REMARKS

ON

THE SUBCUTANEOUS DIVISION OF THE NECK
OF THE THIGH-BONE,AS COMPARED WITH OTHER OPERATIONS FOR RECTIFYING EXTREME
DISTORTION AT THE HIP-JOINT, WITH BONY ANCHYLOSIS.**Illustrated by a Successful Case of the Subcutaneous Division.*

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CASES of extreme deformity at the hip-joint, with the thigh flexed upon the pelvis, and generally adducted or drawn towards the opposite limb, sometimes even crossing over the opposite limb, are not uncommonly met with in surgical practice as the result of various forms of hip-joint inflammation.

Anchylolysis of the hip-joint may be either true or false as in other articulations. By true anchylolysis, I mean bony union of the articular surfaces after complete destruction of the joint; and by false anchylolysis, either one of two conditions; viz., 1. Union of the articular surfaces by fibrous tissue after ulceration of the articular cartilage and partial or complete destruction of the joint; or, 2. Inflammatory thickening and retraction of the ligamentous and other fibrous structures external to the joint; the joint itself remaining in a healthy, or nearly healthy condition, without any destruction of the articular cartilages, but sometimes with intracapsular adhesions.

In the present paper it is not my intention to speak of *false anchylolysis*; but, in reference to the first condition of false anchylolysis above described, I would only observe that it is generally the result of strumous disease, with ulceration of the articular cartilage, and that any amount of contraction and deformity may be overcome by gradual mechanical extension, with or without tenotomy, according to circumstances, so as to bring the limb into an improved position; but there never can be any reasonable expectation of restoring motion in the joint, and forcible extension is extremely hazardous, as liable to set up inflammation and re-excite destructive disease in the articular extremities of the bones.

With regard to the second condition of false anchylolysis, in which there is no destruction of the articular cartilages, I would only observe that this condition is generally the result of acute rheumatism, frequently with gonorrhœal complication, or, as it is called, gonorrhœal rheumatism. In this form, forcible extension under chloroform is especially applicable, any contracted tendons having been divided three or four days previously, where this may appear necessary; by it the deformity may be completely overcome and free motion of the joint restored in a large proportion of cases, if the treatment be commenced within six months or a year of the rheumatic inflammation. Occasionally I have myself succeeded in restoring motion at a much later period, even as late as three years; but, on the other hand, I have entirely failed after the lapse of a year, such cases passing into complete bony anchylolysis. Gradual mechanical extension, combined with passive motion, will occasionally succeed in this class of cases when commenced early, but is very liable to failure. Either of these two forms of false anchylolysis may result from traumatic inflammation occurring in a healthy individual; but unless suppurative in the joint occurs, the latter form generally takes place, the articular cartilages remaining in a healthy condition; and in such cases forcible extension under chloroform, with or without tenotomy, according to circumstances, generally gives the most satisfactory results.

True bony anchylolysis can only occur after complete destruction of the joint and removal of the articular cartilages. This condition may be the result either of the strumous, the traumatic, the more severe forms of rheumatic, or the pyæmic form of inflammation. When resulting from strumous disease after ulceration of the articular cartilages and caries of bone, it occurs only at a late period—generally from seven to ten years after disease has ceased. I have known fibrous anchylolysis to remain in the hip-joint seven years after active disease had ceased; and it is an admitted fact that bony anchylolysis is very slow to result in this class of cases. When resulting from traumatic inflammation, bony anchylolysis may take place within a year if suppurative inflammation of

the joint has occurred; but, if not, the articular cartilages remaining sound long after the injury, bony anchylolysis is not to be looked for, except perhaps as a late result after many years. When resulting from the more severe forms of rheumatism—especially the gonorrhœal form—bony anchylolysis generally occurs in a period of from one to three years; the articular cartilage being first covered by the lymph effused during the inflammatory process, and then slowly disappearing after membranous bands of adhesion have been formed between the adjacent articular surfaces; i.e., from one articular cartilage-surface to the other. For an illustration of this form, see case recorded by myself in the Pathological Society's *Transactions*, vol. xx, p. 296; London, 1869. When resulting from acute pyæmic inflammation, causing rapid and complete destruction of the joint, bony anchylolysis occurs more quickly than after any other form of inflammation, except when acute suppuration follows as the result of an injury in a healthy individual. In the pyæmic as well as in the traumatic form, bony anchylolysis may occur within the period of a year.

