Sciatica : a record of clinical observations on the causes, nature, and treatment of sixty-eight cases / by A. Symons Eccles.

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A RECORD OF CLINICAL OBSERVATIONS ON THE CAUSES, NATURE, AND TREATMENT OF SIXTY-EIGHT CASES

BY

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PREFACE.

One of our most distinguished chemists once said to me that he would rather trust to the crystallization of popular experience than to the result of scientific research; and this dictum of one who has done much to the advantage of many industries by the application of his own original discoveries to commercial chemistry emboldens me in the publication of this little work, which lays no claim to novelty, either in the views herein expressed in regard to the nature of sciatica, or in the methods advocated for its relief.

As to the former, Shakespeare himself has forestalled them in Timon's apostrophe to Athens:

> . . . 'Thou cold sciatica,
> Cripple our senators, that their limbs may halt.'

In regard to the latter, the words of the same great master fitly express the experience of the treatment adopted :

> 'The organs, though defunct and dead before,
> Break up their drowsy grave, and newly move
> With casted slough and fresh legerity.'
>
> *Henry V.*, Act IV., Sc. 1.

A. SYMONS ECCLES.

Hertford Street, Mayfair,
May, 1893.

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SCIATICA

CHAPTER I.

ETIOLOGY: PREDISPOSING AND EXCITING CAUSES.

In the following pages the term *sciatica* is employed in reference to a condition of pain, of a more or less severe nature, occurring in the course and distribution of the large and small sciatic trunks and their branches.

The diagnosis of neuritis, perineuritis, and neuralgia of the great and small sciatic nerves is usually comparatively easy, providing a thoroughly careful examination of the patient is made before arriving at a conclusion as to the nature and seat of the disease; but, unless care is taken to avoid error in certain cases, the too-ready acceptance of the patient's nomenclature for the pain experienced may lead to grave consequences, and severe suffering may follow on rash and hastily-expressed opinion based on insufficient data.

Any pain about the buttocks, thighs, and legs is described by the majority of lay sufferers as *sciatica*, and the possibility of any disease in another locality giving rise to such pain has been ignored in a few cases which have come under the author's notice in patients who had undergone treatment for sciatica by ignorant persons, when a careful examination would have disclosed the existence of grave spinal lesion or pelvic disease.

For this reason, in all cases of long-continued severe pain along the course of the great sciatic nerve or in the gluteal region, it is necessary not only to examine the affected limb and to compare it with its fellow of the opposite side, but the reflexes must be tested, and the general condition of the limb should be observed in regard to posture, muscular atrophy, æsthesia, temperature, and the presence or absence of any localized swelling.

In all the severer cases, even when the existence of the characteristic symptoms of sciatic neuritis leaves no doubt as to the affection of the nerve itself, it is unsafe to omit the precaution of examining the rectum, for, should no visceral disease or pelvic new growth be discovered, rectal exploration will often reveal the presence of scybala, to whose presence and pressure upon the sacral plexus the sciatic pain is due.

Of sixty-five cases characterized by sciatic or gluteal pain, which have come under the observation of the writer up to the time of sending these pages to the printer, fourteen were associated with obstinate constipation of long standing. In three of these there was sacculation of the upper part of the rectum, in two there was prolapse of the lower part of the sigmoid flexure into the rectum, with impaction of fæces, and in the remaining nine cases there was more or less ballooning of the rectum with retention of a hard, globular, fæcal mass, the removal of which was attended by some alleviation of the more severe sciatic symptoms within a few hours in each case.

In one case, in which there was great pain over the right sciatic notch, and radiating all over the gluteal region, with frequent violent exacerbations, and tenderness midway between the trochanter femoris and tuber ischii, examination per rectum revealed the existence of a scirrhous growth encroaching very considerably on the pelvic limits, especially on the right side, and constricting the lumen of the rectum, so that the finger could only just pass the stricture ; yet this patient had attributed the pain and constipation to 'the chill caught some months previously,' which he thought had caused the *sciatica*.

Of other intrapelvic conditions involving pres-

sure on the sacral plexus, or on the sciatic nerve itself, no example has occurred in the practice of the writer ; but as a large proportion of the cases coming under observation had been subjected to examination by the medical friends who sent them, it is not surprising that the opportunities for differential diagnosis have been comparatively few.

For the same reason sacro-iliac and hip-joint diseases, which may possibly be mistaken for sciatica (according to some authorities on the subject), have not been met with. But true sciatica may co-exist with rheumatic arthritis and without any recognisable affection of the hip-joint on the same side, of which a notable example was afforded in the case of a patient who, after having ridden for some time during a severe storm of wind and rain, was attacked by sciatica on the left side and rheumatic arthritis of the right knee-joint synchronously.

The explanation afforded by the patient for this state of affairs appears to be correct, and the local determination of the rheumatism in the joint and nerve respectively was accounted for by the fact that during the ride the full force of the wind and rain had beaten against the left side of the rider, so that the mackintosh-coat he was wearing had been held by the force of the wind closely

against the left knee and thigh, but the saddle had become very wet, on the same side especially, and the right knee was frequently exposed to the rain by the right flap of the mackintosh being blown out balloon-fashion by the gusts of wind.

An analysis of the sixty-five cases of sciatica which have come under observation and treatment shows that in fifty cases there was direct evidence of exposure to damp and cold, or cold alone ; in fourteen cases obstinate constipation and the existence of scybala or an over-distended rectum at the time of examination pointed to the probability of intrapelvic pressure being the predisposing, if not the exciting, cause of the sciatic pain ; and in one case scirrhus of the rectum undoubtedly appeared to be the cause of the nerve-affection, and precluded any attempt to alleviate suffering by the means at the disposal of the writer.

Of the predisposing causes, rheumatism, gout, anæmia, over-fatigue, and undue indulgence in alcoholic stimulants, appear to be the most common.

In thirty-eight cases there was a history of previous rheumatic affections ; in twelve there were evidences of gout ; in six the patients were markedly anæmic ; and in one of these there were distinct symptoms of scurvy, although no dietetic reason for the existence of the puffy ulcerated

gums and brawny condition of the hamstrings could be ascertained. But the rigid adherence to a fresh vegetable dietary, with a fair allowance of meat, and *lemon squash* flavoured with brandy as a beverage, wrought such good results in the condition of the patient that no doubt as to the diagnosis could remain in the mind of one who had seen hundreds of scorbutic cases among troops at the close of a European campaign.

In the remaining eight cases there were two undoubtedly due to alcoholism, one to over-fatigue, and the others afforded no evidence of any predisposing conditions.

In the consideration of predisposition to sciatica, it is interesting to note the influence of sex on the incidence of the malady. Of the sixty-five cases already referred to, forty-one occurred in females whose ages at the date of observation varied from forty to seventy-three years, and twenty-four in males, of whom the youngest was thirty-eight and the eldest sixty-three years of age.

It would thus appear that sciatica is of more frequent occurrence among females,* and although the number of cases on which this suggestion is based may be too small to afford any reliable data on this point, it seems probable that (for certain

* Gowers finds the contrary to be the case in his larger experience.

reasons to be alluded to hereafter) females are more prone to sciatica than males, whereas, on the contrary, lumbago (sometimes a concomitant of sciatica) is more often a malady among men.

The exciting cause of sciatica in by far the largest number of cases occurring in both sexes is exposure to damp and cold for a more or less prolonged period of time, and not unfrequently such exposure will be found to have followed on undue exercise or over-fatigue—*e.g.*, lawn tennis, rowing, and working a treadle sewing-machine for some hours prior to the direct exposure of the limb to a cold draught or a damp seat.

In the more common form, viz., unilateral sciatica, close inquiry into the circumstances under which the patient was attacked will generally elicit good and sufficient reason for the occurrence of the pain on the side affected. In the cases of those who have been seized by sciatica after standing about in cold wind or rain, it will usually be found that the direction of the draught was such that the affected limb was more directly exposed to the cold than the other. Similarly, in cases following on exposure by sitting on a cold or damp seat, the patient will account for the occurrence of the pain on the one side by recalling the fact that a cold current of air was felt on that side more than on the other, or that the limb attacked

felt colder and stiffer than its fellow of the opposite side after rising and moving about. One rather interesting fact in regard to the conditions under which sciatica occurs appears to be brought out by the experience afforded in three cases, the subjects of which were omnibus drivers. In each case the left limb was the seat of the malady, and the reason why the left rather than the right thigh should be attacked appeared to be accounted for by the fact that, while the left limb was maintained in an almost motionless position, with the edge of the driver's seat pressing for some considerable length of time against the partially extended thigh just below the gluteal fold, the right limb was frequently flexed and forcibly extended in the act of putting the drag on the wheel of the vehicle.

In the one limb the conditions of the circulation both of blood and lymph induced by long exposure to damp and cold remained unrelieved throughout the journey, while on the other hand circulation was stimulated and constantly increased by the vigorous muscular movements necessary on the part of the right limb in working the lever governing the drag.

Alcoholism has been cited as a cause of sciatica in two cases.

In one case the pain was confined to one limb; in the other there was bilateral sciatica, or perhaps

it would be more correct to state the case as one of alcoholic neuritis, in which the small sciatic, obturator, and external popliteal nerves of the right side were affected, and the crural, large and small sciatic nerves on the left.

The only case of sciatica due to over-fatigue alone, and unassociated with any exposure to cold impressions, as far as could be ascertained, which has come under the notice of the writer, was one in which the patient—a lady, who had not been on horseback for more than twelve months previously, but who was an accomplished horsewoman—rode for three hours consecutively, and on returning home found that she could not use the right leg without great pain shooting down the back of the thigh and calf. There were frequent cramps in the muscles of the calf, and two tender spots, one in the thigh, over the sciatic nerve, about the junction of the lower and middle thirds, and the other over the posterior tibial, between the inner malleolus and the heel. Any attempt to walk on dismounting was attended by such severe darting pain that she had to be carried to bed.

