THE RELATION OF CHRONIC INFECTION TO RHEUMATOID & ALLIED FORMS OF ARTHRITIS, WITH ILLUSTRATIVE CASES.

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The various forms of chronic arthritis are at present but little understood, and different views have been held from time to time regarding their nature. As the type of joint affection to which this thesis more particularly refers is one which, clinically, closely resembles rheumatoid arthritis, a few preliminary remarks will be made on the pathology and aetiology of this disease. Rheumatic gout, osteo arthritis, arthritis senilis, arthritis sicca, arthritis deformans and rheumatoid arthritis are some of the names that have been given to this group of joint affection. This multiplicity of nomenclature indicates the obscurity of origin, and the uncertainty that obtains in regard to the exact pathology of these conditions. Clinical observation, reinforced by post mortem examination where possible, renders it tolerably certain that more than one distinct type of disease has hitherto been included under the term rheumatoid arthritis.

Although the terminal pathological lesions are somewhat similar, a distinction will be drawn in this dissertation between osteo arthritis and rheumatoid arthritis. Osteo arthritis is here used to designate the joint lesion which, perhaps, might be better named chronic traumatic arthritis. It almost invariably follows some injury more or less local-

-ised to the joint. The injury need not be severe; a twist or sprain is as likely to induce the condition as a dislocation or fracture. The larger joints are usually involved, particularly the shoulder and hip, and the patients are generally beyond middle age. At first one joint only is affected, but in time others may also become involved. The earliest changes are inflammatory and affect chiefly the articular cartilage and bone, in preference to the softer peri-articular tissues. The white, glistening cartilage gets dull and roughened from the cracking and splitting up of the matrix. The cartilage cells proliferate and the capsules distended, finally rupture, discharging their contents into the joint. Owing to the support afforded by the synovial membrane at the lateral margins of the joint, these changes are more marked in the central parts of the cartilage, and this area is the first to disappear. The sub-jacent bone becomes sclerosed and polished like ivory, but later, owing to constant friction of the opposed surfaces, becomes furrowed and worn away. If the articular end of the bone is cut through it will be seen that the thickened part is in immediate relationship to an area of osteoporosis where the bone is unduly spongy, and where much fat is present. While this destruction of bone is

taking place centrally, irregular projections spring from the margins of the articular cartilages and ultimately become ossified, giving rise to the familiar "lipping" of the ends of the bones. The synovial membrane becomes thickened and its fringes enlarge. Nodules of cartilage growing into these fringes may become ossified. Ultimately, the synovial membrane undergoes a mucoid or hyaline degeneration. As a rule, effusion of synovia is diminished rather than increased.

In rheumatoid arthritis on the other hand, the patients are generally adult or middle aged. The joints first affected are those of the metacarpo-phalangeal and the inter- phalangeal articulations, whence the disease extends to the larger joints. The inflammatory process starts in the synovial membrane which becomes pink and swollen, and in the periarticular structures which become thickened. Little or no proliferation of bone or cartilage occurs, so that osteophytes and lipping of the bone ends are either absent or insignificant in amount. The thickenings of the synovial membrane and soft tissues around the joint give rise to smooth spindle-shaped swellings which are usually multiple, and frequently symmetrical. There is more effusion into the joint cavity and surrounding tissues than in osteo-

arthritis, and in the early stages, the sensation imparted to the finger is similar to that obtained when parchment is indented. The disease is usually insidious in its onset, progresses slowly and exacerbations occur from time to time. Ultimately, all the structures, both articular and peri-articular, undergo atrophy, and this leads to wasting and deformity of the joints. The muscles, skin, and nails also atrophy, and sweating of the distal parts is a common cause of complaint. In favourable cases, the disease ceases to progress; but unless this cessation occurs early in the attack, the patient is left more or less crippled from peri-articular thickening and adhesions.

This description of the appearance of the joint structures in rheumatoid arthritis is unsatisfactory because so few cases come to autopsy while the disease is still active; but the condition appeared to be such as has been described above in the case of a patient whose knee joint was explored on the supposition that a loose body was aggravating the arthritis.

