

make out whether recurrence of the tuberculous process had taken place, or whether there was merely catarrhal swelling of the parts. The latter fortunately turned out to be the case, and with a few applications of astringents and complete rest of the voice the latter gradually returned. I advised renewed silence and again weak astringent applications to the larynx.

On July 16th Dr. Felkin reported that there had been a recurrence of the ulceration in the parts just below the interarytenoid fold, which were then treated with applications of pure lactic acid on alternate days. This again resulted in healing of the ulceration and great improvement of the voice. When I saw her on July 19th I found nothing abnormal in her larynx with the exception of a very slight pyriform thickening in the interarytenoid fold, and slight general congestion. There certainly was no actual ulceration, and the voice was better than I had ever heard it before. The condition of the chest had very greatly improved by tuberculin injections under observation of the opsonic index. She went, by Dr. Felkin's advice, for a few months to Scotland.

I last saw her on October 23rd of this year, when I found a very pleasing improvement indeed. Although the voice is still slightly husky there is no active mischief in the larynx. The right vocal cord has completely healed, with some loss of substance near the vocal process, where very distinct cicatrization is visible. There is not a trace of the old prominence to be seen in the interarytenoid fold. The state of the lungs is equally satisfactory, there being no active mischief, and only very occasionally slight pleuritic friction-sounds are heard, after coughing, on the right side, both in front and posteriorly. The patient has gained several pounds since leaving the sanatorium, but is returning there for the winter. She is still easily fatigued, and her temperature goes up on exertion.

CASE VII.

Mr. G. H., aged about 40, was sent to me by Dr. Morell Thomas, of Newport, Mon., in December, 1905, on account of long-continued hoarseness. On examination a well-marked ulcer was seen to occupy the posterior third of the right vocal cord, extending nearly to the arytenoid cartilage. The rest of the larynx was congested. The appearances were so characteristic as to enable me to make the diagnosis of tuberculosis from the larynx alone, but there was additionally a history of probably tuberculous hip disease in early infancy, and a history of serous pleurisy on the right side two years ago, whilst recently, during the patient's stay in Switzerland, tubercle bacilli had been found in the sputum. Careful examination of the lungs did not give evidence of actual disease, the only abnormality being that air did not enter as freely into the right lung as into the left. In the course of the following week the ulcer was scraped twice and pure lactic acid applied. The ulcer became much cleaner-looking and began to cicatrize.

After three weeks' stay in the Cotswold Sanatorium, during which the patient preserved complete silence, I heard from Dr. Etlinger that the patient was looking much better, and that the healing of the laryngeal ulcer had proceeded so satisfactorily that no further applications had been made to the throat. On February 3rd, 1906, I saw him again; he was very much improved, had gained a good deal of flesh, no ulceration was visible in the larynx, the only abnormality being slight congestion of the right vocal cord. He had not used his voice at all since I last saw him. When I tested it there was a good deal more ring in it than there had been. I recommended astringent applications to the larynx, and weak faradization externally for a fortnight's time, after which I thought he might leave the sanatorium.

On February 19th Dr. Etlinger reported that the patient had returned home. The larynx had further improved since I had last seen him, but there was still some redness and relaxation of the right vocal cord, so that Dr. Etlinger had urged upon him the necessity of sparing his voice as much as possible for some time longer.

On October 27th of this year the patient reported that Dr. Etlinger, who had seen his throat in September, had been very pleased with its appearance, that personally he felt nothing amiss with it, that the voice appeared quite normal, and that even his singing voice was coming back. His general health had been and was excellent.

REMARKS.

The history of these 7 cases forms, I am afraid, but dull reading, they being so monotonously like one another. Nevertheless I have thought it right to give them somewhat in detail, for the following reasons:

1. It will have been seen that several of them, notably Cases I, II, III, V, and VI, distinctly belong to the category of grave tuberculous lesions of the larynx, which under ordinary circumstances are but very rarely found capable of such complete restitution of tissue and function as has taken place in these cases.

2. Case I teaches more particularly the value of vocal rest, as it will have been seen that other conditions, namely, general sanatorium treatment and local treatment, having been the same throughout the duration of the case, a real improvement only took place when the patient had been brought to maintain complete and prolonged silence.

3. The number of cases communicated protects, I think, the method against the objection that similar results might have been obtained even if no silence had been preserved. I certainly do not deny the occasional occurrence of the spontaneous cure of a tuberculous ulcer in the larynx, but such cases are very rare indeed, and I have never seen a retrograde metamorphosis without the aid of complete vocal rest, either alone or combined with local treatment, in such severe cases as Nos. I, II, III, and V.