There was no evidence whatever of any bruising of the limb, and apparently the sciatic neuralgia was due to over-fatigue of the limb in a constrained position.

The influence of occupation on the incidence of

sciatica is only remarkable in so far as it bears upon the exposure of the limb to direct cold and damp under circumstances which do not lend themselves to the subsequent reproduction of vigorous circulation in the exposed limb.

In the majority of cases the history of the attack points to the existence of conditions favourable to the prolongation of the effects of cold impressions, even in those cases wherein intrapelvic pressure may be regarded as causative ; thus it may usually be found on inquiry that the attack of sciatica has not occurred as a consequence of exposure to dry cold, but almost always there is a history of standing about in cold rain, or sitting for a more or less lengthened period of time on a damp, cold seat, after which the patient's clothing has remained damp or cold, and no precautions, such as vigorous exercise or a hot bath, have been taken to avoid the effects of a local chill. In forty-seven cases the sciatica has been directly attributable to the effect of sitting on a damp seat exposed to a draught of cold air, while in the remaining cases observed by the writer the existence of exposure immediately prior to the onset of sciatica has almost invariably been noted.

CHAPTER II.

PATHOLOGY AND MODE OF ONSET.

The recognition of the circumstances under which sciatica is most frequently produced leads to the consideration of the pathological conditions giving rise to this painful affection, and although the writer has had no opportunity of observing the post-mortem appearances presented by the nerves affected in a case of sciatica, the records of others who have observed them appear to bear out the hypothesis which he ventures to suggest may sufficiently explain the clinical phenomena observed in cases of more or less severe sciatica.

The most common exciting cause of sciatica being the exposure of the limb to a cold impression, examination of the phenomena produced by local refrigeration may perhaps throw some light on the condition of the nerve which gives rise to the symptoms, varying in severity with the extent and duration of the malady.

The first effect of a cold stimulus applied to the cutaneous sensory nerves is the contraction of the bloodvessels and muscles of the skin, which then presents the appearance known as *cutis anserina*, or goose-skin, producing pallor and actual bloodlessness of the surface, with a sensation of local *cold*. If the cold impression is still further prolonged, the superficial vessels become congested, and the surface of the limb assumes a red colour, which, with the continued obstruction to the circulation through the capillaries of the skin, more or less rapidly becomes livid or blue. Under these conditions the tissues of the skin are deprived of oxygen, metabolism is arrested, and heat-production gives place to heat-abstraction, though the initial contraction of the vessels and subsequent slowing of the superficial circulation may serve to arrest the loss of heat by the surface. With the stagnation of cutaneous circulation there is loss of sensation (numbness) of the part.

Synchronously with the contraction of the superficial vessels of the limb there is reflex hyperæmia of the deeper-lying structures, brought about by the stimulation of the cutaneous sensory nerve-endings. 'So soon as these are touched by a cold stimulus, they signalize the danger of cooling down to the centre, and this at once, by reflex on vaso-motor tracks, makes provision for preventing the

cold from penetrating to the inner organs by dilating the muscular vessels, elevating the temperature of the muscular layer, and causing an increased heat-production within it ;'* and with this dilatation of the deeper-lying vessels of the limb, which are distributed, not only to the muscles themselves, but to the branches of the nerves ramifying between and supplied to them, as also to the nerve-trunk itself, there is an increased exudation of lymph, and with the hyperæmia an augmented metabolism and consequent formation of waste products, not only within the lymph-spaces of the muscles, but also in the lymphatics of the epineurium and the lymph-spaces of the perineurium, which may be injected from and communicate with the lymphatics.†

Under the conditions of collateral hyperæmia of the deeper tissues consequent on cutaneous anæmia, the result of local refrigeration, it appears to be probable that the pathological conditions in a case of sciatica are great dilatation of the bloodvessels and lymphatics of the epineurium, and a corresponding distension of the perineuritic lymph-spaces ; and it is not unreasonable to suppose that much of the tenderness and pain in sciatica is due to the pressure of the abnormally increased fluid within

* Winternitz von Ziemmssen's ' Cyclopædia.'

† *Vide* Landois and Stirling's ' Physiology,' vol. ii., p. 715.

the nerve-sheath upon the nervi-nervorum with which Marshall and Horsley have shown it to be endowed. The graver phenomena of paresis, anæsthesia, muscular atrophy, and cyanosis, sometimes observed in long-standing cases, may perhaps be explained by the interference with the nutrition of the nerve-fibres, brought about by the changes in the circulation and œdema within the nerve-sheath; and Gowers has recorded post-mortem appearances of true neuritis wherein the nerve-fibres have been affected in cases of sciatica.

In some cases of sciatica there is a history of very prolonged exposure to cold, in which, judging from the conditions of reduced surface-temperature and cyanosis remaining some time after the first appearance of the malady, there is reason to believe that the local abstraction of heat from the limb was not limited to the surface, or arrested by the protective influence of cutaneous vascular contraction; but that the cold impression penetrated to the deeper tissues, and produced changes in the circulation through the deeper vessels akin to those which were visible in the skin.

When the effect of cold has penetrated so deeply as to induce contraction of the deeper-lying bloodvessels of the limb, the patient's limb is benumbed and stiff. Movement causes great pain of a sickening character, which accompanies

the return of sensation, and the general pain which follows the 'awakening' of the 'sleepy limb' is in some cases replaced by the acute shooting pain of sciatica which often marks the sudden onset of the disorder. It seems probable that in such cases the deeper-lying branches and the nerves of the trunk-sheath have been stimulated by the cold impression, and under its prolonged influence have become temporarily paralyzed. Then when, either from voluntary movement or from the application of warmth, the circulation is restored, the nerves are again stimulated by the reaction, and, under the conditions of active congestion arising out of the rapid restoration of the circulation, the nerve-endings are greatly excited, stimulation amounting to pain being the result.

It can be shown by experiment that tactile sensibility varies very greatly in the same limb under the different conditions of warmth and cold, and the writer has recorded the influence of massage on the æsthesiometry of the skin.* Similarly, he has found that painful impressions are more acute and more easily elicited in the skin of the limbs when the surface is warm and full of blood than when there is cutaneous anæmia the result of cold, so that the acute pain and

* 'Physiological Effects of Massage,' *Practitioner*, June, 1887.

tenderness at certain points in cases of sciatica may perhaps be referred to the existence of local hyperæmia in the sheath of the affected nerve.

In a few cases it has been possible to recognise thickening of the nerve with increased hardness on comparing the sound nerve of the opposite side with that of the affected limb.

Although sciatica is most commonly caused by the *chill* resulting from more or less prolonged cold, there are other conditions, already referred to, which also give rise to identical symptoms—*e.g.*, pressure anywhere in the course of the nerve-trunk or its branches, and over-fatigue. In the cases of pressure there is obviously interference with the function of the nerve below the site of pressure, and the effects may also be recognised above the seat of injury, though these are not so commonly noticed. The cases in which pressure has been partially or wholly the cause of sciatica have occurred in persons who have either been the subjects of intrapelvic disease or accumulations, or who have sat in a constrained attitude for some time, with the edge of the seat pressing transversely on the trunk of the great sciatic nerve.

The history of the onset of sciatica under these different circumstances appears to be worth recording, for it may serve as a guide to the diagnosis of

the conditions on which the pain depends, and thus aid in the treatment.

In the fourteen cases associated with obstinate constipation, all the patients concurred in the statement that the sciatic pain was very gradual in its development, but that both in force and area the pain had steadily increased. In nine of these cases the first symptoms were rather of the nature of altered sensation—*e.g.*, tingling, thrills down the back of the leg, and a burning sensation in the toes, described by one patient as the first thing noticed. In all (as in other patients affected by cold) there were painful startings of the limb, especially at night ; and in eleven out of the fourteen shingles appeared on the buttock of the affected side, accompanying the pain in the gluteal and hamstring regions.

In the one case of scirrhus of the rectum accompanied by sciatic pain, the patient complained of numbness and aching all down the right thigh and calf, which afterwards, at the time he was first seen by the writer, was followed by exacerbations of pain whenever he moved from the sitting posture, the sudden acute shooting pain down the thigh making him feel powerless and inclined to fall.

This patient also complained of aching pain, but much slighter, in the left thigh.

In the cases of external pressure on the limb which gave rise to sciatica, the patients noticed that the limb had 'gone to sleep,' and that there was stiffness and soreness just at the site of pressure, which gradually gave place to actual pain when sensation was restored.

At the time of examination there was distinct tenderness at the point indicated by the patient as the part of the limb subjected to pressure in one case, and on the application of firm digital pressure, thrills down the calf and numbness over the sole of the foot were temporarily induced.

The mode of onset in sciatica due to local chill appears to vary very greatly; in some cases the attack is very sudden, while in others the pain, at first so slight as to be little more than a sensation of stiffness and uneasiness, gradually increases in force, and is characterized by severe exacerbations, which often recur periodically, and frequently at night.

CHAPTER III.

SYMPTOMS AND DIAGNOSIS BETWEEN NEURALGIA, PERINEURITIS AND NEURITIS.

Some difference of opinion still appears to exist among writers on nervous disorders as to whether sciatica is to be regarded as a neuralgia or a neuritis; but the term may be conveniently employed to designate painful conditions arising in the distribution of the sciatic nerves, whether accompanied by the distinct symptoms of inflammation of the nerve-trunk or not.

