extent. It almost amounts to amputation at the hip-joint, the femoral artery and vein, the anterior crural and the sciatic nerves alone being left intact, and there is wide and deep gouging of the bone at the site of the deformed acetabulum. Personally I am strongly of opinion that it is not advisable to persuade a patient to undergo Hoffa's operation, because of the unsatisfactory results by which it is so often followed. Hoffa details the results of 112 operations by him on 82 patients; 30 of them had bilateral and 52 unilateral displacements. Death occurred in 3 cases, in 2 of them being due to prolonged anæsthesia, hæmorrhage, and shock, and the third to iodoform poisoning. In 9 cases ankylosis of the hip followed, and return of luxation in 11. Dr. Halsted Myers, in the "Annals of Surgery," August, 1895, remarks that he has notes of 177 cases of Hoffa's operation, or some of its modifications, and amongst these are 6 deaths due directly to operation—namely, 3 of Hoffa; 2 of Kirmisson, 1 from hæmorrhage and peritonitis, eight days after the operation, following perforation of the acetabulum, and 1 from septicæmia; there is 1 death in a case operated on by Broca. Kirmisson states that he knows of a few fatal cases in the hands of other surgeons which he is not authorised to mention. Another point that militates against Hoffa's operation is the fact that cure is by no means certain. Hoffa has himself stated that he wishes it to be distinctly understood that these children cannot be completely cured, since there is always left some shortening of the limb. In bilateral cases, however, he can reduce the waddling gait to a minimum, and can almost overcome the lordosis.

The details of Lorenz's operation are: Division of the tensor vaginæ femoris through a longitudinal incision starting from the anterior superior spine of the ilium, and to the first incision is added another passing transversely inwards at the level of the trochanter; the anterior wall of the capsule is then denuded and the capsule opened by a crucial incision, the acetabulum is hollowed out, and the head of the femur re-formed if necessary; after which it only remains to pull on the latter until it is brought down to a level with the cotyloid cavity; much assistance is now afforded by section of the ham-strings. Lastly, the limb is put up in a position of slight abduction; in four weeks' time massage and gymnastic exercises are begun, and these must be continued for a year. The advantages of this operation consist in causing comparatively little interference with the muscles. In Dr. Halsted Myers's paper in August, 1895, in the "Annals of Surgery," on Congenital Dislocation of the Hip, it is there remarked that Lorenz had then operated on 63 cases and had recorded no deaths and but 3 relapses. Since then Lorenz must have found much cause for modifying his opinion of the value of his operation, as "after much thought and careful observation of the cases he has operated on he resolved to alter his procedure in many cases," and has carried out bloodless reduction with perfect success. This statement coming from so experienced a surgeon as Lorenz, from one who has devoted himself so much to the subject, is worthy of the greatest consideration. But before Lorenz had arrived at this conclusion other surgeons' thoughts were drifting in the same direction. For instance, Professor Schede of Bonn, who has had experience of treating such cases in two ways, either by the operative method or by the method of rest combined with extension and abduction of the limb, reported very favourably of the latter method.

3. *Forcible reduction.*—Paci's manœuvres are carried out as follows. The patient lying down, the surgeon flexes fully the leg on the thigh, and the thigh on the pelvis. This movement carries the head of the femur downwards, especially when assisted by direct pressure. The thigh is now abducted slightly. After this the limb is strongly rotated outwards,

and then rather more rapidly fully extended. The last movement throws the head of the femur into, or on, the acetabulum. Paci in 1894 reported on 15 cases, and they were almost perfect a year or more after operation. With the idea of more effectually fixing the head of the femur in its new position or into its proper position, Lannelongue advises the injection of a few drops of a 10 per cent. solution of chloride of zinc at intervals of three or four weeks. This method has answered very well. Lorenz has modified Paci's method, and his present procedure is as follows: First, lowering the head of the femur by traction. Secondly, depressing the head of the femur to the utmost degree by flexion, followed by forcible abduction. The penetration of the head into the cotyloid cavity is announced by a perceptible shock and click. Thirdly, fixation of the femur by a plaster-of-Paris bandage, which prevents reproduction of the dislocation. The plaster-of-Paris treatment should be continued for several months. Lorenz has now employed this method of treatment in 43 cases, aged upwards of six years, and met with success in every case. No apparatus was ever used after the treatment was finished. As a modification Mikulicz employs an apparatus by which extension is made after the reduction, together with considerable abduction, and the head of the femur is pressed firmly into its new position.

