An Address

ON

RHEUMATOID ARTHRITIS.

DELIVERED AT A MEETING OF THE SUNDERLAND DIVISION
OF THE BRITISH MEDICAL ASSOCIATION,

BY

SIR JAMES BARR, M.D., LL.D., F.R.S.E.,

PRESIDENT, BRITISH MEDICAL ASSOCIATION.

MR. CHAIRMAN AND GENTLEMEN,—When, at the request of my friend Dr. Todd, I consented to give an address to your Division on rheumatoid arthritis, I was told that this complaint is fairly common in this district, and he was specially solicitous that I should give you a few infallible tips on treatment; but I am too old to deal in infallibilities—it is only the young men in all ages who propound infallible cures, which as a rule are short-lived, and the patients become sadder, and the doctors perhaps wiser, men. If it had not been for these cocksure gentlemen, I feel confident that we would have known more about this disease than we do at present; there is a statement made by Karl Pearson in reference to another subject, which is very applicable to this one:

It is a very uphill battle to contest one after another the various dogmatic statements made by a small section of the younger medical men on the basis of statistics which are hopelessly inadequate, if they are not misread or perverted.

There are few diseases in which greater confusion exists as to their nature and causation than those of the joints, and yet every writer seems to think that he, at least, knows all about the subject. I believe it was Robert Lowe who said that "it does not matter what you say so long as I understand what you mean," but herein lies our difficulty. If you read any textbook dealing with arthritis, you will be a clever man if you know what the author means; and, on the other hand, you may probably consider that the writer does not himself know. You will find a whole series of diseases inextricably mixed up under the same name, or different names applied to the same disease. You find such names as rheumatoid arthritis, infective arthritis, toxic arthritis, arthritis deformans, osteo-arthritis, chronic rheumatism, rheumatic gout, indiscriminately applied to a variety of affections of the joints and to different stages of the same affection.

Arthritis deformans is a common name for the disease with which we are dealing, but if you wait for deformity before correctly diagnosing the disease you may have to wait for years until the patient is becoming a hopeless cripple. Again, some call this affection an infective arthritis, and others call it a toxic arthritis without offering any proof in support of their contentions. As a rule, the less these gentlemen know about infections or toxins the more dogmatic their statements. Good bacteriologists do not talk in this manner, because they have been taught by Koch:

1. The organism in question must be present in the tissues, fluids, or organs of the animal affected with, or dead from, the disease.
2. The organism must be isolated and cultivated outside the body on suitable media for successive generations.
3. The isolated and cultivated organism on inoculation into a suitable animal should reproduce the disease.
4. In the inoculated animal the same organism must be found.

What author who boldly asserts that rheumatoid arthritis is an infective disease has conformed to those postulates, or what is the toxin that lights up this affection? This toxin is as vague and indeterminate as the imaginary "stimulus" which is supposed to initiate and maintain cardiac contraction.

Because certain cases of arthritis have been associated with pyorrhoea alveolaris or an ulcer in the rectum, and have been cured by a vaccine, it has been promptly assumed that all cases of rheumatoid arthritis are due to some germ or other, or to its toxin. But such evidence as this is no proof whatever that these easily remediable cases are similar or in any way allied to the chronic polyarticular inflammations of the synovial membranes and periarticular structures of the joints which we designate

rheumatoid arthritis. No doubt many organisms, such as the tubercle bacillus, the gonococcus, the *Diplococcus intracellularis* of Weichselbaum, the pneumococcus, the influenza bacillus, the streptococcus and staphylococcus, not unfrequently set up a monarticular or a polyarticular arthritis, but such cases should be easily differentiated from rheumatoid arthritis. It is often marvellous how a case of gonorrhoeal rheumatism, especially if monarticular, can be rapidly cured by a few injections of a gonococcus vaccine. The worst case of suppuration of many joints which I have ever seen was due to the *Diplococcus intracellularis*.

Perhaps the most popular view of this affection in the present day is to look upon it as a toxic arthritis, due to one or more toxins produced by the intestinal flora, but no attempt has been made to show the nature of the toxin or its special affinity for the joints, or what the liver has been doing to allow it to pass its portals. The urine shows no evidence of intestinal putrefaction, and this vague hypothesis rests on no firmer foundation than the imagination of some writers. Such evidence is of no more value than that of the Irishman who, not wishing to reveal his ignorance, when hard-pressed on cross-examination acknowledged that he was perhaps putting a hypothetical case before his lordship and the jury, but when asked what is an hypothesis he replied that in faith he did not know, but he thought it was some part of a pig; so those gentlemen do not know what is the toxin, but they think it is some part of rheumatoid arthritis.