When bony anchylolysis of the hip-joint has taken place as the result of any of the inflammatory affections above described, no operative procedures should be attempted, if the anchylolysis have occurred with the limb in a straight position, as any attempt to obtain free motion by the production of an artificial joint could only be made at the risk of life, and under the most favourable circumstances with a very doubtful result as to useful motion. In the great majority of cases of bony anchylolysis of the hip-joint, however, contraction of the joint with the limb in a deformed position is found to exist; in some cases, simple flexion of the thigh having occurred with very little adduction or abduction; in other cases, severe adduction, with a comparatively small amount of flexion; and again, in others, the distortion will be found to depend upon flexion with abduction, or adduction, of the thigh, in about equal proportions.

The inconveniences consequent upon anchylolysis of the hip-joint with distortion will vary according to the extent, and also according to the direction, in which the distortion has occurred; e.g., in a case of simple flexion of the thigh, even when contracted to a right angle with the pelvis, and accompanied with abduction, as in the case in which I subcutaneously divided the neck of the thigh-bone, and the photographs of which I now exhibit to the meeting, the inconvenience was limited to the uselessness of the limb, the use of a crutch and stick being necessary for progression.

In cases of anchylolysis with distortion, in which adduction of the thigh predominates, so that the knee is drawn across the opposite thigh; or in cases in which the adduction and flexion are combined, the inconveniences are very great when occurring in females, in consequence of pressure upon the labia and the orifice of the vagina rendering urination difficult, and the thigh liable to constant excoriation. This occurred to a serious extent in one of the cases operated upon by Louis Sayre of New York; and in this case even the introduction of a catheter was found impossible. Inconvenience of a similar kind occurred in the case of a young lady who was the subject of fibrous anchylolysis of the hip-joint, with the thigh in an extremely adducted position, with very little flexion, and upon whom I have operated with partial success by means of forcible extension, under chloroform, after tenotomy.

These and other inconveniences will be found to depend upon the extent and direction in which the distortion has occurred, and it is therefore obvious that in some cases an urgent necessity exists for surgical interference; and various operations have been proposed, not only with the object of rectifying the deformity and bringing the leg into a straight and useful position, but it has also been attempted to obtain free motion by the production of an artificial joint.

The first operation, having for its object not only that of rectifying the deformity, but of obtaining motion by the establishment of a false joint, was performed by Dr. Rhea Barton* of Philadelphia, United States, in 1826. This operation was accomplished by a crucial incision made over the great trochanter, seven inches in length and five inches in a horizontal direction. The bone was then divided transversely by a fine saw—it is said "between the two trochanters"—probably just above the small trochanter. The natural direction of the limb was at once restored, and the case proceeded favourably. It is said that useful motion was obtained, but that seven years afterwards anchylolysis took place, and that the man died of phthisis nine years after the operation.

The next operation worthy of attention is recorded by Dr. Louis Sayre† of New York, who operated successfully on two cases in which he performed a new operation, which he had proposed for obtaining a

* Read before the Surgical Section at the Annual Meeting of the British Medical Association in Newcastle-upon-Tyne, August 1870.

* "On the Treatment of Anchylolysis by the Formation of Artificial Joints", in the *North American and Surgical Journal*, April 1827; with further remarks in the *American Journal of the Medical Sciences*, vol. xxi.