In sciatic neuralgia the pain is intermittent, and although it may be severe while present, the limb may be quite free from discomfort in the intervals; moreover, although tenderness may be elicited by pressure on certain points where the nerve is more or less easily compressible, these tender spots are not painful during the remissions save when firmly pressed. The surface-temperature of the affected limb is not found to be markedly different from

that of its fellow of the opposite side, and in the intervals the patient can sit fairly and squarely on a seat without exciting an attack of pain. There are no signs of vaso-motor disturbance, no atrophy of muscles, and the characteristic posture of the limb in walking noticeable in cases of sciatic neuritis is absent. The attacks of pain may recur for many months, and are frequently associated with neuralgias of other nerves, especially of the facial, supra-orbital, and temporal nerves, with which they may either alternate or coincide in periodicity. The exciting cause is generally exposure to cold in persons predisposed by debility or constitutional causes to neuralgic affections. As an example of the periodicity in cases of recurrent sciatic neuralgia, the experience of a patient may be cited, who consulted the writer during an attack of longer duration than usual. There had been attacks of intermittent pain along the course of the left sciatic trunk and in the gluteal region, occurring only at the menstrual period. The pain usually lasted for two or three hours at night, and occasionally again in the day-time, with complete intermissions and freedom from any altered sensation in the limb during the intervals. On inquiry it was found that for some years at the onset, and during the catamenial period, there had been great irritability of the

bladder, necessitating rising from bed two or three times in the night, and consequent exposure to cold.

The position of the commode in the bedroom explained the determination of locality in this case of left sciatic neuralgia, for the limb was exposed to a direct current of air passing from the door to the fireplace in the patient's bedroom. After treatment the adoption of certain precautions obviated the cause of the pain, and for two years the neuralgia has not recurred.

In the majority of cases presenting themselves for treatment, the symptoms are not so purely subjective as to warrant the supposition that the condition is merely one of functional derangement due to temporary irritation by thermal, chemical, or mechanical influences ; but arising from the same causes, and probably resulting from prolonged exposure to them, evidences of true inflammation of the nerve-sheath, followed in some cases by partial destruction of the nerve fibrils, are afforded.

In the milder cases of sciatic perineuritis the hyperæmic and infiltrated state of the nerve-sheath, to which allusion has already been made, gives rise to continuous pain along the course of the nerve so affected. This is greatly aggravated by pressure, is usually increased by movement of the limb, though the exacerbation attending the attempt to

move or walk may wear off if the patient perseveres with the effort, save in the acute stage, when any movement involving tension of the inflamed nerve-sheath causes exquisite pain, which is most intense at certain points along the course of the nerve where the movements of locomotion involve stretching of the nerve against unyielding structures, *e.g.*, midway between the tuber ischii and the great trochanter, and behind the internal malleolus, or where the nerve is rendered more tense than when the limb is at rest, *e.g.*, in the popliteal space.

The *extent* of the perineuritis may be ascertained by the existence of *tenderness* on pressure along the course of the nerve and its branches, for it will sometimes be found that pain may occur over the whole distribution of the sciatic nerve endings, while tenderness will be limited to the portion of the nerve-sheath actually inflamed.

Persons suffering from sciatic *neuralgia* sometimes have difficulty in describing the character of the pain, which is often variable or indefinite ; but in *perineuritis* of the sciatic nerve the sufferer always complains of a burning pain which is intolerable, and is frequently increased at night. Indeed, the insomnia arising from the nocturnal exacerbation of pain in perineuritic sciatica is one of the most troublesome complications of this painful malady.

Another symptom which is characteristic of perineuritis, as distinguished from neuralgia of the sciatic trunk and its terminal branches, is elicited in the following manner :

The patient is directed to steady himself by grasping the back of a chair with the hand on the same side as the affected limb, and, while poising himself on the sound extremity, to kick forwards with the painful limb, the leg being extended as much as possible on the thigh, which is suddenly flexed on the abdomen. This action, involving tension of the sciatic nerve and its divisions, the patient will endeavour to perform, providing he has not previously been subjected to the test, which is too painful for voluntary repetition by persons suffering from sciatic neuritis. The subjective effect produced is a sharp shock running *up* as well as down the course of the affected nerve, and when the trunk is involved above the sciatic notch distinct pain is caused in the gluteal and lumbar region if the patient does not arrest the forward movement of the extended leg, or if he does not avoid the stretching of the nerve by bending the trunk backwards as he throws the limb forwards.

This method, in cases where the patient is able to assume the erect posture, appears to be preferable to the plan ordinarily adopted,* as the observer is

* *Vide* Ormerod, 'Nervous Diseases,' p. 186.

not obliged to overcome the muscular resistance usually offered when an attempt is made by the physician to flex the thigh on the abdomen with the leg extended, though this passive exercise is useful in the later stages of treatment detailed in a subsequent section. In chronic and somewhat severe cases of sciatica, where there has been long-standing thickening of the nerve-sheath, the patient will often have lost the power to fully extend the leg on the thigh, and, coupled with this inability, it will be noticed that the attempt to throw the whole limb forward is accompanied by over-extension (or backward flexion) of the trunk upon the pelvis, and of the pelvis on the hip-joint, so that the whole body is thrown backwards as the thigh is thrown forwards, in order to save the nerve from the extra tension to which it would otherwise be subjected. The attitude of the sufferer from chronic sciatic perineuritis when he is called upon to perform the exercise is very characteristic, and leaves little doubt as to the nature of the case. In cases of sciatic neuralgia, where there is no infiltration of the sheath or implication of the nerve-tubules, the effect produced by the extension test is only to cause pain at certain points in the course of the nerve which are found to be tender on pressure, and in slight cases even this discomfort is not elicited, a little pain or sensation of tension

being referred to the popliteal space only ; often this is little more than may be felt when the healthy limb is quickly moved in the same fashion.

The sudden thrilling pain produced by tension on the inflamed nerve, and shooting upwards beyond the sciatic notch in the severe forms of sciatica in which there is true neuritis, is so marked that there is little possibility of mistaking or underrating the character of the malady.

Some writers on sciatica have mentioned the absence of the patellar reflex as occurring in this malady ; but it seems probable that the crural nerves must have been also the seat of disease if this symptom was present. The *apparent* absence of the knee-jerk has frequently been noticed by the writer in cases of sciatica owing to the defensive rigidity of the hamstrings and calf-muscles, which are almost always thrown into action in order to shield the painful nerve from external pressure or tension. If the muscles of the back of the thigh and leg are relaxed, the sciatic trunk is exposed to any unequal pressure to which the sitting posture may give rise, and of this painful fact sufferers from sciatica have had such experience that every precaution to avoid exacerbation of pain is instinctively taken when they are asked to adopt the attitude required for testing the knee-jerk. It is therefore impossible in many cases to persuade

the patient to induce relaxation of the thigh and calf-muscles so that the ordinary plan may be adopted ; but if the hand of the observer is placed over the front of the thigh when the patella tendon is struck, the contraction of the extensor will readily be recognised, though the voluntary effort of the patient may suffice to prevent the extension of the knee-joint.

The attitudes adopted by sufferers from peri-neuritic sciatica, both in sitting and standing, are characteristic ; and although they are too well known to need description, it may not be out of place to mention them here for the sake of their bearing on the pathological conditions of which they are symptomatic. In sitting, the patient will avoid all pressure on the affected nerve, if possible, by resting on the sound buttock only, sitting side-ways on the chair so as to prevent the edge of the seat from pressing on the nerve-trunk. In the recumbent position, the limb is usually kept semi-flexed in order to avoid pressure or tension on the painful nerve. When standing, the patient throws the weight of the trunk on the sound limb, the knee of the affected limb being semiflexed and the heel drawn up, with the foot partially extended so that the ball of the foot only rests on the ground. In walking, the hip-joint only is moved, the knee being kept almost fixed in the position of slight

flexion, while dorsal flexion of the foot is carefully avoided so as to prevent any tension on the posterior tibial nerve as it passes behind the inner malleolus to form the plantar nerves. In some cases distinct thickening of the nerve-sheath is recognisable at the inner ankle and along the inner side of the tendon Achillis.

In long-continued cases, the muscles of the calf, and sometimes the hamstrings, become the seat of painful cramps, generally occurring at night, or after the patient has been sitting for some time in the constrained position resulting from the effort to protect the painful nerve from pressure. At the same time, the pain in the nerve itself often assumes a throbbing or darting character over and above the burning, continuous pain already mentioned as a marked feature in perineuritis.

The duration of sciatica does not appear to depend so much upon the severity of the initial symptoms as on the rapidity with which the products of inflammation are removed from the lymph-spaces of the nerve-sheath ; for in several cases coming under the notice of the writer, the suffering has been most acute from the outset, but has yielded to treatment directed towards the reduction of inflammation and the absorption of the resulting œdema of the sheath. The long-continued dull, aching, or gnawing sciatic pain,

which is more notably the feature in gouty patients, seldom assuming an acute character, but interfering with the general health by reason of its persistence, appears to be associated with an enfeebled circulation. The aspect of the patient generally, and the cold blue hands and feet usually observed in these cases, point to conditions which are most favourable to lymph-stagnation within the spaces and vessels of the sheath.