Finally—and this is the main reason for the full communication of these 7 cases—their description in detail shows better than any words of mine could do the necessity of perseverance, when once the silence method has been adopted, in the face of initial disappointment and of repeated relapses. As this is the point which I have most at heart, I have risked rather boring the readers of this paper with tedious repetitions than failing to convince them of the value of the method. I shall look forward with much interest to contributions to this question either corroborating or rectifying my own experiences.

A Lecture

ON

PRESENT VIEWS ON DISEASES OF THE JOINTS.

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MANY things have small beginnings. It was in 1818 that Brodie published the first edition of his *Diseases of the Joints*. Here was the opening of a new chapter in surgery. Yet when we look back, unless we remember that the work of the pioneer must often, from the nature of the case, be limited to the seemingly humble office of clearing the ground and turning the first sod, we are struck by the meagre and rudimentary character of Brodie's production. He founded no school, he established no principle, he announced no discovery, he foreshadowed no generalization; his work was, as we now see it, wholly commonplace. His claim to be remembered lies in the fact that he made a beginning—that is all. What he had to say was easily comprised within the compass of 285 pages, consisting largely of records of cases; for his field of vision was limited to what he could observe at the bedside, or ascertain by naked-eye inspection of joints after amputation (and here he had many opportunities), or at *post-mortem* examinations. At the time of Brodie's new departure there were still some thirty years to elapse before microscopic investigation was to lend its aid, and therefore before any sound progress could be made in pathological research.

In the meantime it was customary to speak of some salient feature of a case as if it were itself the disease—in other words, to mistake symptoms for diseases, effects for causes. In Brodie's day one patient had a disease termed inflammation, another a disease termed dropsy, a third a disease termed jaundice, a fourth a disease termed angular curvature. Brodie and his contemporaries could deal only with the phenomena which hidden causes had produced; this was all that was as yet possible. His book consists of three sections, in which he treats of disease beginning in (a) the synovial membrane, (b) the cartilage, and (c) the bones, as if these forms were separate and independent processes. His descriptions were based on examples of chronic inflammatory conditions which had reached an advanced stage, and the majority of which were probably tuberculous. After Brodie's day knowledge, in respect to diseases of the joints, gradually increased, but mainly on clinical lines. The association of acute arthritis with pyaemia was frequently observed at the bedside; the clinical phenomena of rheumatic fever and the heart affection which was frequently present became more and more familiar; "gonorrhoeal rheumatism" was already clearly recognized, as were also the various clinical manifestations of gout; while the idea that joints were often the seat of an admixture of gout with rheumatism was a conclusion which naturally arose from clinical observation; and, although it was erroneous, it formed a link in the chain of progress.

In 1853, when Charcot published his account of acute

rheumatism of nervous origin—*rhumatisme nouveau d'origine nerveuse*—he was limited to a clinical investigation. As to pathology he was altogether in the dark, for what views could he have had as to the nature of acute rheumatism; what did he mean by the term; and what, in such a connexion, did he intend to convey by the phrase, "of nervous origin"? In 1868 he carried the matter a stage further, and established the connexion between the remarkable changes in the joints with which we are all familiar and locomotor ataxia. But how the connexion arose, whether it was that of cause and effect, as he assumed, or whether, as some now believe, the changes in the nervous system and the joints are both due to the same cause, he had no means of forming an opinion.

But in the last thirty years the whole subject of diseases of the joints has attained a new position, and has been brought into the field of modern pathology. In this period, which must always stand out as one of the great epochs of medicine, the recognition of the part which bacteria play in the production of disease has transformed the whole outlook. Old conceptions, mere day-dreams and fantasies, have vanished once for all; and with the help of the higher powers of the microscope, and the accessory processes of staining, etc., the true nature of many affections has been brought to light. As the work has proceeded it has passed through different phases; there has been an advance from the particular to the general, the building up of fragments into the completed whole. Perhaps the clearest illustration is furnished by the pneumococcus. This micro-organism was originally discovered in the lung in cases of lobar pneumonia, and was named accordingly. But subsequent investigations have disclosed the fact that it is by no means confined to the lung, but is met with in the peritoneum, the cerebral meninges, and the joints. Nor is this different from what might, on consideration, have been reasonably anticipated; for the several structures mentioned—the lung, the peritoneum, the cerebral meninges, and the synovial membranes—although they are differentiated in adaptation to their various functions, are yet in their essential characteristics very much alike, in that they include, (a) connective tissue, and (b) a vascular system, through whose channels bacteria readily make their way. To regard the synovial membranes as members of the vascular connective tissue group is the first step towards a proper understanding of the pathology of a large majority of diseases of the joints. And this brings me to the subject to which I desire to direct attention. I propose to refer—as far as time will allow—to the knowledge which has recently been acquired of the part which infection plays in the production of many—indeed, the great majority—of the diseases of the joints. This conception may, in fact, be well called the new pathology so far as the joints are concerned.