† "A New Operation for Artificial Hip-joint in Bony Anchylolysis: illustrated by Two Cases." By Lewis A. Sayre, M.D. New York: D. Appleton and Co. 1869.

false joint and preserving motion in cases of bony ankylosis of the hip-joint, with the thigh in a flexed position. The theory of this operation was to obtain free motion by the formation of a false joint, of a ball-and-socket character, supposed to resemble the hip-joint in possessing an acetabulum or cavity corresponding to this, and a rounded extremity of bone corresponding to the head of the femur; and also a round ligament.

The operation consisted in the removal of a transverse section of the femur, of elliptical form, just above the trochanter minor (as shown in fig. 1), by means of the chain-saw, an incision of about six inches in

Fig. 1.—Diagram copied from Louis Sayre's pamphlet. 1. Head of Femur. 2. Trochanter Major. 3. Trochanter Minor. 4. Line of insertion of Capsular Ligament (variable). 5. Tendon of Psoas Magnus and Iliacus Internus Muscle. 6. Line of Curved Section. 7. Line of Transverse Section. 8, 8. Dotted Lines indicating rounding off of Lower Fragment after removal of Segment.

Fig. 2.—Upper portion of Thigh-bone. Situation and direction of Subcutaneous Division of Neck of Thigh-bone represented by line α , α .

length being made over the trochanter major in the axis of the limb. The first patient, Robert Anderson, aged 26, was operated upon on the 11th June, 1862, and in December of the same year he is reported as follows, "Could stand on either leg without either crutch or cane"; and as late as April 29th, 1868, Dr. J. S. Green says, in a letter to Dr. Sayre, that "Robert Anderson still lives, moves, and walks with practical agility" (p. 35, pamphlet).

The second operation was performed 6th November, 1862, on Miss Susan M. Losee, aged 24. This case proceeded less favourably than the first; but all discharge from the wound ceased four months after the operation. Subsequently, however, an abscess formed, and a little necrosed bone escaped. Pneumonia and pleurisy occurred, and she died on the 17th May, 1863. At the *post mortem* examination, tubercular deposits were found in the lungs, and a large abscess in the left lung. The artificial joint was found to be provided with a complete capsular ligament, and the articulating surfaces were tipped with cartilage and furnished with synovial membrane. In consequence of Dr. Bauer, in his work on *Orthopædic Surgery* (p. 325), stating that this case of Dr. Sayre's died of pyæmia, a number of letters from medical men are given in the appendix to the paper, confirming the tubercular theory, and also Dr. Sayre's statement as to the existence of cartilaginous covering to the bone, synovial membrane, etc.

I am not aware of any operation having been performed in this or any other country on the hip-joint in cases of bony ankylosis, with the object of obtaining free motion by the establishment of a so-called "artificial joint"; and it will at once be seen that further experience is required before we can confidently speak of the success of such an operation, although the cases recorded by Dr. Sayre are undoubtedly worthy of the most attentive consideration.

It occurred to me, however, that in these cases of bony ankylosis of the hip-joint, with extreme distortion, a much more simple operation might be performed by the subcutaneous division of the neck of the thigh-bone, about its centre, within the capsular ligament (as represented in fig. 2), using for this purpose only a long tenotomy-knife, and a very small saw constructed for the purpose, with an inch and a half cutting edge, and a long thin shank like a tenotomy knife; and on the 1st December, 1869, I performed this operation successfully on the following case.