If the retention of uric acid may be regarded as the cause of gouty troubles, it is not difficult to understand why sciatica is so persistent in persons who are subject to gout. The experiments of Brunton and Cash on the effect of acids and alkalies on the vessels show that 'not only do the vessels dilate under the influence of acids,' but that exudation is more free and rapid, 'so that the tissues tend to become œdematous.'* Now, if there is excess of uric acid circulating in the blood of gouty patients, it may be that any circumstances (such as the dependent position, pressure on the nerve-trunk, or cold) which tend to interfere with the freedom of circulation within the nerve-sheath will greatly assist in promoting exudation and accumulation of uric acid within the lymph-spaces of the nerve-trunk. The existence of uric-acid-æmia itself may be sufficient

* Brunton's 'Disorders of Digestion,' p. 342.

to cause the local hyperæmia and increased exudation ; but mechanical or thermal conditions affecting the circulation will doubtless favour the deposition of uric acid in the fibrous tissues of the nerve, just as Haig has suggested is the case in gouty joints.*

The irritation consequent on the retention of uric acid in the interstices of the nerve-sheath in gouty sciatica is sufficient to account for the aching, wearing pain of which the patients complain. But *ubi irritatio ibi affluxus* is true in this case as in others, so that the abnormal stimulus afforded by the presence of uric acid within the nerve-sheath is enough to induce hyperæmia and consequent exudation, a vicious cycle of events being produced—first, by the presence of uric acid in the blood, the vessels are dilated, and exudation from them is promoted ; the uric acid escapes from the vessels, and is precipitated in the relatively more acid fibrous tissues of the nerve-trunk ; then the uric acid thus thrown out produces irritation of the nervi-nervorum, tends to keep up hyperæmia, and favours the exudation of lymph, so that the effects of mechanical or thermal influences on the circulation through the blood-vessels of the perineurium are enhanced by the chemical influence of the uric-acid deposition. In

* Haig, 'Uric Acid,' p. 4.

this way it is possible to account for the constant pain so frequently complained of by sufferers of middle age, among whom it is common to find gouty manifestations other than sciatica; and the variations in the uric-acidity of the blood and tissues may also afford a probable reason for the nocturnal exacerbations of pain and the occasional sharp twinges experienced by gouty patients who suffer from chronic sciatica.

In two cases the writer has noticed the co-existence of tic-doloreux and sciatica in gouty patients, the administration of salicylate of quinine proving useful in modifying the pain, and apparently aiding the elimination of uric acid by the kidney.

Hitherto the symptoms which appear to depend on transient irritation of the nerve (*neuralgia*), or on *perineuritis*, have been mentioned, and the probable pathological states on which they depend have been discussed; but in a large proportion of cases the sensory and muscular phenomena observed cannot be attributed to conditions affecting peri-neural structures only, changes in the nerve-tubules themselves alone being sufficient to account for the impairment of function frequently recognised in severe sciatica. Such cases must be regarded as examples of true neuritis wherein the hyperæmia and exudation within the sheath have produced not only irritation, but partial or complete destruc-

tion of the nerve-fibrils, leading to diminution or complete loss of tactile sensibility over areas of the skin, exaltation of common sensation, paralgia, and increase of temperature-sense, paresis and atrophy of muscles, sometimes the reaction of degeneration, and frequently cyanosis. These symptoms can only arise where there is a change in the nerve-tubules themselves; and comparing the symptoms of sciatic neuritis with those produced in cases of traumatic neuritis, it seems probable that the conditions are very much the same in both cases. Even where it is impossible to detect any thickening of the nerve-trunk in idiopathic sciatica, as one can usually do in neuritis due to injury, the symptoms are so nearly alike that it is impossible to distinguish between the two cases save from the history.

The following table may serve to illustrate the salient differential points between neuralgia, perineuritis, and neuritis of the sciatic nerve:

Neuralgia.	Perineuritis.	Neuritis.
Onset usually sudden.	May be sudden or gradual.	Supervenes on perineuritis.
Pain intermittent.	Continuous but subject to exacerbation.	Continuous.
Tenderness at certain points only.	Tenderness along portion of nerve affected.	Tenderness sometimes distributed over area supplied by nerve.

Neuralgia.	Perineuritis.	Neuritis.
Decrease of surface - temperature not always present.	Decrease of temperature always present.	Decrease of temperature always present, cyanosis common.
Tension may produce paroxysm or pain at tender points.	Tension increases pain and tenderness.	Tension increases pain, causes thrill or numbness.
Temperature-sense unaffected.	Temperature-sense unaffected.	Temperature-sense increased for heat.
Muscular twitching may occur during paroxysm.	Muscular starting, usually at onset of sleep. Cramps.	Muscular paresis, atrophy, and R. D.
		Loss of tactile sensibility over areas of skin. Hyperæsthesia ; paralgia, especially formication.
No thickening of nerve-sheath.	Thickening may be felt.	Ditto.
Associated with other neuralgias, especially facial.	Not associated with neuralgia elsewhere as a rule.	Ditto.

CHAPTER IV.

GENERAL TREATMENT.

The treatment of sciatica should be directed to the alleviation of the pain and the removal of the cause in the first instance, and the prevention of recurrence in the event of success in the fulfilment of these conditions.

The means to be adopted naturally fall under the headings general and local, and among the former the most important which is at the same time the most difficult to procure is *rest*.

Save in the milder cases of sciatic neuralgia, unattended by severe exacerbations, in the majority of instances rest in the recumbent position is indicated, and, if secured in the earlier stages of the malady, it will prove a most potent factor in arresting the development and shortening the duration of the pain. Unfortunately, a large proportion of sufferers from sciatica are unable or neglect to adopt this most important element in

the successful treatment of the malady until exhaustion or powerlessness, induced by long-continued struggling to 'keep about,' compels them to realize the necessity for rest. Then, when the chronicity of the complaint has not only affected the general health, but has also been attended by pathological changes in the nerve-sheath or in the nerve-fibrils themselves, the difficulties of the treatment are greatly enhanced; for it is by no means easy to devise measures in conjunction with the assumption of the recumbent posture which will ensure local rest for the limb as well as general rest for the whole body. Therefore, in every case where it is possible, the maintenance at the outset of the recumbent position for a few days—which may be curtailed to twenty-four or thirty-six hours under favourable circumstances—will greatly tend to mitigate the severity and shorten the duration of suffering in cases where there are no appreciable signs of any more serious condition than simple neuralgia.

In adopting rest in the recumbent position *in bed*, another indication is rendered easy of fulfilment—viz., the application of warmth and the maintenance of an equal temperature, the layer of warm air surrounding the limb and preventing the ill effects of cold cutaneous impressions being an aid to the successful treatment of sciatica second

only in importance among general measures to the recumbent attitude.

In the more severe cases it is well to minimize movement and to enjoin absolute restriction to bed, the patient not even being permitted to rise for the purpose of obeying the calls of nature, suitable arrangements being made to obviate the necessity for leaving the bed. By these precautions all fear of exposing the limb to the effects of chill is avoided, and, as the most common cause of sciatica is such exposure, the importance of its prevention cannot be overrated.

The almost inevitable consequence of the exposure of a limb affected by sciatica to cold impressions being an exacerbation of the pain, often amounting to acute suffering, the smallest detail which may influence liability to such an accident assumes some importance, and not the least of these details is the texture and fabric of the bed and body clothing used by the patient. The bed-sheets may be woollen or twilled calico, but never linen, for even if the patient is clothed in flannel the coldness of the linen sheet will strike through the night-clothing and chill the surface. Linen is not so generally employed for bed-sheets as it was in times past; but even now it is not uncommon to find persons who declare their strong predi-

lection for this fabric, some contending that they cannot sleep between other than linen sheets. A few nights of disturbed sleep or absolute insomnia caused by sciatic pain will, however, reconcile the warmest adherents of cold linen to the substitution of good twilled calico, which is a bad conductor, and does not lend itself to heat abstraction from the surface as the old-fashioned linen sheets will, even after being 'aired' and warmed by the most careful housekeeper.

Nocturnal exacerbation of pain has been directly traceable in cases of sciatica to the use of linen sheets, the patients themselves recognising that the pain followed the sense of chill experienced on shifting the limb from the side of the bed rendered warm by occupation to the previously unoccupied and consequently colder side. Too much stress cannot be laid on this question of textile fabric for the bed-sheets, as frequently in the experience of the writer much suffering has been modified and the tendency to exacerbations of pain minimized by the substitution of calico for linen, not only in cases of sciatica, but in the other local neuralgias; one case of facial neuralgia, in which the pain always came on at night just after the patient went to bed, being relieved by the substitution of a calico for a linen pillow-case after proving insusceptible to various therapeutic measures before

this precaution against cold impression was taken. The night-clothing most suitable in both sexes should consist of two garments made of flannel, or, if, as sometimes happens, the patient objects to the use of flannel next the skin, of a mixture of flannel and silk. Pyjama suits are the most convenient, as they admit of exposure of the affected limb for the purpose of local treatment without unclothing any other part of the body. Night-socks should be worn, or, at all events, the foot of the affected limb must be clothed ; indeed, all necessary means must be adopted to ensure equable warmth, not only of the part affected, but of the whole surface of the body, the personal and bed clothing being of sufficient weight and quality to promote and maintain a comfortable sensation of warmth without undue heat.

For cases of a mild type, in which confinement to bed is unnecessary, it is essential to the success of treatment that the affected limb should be warmly clad and protected from cold. In the case of male patients, the writer has found it a good plan to insist on the adoption of an extra garment, which may easily be devised by cutting off from a pair of merino pants the leg corresponding to the sound and unaffected limb, leaving the waist-band attached to the leg which is to serve as an extra covering to the painful limb. In this way a com-

fortable sense of equal warmth in both limbs is promoted, for in almost every case of sciatica the limb affected will not only feel colder to the sensations of the patient, but is actually colder than its fellow of the opposite side, as may be recognised by the employment of the thermometer or the hand of the observer.

The safest garments for the use of female patients is what is known as a 'combination suit,' over which may be worn a one-legged knickerbocker, warm stockings being substituted for the thin silk or cashmere garments usually worn. In both sexes it is important that the boots should be warm, watertight, and not too closely fitting.

Of all the products of Western civilization, the ordinary water-closet, such as one finds in the majority of dwelling-houses, may be regarded as one of the most fruitful sources of disease. Setting aside the dangers arising from the defective sanitation to which in its construction human imbecility has made it a peculiarly favourable adjunct, the water-closet has been shown by Dr. Lauder Brunton to be a predisposing cause of constipation, and certainly it is the commonest exciting cause of sciatica.