CLASSIFICATION.

The various examples of infective arthritis which are now recognized may be arranged for my present purpose under the following heads:

1. Those with which we have long been familiar from a clinical point of view, and in regard to which mistakes are little likely to be made, such as acute arthritis following wounds, or, however rarely, operations, and such as occur in the progress of acute infective osteomyelitis or pyaemia.

2. Those met with in the specific fevers—acute rheumatism, scarlet fever, typhoid, influenza, or in dysentery, etc. Of these I will only say that they do not offer any particularly interesting material for study, for in the first place—with the exception of rheumatic fever—they are comparatively rare; and, occurring as they do in immediate connexion with an acute illness, the nature of which is readily grasped, their origin is usually at once obvious; and they are generally transitory, or, if more persistent, can be treated only on general principles.

3. But a group remains which I wish to discuss somewhat fully. It is one of great clinical importance on several grounds, but chiefly because the cases it includes are apt to lead to serious oversight and mistakes. This group is composed of examples in which infection is produced by such everyday agents as the streptococcus, staphylococcus, and gonococcus, but in which the symptoms differ so widely from those which we are in the

habit of associating with these several infections that the connexion is apt to remain undetected.

SEPTIC ARTHRITIS.

Take the gonococcus. All are familiar with the symptoms—involving one, two, or several joints—of an arthritis developed in the course of an acute attack of gonorrhoea:—rapid effusion, heat of the surface, and severe pain, associated with general illness and a high temperature. Here the gonococcus, being of full virulence and suddenly introduced in large quantities, produces the symptoms of an acute infection. But under other conditions infection by the gonococcus may present an entirely different picture. Take a case of slight gleet of long standing. Here the gonococcus is growing on an exhausted soil, so that its virulence is dwindling towards extinction; it is present in small amount, and it is probably growing in company with streptococcus or some other bacterial elements, by which it is still further enfeebled. Placed in such circumstances as these the gonococcus may give rise to an arthritis which differs *in toto* from an attack in the active stage of gonorrhoea. It produces none of the features of an acute inflammation. On the contrary, it acts all along at a low grade of intensity; when a joint is attacked it gradually becomes enlarged, in part by some effusion, generally of quite limited amount, into its cavity, but chiefly by slowly increasing swelling of the synovial membrane and peri-synovial tissue; pain, unless the joint is actively used, is slight, or entirely absent, the surface is free from anything beyond a slight degree of heat; stiffness is usually marked, and there is the muscular wasting which invariably accompanies chronic arthritis of whatever origin. Such a case, instead of conforming to the usually accepted type of gonorrhoeal arthritis, bears a very close resemblance, from a clinical point of view, to tuberculous disease. And the likeness is readily explained. It is due to the fact that, under the influence of its environment, the gonococcus has been deprived of so much of its original virulence, and is in such small quantity that the degree of irritation which it produces is practically identical with that to which the *Bacillus tuberculosis* gives rise. The point is, as I have said, one of great importance, for undoubtedly many cases—for instance, of disease of the knee-joint—are diagnosed and treated as tuberculous, when in reality they are not tuberculous but septic in their origin.

CASE I.

Shortly before I relinquished active duty at St. Bartholomew's Hospital, A. B., a man aged 27, was sent up for admission, as he was believed to be suffering from tuberculous disease of the right knee, of five months' duration. On examination all the symptoms fitted in exactly with this view—the considerable and uniform swelling dependent on "pulpy thickening" of the synovial membrane, and a little fluid in the cavity; the slight surface warmth, the stiffness, and the marked muscular wasting, together with pain, usually slight but becoming marked when any attempt was made to use the limb. To all appearances here plainly was a case of tuberculous disease. But it was ascertained that the patient had a very slight gleet remaining after gonorrhoea contracted nine months previously. A bougie was passed and narrowing of the bulbous portion of the urethra detected. The urethral discharge was examined and found to contain a few gonococci and streptococci. The urethral condition was set right by treatment, and in three months, under passive movement, massage, douching, and, later, gradually increasing exercise, the knee completely recovered.

CASE II.