Luke Bristowe, aged 24, a gardener from Loudon, near Chippenham, Wiltshire, was admitted into the Orthopædic Hospital on the 12th October, 1869, in consequence of extreme deformity at the hip-joint. The thigh was flexed upon the pelvis at a right angle, and firmly ankylosed in this position; the heel of the right leg rested on the upper part of the left knee-joint, and the limb was therefore perfectly useless. The

only mode of progression was either with two crutches, or with one crutch and a stick, which he generally used (as shown in fig. 3). He had also ankylosis of the vertebral articulations through a considerable portion of the spinal column; all the lumbar and lower dorsal vertebræ were perfectly immoveable, and the spine was curved posteriorly, with

Fig. 3.—Position of Limb previous to Operation, and the usual mode of progression.

an inclination to the right side in the lower dorsal and upper lumbar region. In consequence of this ankylosis through the lumbar region, the pelvis and spine could only be moved together, and the trunk and leg therefore appeared to be remarkably fixed in the deformed position. There was also a fixed and permanent obliquity of the pelvis, with regard to the spinal column, to the extent of two inches, as ascertained by careful measurement. Partial ankylosis also existed in some of the upper cervical vertebræ; the motion between the occipital bone and the atlas was free, but between the atlas and the axis motion was extremely limited, and the head was habitually carried forwards. This affection was the result of an extremely severe attack of rheumatic fever, with which he was seized seven years ago June last, and which, he stated, was not preceded by gonorrhœa. Various articulations were affected during the fever, and the rheumatic pains were severe for six months, and continued more or less for twelve months. During the latter part of this time he was an inmate of the Bath Hospital for fifteen weeks, and had the hot mineral baths, but without any marked relief; and he then went into the Brighton Hospital for nine weeks, where he was galvanised, and had to swing a seven-pound weight, but without material benefit. No treatment had been adopted during the last six years, nor had he suffered from any further attack of rheumatism. His general health was good, and also his family history.

That the case was one of true bony ankylosis, was proved by the failure of forcible extension under chloroform, tried on three separate occasions at the Orthopædic Hospital; and after this I suggested to the patient the operation of dividing through the bone as the only means of restoring the position of the limb, and he readily gave his assent. For the purpose of the operation, and that he might have the advantage of superior nursing, if required, he was removed to the Great Northern Hospital on the 26th November, 1869.

On the 1st December, 1869, I divided the neck of the thigh-bone subcutaneously within the capsular ligament, in the presence of my colleagues, Mr. Gay, Mr. Carr Jackson, and Mr. Shillitoe; Mr. Mason, Dr. H. Dick, and Mr. John Mackenzie of the Bombay Hospital, were also present. The instruments used were a long tenotomy-knife, and a very small saw, three-eighths of an inch in width, and with a cutting edge an inch and a half in length, at the end of a slender shank three inches in length, made by Mr. Blaise of St. James's Street, and shown on a diminished scale in fig. 4. The details of the operation were as follows.

I entered the tenotomy-knife a little above the top of the great trochanter, and, carrying it straight down to the neck of the thigh-bone, divided the muscles and opened the capsular ligament freely. Withdrawing the knife, I carried the small saw along the track made—pre-

serving this by pressure of the fingers—straight down to the bone, and sawed through it from before backwards, in the direction represented in fig. 2: this was accomplished in five minutes. No hæmorrhage followed; and I immediately applied a compress of dry lint, a plaster, and bandage.

Fig. 4.—*a*, Subcutaneous Saw and *c*, Tenotomy-knife, drawn one-third less than those used in the operation; *A* representing double cutting edge of Saw, full size.

As soon as the bone was cut through, the leg moved freely in all directions; but, before it could be brought into a straight position, it was necessary to divide the tendons of the long head of the rectus and of the adductor longus muscles, and to cut through the tensor vaginæ femoris muscle. The limb was fixed in a straight position and bandaged to a long interrupted Liston's splint. No inflammation whatever followed the operation; no swelling or redness of the skin, or any deep suppuration; but the wound healed slowly. The House-Surgeon, Mr. Willis, reports as follows.

December 4th. The long splint was changed to-day for a short one. He could move the leg from the hip gently whilst the splint was off. The tenotomy wounds were quite healed.

December 5th. A four-pound weight was attached to the leg, which he bore well for a time.

December 7th. The dressing was removed for the first time to-day. A few drops of pus only escaped from the superficial wound. There was no deep suppuration going on. The superficial wound was dressed with carbolic lotion, one part in forty.