Even in the best appointed houses, means for properly warming and ventilating the chamber set aside for sanitary purposes will be found inadequate

or entirely wanting. The box-seat is usually in direct communication with the outer air through the waste-pipe from the zinc tray surrounding the pan, so that a cold draught is constantly pouring into the room through the openings and often ill-fitting joints in the woodwork. No remedy short of demolition and substitution of the more modern and convenient sanitary appliances now coming into use in new buildings can be devised for the evils alluded to; but they may be minimized to some extent by the use of a square piece of felt of sufficient dimensions to cover the seat and slightly overlap its edge, a hole being cut out of the centre, whose circumference should correspond with the rim of the pan. The employment of this square of felt has proved of so much value as a prophylactic against the recurrence of sciatica in cases which have been under the writer's treatment, that he has learned to regard it as a necessary addition to the impedimenta of persons who have suffered from sciatica.

Convalescents who are able to leave their beds for the purposes of nature should use a commode draped with a blanket, near whose upper edge a hole has been cut out corresponding in size with the rim of the pan, the blanket being so arranged that it covers the seat of the commode, falls on either side, and forms a mat on the floor in front

of the night-stool, so that the patient may step out on to the blanket and fold it round the lower extremities, thus avoiding all possibility of exposing the affected limb to sudden or continued cold impressions. The neglect of this simple precaution will often produce a relapse, and seriously interfere with the good progress of the case towards recovery.

The dietary of patients suffering from sciatica is by no means an unimportant factor in treatment, but must necessarily vary with the general condition of health and the stage of the complaint. While in some cases plenty of good nourishing food, with a moderate quantity of alcoholic stimulants, is indicated, in others the diet must be restricted, and abstinence from alcohol enjoined ; indeed, so much depends on the physical state of the patient at the time of treatment that it is impossible to formulate any rules which would be useful or applicable in all cases.

So far as chronic sciatica is concerned, the majority of patients suffer from malnutrition, induced apparently by the wear and tear of the constant or frequently recurring pain, on the one hand, interfering with exercise, sleep, and nervous equilibrium, while, on the other hand, acting under the impression that the sciatica is due to or fostered by errors in diet, the patient has cut off this, that,

and the other article from the list of nutritious comestibles, till both the dietary and the victim are attenuated to such an extent as to render recovery from the malady very problematical unless prompt measures are taken to restore health and strength by the judicious restitution of a varied and nutritious dietary.

It appears to be far better, in these and other cases in which the inflammation of the nerve-sheath is suspected to be of rheumatic or gouty origin, to prescribe a generous diet with a fair proportion of stimulant, and to combine therewith the exhibition of copious draughts of hot water, or of some indifferent mineral table water, to be taken an hour or more after the meals, than to half starve the patient by enjoining rigid adherence to a dietary from which everything palatable, and nearly everything nourishing, has been eliminated, save food which may be excellent for nursery purposes, but must prove as obnoxious to the adult stomach as did the manna in the wilderness to the children of Israel.

In regard to the drug treatment of sciatica, little can be said in favour of any particular medicament, as the choice of internal remedies must depend on the nature of the case, the presence or absence of any dyscrasia, and the general health of the patient. In some instances the addition of gradually

increased doses of iodide of potassium to the large draughts of water, which are useful for eliminative purposes, appears to have a marked effect on the severity and frequency of the paroxysms, and especially in modifying the nocturnal exacerbations in cases of suspected specific origin ; but for the relief of pain by other than local means, a combination of the salicylate and bromide of sodium, in not less than twenty-grain doses of each, has proved most useful in the experience of the writer, not only in cases associated with rheumatism and gout, but also in subjects whose history leads to the suspicion of a malarial condition as the predisposing cause of the sciatic affection. In very few cases, however, will internal remedies suffice to allay the local pain ; and while employing such constitutional treatment as may be indicated by the general state of the sufferer, it is necessary in many, and conducive to rapid recovery in all, cases to employ local measures for the relief of pain and the cure of the malady.

CHAPTER V.

LOCAL TREATMENT: MASSAGE AND ELECTRICITY.

In the milder forms of sciatica, wherein the pain amounts to little more than uncomfortable stiffness of the limb, with sharper twinges on movement after more or less prolonged rest in one posture, when there is little or no interference with the walking powers, and sleep is not prevented by increase of pain at night, it is not necessary to enjoin absolute rest in the recumbent position, so essential in the earlier stages of the more acute cases. But even in the slighter conditions of sciatic neuralgia it is well for the patient at first to abstain from much exercise, as the supervention of fatigue is much more rapidly induced in a limb affected by neuralgia than in its fellow of the opposite side, and fatigue will certainly be accompanied by increase in the severity and duration of pain.

Allusion has already been made to the mainten-

ance of surface-warmth by the wearing of an extra garment on the affected limb ; but in many cases the employment of a pad (made of cotton wool, freely sprinkled with equal parts of precipitated sulphur and mustard-flour, enclosed in a quilted flannel cover) will greatly aid in producing a comfortable sensation of warmth, and, when applied over the painful points or along the course of the affected nerve, certainly seems to allay pain and promote recovery.*

Unfortunately, such simple external applications are not sufficient in themselves for the cure of sciatica, and of all the local means hitherto adopted for the treatment of all forms of this painful malady, none appears to be so generally and commonly efficacious as the systematic administration of skilled massage, which alone will suffice in a few days for the relief of all pain and discomfort in the milder cases.

For those cases in which one or two days' treatment by massage has resulted in complete disappearance of all pain, it may quite fairly be alleged that the sciatica would probably have ceased to exist if nothing at all had been done ; but there are very few, if any, recorded cases of equally rapid spontaneous cure of sciatica, and

* *Vide* also Duchesne, *Journal de Médecine*, January 15, 1888.

there are a very large number of sufferers from chronic sciatic inflammation who, when they are subjected to a systematic course of treatment by skilled massage, are relieved from all suffering and restored to the painless use of limbs which have been crippled and painful for years. The experience of the writer goes to show that much unnecessary suffering might have been avoided if such chronic cases had been treated by massage judiciously applied in their earlier stages, and the results in a large number of acute and chronic affections of the sciatic nerve and its branches appear to bear out the opinion that neuralgia and the slighter conditions of perineuritis of the sciatic nerve may be more successfully treated by massage and mechanical exercises only than by any other therapeutic means ; while sciatic neuritis and the more acute forms of sciatic perineuritis will yield more quickly to rest in a swinging splint, massage, and subsequently certain passive and active exercises, than to any other method of treatment yet devised. It has been asserted, and doubtless with truth, that the violent manipulations of a professional rubber, employed to treat a dull aching in the sciatic region, may bring about acute sciatica ; but this very probable result of maladroitness on the part of an ignorant person can only be regarded as the natural though most

unfortunate consequence of entrusting such a case to the hands of an unscrupulous and uneducated layman, without instruction and supervision on the part of a medical practitioner who is also a skilled masseur. So long as the public are led to believe that the term 'certificated masseur' means anything more in many cases than that the value of the certificate is equal to that of the paper on which it is written, the results of careless and unskilful manipulations will continue to come under the notice of the medical profession and to deserve its censure.

But the medical profession is itself to blame if ill results follow the abuse of massage at the hands of persons whose services as rubbers have been engaged for the treatment of any condition in which skilful manipulations or properly regulated massage would be useful, when professional rubbers are employed by medical practitioners *to treat* any morbid condition without the skilled supervision necessary to recognise whether a rubber knows his work, and to instruct him as to what manipulations should be employed, with what force, and for how long.

It is only by practical experience that a correct judgment can be formed as to the character, force, and duration of the manipulations, the necessity or otherwise of more or less prolonged rest, and the

employment of mechanical support of the limb appropriate to each individual case of sciatica ; and it is by no means easy to convey in writing a clear conception of the class of cases to which the modifications of the methods adopted by the writer are, or may be, applicable. But, generally speaking, in cases of sciatic neuralgia, where the general health of the patient is fairly good, from fifteen to thirty minutes' daily manipulation will suffice in the course of from three to fifteen days to relieve the sufferer from all discomfort.

At first upward friction along the course of the nerve, gradually increased in firmness, and embracing the whole circumference of the limb, should be rapidly and thoroughly practised so as to increase the surface-temperature and thoroughly vascularize the skin and superficial tissues. A skilled manipulator can usually accomplish this in two or three minutes. Then, the patient having become accustomed to the firm, equable pressure of the hands on the affected limb, deeper pressure should be brought to bear upon the painful tissues, the firmer manipulations being employed always in a centripetal direction, the hands being brought down the limb lightly and gently, care being taken to avoid anything in the nature of a jerky, uncertain, or unequal stroke.

One of the most important features in successful

massage of painful parts is the firmness and equality of grasp and pressure which imparts a sense of security to the patient, and reassures even the most nervous sufferer. Gradually, and with an almost imperceptible change of manipulation, vigorous kneading of the calf and hamstring muscles should be practised without undue rapidity of movement. The deeper and firmer manipulations should always be more slowly and rhythmically performed than the initial lighter surface-friction. The hands of the masseur should remain in contact with the surface of the limb until the kneading, upward squeezing and rolling of the muscles have been accomplished. Then, if the patient is bearing the free manipulation of the limb without undue discomfort, closer attention should be given to the nerve-trunk itself, and along the course of the affected branches, the tender points of the sciatic trunk itself being subjected to firm upward pressure by the thumbs of the operator. Finally the whole of the back of the leg, the thigh and the buttock should be subjected to rapid hacking with the ulnar border of the hands, always providing that the practice of massage has so developed the abductor and extensor muscles of the manipulator's little finger that he is furnished with a firm elastic cushion on the ulnar edge of his hand in place of the ridge of the fifth metacarpal bone, which is

seldom well covered by the usually flat and ribbon-like muscles of the hand of a person unaccustomed to any form of manual labour.

