ON THE DIAGNOSIS AND TREATMENT OF JOINT- DISEASES IN THEIR VARIOUS STAGES.

Being an Address delivered on the opening of the discussion on the subject in the Surgical Section at the Annual Meeting of the British Medical Association in Cork, August 1879.

By LEWIS A. SAYRE, M.D., New York.

MR. PRESIDENT AND MEMBERS OF THE BRITISH MEDICAL ASSOCIATION: GENTLEMEN,—I thank you most sincerely for the great honour you have conferred upon my country, and particularly upon myself, by inviting me to open the discussion upon the "Diagnosis and Treatment of Joint-Diseases in their various Stages". I am personally grateful for this distinguished honour, as it will enable me to clearly define my position in regard to the subject under consideration, which I am anxious to do, inasmuch as some of the views I entertain are at variance with those usually accepted. These views are the outgrowth of personal observation, extending over many years, of numerous cases of joint-diseases which have come under my care. Believing them to be correct, if I am so fortunate as to state them so as to carry conviction to your minds of their accuracy, and thus ensure an application of these principles of treatment at your hands in similar cases, I shall have accomplished my mission.

The time allowed for the discussion of this subject will prevent the consideration of the minute anatomy of the various joints; but in order to understand the general principles of treatment involved in the diseases which we shall discuss, it will be necessary to give a general outline of the structures embraced in the pathological changes. And first, what are the component parts of a perfect joint? They are bone, cartilage, fibro-cartilage, ligaments, and synovial membrane. Some of the joints of which we shall speak, as, for instance, the articulations between the bodies of the vertebrae, have no synovial membrane. The varieties of synarthrosis are not included in this discussion. The ends of bones composing joints have a thin shell of dense tissue overlying a mass of cancellated structure which is exceedingly vascular; and it is owing to this anatomical structure that extravasation of blood in the extremities of bones can readily occur from concussions. The cartilages covering the ends of bones have neither blood-vessels nor nerves that have yet been discovered, and live simply by imbibition or absorption of their nourishment from the rich supply of blood-vessels in the cancellated structures beneath; having, therefore, so little vitality, they easily undergo necrosis or degeneration. The synovial membrane is highly vascular, and hence easily excited to inflammatory action from various causes, particularly by sudden changes of temperature after excessive motion. The ligaments which hold the bones together are of a firm fibrous texture closely attached to the periosteum, and are supplied with blood-vessels, and are liable to be torn, more or less extensively, from their attachments, or severed in their fibres, by severe wrenching or straining; the same as the hawser of a ship, when severely strained, may not break entirely, but a few fibres will be torn, and if only so few as not to be detected, makes the hawser more dangerous than if it had been completely broken, for then it would have been laid aside as useless.

Before proceeding to the subject of etiology, I wish to state that in my remarks I shall make no reference to syphilitic, rheumatic, or gouty arthritis, but shall confine myself to those diseases of the joints which have been generally called chronic, strumous, tuberculous, fungus articulari, exudation and gelatiniform softening, commonly called scrofulous diseases of the joints. This latter class of diseases is illustrated by the so-called strumous disease of the ankle-joint, white swelling of the knee-joint, hip-joint disease, and Pott's disease of the spine. All of these diseases have generally been considered to be dependent upon and caused by a constitutional dyscrasia. In proof of this, I would quote one of the most distinguished surgical authors of my own country, who says, in speaking of the etiology of morbus coxarius: "It cannot arise in persons healthy in other respects, there must be a constitutional vice as a predisposing cause. The body must be in a state of debility or feebleness. This is my belief, nay, my solemn conviction."..... "In the great majority of instances, the affection is of spontaneous origin, and it is not necessary for a blow, or a fall, or any injury, to produce the disease." Further along in the discussion, he goes on to state: "The difference between Dr. Sayre and myself seems to be simply this: he