A man, aged 29, had been under treatment for nine months for what was taken for granted to be tuberculous disease of the knee. The appearances very closely resembled those met with in the case of A. B. The history was that at first the case was somewhat acute and attended with marked pain, heat, and considerable effusion. Under treatment by rest, secured by a plaster-of-paris splint, the effusion disappeared and the other symptoms became less marked. Each attempt, however, to discontinue the rest treatment led to an immediate sharp relapse. When I saw the knee it was and had been for five months in a Thomas's splint. There was no pain, or surface heat, but there was considerable enlargement due to thickening of the synovial membrane. The thigh muscles were markedly wasted. Thus, so far as superficial appearances went, this was a case of tuberculous disease. Persistent inquiry failed to elicit any history of infection. The existence of gleet was denied. Yet the improbability that a perfectly healthy-looking man of this patient's age was suffering from tuberculosis was manifest, while the chance that he might have been the subject of urethral infection was so obvious that the condition of the urethra was investigated.

The examination disclosed a narrowing in the bulbous

portion, and a slight gleet. In this secretion some gonococci were found. The stricture was dilated and the gleet cured. Then the knee was manipulated under ether, and treated by passive movements, hot douching, and massage. In three months it had returned to a normal condition.

CASE III.

A gentleman who had been residing abroad returned home with the following history: Nine months before he had an acute illness, with continued high temperature, loss of flesh, and a marked degree of anaemia. Several of the large joints were swollen and painful. He was thought to be suffering from rheumatic fever. When he returned to England he was in an anaemic and enfeebled condition. His knees and ankles were stiff and swollen, and his walk, rendered difficult by the condition of his joints, was suggestive of locomotor ataxia. His back was stiff and painful, and the question had been raised whether he was not suffering from either Pott's disease or osteo-arthritis of the spine. When I saw him, shortly after his arrival, I learnt that he had been examined by some of the ablest physicians of the day, but that much difference of opinion as to the nature of his illness had arisen. Some thought that he had extensive degenerative changes in the cord to which the condition of his joints was secondary, while others considered that he had osteoarthritis following rheumatic fever. Close and repeated inquiry failed to elicit any history of gonorrhoea. The question, in fact, was answered by a direct and sturdy denial, and no appreciable gleet was then present. As the patient had been living in an unhealthy climate the probability seemed to be that he had some form of blood poisoning, the exact origin of which, however, could not be traced. A few weeks later, during a conversation with the surgeon who was attending him, and who was also an old acquaintance, the patient became confidential and mentioned some circumstances of his life abroad which indicated the probability that, after all, urethral infection had been present. This was enough for his surgical friend, who persuaded him to submit to examination, with the result that he was found to have a stricture, and that washings from his urethra contained gonococci. The treatment of the urethra soon led to a remarkable improvement in the patient's general condition, and he gained flesh, strength, and colour; at the same time the swelling and stiffness of his joints and spine decreased, and his ability to walk improved. In eighteen months he had practically recovered.

Although the form of septic arthritis under discussion is best illustrated by that which is of urethral origin, yet infection may be derived from many other sources. Indeed, the ground can only be adequately covered by the generalization that wherever, in any organ, or any part of the body, a septic process exists, joint infection may result. The part played by the tonsils and the lymphatic tissues of the pharynx in harbouring agents by which the joints may be infected has only recently been fully appreciated. So long as the true pathology of rheumatic fever was unknown no explanation could be given of the association—with which clinical observers had long been familiar—of this condition and inflammation of the tonsils. But now that it has been shown that acute rheumatism is due to infection, the connexion between it and septic conditions of the fauces has become obvious.

The primary septic focus may be connected with a necrosed tooth. A gentleman who had been out of health for several months was attacked with what was regarded as acute rheumatism of the right knee, which suddenly became painful, considerably enlarged from synovial effusion, and infiltration of the surrounding structures. The surface was hot, the skin was a little dusky and there was some pitting on pressure. No other joint was involved. It was found that purulent discharge had been going on from the sockets of three of his teeth for at least a year. When the teeth had been removed, and the alveoli scraped and rendered aseptic, the patient's general health considerably improved, and was ultimately completely regained. The joint, however, remained stiff from fibrous ankylosis, and the patella was firmly adherent to the condyles of the femur. I have seen two cases in which, after carious teeth were cut down level with the gum and a new crown was applied, on the American system, the patients became subject to what was regarded as acute osteo-arthritis, involving several of the large joints, and those also of the hands. Infection being suspected, attention was turned to the teeth, in which, ever since the crowns had been fixed, there had been some discomfort. On investigating their condition, a dental surgeon expressed the opinion that the fangs were probably necrosed. The fangs were therefore removed, when a small amount of pus was found in the sockets.