With regard to aetiology, the view that rheumatoid arthritis is of gouty origin, is mere speculation, and has been generally abandoned. Probably also the disease has nothing whatever to do with rheumatism in the modern accept-

-ation of the word because salicylates are not effective and cardiac valve affections do not accompany rheumatoid arthritis. These statements, however, require some qualification, for until the actual cause of acute rheumatism is definitely known, it is difficult to see how one can positively assert that rheumatoid arthritis is a thing altogether apart from that condition. Thus, a full dose of salicylate of soda (30gr. at bed-time) will often relieve at any rate one of the most characteristic symptoms of rheumatoid arthritis, namely, the stiffness and pain on first waking in the morning. Again, rheumatoid arthritis may occur in a person the subject of chronic valvular disease. Thus, a few weeks ago, I saw Mrs. M.T., aged 74, who on 16th October 1910 had fallen and fractured her right thigh. She has suffered for many years from organic disease of the heart and has a well marked degree of rheumatoid arthritis in both hands. There are swelling and stiffness of the inter-phalangeal joints with ulnar deflection of the phalanges, muscular atrophy and enlargement of the heads of the metacarpals of both hands.

Some authorities hold that important factors in the production of this disease are heredity, exposure to cold and damp acting in conjunction with a depressed state of the nervous system brought on by excess of worry or mental

anxiety. Alcoholic and sexual excesses, venereal diseases, defective nutrition and faulty hygienic surroundings have all been given a place in the aetiology of this disease.

Others refer it to a disorder of the central nervous system on the grounds that the joint lesions are symmetrical and closely resemble the changes that take place in the articulations in such frankly nervous diseases as syringomyelia and tabes dorsalis. Moreover, atrophy of the muscles and general trophic disturbances are common, and it has been frequently noted to follow shock and prolonged mental strain.

Others have advanced yet another view that the disease depends on a bacterial infection, and point out that in some cases organisms have been found in the tissues, that in a few cases there is an acute onset, that an acute illness sometimes preceeded it and that, occasionally, the spleen and glands are found enlarged. Such cases have been described by Still, especially amongst children, but they are occasionally seen in adults. Organsims have been found by some observers in the joints and surrounding tissues. Thus, Max Schüller, who studied the form associated with villous outgrowths from the synovial membrane, described a bacillus and a coccus in the inflamed synovial membrane and its fringes. The bacilli were short, stunted and showed polar staining.

The cocci resembled the ordinary pyogenic cocci. On injection of the bacilli into rabbits, he reproduced a villous arthritis which resembled, in miniature, the condition found in the human joint. In 1896, Bannatyne and Blaxall described an organism which was only obtained in cases of rheumatoid arthritis. This was a bi-polar bacillus. It grew in transparent colonies on agar medium, was Gram negative and inoculation experiments with this organism were unsuccessful. Fayerweather isolated a bacillus and obtained successful results on inoculation.

It was formerly supposed that the absence of the organisms from the affected tissues negatived the infective origin of any particular case. The fallacy of this view has been clearly demonstrated by bacteriologists. It has been conclusively proved in certain conditions (as an example of which the case of diphtheria may be quoted) that the organisms need not necessarily be localised to the affected part, but that the toxins elaborated in their growth and development are the all important factors in the production of symptoms. The presence of organisms in the joints in cases of acute rheumatism has not been satisfactorily demonstrated, and in some forms of arthritis which occur during a gonorrhœal infection organisms cannot be detected in the synovial fluid or peri-

articular structures. It seems, therefore, reasonable to suppose that other organisms, localised in a distant part of the body, are capable of producing changes of a similar character in tissues situated at a distance. This thesis contends that such is the case, and is supported by the results of treatment directed against the primary source of infection. It may also be mentioned that aspiration of the joint cavity in four cases of rheumatoid arthritis showed the absence of organisms both microscopically and by culture. The objection might be raised that they were present, but lodged in the synovial membrane. Unfortunately, the latter could not be examined. This point, therefore, requires further investigation.

If rheumatoid arthritis be of infective origin, one would expect to meet occasionally, types of acute disease. Such cases do occur and closely simulate acute rheumatism. There is a sudden onset with pains in many joints, high temperature and general febrile disturbance; but in acute rheumatoid attacks the coating of the tongue is not so typical, sweating is less extreme and mostly confined to the palms and soles, cardiac complications are rare, the smaller joints of the hands and feet (more rarely the larger joints) are first affected, and finally, salicylates do not influence the course of the disease in a characteristic manner. Presumably the reason why

salicylates fail to produce uniformly good results in these cases is the fact that most of them depend upon infections occurring elsewhere than in the intestines. In those cases, however, where the source of infection is intestinal salicylates are of use. This is easily understood when we remember that this drug is a phenol derivative.