It would seem, then, that of the three methods that have been described that of recumbency with extension, although fairly well tried, has not been quite satisfactory; that of open operation—namely, Hoffa's method—is somewhat dangerous, is by no means perfect in its result, and cannot be relied upon, while that of Lorenz, although less severe, yet also cannot be said to be quite perfect, nor can the originator of that operation admit that he himself is quite satisfied with it, while there is to be noted the sudden change of his opinion in favour of the third measure—namely, forcible reduction. For my own part I have been quite unable to convince myself that it is possible, in the first place, to deepen an imperfect and shallow acetabulum in such a way that the head of the femur can be retained in spite of all the shocks of body movement and weight that it has to bear. Nor in the few cases of Lorenz's operation which I have seen has the result been in any sense satisfactory—either the lordosis or some up-and-down movement has remained, or, as in one case I saw, there was bony ankylosis. This was a young girl, aged thirteen years, who went over to Vienna to be operated upon and came back to show herself to me afterwards. I found firm bony ankylosis of the left hip, surely a very serious occurrence in view of the future possibilities of marriage and pregnancy. Nor do I think that those cases which have been operated upon in England have in any sense satisfied the surgeons that Lorenz's procedure is to be relied upon, or that they have a distinct curative value.

In support of these views is the following abstract from the *Sammlung der Gesellschaft Deutscher Naturforscher und Aerzte*, 1896. Professor Schede, who initiated the discussion, stated that out of a total of 99 cases he had in 98 successfully reduced the dislocation by external manipulation. The ages of the patients ranged from infancy to fifteen years. In children who had not learned to walk the reduction was accomplished under chloroform by simple traction on the limb with the thigh abducted. A return of the displacement was prevented by a plaster-of-Paris bandage, which maintained the abducted position of the limb and at the same time exercised pressure upon the trochanter. In all the children where this simple procedure failed it was necessary to make repeated attempts, and especially to overcome in the first instance by means of extension the resistance offered to the reduction by the contracted soft parts. After reduction in unilateral cases, if the child had learnt to walk, he was allowed to go about in a plaster bandage. But inasmuch as the abducted position results in apparent lengthening of the affected limb, the sole of the sound foot must be heightened to a corresponding degree. In bilateral cases it is strongly urged that both dislocations be reduced at one sitting. The thighs are maintained in an abducted position by a plaster bandage like a pair of bathing-drawers—that is, it stops short at the knees. The bandage should be worn for from four to six months. Lorenz formerly the advocate of operative treatment, continued the discussion, and stated that he had been successful in securing reduction by external manipulation in 83 cases. He drew attention to the value of first employing some method of extension whereby the displaced head of the femur can be drawn down to the level of the acetabulum. The joint is then fixed in

the abducted position until the shorter adductor muscles are sufficiently stretched to allow of the surgeon proceeding to the actual reduction. This latter is accomplished by flexing the thigh to a right angle, and while traction is made in the long axis of the thigh the latter is abducted until the head of the bone enters the socket with a characteristic click. The head may then be felt in its normal position in the inguinal fold midway between the anterior superior spine and the symphysis pubis, while at the same time the thigh becomes visibly longer.

The advantages of securing reduction by manipulation instead of by operation are obvious, apart from the avoidance of risks appertaining to all major operations. There is no scar, there is no possibility of later contracture or of osseous ankylosis, and the after treatment is so simple that children may be treated as out-patients. Operative measures may therefore be said to be restricted in the future to cases in which the manipulative procedure has failed after repeated attempts. Hoffa of Würzburg, Wolff of Berlin, and Kümmel of Hamburg corroborated the opinions expressed by Schede and Lorenz.

It seems, then, that we have reached this position—that operation either by Hoffa's method or by Lorenz's method must be considered seldom necessary, and it is entirely discredited as a means of treating every case of any severity, and that it can only be used as a last resource, and then with no certainty of success, but at considerable risk to the patient. At almost any age up to adult life the manoeuvres of Paci, as modified by Lorenz, will be found to afford the best method of treatment. So far, then, we have not attained to any ideal form of treatment of this serious deformity, and the matter must remain for the present in an incomplete stage, but the best we can offer the patient is forcible reduction without an open wound, with the prospect of cure in many cases and of much improvement in others.

Weymouth-street, W.

ON SERUM DIAGNOSIS IN GLANDERS.

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ALTHOUGH Professor M'Fadyean of the Royal Veterinary College called attention some five months ago to the fact that the serum from a case of equine glanders caused well-marked agglutination in bouillon cultures of the glanders bacillus, no record has hitherto been made of the serum reaction in human glanders. In Professor M'Fadyean's case the serum was diluted with nine times its volume of sterile bouillon and then mixed an equal volume of a bouillon culture of the bacillus. The proportion of serum used was thus one in twenty, and "the reaction was quite distinct after an hour, and at the end of two hours almost the whole of the bacilli had become motionless and collected into large irregular clumps."¹