In both these cases the joint affection was arrested. In the one the finger-joints remained somewhat enlarged but were otherwise normal, and the large joints regained their

full range of movement. In the other, one knee and one ankle were left in a condition of partial fibrous ankylosis and the finger-joints were enlarged and the fingers deflected towards the ulnar side. In another case, a lad of 14 had enlargement and slight stiffness of several finger-joints and swelling and stiffness of both ankles and one elbow. He was anaemic and pale, but had not been acutely ill. The condition, regarded as chronic rheumatism, had been present for six months, but in varying degrees, sometimes almost disappearing and then becoming more pronounced. On searching for some infective focus it was ascertained that the discharge of a small quantity of pus had been going on intermittently for four months from a pinhole opening in the gum opposite the bicuspid teeth of the lower jaw. As the teeth in the neighbourhood of the sinus were all normal in appearance and free from pain, it was uncertain which was at fault. A skiagram was therefore procured in order to see if any further evidence could be obtained. This showed quite definitely that one fang of the second bicuspid was necrosed and that the alveolus was enlarged into a globular cavity and filled with either pus or granulation tissue. This tooth was removed and the alveolus, which contained three or four drops of pus, was scraped out. Improvement of the boy's general health quickly followed and the joint affection receded, and in three months had practically disappeared.

Many cases have, within the past fifteen years, been recorded in which an infective arthritis has been met with in connexion with septic cavities in the lungs. In the *Transactions of the Clinical Society* (1902), Dr. Percy Kidd reported the case of a female patient, aged 26, who, eighteen months before, had become the subject of chronic bronchiectasis. Six months later the sputum was copious and very offensive, and the ankle-joints became swollen and stiff. Subsequently the wrists and knees were involved. When the patient was exhibited the wrists were tender, swollen, and stiff. The fingers were generally enlarged, their joints swollen and painful, and their ends clubbed. The knees were swollen and contained fluid; the ankles were swollen. It was noticed that the condition of the joints varied with that of the bronchiectasis. When this was, as is said of volcanoes, active, and there was expectoration of much fetid pus, the joints were much worse, while they improved when expectoration was smaller in amount and less fetid. The features of this case were so marked, that the connexion between the joint affection and the condition of the lung was readily apparent.

In other instances infective material, whether derived from a pulmonary cavity or an empyema of long standing, may be in such small quantity, that when arthritis makes its appearance its septic nature is overlooked, and it is attributed to a mild form of rheumatism.

A boy of 17 had empyema. A portion of rib was removed and a drainage tube introduced. In two months the opening was nearly closed, and the discharge amounted to only a few drops in the twenty-four hours. This limited discharge of pus continued for six months, when painless swelling and stiffness were noticed in the ankles, one knee, one wrist and in almost all the finger-joints, and the patient became anaemic and lost flesh. For some months he was treated for rheumatism, and salicylates of sodium, quinine and arsenic were prescribed, but the results were disappointing; later on he was sent into the country and ordered to take iron in various forms, and arsenic. His condition remained unchanged except that while one of the ankles and the wrist slowly recovered, one shoulder and the joints in the lower part of the cervical spine became affected. When the case was seen three months later, a probe introduced into the sinus passed in a direction downwards for about 3 in. Two inches of the seventh rib were removed and a cavity defined which was found to contain 3 drachms of odourless pus, in which a few streptococci were to be seen under the microscope. This cavity was scraped and drained. Favourable healing took place and was completed in eight weeks. After this the arthritis slowly cleared up and in twelve months had disappeared, but the spine and the shoulder were still stiff.

Arthritis may be secondary to an infective process in the skin.

W. R., aged 54—a patient of Mr. John Adams of Aldersgate Street—who had been intemperate, and now had diabetes, had a boil on his abdomen near the groin. This was opened, and 2 drachms of fetid pus were let out. Within three days he had very acute inflammation of the right knee-joint, which became flexed, considerably swollen, and globular from periarticular infiltration (there was no fluid in the joint), and intensely painful. The skin was red and shiny, suggesting early suppuration; but none occurred. The patient had a high tempera-

ture, and was very ill. The knee was treated by rest and extension. Slow improvement occurred, and in six months the patient was able to be up on crutches. Ankylosis, however, followed.¹ No other joints were involved.

A boy of 18 had a quite superficial excoriation of the skin over the middle of the tibia, the result of a fall on a gravel path. This youth was so careless and neglectful that he neither mentioned the injury nor took any care to keep the surface clean. A fortnight later he was attacked with "rheumatism" in his left knee and ankle, and had a temperature of 102°. The wound in the leg was dirty, and the leg of his drawers was sticking to the exposed surface over an area about an inch square. In the next fortnight his right shoulder and wrist and several finger-joints became stiff, swollen, and painful, but all ultimately recovered except the knee, which remained stiff from adhesions. Movement, however, was restored to nearly the full extent by manipulation under chloroform, and hot douching and massage.