December 13th. The splint was removed altogether to-day. He could draw the leg up almost as well as the sound one, and had very fair motion at the hip.

December 22nd. He was going on well. No febrile symptoms or deep suppuration were going on. The superficial wound was nearly healed. There never had been more than two or three drops of pus on the lint in the morning. Collodion and castor-oil were applied to-day instead of carbolic acid lotion. He got up to-day for the first time, just three weeks since the operation.

I encouraged motion from the 13th December, and moved the limb frequently myself; and, when he walked about the ward on crutches, induced the patient to swing the leg as much as possible. After walking about daily for a fortnight, however, the limb began to stiffen at the hip, and all attempts at movement were painful. I then determined to abandon all idea of obtaining motion, and endeavour to procure bony ankylosis with the limb in a straight position.

On the 6th January, 1870, the man was ordered to keep his bed, and the limb to be maintained in a straight position by an extending weight of from three to five pounds suspended over the end of the bed. At the end of three weeks, the divided neck of the femur seemed to be firmly ankylosed; and on the 24th January, he was discharged and transferred to the Royal Orthopædic Hospital.

March 18th. He had gained sufficient strength to be able to walk about the ward with the aid of one stick, and he could walk a little without any assistance. [Fig. 5, taken from a photograph, represents him in the standing position, and a small depressed cicatrix is shown at the seat of operation.]

April 25th. He was taken to the Medical Society of London, and exhibited his power of walking about the room without any assistance. He continued steadily to improve, and gained sufficient strength to bear the entire weight of his body on the leg which had been operated upon, as shown in fig. 6, in which he is represented as standing on this leg. He still, however, generally uses one stick in walking, and walks with the body somewhat inclined to the right side (as represented in fig. 5) in consequence of the obliquity of the pelvis and ankylosis of the lumbar and lower dorsal vertebræ. Although there appears to be a little shortening of the right leg, he is not at all improved, as to the erect position of his body, by any addition to the boot, so that he wears boots of the same thickness.

November 10th, 1870. This patient having been at his home in the country for several months, came to London, and I again examined him. He could now walk three or four miles with ease, and did not require a stick for walking purposes, although he always used one to

improve the general balance of his body, which was somewhat disturbed by the spinal curvature.

In comparing the relative merits of the three operations which I have now described for rectifying extreme distortion at the hip-joint with bony ankylosis, the different objects sought to be accomplished and

Fig. 5.—Patient in standing position, between three and four months after operation.

Fig. 6.—Patient standing, and bearing the weight of his body on the leg which had been the subject of operation.—Taken by Mayall at the same time as Fig. 5: and woodcuts 3, 5, and 6, were taken from photographs by Mr. Mayall, who, by his artistic assistance, generously aids the Orthopædic Hospital.

employed by Sayre; and the evidence is not yet sufficient to prove that even by such means a permanently useful artificial joint can be established in the neighbourhood of the hip-joint. In Rhea Barton's case, bony ankylosis was proved to have taken place by the *post mortem* examination of the patient, who died from phthisis eight years after the operation, although motion is said to have been preserved for six years.

In Sayre's first case, in which a segment of bone was removed above the small trochanter, an useful limb was permanently obtained, and good motion existed five months after the operation, but some necrosis subsequently occurred; and the late accounts, six years afterwards, are less satisfactory than we could desire as to the evidence of free motion at the joint. In Sayre's second case, which undoubtedly offers a good illustration of the establishment of a false joint, necrosis, although in a limited degree, was still proceeding at the time of death—six months after the operation—and bone had exfoliated previously, so that Dr. Bauer was induced to believe that the death arose from pyæmia rather than phthisis.

In the case which I have now brought before the meeting, I was encouraged, by the absence of inflammation, to hope for [the establishment of motion; but, this failing, the result was limited to remedying

the deformity and obtaining a useful limb for the patient, with bony anchylosis in a normal position; and to such a result I would advise, in all future operations, that our expectations should be limited.