Osteo-arthritis is frequently used as a synonym for rheumatoid arthritis, but really the two conditions are diametrically opposed. The former usually occurs at a later age; the disease runs a very chronic course without any exacerbations. There is thickening of the synovial membranes, erosion of the cartilages, eburnation of the ends of the long bones and the formation of osteophytes. It usually affects many joints, but one hip-joint may be the only one involved. In this category must be included Heberden's nodes, and spondylitis deformans. It is true that the deposition of lime salts may take place in the final stages of rheumatoid arthritis, but this only occurs after the disease is over and the deformity left. It is Nature's clumsy method of effecting a cure.

RHEUMATOID ARTHRITIS.

By a process of elimination I am now in a position to define what I mean by rheumatoid arthritis. It is a low, chronic, polyarticular inflammation with frequent acute exacerbations. There is thickening of the synovial membranes and the periarticular fibrous tissue, with slight serous effusion into the joints. The muscles generally are wasted, irritable, and contracted; the deep reflexes are increased, and there is frequently neuritis, especially of the nerves supplying the joint structures. The joints are at first stiff, grating and painful on movement. In my experience the large joints, especially the knees, shoulders, and ankles, are first involved, and one joint only may be at first affected, especially if it had been previously injured. In this stage of the disease, if recognized and energetically treated, it rapidly disappears; but unfortunately the disease is not then usually diagnosed, but is called chronic or subacute rheumatism and treated accordingly; or if it be recognized, the patient is told that it will eventually cripple her, and nothing can be done except to try and delay its progress. If the disease be allowed to progress, as it practically always is, then you get the smaller joints affected, such as the wrist joints, carpus, metacarpo-phalangeal and first phalangeal joints, and the joints of the toes. You then get the characteristic fusiform swelling of the joints, and of course diagnosis can no longer be delayed. The further swelling of the joints is accompanied by increased effusion, erosion of the cartilages and rarefaction of the articular ends of the bones from absorption of the lime salts. From the disorganization of the joints and muscular contraction you get well-marked arthritis deformans. It is still possible to cure the disease, but not the deformity. If, however, you keep hunting after the germ and its toxin, the patient as well as her joints will become a hopeless wreck.

Etiology.

In dealing with the nomenclature I have to some extent referred to the etiology. As I believe with Newton that

we should admit no more causes of natural phenomena than such as are both true and sufficient to explain their appearance, I shall at once pass over the score of causes which have been set down in textbooks, and now state my own view as to the immediate cause of the disease, and afterwards lay bare the foundations of my belief. The proximate cause, in my opinion, is a mild chronic acidosis, which extracts the lime salts from the fibrous tissue, muscles, nerves, cartilages, and bones. I thus look upon this affection as a general disease, and the apparent localization in the joints is due to their structure and liability to injury. The extraction of the lime salts from the fibrous tissue causes it to swell and its vascularity increases; with the loss of the lime salts the muscles get into a condition of irritable weakness—they waste, readily contract, cramp frequently occurs, all the deep reflexes are exaggerated, and even a state of rhythmic tremor may be set up. There is not much lime in the nervous tissue, but its abstraction leads to a marked result; neuralgic pains readily occur, and even neuritis is easily established. The patients frequently complain that the pains are worse at night, and this is almost universally ascribed to the heat of the bedclothes, a regular *post hoc, propter hoc* argument, but when the patient is in bed in the daytime the pains subside, though "the heat of the bedclothes" remains the same. The condition really is that the blood is less alkaline at night; it is consequently capable of holding more lime, which is taken up from the tissues. The night pains can usually be obviated by a drachm of sodium bicarbonate and 15 grains of lime carbonate in a glass of milk at bedtime.