In the course of last year I saw, in consultation, a young lady, several of whose joints were on mere inspection the seat of osteo-arthritis. Yet the strong probability appeared to be that the real condition was that of infective arthritis due to absorption from the septic area of skin at the heel, which had been chafed by a tight boot and on which a crop of small pustules had formed. Some of the joints originally involved had recovered, but one shoulder was stiff and one wrist was permanently damaged.

Infective arthritis may be secondary to vaginal discharge (other than gonorrhoeal), and to septic conditions within the uterus. This sequence of events is probably more common than is usually supposed, and not a few cases which have been regarded as rheumatism or tuberculosis have been due to absorption from a septic vaginal or uterine mucous membrane.

Mrs. R., aged 34, after a long railway journey in the winter of 1904, was attacked with a rigor, and severe pain in the left knee, which became hot and considerably swollen. The evening temperature was 103° and the pulse 102. The illness was regarded as acute rheumatism. The joint was so painful, in spite of the use of a splint, that subcutaneous injections of morphine were used for several nights. No other joints were affected. Salicylates gave no relief. For two months pain continued and was aggravated by any movement. At the end of this time the joint appeared to be firmly ankylosed. It has remained stiff. This patient had a chronic brown discharge associated with painful menstruation, from which she recovered under treatment.

I have no proof that the arthritis was produced by the septic uterine discharge, but I think there can be no reasonable doubt on the subject.

In another instance an infective arthritis of the knee-joint, of uterine origin, had been treated for four months as tuberculous disease:

A lady, aged 29, had a miscarriage, followed by a brown fetid discharge. Six months later her left knee became swollen and painful. At first the affection was thought to be rheumatic, and salicylates were prescribed. But when no improvement followed, and when the synovial membrane became more and more infiltrated and thickened, the condition was regarded as tuberculous, and rest in a splint was ordered. When I first saw the knee the appearances of the joint were in every respect similar to those commonly met with in advanced tuberculosis, yet they were also such as might be due to sepsis. During the interview it transpired that the patient was under the care of a gynaecologist, who had recommended, as the discharge still continued, that the uterus should be curetted. I was glad to hear of this, for it seemed likely that the proceeding might have a very advantageous effect on the knee. This anticipation was fulfilled. Two months after the operation was carried out a marked improvement had taken place, and in six months the joint, after passive movements, douching, and massage, recovered.

It is enough simply to mention cases of septic arthritis following parturition, which were formerly regarded as examples of acute rheumatic arthritis, and in which patients became anaemic and debilitated, and had raised temperature and multiple arthritis, involving several of the large joints and those of the fingers. The nature of such cases is now generally recognized.

In reference to arthritis which is produced by absorption from the surface of the intestine, nothing very definite or conclusive is at present known beyond the fact that infection by the *Bacillus coli* has been observed.

Cases are by no means rare in which, although it is clear that septic arthritis is present, the source from which infection has been derived cannot be ascertained. In some of these it seems probable that further investigation may show that they are of intestinal origin.

Diagnosis and Prognosis.

When arthritis occurs in the circumstances I have described, it takes the form of a plastic inflammation attended with the development of adhesions leading to a varying degree of fibrous ankylosis. Usually effusion into the synovial cavity is limited. It seldom amounts to more than 3 oz. or 4 oz.; often it is entirely absent. The subsynovial tissue and the periarticular structures are infiltrated, considerably thickened, firm, inelastic, and brawny, so that the joint is enlarged from uniform swelling. When the knee is affected, thickening may extend to the periosteum and adjacent structures investing the lower end of the femur, and the bone may feel enlarged for 4 in. or 5 in. above the condyles. The skin covering the joint, in severe cases, is dusky red, as if suppuration was imminent; but generally its appearance is unaltered. Pain is very variable in degree. In acute cases it is severe and persistent, difficult to relieve, and aggravated to intensity on any disturbance of the joint. In the case of W. R., the patient was in great suffering for three weeks, in spite of complete rest of the joint in a carefully-adjusted splint. In the case of Mrs. B., pain continued to be very severe for nearly a month, although the joint was kept at absolute rest, and weight extension was employed. In mild cases pain is slight, or even entirely absent. In some it is present only when the joint is moved; in other words, it corresponds with that which attends the usual run of tuberculous cases. In acute cases reflex irritation leads to a high degree of muscular spasm and a tendency—in the knee—to flexion, which it may, subsequently, be difficult, or, I may add, impossible, on account of adhesions, to remove. In slight cases spasm is practically absent. Muscular wasting always supervenes, but varies widely in amount. When it is marked and associated with persistent swelling of a joint it readily misleads the unwary, as it exactly corresponds with what is observed in tuberculous disease. The body temperature is usually between 99° and 101° F. In mild and prolonged cases it may be normal. I believe it is correct to state that suppuration never occurs in these cases, even in those which are most severe, and are attended with severe and persistent pain, and with a dusky tint, and, as is occasionally to be observed, some oedema, and pitting of the surface. When these cases first attracted my attention I often felt assured that pus was about to form, but I have never known suppuration to occur.