With regard to the subcutaneous operation, which, so far as I know, was first suggested and performed by myself, and which I have now brought before the British Medical Association, I would only observe that the subcutaneous division of bone—subcutaneous osteotomy, as it may be called—has proved itself to be as simple and harmless an operation in its immediate effects as subcutaneous tenotomy, with which, in its essential characters, the operation may be compared.

Since this paper was read at the Association meeting, this operation has been successfully performed by Mr. T. R. Jessop of Leeds, who on the 17th September, 1870, writes as follows. "Three weeks ago last Thursday, I performed the operation upon a young woman whose right thigh was fixed by bony anchylosis at a right angle with the pelvis. By practising upon the dead subject, I had previously found that the best spot at which to make the puncture was about an inch behind the posterior margin of the great trochanter, near its upper border. The division we made without any difficulty. The operation and the subsequent dressings were performed after Professor Lister's method. The wound healed at once without a single drop of pus. For a fortnight I kept the patient in bed, with the limb stretched by means of a weight slung over a pulley attached to the ankle. Since the expiration of a fortnight, I have had the woman up, walking about on crutches, and swinging the leg in all directions, with the view of procuring a false joint. The limb measures barely an inch shorter than the sound one; and the patient makes complaint only of a little pain in both hip and knee. Crepitus can both be felt and heard very distinctly. I will have the result duly reported." The operation has also been successfully performed by Mr. F. W. Jowers, of Brighton, and Mr. Furneaux Jordan, of Birmingham. No inflammation or suppuration followed the operation in either case. The details of these three successful cases will shortly be published; and the fact that this operation has been successfully performed in four cases, goes far to establish it as a surgical procedure.

SUBCUTANEOUS SECTION OF THE NECK OF THE FEMUR.

By FURNEAUX JORDAN, F.R.C.S.,

Surgeon to the Queen's Hospital; Professor of Surgery in Queen's College, Birmingham; etc.

EMMA H., aged 16, from Wales, had had hip-disease for six years. She had had several sinuses opening and closing during that time. On admission into hospital, there was a little oozing from one near the perineum. The thigh was flexed at right angles to the trunk; and there was unmistakable osseous anchylosis of the hip-joint, as revealed by examination under chloroform. I divided the neck of the femur by the method and with the instruments devised by Mr. W. Adams. The sudden mobility of the joint when the section of the femur was completed was very striking. The adductor longus and long head of the rectus femoris required tenotomy. The limb was then put into a position which promises a very useful result. It is now three weeks since the operation, and the progress has been most favourable.

In this case, the naturally short femoral neck of early life, made shorter by caries and anchylosis, combined with a very fat gluteal region (since anchylosis, the patient has become very stout), required more than ordinary care in every step of the operation.

ON SCARLET-FEVER, WITH SPECIAL REFERENCE TO PATHOLOGY AND TREATMENT.*

By ROBERT RENFREW, M.D., Glasgow.

SCARLET FEVER is one of the zymotic diseases. These diseases are now generally believed to be produced by a specific organised substance entering the body, either by the stomach or lungs, or by both; when it has entered the system, it has the power of developing and multiplying itself, as seen in inoculation and vaccination. The process of multiplication deteriorates the blood, deranges the nervous system, quickens the circulation, causing rapid disintegration of the tissues, as evinced by the increased temperature, and altering the secretions from the secretory and excretory organs. Disintegration goes on with such

rapidity that the normal physiological and chemical changes cannot take place, and disintegrated substances are floating in the blood, still further deteriorating the vital fluid.