As more and more lime gets absorbed, you get swelling of the periarticular tissues and effusion into the joint; this serous effusion is often bloodstained, and inflammation in the joints soon attacks the cartilages, from which absorption of the lime salts takes place, followed by their erosion and thinning. The ends of the bones in the afflicted joints are attacked last, and absorption of the lime salts with rarefaction takes place; these parts of the bones are selected as they are easily damaged from use and become more vascular. The deposition of lime salts readily takes place in parts which are not functioning, and if you wish to cause absorption you must see that the function of the part is restored—for example, if you wish to decalcify rigid costal cartilages, you must not merely use decalcifying remedies, but you must also make the patient take respiratory exercises.

I frequently use decalcifying agents, but I am always quite alive to the danger of producing rheumatoid arthritis, and so such an untoward event has never occurred in my hands. Perhaps some of my followers will accomplish this, but it will not be without warning. If people were more careful in their diet they would not require so much physic.

Sex.

Women are much more liable to this disease than men. There is nothing in the constitution of a woman which should make her specially susceptible to this disease, but the very same conditions which make her less liable to arterio-sclerosis render her more prone than men to rheumatoid arthritis. In the poorer classes, where this disease abounds, she is badly nourished, lives on tea, bread-and-butter, and various carbohydrates, which readily undergo acid fermentation in the stomach; there is a poor supply of milk and other proteins. She gets very little lime and other alkalies, while she is liable to exhausting discharges, such as menorrhagia, leucorrhoea, excessive lactation, and mucous colitis, which rob the system of its lime. The leucorrhoea is usually due to the *Bacillus coli* or other organisms, but so far as the rheumatoid arthritis is concerned it is not the organisms, which are practically outside the body, but the loss of lime, which works the mischief. It most frequently occurs in women between the ages of 15 and 35, during their most active menstrual period. It does not usually start after the menopause, but if then already present other causes may maintain it in an active condition. The thyroid gland is more active in women than in men, and this leads to active calcium metabolism. It is essentially a disease of debility, and nutrition is readily affected by worry, anxiety, overwork, frequent childbearing, loss of blood, etc.

Among the associated conditions which to some extent

stand in a causal relation must be specially mentioned an almost invariably dilated stomach with deficient motor action and obstinate constipation with occasional diarrhoea. For the maintenance of the motor function of the stomach and bowels a certain amount of calcium and potassium salts are necessary, while in these cases the supply of both is deficient. This leads to stagnation with acid fermentation, and the production especially of lactic and butyric acids; this tends to increase the excretion of lime rather than its absorption. The late Dr. O. T. Williams showed how the insoluble lime soaps damage the mucous membrane, setting up mucous colitis; but in this case they have the further deleterious effect of robbing the system of lime.

The amount of lime taken up from the intestinal tract when administered in the form of food or medicine is very variable. In many cases only a small fraction of that administered reaches the blood, while many individuals absorb it freely and excrete it as rapidly. Apart from individual peculiarities, this to a large extent depends on the form in which it is presented for absorption; the tribasic phosphate is a very fixed salt and almost entirely insoluble, yet I have heard a professor of therapeutics assert that this salt cures the toothache of pregnancy. Such child-like simplicity and therapeutic faith deserve a place in the Kingdom of Heaven if there be no retribution for culpable ignorance. The sulphate is rather insoluble but it is readily decomposed in the intestinal tract, and so presented to the mucous membrane in more assimilable forms; the same can be said for the carbonate. The chloride, the lactate, the glycerophosphate, and the iodide of calcium are all easily assimilable forms; the iodide is an especially active salt, but from its stimulating effect on the thyroid gland it is not always advisable in this disease. The oxalate of lime is very insoluble, though it may be decomposed in small amount by the hydrochloric acid of the stomach; the citrate of lime is fairly soluble, but the citric acid hastens elimination. Where sodium citrate is added to cow's milk it splits off the fixed lime from the casein, and thus lessens the density of the curd. When the stearin and palmitin of beef and mutton fats are decomposed by the lipase in the intestines, their saturated fatty acids readily form insoluble lime soaps; but, on the other hand, the oleate of calcium is easily assimilated.

Lime exists in two states in the blood—first, as a fixed albuminate of calcium, and, second, as free ionizable calcium; the amount in both states varies considerably, but especially in the latter. When the blood is very alkaline the fixed lime is fairly constant, but as the alkalinity increases the blood holds less free lime and part of the free ionizable calcium is thrown out into the tissues, or excreted by the bowels and kidneys.