In February last I was enabled by the kindness of Mr. Atkinson, house surgeon at King's College Hospital, to investigate thoroughly the serum reactions in a case of glanders occurring in a stable-boy who had been admitted under Mr. Rose. In testing this serum a bacillary emulsion was made as follows. Five c.c. of a 0.5 per cent. sodic chloride solution were added to a five days' old culture of the bacillus on glycerin-agar; the contents of the tube were shaken up gently and then allowed to stand for about an hour in order that any small particles visible to the naked eye might settle. The upper part of the fluid was then pipetted off and the emulsion thus obtained was found to be in every way suitable for the experiments. The bacilli used were of a stock isolated from pus derived from the patient in question. Using hanging drop preparations, in which the proportion of serum to bacillary emulsion was as one to nine, it was found that large clumps always formed before the specimen could be transferred to the stage of the microscope for examination. With one part of serum and nineteen of the emulsion a similar agglutination invariably occurred within ten minutes. Thus the human serum would appear to act more energetically in this respect than does the equine serum as described by Professor M'Fadyean. The agglutinative action of the

serum was equally well shown in test-tube experiments. Two series of these experiments were carried out, in one set 0.2 c.c. of the serum with 2 c.c. of the emulsion and in the other 0.1 c.c. of the serum with 2 c.c. of the emulsion being used. There was no appreciable difference in the appearance of the tubes in the two sets of experiments. In either case the upper part of the emulsion began to clear in about six hours, and at the end of twenty hours there was complete sedimentation of the bacilli, which formed a coherent mass at the bottom of the now otherwise clear fluid. Several samples of normal human serum used in the proportion of one part to nine of the emulsion caused no change whatever in the bacilli, whether in hanging drop preparations or in the test tubes. Professor M'Fadyean notes that the same is true of normal equine serum. So far the results of the experiments were quite satisfactory, and in accordance with what has been found to be the action of the serum from cases of cholera, typhoid fever, and diphtheria upon the respective bacteria causing these diseases. But on further investigation it became apparent that this agglutinative action of the glanders serum could not be said to be a specific one so far as the glanders bacillus was concerned, for on repeating the above experiments with a similar bacillary emulsion, but substituting for the glanders serum first anti-diphtheric serum (1 c.c. = 300 normal units) and then four different samples of serum from cases of typhoid fever, it was found that equally well marked agglutination of the glanders bacilli occurred. Similar results were also obtained with bouillon cultures of the bacilli; and it is almost unnecessary to add that control experiments were made throughout.

The result of all this may be summed up as follows. Agglutination of the glanders bacillus can be brought about by contact with (1) a serum from a case of active infection by the glanders bacillus; (2) a serum from a case of active infection by the typhoid bacillus; and (3) a serum from a horse immunised against the diphtheria bacillus. And, on the contrary, no such action is manifested by either normal human or normal equine serum. On reversing the experiments it was found that a certain, though decidedly less active, agglutination of the typhoid bacillus was caused by both anti-diphtheric serum and glanders serum. With regard to these latter experiments I do not propose to offer any comments now, as I hope to deal fully with them in a paper in the forthcoming volume of Transactions of the Institute of Preventive Medicine. From the above; will be readily seen that the value of the serum reaction in glanders as an aid to clinical diagnosis is extremely doubtful.

As to the interest and immense importance in its bearing on various problems affecting bacterial diseases of the work on serum reactions which we owe to Pfeiffer, Grüber, and Durham there can be no question. But the application of their results for purposes of clinical diagnosis is quite another matter. And without wishing for one moment to underrate the very valuable work in this direction which has been carried out more especially by Widal abroad and in this country by Sheridan Delépine, I would venture to suggest that the absolute specificity of serum agglutination in different diseases has yet to be proved. Indeed, it appears to me to be, in the first instance, most unlikely that the unknown substance which in the serum of typhoid fever—to take that disease as an example—exerts so potent an influence on the typhoid bacillus should be inert as regards other bacteria. One is therefore not surprised to find that the equally unknown, but probably similar, substance in anti-diphtheric serum has an agglutinative action on both the glanders and typhoid bacilli.²

Carlisle-mansions, S.W.

² With regard to the anti-diphtheric serum it must not be forgotten that Bordet found that agglutination of typhoid bacilli was sometimes observed with normal equine serum. But normal equine serum has, as already stated, no action of the sort on the glanders bacillus.

¹ Preliminary Note on the Sero-diagnosis of Glanders, Journal of Comparative Pathology, December, 1896.

THE NEW ELTHAM COTTAGE HOSPITAL.—A dramatic performance will be given on Monday next, May 3rd, at 8.30 P.M., at St. George's Hall, Langham-place, on behalf of the hospital. The play to be performed is the ever popular *Dan'l Druce*. Tickets may be obtained through Mr. Jeken, Bexley-road, Eltham; Dr. Mitchell, Court-road, Eltham; Mr. White, High-street, Eltham; Mr. J. Eagleton, West Chislehurst-park; Mr. E. Hesketh, Court-road, Eltham; Mr. E. R. Sharpe, Court-road, Eltham; and Mr. W. G. Cowell, High-street, Eltham.