The following case of acute rheumatoid arthritis illustrates the failure of salicylates in the treatment of this condition. A man aged 43 had a polyarthritis chiefly affecting the small joints, with a temperature varying from 101° to 103°.5. He gradually developed a pleural effusion and some ascites. Salicylates with local and general treatment were given for a period of six weeks in hospital, but the pain and swelling of the articulations persisted. His mouth was examined and a number of septic stumps were extracted, with prompt subsidence of the various synovial effusions, and relief of the pain in and swelling of the joints.

I shall now quote cases of the commoner sub-acute and chronic types of the disease in which the source of infection has been traced to

(a). suppuration in the neighbourhood of the teeth- Case 1.

(b). the respiratory tract - Case 11.

(c). the genito-urinary organs - Cases 111, 1V.& V.

(d). a sinus following laparotomy - Case V1.

(e). the alimentary tract - Case V11.

All these cases have been seen in hospital and private practice and in all of them, affections of the joints were present which would be described at once as rheumatoid arthritis. On careful examination, they were found to be suffering from some form of chronic sepsis, although in some of the cases the source of this was not, at first sight, apparent. In these cases treatment directed to the septic condition has been successful in relieving the symptoms and the associated joint lesions.

Many people have some focus of infection unknown to them possibly for years, and yet do not develop joint trouble, or indeed any trouble at all. It is, therefore, obvious that there must be some other factor at work in producing the arthritis. It is difficult to say what exactly this is. Perhaps the toxin has to be absorbed in maximal doses in a minimal period of time. Again, it is conceivable that an immunity has been established against such organisms as are present in the cases where infective foci are present. Such immunity may give out under some or any of the many conditions which were formerly instanced as causative factors.

Case Vl. quoted below suggests that obstruction to the outflow of pus may be a circumstance of importance, and it is impossible to maintain that this condition is not present in many of the other infections cited.

Clinically it would appear that in many of these cases subsequent to infection there is a period of about eighteen months during which the patients are free from objective joint symptoms and muscular atrophy. Very constantly, however, they complain during this stage of a dead or numb feeling in the fingers which get pale or cyanosed, of pains and stiffness of the joints on first waking in the morning, of diminished muscular power and of sharp pain along the ulnar border of the palms and under the ball of the great toes. Constipation, anæmia and a low blood pressure are common associations. Occasionally, some enlargement of the thyroid gland is observed, as in the case of a nurse at St.John & St.Elizabeth Hospital, London, who, in addition to arthritis, developed some tremor, rapid pulse and general symptoms suggestive of an early stage of exophthalmic goitre. Before being put to bed for a prolonged rest as treatment for the latter condition, she was advised to see the dentist, who extracted three septic stumps and filled some other decayed teeth, with the result that at the end of a fortnight all her

symptoms disappeared. She has remained quite well for the last three years.

In a minority of cases joint symptoms may not appear for many years. Thus, Briscoe records a case where the patient had a discharging maxillary antrum for thirty five years. Two unsuccessful operations had been performed. Joint symptoms appeared. Then a radical operation was undertaken and the discharge ceased. All the fluid became absorbed from the affected joints, but, owing to the extensive changes that had taken place, this removal of the fluid left him with more pain than formerly and his condition was probably worse than before the operation.

Amongst both in-patients and out-patients at King's College Hospital there has been abundant and convincing proof of the fact that oral sepsis is capable of producing an arthritis which cannot be distinguished from rheumatoid arthritis. I have seen several cases associated with peridental sepsis and the arthritis has cleared up when proper attention was given to the teeth and gums. The joints which in my experience were most frequently affected were those of the fingers and wrists, & next in order the knees and ankles, but any joint may be involved, though, in only one case, have I seen the disease present in the joints of the cervical

vertebrae. Dental plates are exceedingly common in hospital patients, and, as worn by them are often times a fruitful source of oral sepsis. If one looks into their mouths nothing much is to be seen, but when the plate is removed the true state is revealed. In many cases the plate covers over the suppurating stumps of teeth, the crowns of which had been previously removed by some inexperienced or unqualified operator. The roots are left embedded in the gums and, sooner or later, they and the tissues around become inflamed and suppurate. Pus and blood can be squeezed up easily between the gum and stump. The pressure of the plate doubtless aids in the absorption of the toxin from this suppurating focus. Anaemia and digestive disturbances are frequently associated with the joint trouble in these cases. The degree of sepsis varies. Instances are recorded where two or more joints were affected and the symptoms subsided on the extraction of only one suppurating stump.