says that hip-disease is almost always of traumatic origin, and not necessarily connected with a vitiated constitution; I, and those who think with me, do not deny that injury may excite the disease; on the contrary, we confess that it frequently does so, but we maintain that the disease is always necessarily connected with a vitiated condition of the system." (*Transactions of the International Medical Congress, Philadelphia, September 1876.*) If this doctrine be true and the theory correct, I would simply ask why it is that so many patients, having recovered from hip-joint disease, are ever afterwards perfectly well and sound. Why is it, that simply having had hip-disease cures this constitutional taint? That this doctrine is not true I am positive, and I base my opinion upon facts obtained from the study of many cases where there was unquestionably disease of the hip-joint, some of them resulting in caries requiring exsection for the removal of the disease, after which the general health has been thoroughly restored and many of them have become vigorous and robust, showing no taint of scrofula, struma, or any other constitutional vice. Many of the cases can be traced in their family history for generations back, without a single taint of struma, scrofula, or any other debilitating affection. A case of this kind, most marked, was placed under my treatment by Mr. William Adams, with undoubted disease of the hip-joint of many months' standing. The case had also been seen by Sir James Paget, who confirmed the diagnosis. The patient has now recovered without deformity and with perfect motion. In this particular case, the family history, for several generations, is remarkable for the longevity and robustness of its members. In no branch of the family is there a trace of consumption, except by intermarriage. Many of these facts are obtained from Burke's *Landed Gentry*, and hence are reliable. One positively ascertained fact of this kind must necessarily be accepted as a successful refutation of any or all theories in opposition to it. I have the records of many cases precisely similar to the one just referred to, but the accuracy of their family history for so many generations cannot be vouched for, as in the case referred to, because, in my country, the genealogical record of families is not so accurately preserved.

Struma, scrofula, or a vitiated condition of the general system, from whatever cause, is the modifying influence of the disease in the joint, but not the cause of the disease. The disease itself is the result of traumatism, generally so slight as to be unobserved at the time the injury is received. If the traumatism be a concussion, an extravasation of blood occurs, which, not being observed, undergoes degenerative changes, and thus becomes a foreign body; or the cartilage may be slightly loosened from its attachment, and having naturally but feeble vitality, becomes necrotic, and it again is a foreign body; or a severe wrench, tearing from their attachment some of the fibrous tissues, causing an exudation of serum or blood, which not being absorbed for want of sufficiently long rest, undergoes degenerative changes, and thus becomes a foreign body; or the synovial membrane being irritated or inflamed from whatever cause, produces an abnormal secretion, and thus makes a deviation from the perfectly normal state.

In either of the instances of traumatism we have just described, we have the nidus, or the starting-point of a chronic inflammation. This is particularly the case if the injury be very slight, so slight in fact as not to attract observation, because then the proper treatment for restoration is not applied at the time the injury is received; if it were, in the great majority of instances, these cases would result in a speedy recovery. If the accident were more severe, sufficient to excite an acute inflammation, it would attract attention, and, by proper treatment, would probably result in an early recovery; but being so slight as not to be noticed, motion and exercise are continued until serious damaging changes have taken place.

Now, if the individual thus injured be in a robust vigorous condition and of healthy parentage, he may have recuperative power sufficient, with proper treatment, to restore him to health without suffering any constitutional disturbance. But even this person in robust health, if the injury be so slight as not to attract attention, his usual avocations and exercise being continued, instead of repair taking place, degenerative changes are instituted, and chronicity of the disease is the consequence. The degenerative processes going on in and about the joint thus slightly injured produce constitutional disturbances before the local manifestations are such as to attract attention; so that, when the medical attendant detects the local trouble, he finds it also connected with a constitutional dyscrasia, and the local manifestations are, to his mind, the result of this constitutional condition; instead of which, the constitutional condition observed by him is the result of long-continued disease which had been unsuspected, and hence neglected.