The morbid matters of the zymotic diseases are not eliminated by the usual eliminating organs. Each poison is thrown off by a distinct and separate part of the body: small-pox, by the skin; cow-pox at the point of introduction; measles, by the mucous membranes of the eyes, nose, fauces, and lungs; whooping-cough, by the mucous membranes of the respiratory organs and stomach; enteric fever, by the lower third of the ileum; cholera, by the stomach and bowels; scarlet fever, by the fauces, nose, and perhaps by the stomach. In typhus fever, the eliminating part is not so obvious, but, perhaps, it is done by the lungs. The parts specified above, however the poison may have been introduced into the blood, are always those affected. That the poison of enteric fever is thrown off by the intestines, and cholera by the intestines and stomach, there can be no doubt, for it has been proved that persons drinking water containing the discharges from these diseases have been seized with similar disorders.

It has been said that "it seems probable that in all varieties of scarlet fever a primary effect is suddenly and violently to stimulate the natural cell-growth of all the secreting organs." We have no evidence that this takes place anywhere else than in the parts pointed out; for in scarlet fever we have very seldom any disease of the lungs, liver, or bowels. Sometimes the kidneys show signs of congestion, but not more so than in pneumonia, typhoid, and typhus fever. In parts where we have always irritation or inflammation in zymotic diseases, I believe they are always caused by elimination or absorption of the poison.

The severity of the symptoms, whether general or local, in the zymotic class of diseases, depends upon the power of the system to develop the poison in the blood. For, if a number of persons be inoculated from the same person, there will be found a great variety in the number and character of the pustules. If several children be vaccinated with the same lymph, and with equal care as regards the number, depth, and extent of the scratches and quantity of matter applied, you will have a great diversity in the number of the vesicles and amount of lymph produced. In one child you may only have one vesicle, in another two or three, and so on, until you have a cluster of the size of a shilling.

At one time I thought that the small number of vesicles after vaccination depended on some imperfection in the introducing of the lymph, until I tried—when there was only one vesicle—vaccination on the other arm, and failed; showing that, however small the amount of lymph eliminated, the purpose had been accomplished, and that the power of multiplying the poison had been weak.

In every case of scarlet fever the throat is affected. The rash may be absent, but the throat-affection is never. In the mild form the fauces are red, somewhat swollen, and the secretion increased in quantity and altered in character. In scarlatina anginosa and maligna these appearances are all greatly aggravated, and they have extended themselves into the nose, and sometimes even into the Eustachian tube, causing great pain in the ear, and often suppuration. In these two forms the tonsils are found to be greatly enlarged, but in scarlatina anginosa they are often covered by a yellowish white exudation. In scarlatina maligna we have in addition ashy-coloured sloughs, and some of these sloughs go so deep into the tonsils that, when they break up, we have sometimes an artery of considerable size opened, causing alarming and dangerous hæmorrhage. In these forms pain of the throat is so great that deglutition is performed with great difficulty, and in some cases it cannot be performed at all. Secretion is greatly increased, so that it flows out of both mouth and nose, its character being so much altered that it irritates and excoriates the parts over which it flows.

I believe that in some of the zymotic diseases, where the poison can be reabsorbed, the disease is aggravated and prolonged. In enteric fever I have observed that where there was diarrhoea—although otherwise this indicates greater severity in the general and local symptoms—the course of the fever was generally shorter than where there was very little or none. The diarrhoea hurried the poison out of the bowel; but where there was no purging, or very little, it remained to be absorbed, prolonging the fever.

After these general remarks, I will now call your attention to some special points in the pathology of scarlet fever and the treatment.

A poison enters the blood, capable of extensive multiplication. After a shorter or longer period the tonsils and parts already mentioned, by some physiological law, take on the process of eliminating the poison, producing the local symptoms already stated. A great part of the eliminated poison must be swallowed, to be reabsorbed by the stomach, intensifying and prolonging the disease. In connection with this view, I will state a pathological condition of the stomach, which may, in part, be caused by the poison passing from the throat and other parts into it.

* Read in the Medicine Section before the Annual Meeting of the British Medical Association in Newcastle-upon-Tyne, August 1870.