CASE 1. The following case is a type of the disease associated with oral sepsis.

M.A.T., widow, aged 46, was admitted into King's College Hospital on 13th September, 1910, complaining of pains in her feet, legs and thighs. Seventeen years ago she had an attack of rheumatic fever from which a complete recovery was made, and with the exception of occasional sore throats had subsequent-

-ly enjoyed good health. During six months before admission to hospital she had noticed some weakness in her legs and always felt tired. In the left side of her face she had attacks of neuralgic pain which extended down her neck to the left shoulder. The roof of her mouth became swollen and she began to suffer from severe pain in her feet, ankles and knees, which varied in intensity from time to time but was worse at night and was chiefly felt in the joints. On examination, her heart, lungs, urine and abdominal organs were found normal.

There was a little pain in the right shoulder but the movements were fairly good. The left shoulder was so intensely painful that no movements were permitted. The right elbow movements were good and there was very little pain complained of, but in the left elbow, though there was no swelling, the movements were limited and painful. Both right and left wrists were painful and swollen especially over the tendons on the dorsal aspect. The swelling was peri-articular as well as in the joint. The ring and little fingers of the right hand were red and swollen and could not be flexed on account of the pain. The same fingers of the left hand were also swollen, but slow movements were possible. Both hips were slightly painful, but their movements were normal. The right knee was considerably swollen, the left only slightly. Both ankles and both feet were painful and swollen, particularly

over the dorsum. For three weeks the temperature ranged from 97°.4 to 101°.5, but for the most part was above normal, while the pulse rate varied from 90 to 100. For sixteen days, twenty grains each of sodium salicylate and potassium bi-carbonate were given four-hourly with local applications to the joint. On the sixteenth day opium had to be given to control the pain and with this Tallerman & Sheffield's hot air treatment was carried out. This last undoubtedly gave the best results and on the 26th October she was allowed to get out of bed. On 28th October she left hospital and went home, certainly with less pain, but with no appreciable diminution in the swelling of her joints. Fourteen days afterwards she returned to hospital and was seen in the out-patient department. The pain and swelling of her joints were as bad as ever. Careful examination of her mouth revealed a marked degree of gingivitis around the lower molar teeth which were decayed and broken off in some cases below the level of the gums. Pus could be squeezed up between the gums and the remainder of the teeth. She was referred to the dentist and the offending teeth were removed at two sittings. This operation was followed by immediate relief to the pain and swellings of her joints and she has remained quite well for the last two months.

Before leaving the oral cavity, another source of septic absorption may be mentioned, namely, gold crowns. One case had both knees affected and proved most intractable until a molar tooth capped with a gold crown was examined. On removal of the crown, a septic focus was discovered and when this was treated the joint symptoms subsided. Mr. Wallis, dental surgeon to King's College Hospital, by way of experiment had a crown put on one of his teeth which was diseased. Pains in his knee joints followed which were wholly relieved when the crown was removed and the septic cavity treated antiseptically.

It is quite a noteworthy fact and one which I have constantly observed in practice, that elderly patients, the subjects of arthritis, enjoy better health and are more free from joint pains when they become edentulous from shrinking of the gums and atrophy of the alveolar border incident to advancing age.

In joint affections of obscure origin, a thorough examination of the nose and accessory sinuses may reveal the source of infection. Suppuration in the nasal cavities and annexes is very often of influenzal origin and in this connection it is interesting to recall the association of rheumatoid arthritis with influenza. It is surprising too, how long organisms

may remain latent before any symptoms become manifest. Thus in one case, the influenza bacillus was found in the frontal sinus of a patient eight years after infection. As most of these cases go to the rhinologist for treatment, there has been very little opportunity of personally observing this process in connection with joint affection, but it is a recognised fact that joints are often involved in connection with chronic suppuration in the accessory nasal sinuses. (See case already cited.)

CASE 11. The following is one of a type where the source of infection was pulmonary.