Take, for instance, diseases of the spine; long before there is any deformity that attracts attention, the patient has suffered from neuralgic pains in different parts of the body distant from the spine, and generally are not brought for treatment until the deformity is conspicuous, which

could not possibly occur until absorption of the bodies of the vertebrae had taken place—an evidence that the disease had existed a long time before medical advice was sought. So, too, with disease of the hip-joint; months or even years elapse before medical advice is sought for the treatment of the hip-disease, attention having been paid even by medical attendants to the knee, which they have covered with iodine and narcotic poultices. This serves as an illustration of the principle which I wish to inculcate.

Now, if the person thus slightly injured be of a strumous diathesis, either inherited or acquired, or if his system be vitiated, enfeebled, or broken down from any cause, the degenerative changes in the joint involved will go on with more rapidity and lead to more disastrous results, than if he had been in a healthy condition at the time of the accident. But even the most decidedly strumous, or scrofulous, must receive some local injury to the joint where these destructive changes manifest themselves; for the scrofula or struma, the constitutional dyscrasia, by whatever name you may call it, involves the entire system—muscular, vascular, nervous, and osseous; and that there should be degenerative changes taking place in one or other particular joint of the body must necessarily be the result of some exciting cause impinged upon the point involved. If scrofula were the essential cause of this disease, as stated by the author above quoted, and almost all of our surgical authors, why is it that so many millions of children with scrofula die from other causes without developing any joint-disease?

No man admits more fully than myself the modifying influence of the strumous or scrofulous diathesis; but that this condition does not produce disease of any joint *spontaneously*, or without some exciting cause, is my firm conviction. It requires the exciting cause of traumatism to give rise to the local manifestations of this dyscrasia. By traumatism, I do not mean the necessity of a rail-road accident or a fall from St. Paul's church; but any accident, no matter how slight, that can produce a rupture of tissues—whether from falling over a footstool, or even a door-sill. Even these slight accidents in enfeebled children often terminate in most serious destructive changes.

Before proceeding further, let us try and come to some understanding as to what is meant by the term "scrofula". If the question were asked this learned body, probably there would be as many answers as there are members present. There is a peculiar condition of the system, with enlarged glands, weak muscular fibre, sore eyes, thick lips, chronic supuration from the ears, all the evidences of *malnutrition*, which, by common consent, we all include under the term scrofula. Some assert that this ill-defined condition must necessarily be inherited; that it is impossible for it to be acquired. If this doctrine were true, it would necessarily involve the tracing back of the scrofulous constitution through the generations of the past ages to Adam, the founder of the human race; and consequently every human being, both male and female, would necessarily be tainted with this inherited condition. The probability of this state of affairs is too absurd for belief; and hence I maintain that this general constitutional dyscrasia, which we have by common consent called scrofula for want of a better term, can be, and frequently is, acquired by persons of a healthy ancestry, by living in violation of hygienic laws. Bad air, bad food, insufficient amount of nutrition and clothing, sleeping in damp badly-ventilated rooms, want of cleanliness, and the frequent intermarriage of persons living under these deteriorating influences, will produce a condition which cannot be in any way distinguished from that which has generally been recognised as inherited scrofula. It will, therefore, be seen that this condition of the system, which has by common consent been termed "scrofulous", can be created by living in violation of the laws of health. That this condition, no matter how produced, whether inherited or acquired, necessarily modifies any disease or accident from which the patient may be suffering, all must, I think, admit.

Take the athlete or pugilist, who is, as you call it in this country, in the condition of "perfect form". He receives injuries, severe blows, wrenches, strains, or contusions, frequently with but slight extravasations of blood, or none at all, his tissues being in such a condition that the vessels do not rupture; but if the vessels do rupture and blood be extravasated, it is absorbed in a short space of time before degenerative changes have taken place. In this condition of maximum health, the reparative processes take place instead of the degenerative. Now, this same athlete or pugilist, by leading a different mode of life—frequent debauches, imprudent diet, want of his accustomed exercise, and a vicious mode of life—may bring his previously splendid constitution into exactly that condition which has generally been understood as scrofulous. When in this latter condition, the same blows or contusions which he could before resist without difficulty now terminate in serious constitutional disturbances.