After the massage of the limb the patient (who must be placed in the prone position on an inclined plane during the manipulations described above) should rest supine on the couch while passive flexion of the thigh upon the abdomen is performed by the masseur, who should grasp the ankle of the affected limb and gently but steadily flex the leg on the thigh, and the thigh on the abdomen three or four times ; then, placing the one hand on the knee, and the other again grasping the ankle, the whole lower extremity should be flexed as far as possible on the abdomen with the leg extended on the thigh. This exercise, which involves stretching of the sciatic nerve, concludes the first series of manipulations.

In some cases, when the patient is not too fatigued, and time is a matter of great importance, as it is to many busy persons who can ill afford to lay up and be absent from their affairs for some days, the limb may be manipulated as described twice or thrice daily, the manipulations being increased and decreased in force, variety, and duration, as the state of the patient and the effect of the previous treatment may indicate. On the second day the same series of manipulations should

be used, the flexion of the limb on the abdomen being repeated more frequently and other passive exercises added, viz., abduction, adduction and external rotation of the thigh, the patient maintaining the recumbent position at first ; while if the treatment be employed for a second time on the same day, active movements similar to those previously carried out by the masseur must now be practised by the patient. Meanwhile all unilateral vicarious movements made by the sound limb to relieve the affected parts must be combated both by the operator and by the will of the patient, who must be induced to rise from the couch, to sit down, and to walk by equal employment of both sides. This, which will be difficult to attain at first in most cases, will by perseverance gradually supersede the one-sided movements induced by the painful condition of the affected limb.

In cases of sciatica, whether mild or severe, one of the best tests which can be employed to ascertain how far the treatment has been successful is afforded by the exercise suggested by Schreiber in the use of wooden blocks placed at regular intervals, over which the patient is at first led and subsequently is induced to walk unaided, the distance between each block being gradually increased till the patient is able to stride equally with both limbs without hesitation, and to poise himself on

one leg with the other raised to take the next step without losing his balance.

The writer is much indebted to this simple but ingenious device, for its utility is not confined to cases of sciatica, and apart from the value attaching to its employment as a species of gymnastic steeple-chase, it is useful for stretching contracted muscles of the lower extremity, and for increasing the flexibility of the ankle, knee, and hip-joints.*

In 1887 the first fifteen cases treated by rest, position and massage were recorded by the writer, and since that time many opportunities have occurred for testing the value of the combination, which, with slight variations and improvements, has been successfully employed in all cases marked by great severity of symptoms, and associated with more or less constitutional disturbance resulting from acute, long-continued pain and consequent loss of sleep.

The majority of the cases so treated have been of a chronic recurrent type, in which the patients had not at any time been completely free from stiffness, lameness, or some one or other sign of sciatic trouble, sometimes amounting to actual pain, increased by fatigue or damp weather to severe suffering ; in other cases recognised during the intervals by such slight manifestations as leg

* Schreiber, ' Manual on Massage,' p. 120.

weariness, or numbness of one or more toes, or cramp in the muscles of the limb ; but in all cases characterized by acute exacerbations, obliging the sufferers to lay up, and in not a few instances producing wasting and paresis of the muscles of the leg, thigh, and buttock.

Fortunately the writer has had no experience of any bad results following the employment of mechano-therapy in the treatment of acute sciatica, and, from somewhat prolonged practice in its performance, he has no hesitation in applying it even when the patient is suffering from acute exacerbation of pain. Almost in every case the effect of manipulation has been to soothe the pain and to render the limb more comfortable, less stiff, and free from the constant wearing pain which has been aptly described by one of his patients as 'toothache in the thigh.' The most difficult pain to overcome is the boring, aching sensation frequently experienced by sufferers from sciatica, usually situate in the gluteal region, and radiating from a tender point just external to the sacro-iliac synchondrosis.

The buttock is the citadel of sciatica ; long after the pain in the leg and thigh has been subdued, even after the concomitant symptoms of local anæsthesia, tender spots, muscular cramps, and atrophy have been successfully dealt with, the

patient will still complain of the pain and tenderness existing at one or more points in the distribution of the small sciatic or of the external branches of the posterior sacral nerves. Indeed, were it not for the frequency with which this affection of the buttocks is associated with perineuritis and neuritis of the great sciatic nerve, it would perhaps be mistaken for muscular rheumatism of the gluteus; but it is rarely found to be present save when co-existent with sciatica, and it is almost always possible to find tenderness on pressure at certain spots, especially over the sacral foramina at the points of exit of one or more of the sacral nerves. Just as the pain and tenderness of sciatica will linger longest over the sciatic notch, just below the lower border of the pyriformis muscle, so will the gluteal pain and tenderness defy treatment often for some time after all other painful conditions about the limb have subsided.

There appear to be two reasons for the obstinacy exhibited by the gluteal pain: first, the muscular atrophy, which, on comparison with the opposite buttock, is very readily recognised, exposes the nerves to pressure, from which the attenuated muscles, reduced from firm fleshy masses to thin flabby ribbons, afford little or no protection against the compression of the nerve-endings and trunks

between the comparatively unyielding surface of the bed or couch and the bony plane of the ilium and sacro-iliac synchondrosis; and secondly, the proximal lymphatics from the gluteal region cannot be reached and unloaded, so as to induce the rapid absorption of waste-products from the lymph-clogged sheaths of the nerves and the lymph-spaces of the muscles and fasciæ of the gluteal region. The superficial portions of the sciatic and the sacral nerves can be dealt with; but so soon as the former reaches the sciatic notch, and the latter are buried beneath the multifidus spinæ, they cease to be within reach of massage, and are unamenable to mechanical treatment.

It is a most noticeable feature in cases of sciatica complicated by gluteal pain of a paroxysmal character that the last painful symptoms which yield to any form of treatment are the tender points over the sacral and sciatic foramina. If it is correct to assume that the pathology of the majority of sciatica cases is in the nature of a perineuritis—*i.e.*, a clogging of the lymph-spaces of the nerve-sheath by the products of inflammation—it is not improbable that in old standing and severe cases this condition of the sheath may extend into the pelvis and involve the sheaths of the sacral plexus, which forms the great triangular cord whence the sciatic nerve arises. The application of the con-

stant current, with the anode over the sacro-lumbar articulation, and the cathode over the great sacro-sciatic notch, will often serve to allay the deep-seated pain and tenderness felt by the patient at a point corresponding with the exit of the great sciatic nerve from the pelvis. Careful examination will show that there is pain on pressure over the pyriformis muscle, and examination per rectum will elicit pain on pressure directed towards the side of the bowel corresponding with the affected nerve.

In all cases of sciatica it is most important to prevent any fæcal accumulation in the rectum, which invariably produces increased pain, and is not infrequently the cause of obstinate sacro-sciatic tenderness.

In some cases where the external galvanization of the nerve has failed to produce the usual anodyne effects, the writer has employed with advantage a plan which has been successful whenever it has been carried out ; but the opportunities for its use have not been sufficiently numerous to enable him to lay much stress on its value, though the results obtained on each occasion justify further trial. The anode electrode is passed into the rectum, the contents of the bowel having previously been evacuated by means of a small enema. The electrode is covered with chamois leather,

which must be renewed each time the method is employed. The ovoid extremity of the rectal electrode should be pressed against the side of the bowel nearest to the affected nerve. Over the sacro-sciatic foramen the cathode electrode is firmly pressed, and from five to eight milliampères of current are gradually passed for from five to ten minutes.

The cathode electrode should be an inch and a half in diameter, and well moistened with hot water without salt. Care must be taken not to exceed the dosage either in strength or duration, and if any pain is experienced the current must be reduced. Before using this method it is important to make sure that the galvanometry is correct; otherwise unpleasant, if not serious, effects may be produced. The use of Leubuscher's method of electrization of the intestines will familiarize those who have employed it with the precautions necessary to be adopted in all cases in which intra-rectal electrization is adopted.

The effect of remedies applied for the relief of sciatic pain high up near the origin of the nerve can best be tested by throwing the external rotators of the thigh into action, or by inducing the patient to abduct the limb while in a sitting position. If these actions can be painlessly performed there remains no doubt as to the success of

the means which may have been adopted for the relief of pain and tenderness.

The use of faradization in sciatica has been extolled by some, but the class of cases in which it has proved useful in the practice of those who advocate it has not been specified. Save as an adjunct in the treatment of muscular paresis following sciatic neuritis, the writer has not found the application of faradism useful in sciatica, for if the faradic current is sufficiently strong to induce muscular contraction, severe exacerbation of pain, which does not cease with the conclusion of the application, is produced. If the current is only mildly stimulant it merely acts as a slight counter-irritant, and cannot be regarded as in any sense remedial. It is true that the muscles act as lymph-hearts, and in contraction serve to pump the lymph forward, to aid the venous circulation, and to exercise pressure on the nerve-trunk ; but synchronously with their contraction waste product is formed and the lymph-spaces are reloaded, exudation being promoted rather than absorption ; whereas in passive movement and massage of the affected limb the lymph and venous circulation is favoured and the vessels are unloaded without any action on the part of the muscles, out of which the lymph is mechanically squeezed without the reformation of waste-products, the result of contraction. More-

over, the great advantage which massage possesses over other methods is that, even though there may be increased pain during the actual employment of the manipulations, there is no after-pain ; but, on the contrary, without exception, the patients who have been so treated by the writer have always experienced a sense of well-being, and have expressed their feelings of comfort in the limb after massage. Often the remark has been made on the question being asked as to their condition : 'I felt very well and quite free from pain after you had finished the massage, but the suffering returned about an hour or so after.' The progress of the patient is marked by the prolongation of the time during which the ease following massage is felt, till the successful result is obtained in complete immunity from pain in the interval between massage on the one day and its application again on the next.