In acute cases the result to be expected, or feared—for it is almost inevitable—is firm and complete fibrous ankylosis. I have seen this occur in the course of six weeks. Indeed, it has often been a matter of surprise to observe the rapid way in which such an abundance of inflammatory material is developed into new fibrous tissue that the joint is completely effaced and replaced by a cicatrix.

Treatment.

As an obvious preliminary, every effort must be used to find out the source of infection. In many instances this is at once indicated by a gleet, or a discharge of pus from a sinus in connexion with an empyema of long standing, or when there is bronchiectasis with purulent expectoration, a fetid ozaena or suppuration connected with the skin. In female patients a vaginal or uterine discharge must not be overlooked.

Unless it is remembered that a very limited amount of septic material may produce infection, the presence of some chronic and scanty discharge may be thought too insignificant to deserve attention. And further, it must be borne in mind that the amount of discharge coming from a sinus of long standing is by no means a trustworthy indication as to the condition of things at the deep end of the sinus. Every surgeon of experience will agree that a sinus in the lower part of the thigh, although it has only a pin-hole external orifice, and gives issue to only a few drops of thin pus in the twenty-four hours—even although it appears, every now and then, to have finally closed—may yet lead down to an extensive necrosis of the femur, and a large sequestrum lying in a bed of granulation tissue pervaded by infective bacteria. In such a case the staphylococcus or streptococcus, whichever it is, although it has become less and less virulent by prolonged growth in a soil tending to become exhausted, may yet, by maintaining a continuous though limited supply of infective material, lead to the low-grade arthritis which I have described. Every surgeon also will agree

that a small sinus in the heel may communicate with the os calcis, whose cancellous interior has been extensively destroyed by tuberculous disease and replaced by septic granulation tissue. The fact that in conditions such as these infection is very rare must not be allowed to obscure the possibility of its occurrence. The important point is that whenever any source of infection—however limited it may appear to be—can be detected, means should at once be adopted to cut it off, and to this end treatment must be thoroughly and persistently carried out. There is, however, a serious difficulty which may present itself, namely, that in a case which there are good clinical grounds for regarding as one of infective arthritis, there is nothing to show where the infection has originated. In such circumstances the condition of the intestinal canal must be suspected, and if there are any signs of an unhealthy state of the secretions, corrective measures must be adopted. When once the source of infection has been removed, the joint condition will improve, but at different rates of progress in different instances. I have seen joints infected from a chronic gleet recover under treatment in the course of three months, while in others repair has extended over nine months, or even a still longer period.

In considering the line of treatment which should be adopted, the life history of the bacteria concerned must be remembered. This in the case of streptococcus, staphylococcus, and gonococcus is widely different from that of the *Bacillus tuberculosus*. A chief characteristic of the tubercle bacillus is its prolonged vitality and the manner in which it is able to resist destruction by phagocytes and kindred agencies. The other bacteria just mentioned are much more easily eliminated. Although the streptococcus, for example, may be present in large numbers in cases of diffuse supuration or acute abscess, it may by incisions and drainage, disinfection and phagocytosis, be got rid of in the course of a few days. After this the tissues, freed from infection, are in a position to undergo repair; and the object of treatment is limited to the removal of such symptoms as remain and the repair of damage which the process of infection, now at an end, has brought about. Thus the necessity, in relation to treatment, of distinguishing between tuberculous disease and infection by the gonococcus or streptococcus becomes obvious. If arthritis is tuberculous the joint must be kept for many months at complete rest, and the patient must, if possible, be treated on the open-air system, while in the other group the purpose of treatment, when the supply of infective material has been cut off, will be the removal of coagulable lymph, the separation of adhesions, the restoration of movement, and the repair of atrophied muscles. These several results are best attained by hot douching, massage, and often by manipulation under an anaesthetic.

Douching should be employed morning and evening, at the highest temperature that can be borne without discomfort. A series of small blisters is often very useful. So are hot-air baths. Manipulation to overcome stiffness in slight cases may be carried on without an anaesthetic, and should be combined with voluntary efforts on the part of the patient.