Some authors have attempted to describe these diseases as chronic, as if the simple element of time had anything to do with the nature of the

disease. Most of these cases are chronic, owing to the simple reason of their feeble origin; the traumatism being so slight as to excite but very feeble disturbed action. Had a more severe injury been sustained, the whole trouble would have been rapidly developed, and thus gone through its various stages with greater rapidity, because a larger number of elements would have been engaged in the destructive processes. In either case, it is simply irritation producing inflammation and its necessary consequences, only differing in degree.

Take the poor man unaided and alone, with his wheelbarrow and shovel, who digs out the cellar, lays the foundation, and constructs his humble dwelling without assistance. He would certainly be a long time in doing it. If as many workmen as could advantageously have been employed had aided him in digging his cellar and constructing his house, the work would have been accomplished in a much shorter period of time. The rapidity of the construction of the house would depend upon the amount of force occupied in the work. So with these diseases; if but few elements are involved in the structural changes, more time will elapse before they will have accomplished their ultimate destructive metamorphoses than if a greater injury had been sustained; showing, therefore, that chronicity has nothing to do with the character of the disease.

Whenever these injuries occur, they produce an abnormal condition of the system which we term "irritation", which gives rise to muscular contractions, thereby limiting the movements of the joints and parts involved, and causing characteristic changes in the form and position of the body, or the joint, or the limb involved. This peculiar muscular rigidity, which has been called reflex muscular contraction, persists and continues until the termination of the disease. It is one of the essential elements which aggravates the difficulty by causing undue pressure upon the parts inflamed, and leading to interstitial absorption and necrotic changes from diminution of the normal blood-supply. The bed-sore on the heel, on the sacrum, and on the scapula is the result of pressure interfering with the nutrition of the part. So this reflex muscular contraction creates undue pressure upon parts brought in contact, and produces the same result.

We hence see the absolute necessity of extension and counter-extension to overcome these reflex muscular contractions in the treatment of all chronic joint-diseases. Great errors have been made in the application of this principle by making the extension beyond the point required, for then tension or traction is made upon the ligamentous structures that hold the bones together, and one of the most essential principles in the treatment of these cases becomes one of the most destructive agents. Consequently extension and counter-extension should only be carried to the point of relieving the diseased parts from pressure, which is to be decided by the *comfort* of the patient; and when this point is reached the parts should be there secured, and maintained in this position of perfect comfort.

Rest, as perfect and complete as can be given to the parts involved in the disease, is the next most essential element of treatment. As the diseases of which we are speaking run a chronic course, and therefore a long time must elapse before recovery can take place, the rest obtained to the part involved, by the confinement of the whole body to the bed for months or years, as the case may be, is detrimental to the general health of the patient. If, therefore, we can by any mechanical contrivance or artificial means secure this perfect and complete rest to the involved joint or parts involved in the disease, and at the same time allow the patient to take free exercise in the open air, we have put him in the best condition to overcome the constitutional dyscrasia from which he is suffering, whether this constitutional condition was a scrofulous diathesis existing previous to the disease, or whether this similar condition had been caused by the disease. For by exercise the appetite is improved, the fresh air begets a healthy action in the system, which, together with a generous and nutritious diet, does more to eradicate the so-called scrofulous diathesis than any course of medication yet devised.

If, as has been stated, it has been proved by the microscope, that minute doses of mercury add to the number of the red blood corpuscles, and then in these minute doses, it may be considered a most valuable tonic. Iron, cod-liver oil, and quinine may also be added frequently with advantage. In some of the joints we have a capsular ligament, and in these there is a period in their treatment when motion becomes as essential an element of treatment as rest in the earlier stages of the disease. If this fact be disregarded in their treatment, the result will be ankylosis. In the majority of cases of diseases of the joints, if detected in their earlier stages, by carrying out the general principles of treatment above described, they will generally recover with little or no deformity and motion more or less complete.