One of the earliest effects produced by massage in cases of neuritis and perineuritis is the diminution of the differential surface temperature between the affected and the unaffected limbs. As will usually be markedly apparent, the surface temperature of the affected limb before the initiation of treatment is much below that of the sound limb, and the surface temperature of the cutaneous area of distribution of the nerve affected will in most

cases be recognised as lower than that of the area supplied by the sound nerves of the same limb. Thus in several cases the surface temperature of the outer aspect of the affected leg has been found to be three or more degrees (Fahrenheit) lower in temperature than the same area of the opposite side; while, at the same time, the temperature of the small sciatic cutaneous area has been appreciably higher than that of the peroneal area, but lower than the small sciatic cutaneous temperature of the opposite limb. It appears to be possible, by close attention to the distribution of hyperæsthesia, temperature-sense for heat, and loss of cutaneous temperature, to localize in a measure the extent to which the nerve-trunk or its branches is involved; but the number of cases in which such localization has been attempted by the writer has not been sufficiently great to prove its accuracy within close limits.

It is, of course, comparatively easy by these means to exclude or include the small sciatic, and to determine as to whether the sacral plexus is involved or not.

But after more or less massage, varying greatly in different cases, such localization by these means is rendered no longer possible, for the cutaneous temperature is speedily restored by manipulation, and with this restoration the temperature-sense for

heat is decreased to an equality with that of the unaffected areas; and hyperæsthesia, paralgia, and anæsthesia are also greatly modified, although the two last forms of altered sensation do not yield so rapidly to treatment as other phenomena of the malady.

CHAPTER VI.

LOCAL TREATMENT (CONTINUED)—REST, WARMTH, ETC.

THE most difficult problem to be solved in cases of severe sciatica in which the gravity of the symptoms points to serious lesion is to obtain and maintain rest of the affected limb. It is one thing to place the patient in the recumbent position, but it is quite another matter to secure rest for the limb, without which freedom from great suffering cannot be ensured.

So far as the writer's acquaintance with the literature of sciatica has served him, no record of an absolutely successful plan for securing rest to the painful limb exists ; and he believes that his practice of swinging the limb, which was initiated in 1886, has not been superseded by any better method, though cases have been published in which splints have been employed by writers on the subject since his paper on the treatment of

sciatica appeared in the *Practitioner* of November, 1887.

As yet no more efficient plan for resting the limb has been learned than the following, which appears to fulfil the necessary conditions as nearly as possible in the present default of apparatus which shall be neither too cumbersome nor too difficult in application and removal.

The patient being placed in the dorsal position with the shoulders on the same level with the hips, and in severe cases resting on a water-bed, as suggested by Dr. Buzzard, the limb should be raised to such an angle with the trunk that the weight of the trunk is taken off the buttock, and thrown as far as possible upwards, so that little pressure is felt below the crest of the ilium. Then the lower extremities should be clothed with a pair of merino drawers or flannel pyjamas, the leg of which corresponding to the affected side must be ripped the whole length of the outer side. The thigh being flexed on the abdomen at an angle of 45°, or rather at such an angle as may prove most comfortable to the patient, the leg should be flexed on the thigh so that, from the knee-joint to the heel of the foot, it should lie on a horizontal plane in a Salter's swing, the ordinary bands of which may best be replaced by one continuous piece of stout material.

It will then be necessary to secure the posterior pad of flannel containing sulphur and mustard, already alluded to, so that there are no rucks or folds therein, to the waistband of the pyjamas and to the swing. In this way the weight of the whole limb is supported without subjecting the nerve to unyielding pressure. The whole limb must be swathed, so that no cold impression may result from the use of the cradle over which the bedclothes are drawn. Hot-water bags may easily be applied to any part of the limb, or, if necessary, along its whole length. It is important that the bedclothes should be sufficiently broad to fall over each side of the cradle, to cover and rest on the sound limb, and to be tucked in on both sides, so that the patient may experience a comfortable sense of warmth and clothing, and in order to maintain a warm atmospheric environment for both extremities. Practice in the use of the swing, and attention to minutiæ, which go to make up the sum of the greatest possible comfort for the sufferer, will reward the patience of the attendants by securing freedom from discomfort for the patient, and a grateful appreciation of their efforts to overcome the weariness so frequently engendered by weeks of unallayed suffering in chronic sciatica which has not been assiduously treated. At first the constraint and novelty of

the position may tend to render the patient restless and ill at ease; but the early irritability arising from the irksome restraint is easily overcome by appropriate anodyne remedies, and the initial discomfort attending the employment of the swing speedily gives place to ease from pain, and comparative comfort and restfulness.

For the first few days of treatment it may be found advisable to leave the limb in the swing, postponing more active measures until the rest so afforded has resulted in marked diminution of the pain. At the earliest possible moment, however, the daily manipulations should be commenced, the cradle being removed for the purposes of massage, which should be practised at first in the early part of the day, the swing being readjusted at the conclusion of the manipulation. Gradually, as the patient obtains longer intervals of relief from pain, the number and duration of the 'rubbings' should be increased, till thorough rubbing, kneading, hacking, and passive movements are practised for an hour twice daily.

The vaso-motor disturbance, often simulating the earlier stages of Raynaud's disease so frequently met with in cases of sciatica, is favourably modified by the employment of the descending current for ten to twenty minutes either by means of the cathode electrode in the rectum, with the anode

labile over the foot, leg, and thigh (10 to 15 m.a.), or with the cathode electrode over the great sacro-sciatic foramen, and the anode in a basin of hot water in which the foot is immersed. Care must be taken that no soreness or roughness of the skin is permitted to result from the use of galvanism, an accident which may occur with the use of 10 m.a. of current after massage if the amount of local hyperæmia produced by stabile galvanism is not noted.*

From popular experience of their efficacy certain remedies have been employed with the best results almost from time immemorial, and the author has often witnessed in his boyhood the successful application of 'ironing' to cases of lumbago and sciatica in the country districts of Devonshire by certain old ladies who professed a great knowledge of 'simples,' and practised it on all and sundry in somewhat contemptuous opposition to the therapy prescribed by the orthodox local medico.

The administration of wonderful decoctions internally, and of a mystic number of oils externally, doubtless served to increase the practice of the country doctor who was called in after the wise

* Massage of a part greatly reduces the resistance to the passage of the constant current, so that half the number of cells after massage will give the same current as a given number before massage has been employed.

women had exhausted their pharmacopeia ; but the employment of the flat-iron by some of his old friends has called forth unstinted praise from the parish doctor who first drew the writer's attention to its use on an occasion when he assisted in dressing a broken head—the result of its abuse.

In employing rest, warmth, massage and electricity in the treatment of sciatica, it occurred to the writer that a combination of the three last might be locally applied by means of a flat-iron, and after some few trials of various patterns, the ovoid polishing-iron, used by laundresses for getting up shirt-fronts, has been found to answer the purpose fairly well. The iron being heated to the requisite temperature, a chamois leather cover is adjusted to the polished surface and damped. The iron, which is furnished with a screw attachment for the rheophore, is employed as the anode, while a large flat cathode electrode is placed over the lumbo-sacral region. The patient lying in the prone position, the iron is firmly applied over the posterior surface of the leg and thigh and along the course of the affected nerve. Thus warmth, firm upward pressure and galvanism can be applied to the painful part at one and the same time. The results have been satisfactory in so far as the palliative effects are concerned, and in the cases thus treated the writer believes that this simple

adaptation of an old-world remedy has proved a useful adjunct to the other means employed.

In lumbago the relief obtained from the use of the flat-iron electrode is much more lasting than that which usually follows its employment in sciatica, and in cases of combined lumbar and sciatic pain, the early cessation of pain in the back is a marked result after two or three applications.

CHAPTER VII.

EXERCISE: PASSIVE AND ACTIVE.

After a period of rest in the recumbent position, with the limb swung, varying in duration from a few days to three or four weeks, according to the severity of the case, the limb is gradually restored to activity of use by means of exercises designed to overcome the tendency, which occurs in all long-standing cases of sciatica, to sit, stand and walk almost entirely on the sound side, a practice which becomes so habitual with some patients that serious complications arise therefrom, resulting in lateral curvature of the spine, contraction of the hamstrings, and talipes equinus. Happily, in the majority of cases, these conditions being acquired by faulty posture, and not following on actual disease of the structures involved, active exercises assiduously performed will generally serve to overcome the deformity; especially if care is taken by the attendants never to permit the patient to

relapse into the habit of sitting on one buttock, standing on one leg, and stepping off always, and walking forwards only, with the sound limb, merely dragging the affected extremity up to the level of its fellow in locomotion. Paresis of the hamstrings, and of the peroneus longus and brevis, apparently occurs more frequently and markedly in sciatic neuritis than other forms of muscular paralysis due to inflammation of the nerve-trunk or its branches, but in only two cases has the writer observed permanent deformity resulting from long-continued loss of muscular power following sciatica.

Before any attempt is made to institute active exercises in cases of severe sciatica in which rest, massage, and electricity have been employed, it must be borne in mind that passive exercises should be commenced as early as possible, so that the patient may be accustomed for some time to the movement of the limb in certain directions systematically and always in the same sequence. In this way, almost unconsciously the regular movement by the attendant will induce voluntary effort on the part of the patient to direct the limb into the position which he knows by experience to be that which the passive movement will cause it to assume; so that after a short time the fears of the patient, which at first tend to promote resistance,

will subside, and will be replaced by anticipation of the desired posture, with the result that, in many cases, the indication for the initiation of active exercises will be afforded by the obvious aid given to the attendant by the patient in carrying out the various movements of abduction, adduction, rotation outwards, flexion, and extension of the affected limb, while as yet the patient is still in the recumbent posture. As soon as this stage is reached the attendant points out to the patient that the movements are no longer passive, and the operator endeavours to obtain the voluntary conscious assistance of the patient in making the various motions; but it is often found that when so called upon the aid previously afforded is not so readily forthcoming, and some patience is required to demonstrate successfully to the chronic sufferer that painless power to use the limb has been restored. The exercises then assume the character of assisted active movements, which are gradually replaced by unaided voluntary movements on the part of the patient, who will speedily recognise the restoration of strength and ability to use the limb without pain.