The fixed lime in the form of large molecules of calcium albuminate increases the viscosity of the blood, lessens the capillary velocity, and diminishes transudation of albuminous fluids, hence where the blood is well charged with fixed lime you do not get any albuminuria; on the other hand, with diminished alkalinity and the presence of acid salts with an alkaline reaction the blood holds a considerable amount of lime, which is readily excreted by the bowels and kidneys, and leaves the blood ready to take up more lime from the tissues or alimentary tract. So long as the blood is more or less saturated with lime the fixed calcium remains constant, but where the acidosis is not completely saturated with lime or alkalis the fixed calcium may be split off from the albumen, and then you readily get transudation. Hence, in the early stages of rheumatoid arthritis the urine is usually free from albumen, but in the later stages or during acute exacerbations when the fixed lime is lessened you get albuminuria, and also effusion into the joints and tissues. Dr. Sydney Ringer made experiments on the swelling of laminaria when immersed in water, and he found that sodium and potassium chlorides retarded, but did not lessen, the amount of fluid taken up; on the other hand, even minute traces of the chloride or other soluble salt of calcium greatly and persistently restricted the swelling of laminaria. Among the causes of dropsy the presence of sodium chloride in excessive amount must be recognized; and in the treatment of this affection Vidal and many others have recommended a salt-free diet; but I have shown that in many cases this is not enough; you

must to some extent replace the sodium salts in the tissues with calcium salts. In rheumatoid arthritis there is usually a deficient supply and excessive excretion, though, of course, the activity of the process is an ever-varying quantity.

Symptoms.

We have already referred to the dilatation of the stomach, deficient motor function, acid fermentation and intestinal stasis; when the latter is very marked and persistent you get pigmentation of the skin with dark lines round the eyes. The function of the liver and pancreas are impaired, and the patient is usually troubled with flatulence. There is anorexia, but very rarely vomiting. As was originally pointed out by Kent Spender, there is a moderate tachycardia, and this is associated with excessive function of the thyroid, which leads to excessive calcium metabolism, fibrillar tremor, myotatic irritability, and rather free action of the skin. There is general muscular wasting, muscular irritability and contraction, frequently spasm and cramp, and at later stages neuritis with atrophy of the interossei and muscles of the thumb with deformity of the hands. The neuritis and symmetry of this disease have led many to imagine that it is of nervous origin, but as Sir James Paget pointed out, the decay of a leaf is symmetrical without any nerves. The quadriceps extensor femoris and deltoid are frequently much wasted. The muscular wasting leads to weakness, fatigue, and weariness, but although there is usually general emaciation and malnutrition, the existence of the disease is quite consistent with the presence of a considerable amount of adipose tissue. There is a slight effusion into the joints, swelling of the periarticular tissue, and the joints become fusiform in shape, stiff, and tender. The skin over the joints becomes attenuated and glossy. All the deep reflexes are exaggerated except where the action is limited by the stiffness of the joints. There is often much general pain and tenderness from effusion into the sheaths of the muscles, and the presence of sarcolactic acid; these pains, as well as those of the joints, are worst at night. There are frequently acute exacerbations with intermittent pyrexia. At such times the affected parts feel hot, and there is rather profuse perspiration, increased muscular weakness, and general lassitude. At other times the extremities may be cold and somewhat livid, or the fingers may feel "dead and numb."

At a later stage a radiogram shows wasting of the cartilages and rarefaction of the articular ends of the bones; this leads to more or less irreparable deformity. The lungs are not affected; the muscle of the heart may be weak and irritable, and the blood pressure is low; but any valvular lesion which may be present is due to other causes, or may be induced in Nature's methods of cure. The brain is not involved, except so far as the irritability of the patient's temper may be considered evidence of such involvement. At any rate, the patient is never stupid nor mentally lethargic, though migraine is not uncommon; there is often slight anaemia. The urine is usually clear, amber, acid (except from the effects of treatment), deposits urates during febrile attacks, contains an excessive amount of lime and phosphates, occasionally a trace of indican, and a little albumen in the later stages.

Treatment.