W.C., telegraphist in the Anglo-American Co.'s employment, aged 53, was admitted into King's College Hospital on 3rd January, 1909, complaining of swelling and pains in his hands, wrists and knees of fourteen days duration; for one night too, he felt his jaw stiff. There was nothing in the past history worthy of comment, beyond several attacks of sore throat. His trouble dated back to eighteen months ago, when he began to lose strength and felt more easily fatigued than formerly. During this time he lost over two stone in weight and suffered from a cough with expectoration. Twelve months ago he first noticed a swelling in his right ring finger, both inter-phalangeal joints being affected. Three months before admission both hands got puffy, swollen and painful.

Four or five weeks after that he noticed a stiffness in his knees and difficulty in moving them in the morning, and this stiffness was soon followed by swelling of the joints. The bowels were regular, the appetite good and he slept fairly well. On examination there was much muscular wasting all over his body and the subcutaneous fat was deficient. The fingers of both hands were symmetrically involved, the joints were swollen and the synovial membrane was thickened, but there was no ulnar deflection of the digits. The skin was glossy and atrophied and the nails were smooth and recurved. Both wrists were swollen and there was fluid inside the joint and the tissues around were oedematous. The shoulders were more or less fixed and there was grating in both knees, but no marked degree of swelling. The urine was normal and abdominal examination for any evidence of disease yielded negative results. The nose was healthy. Examination of the mouth revealed the presence of several decayed teeth, in one of which the root was exposed. There was no inflammation of the gum, however, nor could any pus be expressed between it and the teeth. The heart was normal. Coarse crepitations were heard over the left lung from the eighth rib downwards. Several examinations of the sputum, which was muco-purulent, failed to reveal the presence of the tubercle bacillus, but

large numbers of streptococci and diplococci were discovered. A culture was made of these organisms which grew as a streptococcus. A vaccine was prepared and injected each week. At the same time the patient was put on full diet with cod liver oil and inhalations of creosote and carbolic acid. A marked improvement in the condition of the joints followed the first injection of the vaccine. After a month he was free from all pain in the joints, and the swellings had very much diminished. In addition, he gained 8lbs. in weight. On examination, the lungs presented no abnormal physical signs. In the past year he has gone back to work and has had no recurrence of pain or swelling of the joints.

In this case, the shoulders were more or less fixed, and this fixation of a joint with muscular atrophy is a condition not infrequently found in cases of pulmonary tuberculosis, which suggests that the tubercle bacillus or some secondary infection associated with it is also capable of producing this joint affection. I might also call attention to the condition of hypertrophic pulmonary osteo-arthropathy, for which no satisfactory explanation has been given, though Marie suggests that the toxins absorbed from the pulmonary lesions, e.g. bronchiectasis, empyema or tubercle, which are so frequently associated with it, give rise to a chronic osteitis of the bones affected.

CASE 111. Bacilluria is often associated with arthritis, and an interesting case of this will be recorded next.

H.B., a cook, aged 56, had complained for more than a year of stiffness, swelling and pain in various joints, but chiefly affecting the left knee. She was a strong healthy looking woman, although she suffered from habitual constipation. Her teeth had been removed years previously and her gums were healthy. On examination, there was some general stiffness of the arms and legs, but no swelling was noted except in the left knee. Here, the synovial membrane was much distended, fluctuation could be made out and the joint was painful on manipulation. The skin overlying the joint was not hot, and there was no œdema. The heart, lungs and abdominal viscera were found to be normal, but the urine contained a trace of albumen and was opalescent. This opalescence was due to the presence of large numbers of the bacillus coli communis, as proved by cultivation. There were a very few pus cells. General treatment was instituted, the patient was put on appropriate diet, purges were given and urotropine administered. This did not give much relief. A vaccine was prepared from the organism and fifty million injected. This produced immediate relief so far as the pain and stiffness were concerned, but although some of the fluid was absorbed

the swelling of the knee joint did not completely disappear. Local applications in the shape of blisters, Scott's dressing and Bier's treatment were tried with no better result. Ultimately, the joint was aspirated, the fluid removed and an equal quantity of sterile saline was introduced. This was followed by a sharp rise of temperature with pain and swelling in the joints. The temperature lasted forty eight hours, and then dropped to normal. All the fluid was completely absorbed in the course of the following week. The patient has been doing her usual work for the last two years with freedom from all joint symptoms.

There remains still a class of patients who present themselves with joint swellings and pains, and yet on examination there is no visible source of sepsis, and the urine is normal. These patients are of both sexes, but more often they are female. It is very common to find them suffering from scanty losses at the menstrual periods, leucorrhœa, marked constipation and digestive derangements. The following case illustrates this type.