If the effusion be very great, in addition to rest, extension and counterextension, blisters, counterirritation, and the internal administration of such remedies as will promote the absorption of the effused

fluid, are requisite. Friction and elastic compression are also essential elements in the treatment of these diseases in certain stages. If the effused fluid have undergone degenerative metamorphosis, it should be evacuated by means of the aspirator, if possible. If, however, the contents cannot escape by the aspirator, then the joint should be freely incised under the antiseptic spray, and carefully washed out and dressed according to the principles so admirably described by Mr. Lister.

If the disease have progressed to caries or necrosis before it comes under observation, it is frequently accompanied with one or more tortuous sinuses which afford but an insufficient exit to the morbid materials, and hence it is possible, by means of a free incision in the right direction, to facilitate the exit of the discharges, and then by following out the general instructions above given, repair may take place with more or less deformity and partial or complete ankylosis. But in this latter condition of caries or necrosis, after having given the patient the benefit of the treatment just recommended, and the disease still goes on progressively, showing the extent of disease to be so great, or, that the constitution of the patient is so bad that he will probably succumb before the escape of the diseased bone could be effected by the slow process of exfoliation; then, excision and complete removal of the diseased parts is our only remedy. This, when done properly, and with proper after-treatment, will frequently yield the most satisfactory results. In the knee, we have a splendid limb with ankylosis; in the ankle, hip, elbow, and wrist, we frequently have fine results with but slight deformity and very nearly complete motion.

SHORT NOTES ON THE USE OF SAYRE'S SWING AND PLASTER JACKET IN SPINAL DISEASE.

By C. H. GOLDING-BIRD, F.R.C.S.Eng.,
Assistant-Surgeon to Guy's Hospital.

AFTER a somewhat extensive employment of Sayre's plan of treating spinal disease, the following points in connection with it, in addition to those recorded in my lecture upon the subject, published in this JOURNAL for September 21st, 1878, may be worth recording.

The plaster jacket must in all cases be made to reach one inch to one inch and a half below the anterior iliac spines, or the patient will be unable to wear it; a too short jacket is the commonest failure. The anterior iliac spine must be protected with a pad of cotton-wool; and one should be placed over every bony prominence, natural or acquired; the ensiform cartilage often has to be thus protected. All the permanent pads used—the dinner and breast pads are only temporary—are best placed *outside* the merino vest; they do not in this position become so readily hardened and clogged by the perspiration.

If the plaster bandage be put on in a spiral fashion, there is less chance of its "giving" in the loins—the weakest place in the jacket; if attention be paid to this, tin strips may be dispensed with. The strain on the jacket being less in a case of caries than of general curvature—in which the tendency to "telescope" is great the moment the patient is removed from the swing—more care must be given to the strength of the jacket and the setting of the plaster in the latter than in the former. A case of caries may walk away in an hour or two; but one of general curvature is best kept lying till the next day.

The bandages can scarcely be too thickly spread with plaster-of-Paris; the after smearing on of a layer of plaster outside all looks well at the time, but is useless in point of strength; it soon cracks, and is the cause of the "crumbs", by which an improperly put up "Sayre" can be tracked from room to room.

In employing the jury-mast, a thin jacket should be first put on, of two to three bandages, while the patient is in the swing; when it has set, the patient should stand, and the jury-mast can be fitted with more bandages, and the jacket brought to the required thickness.

In spinal caries, fixation of the jacket—physiological rest—is of primary importance; the extension is secondary. Yet the maximum amount of good to the patient will not be obtained without the employment of the latter. It not only opens the chest (retaining it in its most capacious form), but it each time helps to decrease deformity; and those who employ the jacket without extension treat the disease, but miss the full benefit of the treatment in regard to the distortion. A variable amount of straightening is obtained as ankylosis progresses; once in a favourable condition, Nature tends to bring back the body to the normal standard; but the great gain is each time the patient is swung for the jacket to be applied. Repeated extension is not advisable; it interferes with "physiological rest".