The earlier the recognition of the disease the more successful the treatment. Our attention should be first directed to the *prima via*, the teeth should receive scrupulous attention and all sepsis should be eradicated; the acid fermentation in the stomach should be eliminated, and this is most readily accomplished by cutting off all saccharine and farinaceous articles of diet, and placing the patient for a few days on an abundance of red meat with plenty of hot water. Red meat produces ammonia, which neutralizes the sarcolactic acid in the muscles; then milk to which some sodium bicarbonate and chalk or lime water have been added, junket and cream. The sour milk craze in this disease has fizzled out. Afterwards green vegetables and farinaceous food, except oatmeal; a fair amount of fat should be given, especially olive oil or cod-liver oil; at least an ounce of one of these oils should be given every night at bedtime. Bacon gravy, fat bacon, cream, butter or margarine are valuable adjuncts, but beef and mutton fats had better be eschewed. The patient should take a liberal allowance of table salt

with meals. All acids and acid fruits, rhubarb, tomatoes and asparagus should be avoided. When saccharoses are considered permissible, glucose and honey are better than cane sugar or jams, but perhaps a little marmalade may be occasionally allowed. When the patient is improving, grapes, bananas, nuts, stewed prunes and figs may be allowed; saccharine is better than sugar, more especially if the urine has become alkaline under treatment, and tends to deposit phosphates. Regarding drink, there is nothing better than pure water, especially when hot, weak tea, milk and soda water (containing about 30 grains of sodium bicarbonate to the pint), plain barley water, and raisin tea. Avoid all sweet and acid drinks, wine and malt liquors. Regarding alcohol, I think the patient is better without any, but if for any particular reason a little is ordered it should be in the form of whisky, gin, brandy, sloe gin, or liqueur cognac.

To correct the acid fermentation and improve the motor function of the stomach a good combination consists of 30 grains of sodium bicarbonate, 10 grains of potassium bicarbonate, and 15 or 30 grains of aromatic chalk in a glass of milk about half an hour before meals, and a double dose at bedtime; often smaller doses suffice. An excellent stomachic of calcium chloride, hydrochloric acid, and minute doses of the perchloride of iron is very useful after meals; a small cholagogue pill should be regularly administered to keep the bowels open; for this purpose an excellent mixture can be made with the sulphate, bicarbonate, and salicylate of sodium and liquorice. The pancreas is also usually at fault, and to improve its action I often prescribe a capsule of holadin and bile salts about two hours after meals. In these cases the thyroid gland is usually too active, and so all preparations of iodine and thyroid should be avoided. Possibly suprarenal gland and pituitary extract might do good, as Dr. Blair Bell has shown that these secretions tend to retain the lime in the system, whereas the thyroid increases its elimination, but personally I do not care to prescribe such powerful drugs when milder remedies may suffice. It is imperative to get lime into the tissues and to lessen its elimination, but herein lies our difficulty, as no matter how much is administered by the mouth it may be as rapidly excreted as it is absorbed, and so none may reach the tissues; but on the other hand the acidosis in the blood may be taking lime from the tissues as well as from the intestinal tract. In order to get the lime into the tissues there must be a liberal oral supply, and the blood must be kept very alkaline. For this I prescribe freely chloride of sodium and potassium, sodium bicarbonate, chalk, lactate of lime, and calcium glycerophosphate. If it be desired to get calcium rapidly into the tissues it may be given in a very dilute form subcutaneously, say a pint of sterile normal saline solution with 0.05 per cent. of calcium chloride, and 3 per cent. of syrup of glucose. If the calcium chloride be administered hypodermically in a concentrated form, it may readily produce gangrene of the skin and adjacent tissues. Iron is best administered in the form of underdone red meat, and yolk of eggs; arsenic, potassium iodide, guaiacal, and a host of remedies commonly prescribed are worse than useless.

Leucorrhoea should be treated with injections, and any infection of the urinary tract should receive attention. Here vaccines will often prove useful, and the same may be said for pyorrhoea alveolaris.

General massage and the Aix douche improve nutrition, and are highly beneficial; the hot air and electric light baths applied to affected joints often give much relief, but can scarcely be looked upon as curative agents. When you have cured your patient you can send her or him to Egypt, Timbuctoo, or any health resort. Encourage the patient to take a fair amount of exercise short of fatigue when the disease has subsided, and to live a godly, righteous, and sober life in this present world.

THE late Dr. William Carter, formerly Professor of Materia Medica and Therapeutics at Liverpool University, left estate valued at £35,591.

A BILL has been introduced into the North Carolina State Legislature making it unlawful for any medical practitioner or other person to prescribe or recommend any drug or preparation without knowing its true nature and composition. The bill would also require the prescriber to make known the nature of the composition to the patient if requested.