CASE IV. A private patient Mrs. H.S., aged 41, had suffered from pain and stiffness with grating in the right knee joint for three years. There was marked intra and peri-articular effusion, some atrophy of the surrounding muscles and slight swelling of the opposite knee. Scott's dressing and massage

afforded only temporary relief. Preparations were being made for inoculation of a vaccine, prepared from organisms found in the vaginal discharge, but an acute intercurrent illness led to the patient's death.

Films of the vaginal discharge in these cases, will show organisms of almost every description and in overwhelming numbers. In short, the lower vagina and vulva may be in such patients true foci of chronic sepsis. In other cases of a similar type, careful inquiry will elicit a history of gonorrhoea, dating it may be many years prior to the onset of the joint symptoms. Examination of the urethra will frequently confirm the history by revealing the presence of the gonococcus. This is not surprising when we reflect what excellent harbour the male urethra offers to this diplococcus, and how long after infection this organism may remain latent in the various folds and crypts of the urethral mucosa.

In the following case it was found sixteen years after infection.

CASE V. J.L., clerk, aged 29, was first seen on 10th January 1909, complaining of pains and swelling of the feet of six weeks duration. The pains came on in the evening and were associated with stiffness on first using his feet in the morning. He had no feelings of malaise with this. Sometimes

his hands were swollen and painful, but this was only of temporary duration. The previous history showed that at the somewhat early age of thirteen he contracted gonorrhœa, and that when he was eighteen years of age he had some swelling and pain in the joints of his fingers, which lasted for one week and then disappeared. He had been all through the South African War and had received some injury to the skull. (A depressed fracture.) He appeared to be a healthy fellow and on examination all his organs were found to be normal. He had double flat foot with some thickening around the tendo Achillis which was painful on moving the ankle joint; there was tenderness on all movements of the metatarso-phalangeal articulations of both feet. Two septic stumps with pyorrhœa alveolaris were discovered. The stumps were extracted and appropriate treatment directed to the gums. At the same time, a platinum loop was passed down the urethra and a film made from the material obtained. This displayed the characteristic picture of gonococci with a few pus and epithelial cells. He admitted that there was some stickiness of the meatus urinarius in the morning. As removal of the oral mischief had not relieved the condition by the 5th February, an injection of gonococcus vaccine (twenty million dead organisms) was given on that date and he was directed to take

10gr. of aspirin if he had any pain after forty eight hours. On 12th February, the pain was much better and he had only required one dose of aspirin. Fifty million gonococci were injected. On 19th February, he had been free from all pain. Local treatment was started and he was given seventy million gonococci. On 26th February, pain was still absent and eighty five million gonococci were injected. Each week he received a dose of vaccine (not exceeding one hundred million) and on the 19th March, he reported himself free from all pain and local symptoms and stated that he had danced all through the previous evening.

The rectum may be mentioned as another source of infection in these joint cases. The most usual pathological condition of this viscus associated with the condition under discussion is a chronic ulcerative proctitis. Curiously enough this latter condition has been commonly found to be associated with some form of oral sepsis, the other chief causes being gonorrhœa and certain tropical diseases. Whichever be the cause, the condition, though persistent, when once cured is usually followed by a subsidence of the joint symptoms.

CASE Vl. A case of a somewhat different type occurred while I was attending the Royal Free Hospital in 1902.

E.P., aged 34, was admitted for chronic abscess of the

tubes and ovaries, most probably of gonococcal origin. Laparotomy was performed and dense adhesions were found, in separating which, the second part of the rectum was torn. This was sewn up over a decalcified bone bobbin. The wound healed by first intention except at one part where a drainage tube was put down to the rectum. For a long time a sinus remained which discharged pus but no faeces. Meantime both knees got painful and swollen, and creaking was felt. In fact she developed a rheumatoid arthritis of both knees. The more freely the sinus discharged, the less troublesome were the knees; but if the sinus was even temporarily obstructed pain and swelling supervened. This sinus persisted for several months and then healed. Shortly afterwards her knees improved and have since remained quite well. She was seen at the Royal Free Hospital on 19th January of the present year, and there was no sign of any joint affection.

This is the case which suggested the remarks previously made, that pus under pressure probably plays some part in producing these secondary joint changes.

Lastly, there are cases of arthritis which are relieved by antiseptic treatment directed to the alimentary tract, which is some presumptive evidence that the toxin is derived from organisms in this situation.