In lateral (general) curvature, extension is of primary importance; fixation is secondary. Mild cases may be cured by daily extension alone without the jacket. Great straightening and diminution of rotation are

obtained in the swing at the putting on of the jacket; but the same exercise—extension from the head, as described by Professor Sayre—must be continued twice daily; first, with the intention of keeping the spine straightened, and in very bad cases of opening up the chest more and more; and, secondly, to act as dumb-bells to the dorsal muscles which invariably waste from want of use under the jacket. In spinal caries, this is unimportant; for, ankylosis being completed before the jacket is discontinued, the spine is rigidly fixed and able to hold its own from the first; but in general curvature, there being no ankylosis, the muscles are called upon the moment the jacket comes off, so that if they are wasted the patient will be often utterly unable to keep himself erect on the removal of the jacket till his muscles are again in "working order".

General curvature or caries of the cervical spine must be treated with the jury-mast. In the former, the daily exercise must be employed in addition. In a case of caries, a girl aged 14, with fifteen months' history, and pharyngeal abscess, all her pain, inability to support the head, posterior cervical thickening, with much deformity, entirely disappeared after one year's wearing the jury-mast. No visible deformity remained; but deep pressure with the fingers at the back of the neck could detect an unnatural fullness. The same jacket was worn the whole time—an exceptional circumstance.

Upper dorsal caries ought to be treated with a jury-mast; yet the jacket alone, by fixing the ribs, as Sayre has described, will suffice to give physiological rest to a boss that itself lies above the level of the jacket.

Upper dorsal general curvature must have a jury-mast, if any apparatus at all, and the daily exercise. Below these points, both forms of disease are alike treated with the jacket; the general curvature requiring the exercise as well.

Where spinal caries is complicated with abscess, especially if already open, above the level of the iliac spines, the case is difficult to treat, even in the way that Sayre has indicated; but where the abscess exists, or is open below that level, treatment is easy. If already a sinus, it requires only some ordinary dressing; if still an unopened abscess, it should never be opened; but, by supporting the patient in a jacket and enabling him to walk about, the pus gravitates downwards, points more rapidly below the jacket, the abscess will open of its own accord, and discharge thoroughly, though gradually, without rise of temperature, or interference, as a rule, with the patient's getting about. It is a mistake to keep a case of psoas abscess lying down where by any means it can be got into the erect position; it is a still greater mistake to "aspirate" it; for, unless with the desire to make it point more rapidly, there is no one sound reason for touching it at all. Open an acute abscess, and the temperature falls; open a chronic one, and the temperature rises to fever point; let Nature open the latter at the right time, and there is scarcely any constitutional disturbance.

To say that "Sayre's treatment" is as sound in principle as it is effective in practice, is only now to utter a truism; but every fact, I believe, that he has advanced in connection with it my cases fully and repeatedly verify.

IRRITABLE SPINE AS AN IDIOPATHIC AFFECTION.*

By J. G. SINCLAIR COGHILL, M.D., F.R.C.P. Edin.,
Physician to the Royal National Hospital for Consumption, Ventnor.

THE terms irritable spine, rhachalgia, spinal irritation, notalgia, neuralgia spinalis, etc., are used indifferently in the text-books, with reference apparently, for the most part, to a secondary affection of somewhat vague pathological identity, of which the characteristic symptom is tenderness on pressure over the spinous processes of one or more of the vertebrae. It is described as being met with more frequently in women than in men; associated with pains in the mammae and other parts of the thorax; or in the ovaries, uterus, and other abdominal viscera. By others, it is viewed as a combination of myalgia and hysteria dependent on general debility. It has even been described as seated entirely in the ligaments of the vertebral column. By all it is regarded as essentially dependent on reflex action, having its original source in some peripheral irritation.

I have, of course, in common with my professional brethren, from time to time been consulted by patients in whom certainly localised tenderness in the spinal region, especially its lower segments, was present as an incidental condition accompanying uterine disorder, and, in a milder form, symptomatic of gastric ulcer; but, at the same time, I have occasionally met with cases in which I am quite sure this associa-

* Read before the Southern Branch of the British Medical Association.