In suitable cases—those, namely, in which the joint is cool and painless, but yet stiff—manipulation should be the first step. It will be well borne, and followed by quite moderate swelling and heat, which will subside in a few days. After it the other treatment referred to will act with much more marked effect. In employing manipulation, however, there is an important point which must always be kept in view. In infective arthritis the inflammatory process is often of such a plastic character—although the symptoms are of only moderate severity—that complete fibrous ankylosis may occur, as it were, stealthily, in the course of six or seven weeks, or, as I have seen, in a still shorter time. Indeed, the formation of new tissue may be so active as to remind us of what is seen in the repair of fractures, and the period occupied in the production of ankylosis is one of weeks, not months.

Hence it may be found on manipulation under an anaesthetic that the joint is so fixed that it does not yield to considerable force. This will be conclusive evidence that the joint has been obliterated and replaced by cicatricial tissue. In such a case all hope of restoring movement must be abandoned; for, although by the use of

more force it may be possible to tear the cicatrix across, and so produce movement at the time, the cicatrix will inevitably re-form, probably over a wider area than before, and stiffness will return, and the damage done will be followed by a period of much suffering, lasting several weeks, and by thickening and brawny swelling extending over many months.

In cases in which it is found on manipulation that firm fibrous ankylosis has occurred it may yet be advisable to employ force enough to rupture the union. This is the case when the joint has become fixed at an unfavourable angle, when, for instance, the foot forms an angle of 120° with the leg, so that the heel cannot be brought down. In a man of 25, after gonorrhoeal infection, the ankle-joint was fixed in the position described. Ankylosis was so firm that it was broken down only by very considerable force. The foot was then put up in plaster-of-paris just within a right angle. Stiffness returned, as was inevitable, but the patient could now stand firmly on his heel. Subsequently, by the persistent use of manipulation, as forcible as could be used without producing pain, and by exercises, compensatory movement of the joint (medio-tarsal) between the astragalus and the scaphoid became so free that scarcely any lameness remained, and the patient said that he was conscious of no more than slight difficulty in using the foot in dancing and running. When it is the knee which is ankylosed in a bad position, and cannot be moved without considerable force, excision, in patients between 15 and 45, had better be performed. This will secure, at practically no risk in the hands of a competent operator, a straight and sound limb with less than an inch of shortening, and ready for active use within two months; whereas manipulation may fail to correct the position of the limb, and be followed by recurring and disabling inflammatory attacks, and by recurrence of deformity.

In cases in which the adhesions easily give way under manipulation it may be necessary to repeat this proceeding once or more at intervals of a fortnight—if stiffness is threatening to recur—so that the reunion of adhesions may be prevented and their absorption promoted. The latter is a point on which a word may be said. The absorption of superfluous callus as the last stage in the repair of fractures is a process with which all are familiar. That adhesions may also be completely removed is sometimes overlooked, with the result that manipulation and exercises are not used with sufficient perseverance, and limitation of movement, which might have been removed, is allowed to remain.

An officer in South Africa was shot transversely through the posterior segment of the knee-joint. Primary union occurred, but the joint became stiff, in a position of flexion, and the patient was invalided home. When he was examined under an anaesthetic, while the patella was movable, the adhesions between the femur and tibia were so firm that they gave way only when the attempt to separate them had been carried to the full degree which seemed advisable. Manipulation under an anaesthetic was repeated twice in the course of the next month, and then the joint could be moved through an angle of 40°. Daily movements of the joint by means of an arrangement of a weight and pulley were ordered. In the course of a few months movement gradually increased, until no defect remained except a slight limitation of flexion. In this instance, which may be regarded as representative of many others, extensive adhesions were removed as completely as peritoneal adhesions often are after tuberculous and other forms of peritonitis.

REFERENCE.

¹Bradshaw Lecture on *Infective Arthritis*. 1903. Smith and Elder.

In celebration of their golden wedding, Mr. and Mrs. Bischoffsheim have divided £100,000 among certain charities in which they take special interest. Of this sum, £20,000 has been set apart for Jewish charities, including £10,000 to the Danaewood Sanatorium, and the following are among the other institutions receiving donations:—Imperial Cancer Research Fund, £40,000; the King Edward's Hospital Fund for London and the King Edward VII Sanatorium (for tuberculosis research in connexion therewith), £10,000 each; London Hospital, Middlesex Hospital, Charing Cross Hospital, Queen Charlotte's Lying-in Hospital; Hospital for Children, Great Ormond Street, and the Metropolitan Provident Medical Association, £2,500 each; and St. George's Hospital and the Surgical Aid Society, £1,000 each.