CASE Vll. may be quoted as illustrating this type.

G.H., governess, aged 23, was admitted into King's College Hospital on 14th November, 1910, complaining of pain and swelling in her right wrist and hand and in her ankles. She was quite well until March, 1909, when without any apparent cause she got "run down". She felt faint at the skating rink one night, and had to give up skating. She used to sew a lot and was quite happy and contented. She states that in 1904 her fingers went blanched, cold and wrinkled, but this did not trouble her again until 1909, when she noticed that her hands used to get hard, stiff and fixed when giving the children their bath. They got well again the following morning. One night in August, 1909, she developed a pain in her left shoulder which became hot, stiff and so painful that she got no sleep that night. The joint got well in three days, but a fortnight later the right shoulder was affected in exactly the same way. In October, 1909, the middle finger of the right hand became stiff in one night and the inter-phalangeal joints swelled. Subsequently she had pains under the ball of the toes and instep. Lastly, her hands got swollen and she was then sent to the doctor. She was never kept in bed and her condition on admission was the same as it had been a year previously. The pain however, was less severe

though constant. She had chickenpox and whooping cough as a baby, and measles when four years old. In 1900, she had influenza, for which she remained in bed for less than a week. Until 1907, she suffered greatly from constipation but at the present time her bowels act regularly. At school she was subject to headaches, occasionally over the vertex, but mostly of the frontal and temporal type. She never suffered from colds in her head or chest, and went once a year to the dentist. In 1904 she had four teeth extracted. No gold caps were present in the mouth. She had no trouble with micturition and had noticed nothing abnormal about the urine. Her parents are alive and well. She has no brothers, but three sisters are living and healthy. On examination, the heart, lungs and abdominal organs were found healthy. There was no albumen and no sugar in the urine which was sterile on bacteriological examination. The teeth and gums were very good, the nose was normal and no vaginal discharge was detected. The jaw, spine, and hip joints were normal. The right wrist was swollen and painful and the capsule was distended with fluid. The joints between the first and second phalanges of all the fingers and the thumb of the right hand were swollen, but contained little fluid. They were only slightly painful and were not fixed. Some pain was

elicited on pressure over the outer aspect of both knees. The ankles and toes were swollen and painful. Treatment was directed to the intestinal tract and consisted of saline purges and intestinal antiseptics (creosote 1m. with 1drachm of codliver oil t.i.d., p.c.) while locally, the joints were covered with Scott's dressing and well moved each day. The swelling and pain gradually subsided, though for one week she complained of some morning stiffness of the left fingers. She was then given guiacol carbonate and there has been a steady improvement in her condition.

In this series of cases one point stands out pre-eminently, namely, the presence of some septic focus. Treatment which has been directed against this focus has produced amelioration of the symptoms associated with rheumatoid arthritis and subsidence of the local joint conditions. It seems, therefore, reasonable to conclude that the rapid improvement produced in a disease which is otherwise intractable, is to be attributed to the removal of the exciting cause. This is especially true when we consider that sepsis "at a distance" has not till late years been given a place in the aetiology of the disease, and that treatment has, therefore, not been directed against this particular condition.

It would be wrong to affirm that it is only joints

which are affected by chronic infective processes occurring in the body. Many cases of so-called muscular rheumatism or "rheumatics" have been traced to a rise in the quantity of toxin absorbed, especially from the gastro-intestinal tract. The word rheumatics is here used in the sense in which it is applied by Stockman i.e., to those pathological changes that occur in the white fibrous tissue of aponeuroses, fibrous septa, the sheaths of muscles and nerves, periosteum and the fibrous structures surrounding the joints. "The lesion" he says "consists in inflammation and hyperplasia of the connective tissue in patches, and the condition may be widely spread over the body or be confined to a certain area of it." (British Medical Journal, Feb. 27th 1904.) Lumbago is a typical instance of this fibrositis. It falls into line with the joint affections if we consider that the fibrous capsule, in which the muscle is enclosed, is of a very similar structure to that of other serous cavities of which a joint may be considered to be one. Such well-known predisposing causes as exposure to cold and damp are often present as factors in the production of lumbago, but the proximate cause is almost certainly the same in every case namely, an increased absorption of toxins from the gastro-intestinal tract or other site of infection. The treatment which, in

my experience has been of most service, is an intestinal antiseptic such as calomel ¼gr. t.i.d., with the imbibition of three pints of water per day.