The next stage in the proceedings involves resistance on the part of the attendant, which must be carefully graduated and controlled; each active movement by the patient being at first

gently, and by degrees more firmly, opposed by the attendant, who grasps the affected limb and restrains the voluntary motions of the patient, thus exciting more powerful contractions of the muscles whose activity and nutrition has been impaired.

Subsequently the order of events is reversed, and the patient is directed to resist the passive movements practised by the attendant. Each series of movements should be carried out deliberately, and repeated for a given number of times, increasing daily, additional movements being learned and practised until the time arrives for more varied and extended exercises by the abandonment of the recumbent posture and the initiation of movements which involve locomotion, the support of the trunk by the affected limb, and the equal employment of both extremities in exercises which, prior to the systematic treatment of the malady, have been carried out by the sound limb only. It is at this juncture that all the efforts of the attendant are demanded to counteract the habitual disuse of the crippled leg consequent on chronic sciatic pain. While the patient is engaged in performing systematic exercises under supervision, the inequality of function between the affected and the sound limb will probably be overcome, and scarcely perceptible, save in the

practice of movements entailing hard work on the enfeebled muscles, as in poising the trunk on the lame extremity; but when the patient is moving about in the ordinary way, without concentrating his attention on the mode of exercise in which he is temporarily engaged, he immediately relapses into the habits of unilateral activity acquired during the painful period of the sciatic affection. Under these circumstances constant and reiterated criticism of his movements must be steadily pursued until in self-defence he assiduously avoids the faulty postures and crab-like movements which have been acquired under the painful circumstances of long-continued suffering. An ungraceful limp will be characteristic of his locomotion long after the victim of sciatica has regained the painless use of his limb if measures are not taken to break this habit. At first, no doubt, the bilateral equality of movement is attended by more or less pain and stiffness, the latter sensation remaining after the exercises have been performed, for which reason it is the practice of the writer in these severe chronic cases to administer massage to the limb at the conclusion of the daily exercise, with the result that the patient is much refreshed, and will be free from the fatigue and stiffness following on the use of the enfeebled muscles if the massage is omitted.

The only apparatus necessary in the employment of exercises for the restoration of active use to the affected limb of a convalescent from sciatica are the blocks of Schreiber already alluded to. For the rest, footstools, chairs, housemaids' steps, and staircases afford the materials necessary to the performance of the quasi-gymnastic feats, in which the patient will excel after careful treatment and teaching; but much disappointment and delay will be avoided if the apparently simple exercises are prohibited, except under supervision by a competent attendant who possesses some knowledge of muscular anatomy and action, and who is able to detect when movements normally performed by certain muscles are being carried out vicariously by other groups not implicated by the disease. This tendency to avoid the use of muscles which have been the seat of myalgia, or whose action entails pressure upon the painful nerve, leads to the adoption of all kinds of ingenious devices on the part of the patient, who will instinctively call into play many substituted, though clumsy, methods of attaining a desired action rather than risk the pain which experience has shown will follow the employment of ordinary movements. For instance, a patient suffering from sciatica will stoop to tie up the shoe rather than employ his external rotators and abductors in order to rest the foot of

the unsound limb on the knee of the opposite side for the accomplishment of the same action. Again, if in the erect posture he is asked to rotate the foot outwards, the action will only be carried to the extent possible without using the external rotators of the thigh, the leg being semiflexed and the foot rotated without any action of the outer hamstring on the leg, or of the glutei and other external rotators on the thigh. Abduction of the affected lower extremity is seldom, if ever, attempted by sufferers from sciatica so long as the recumbent position is maintained until after a more or less prolonged course of passive and assisted movements has been employed to overcome the fear of exciting pain. In the erect position the trunk is thrown over to the sound side, and no actual abduction of the thigh is practised, though an unskilled observer might accredit the patient with the action which is simulated but not performed. The acts of sitting down, kneeling, lying down and rising from these attitudes, are all performed unilaterally by the convalescent from sciatic inflammation unless the attendant is careful to enforce symmetrical action. In walking on level ground, and in going up and down stairs, the sound limb is always put forward first, the other merely being brought to the level of its fellow, no attempt at equal progression with

both extremities being made, save under persuasion and supervision.

Of course, in the milder cases the defective use of the painful limb is not so marked nor so persistently maintained as in the more severe and chronic conditions; but even in slight sciatica halting and lameness are almost always present as noticeable features of the patient's gait, long after the pain which caused them has ceased. For this reason it is not uncommon to meet with persons who have become deformed as a result of long-maintained faulty posture and disuse of muscles which have been atrophied and contracted, not entirely as a consequence of impaired nutrition due to the primary nerve-affection, but to a great extent as the natural sequence of functional abeyance.

If in these cases passive and active exercises had been instituted at an early stage of the treatment, there is little doubt that permanent disablement or surgical interference for its relief might in many cases have been avoided.

Subject to modifications which will vary with the necessities of the case, and the indications afforded by the site, extent, and duration of the pain, the following passive exercises should be employed daily at an early stage of treatment in the sequence here set down:

Flexion of the thigh on the abdomen—first, with leg flexed; second, with leg extended. Abduction of the limb, the leg extended; abduction with external rotation of the thigh, the leg flexed.

Combined flexion, rotation outwards and inwards, and extension of the thigh, commencing with rotation outwards; forced flexion of the thigh on the abdomen, internal rotation, bringing the knee of the affected limb across the front of the sound thigh, and so down to the extended position again.

The same exercise should be repeated in the reverse direction — *i.e.*, beginning with internal rotation, followed by flexion, etc.

These exercises are performed by the operator, the patient being in the recumbent position; and after having been repeated for a few days without any attempted assistance on the part of the patient, they should be replaced by assisted exercises until the amount of help rendered by the attendant is reduced to nil, when he should commence to oppose resistance to the voluntary efforts of the patient. Subsequently the active resistance of the patient is opposed to the passive exercises performed by the operator, and the series of exercises practised in the recumbent position give place to those which are carried out in the sitting and erect postures.

As soon as it is found advisable that the patient should assume the sitting attitude, the following additional exercises may be employed:

External rotation of the thigh, with the ankle of the affected limb resting on the opposite thigh just above the knee.

This position is not usually attainable at first by the patient's unaided effort, and it may be impossible to place the limb in the desired position on the first attempt without causing pain; but careful manipulation will overcome the involuntary resistance, and gentle pressure on the inner condyle of the thigh will produce the desired rotation outwards, which should be repeated until the action takes place with little if any discomfort to the patient, who should be encouraged to perform the exercise of tying the shoe on the foot of the affected limb in this position, which involves flexion of the pelvis and trunk on the abducted and externally rotated thigh.

Sitting down and rising up must next be practised, at first with, and then without, assistance. This is an exercise which is invariably performed asymmetrically by sufferers from unilateral sciatica unless precautions are adopted to prevent the undue use of the sound limb.

The patient must stand close to the edge of a well-padded seat, 24 inches in height, with the

heels and toes together, care being taken that the unsound limb is not advanced beyond its fellow.

The attendant, standing in front of and facing the patient, grasps the hands in his, and the patient thus supported, with the arms extended, is directed to flex both knees, and so gradually lower himself on to the couch behind him till he assumes the sitting posture thereon.

Unless the sufferer is a tall person, the attitude of sitting will bring both feet off the ground, and so prevent the possibility of supporting any part of the weight of the trunk or limb save on the buttock. Uprising from the couch is performed by the attendant grasping the patient's extended hands as before, and exercising gentle traction until the patient has again assumed the erect position. The height of the seat employed for this exercise must be daily reduced from 24 inches to 18 inches (ordinary chair), 12 inches (low chair), and finally 6 inches (hassock); and meanwhile the practice of sitting down on and rising from the high couch may be performed by the patient unassisted, while the same exercise with the lower seats is repeated with assistance, until at last sitting on and rising from the hassock is achieved by the unaided powers of the patient.

Kneeling and rising may be performed while the last exercise is being practised, commencing with a

bench twelve inches in height, and concluding with a pad some two or three inches thick, merely to prevent bruising the knee on the floor. The exercise of kneeling is to be performed first with both limbs acting together, and subsequently with alternations.

The following active exercises performed in the erect position should next be assiduously practised, at first three or four times each consecutively, and gradually increased to ten, fifteen, and twenty times each.

Flexion of the thigh on the abdomen with the leg extended. This should be done with a swing forward as far as possible, care being taken that the knee is not bent.

This exercise entails stretching of the nerve, and is an excellent test as to the freedom of the sciatic trunk from pain on tension.

Rotation outwards of the lower extremity.

Rotation outwards and inwards alternately.

Rotation in both directions with abduction and adduction.

This may be done by sliding the feet apart, alternately using the heel and toe as a pivot, until the feet are as far from each other as is possible with the maintenance of equilibrium, and subsequently drawing them together again as suggested by Schreiber.

Foot raising forwards with flexion of the thigh on the abdomen, and of the leg on the thigh. This exercise is performed by the patient lifting his foot forwards and resting it upon bars at various heights, 4, 6, 12, 18, and 24 inches, by degrees reaching the height of an ordinary table.

Foot raising backwards.—The patient standing with his back to the bars, and flexing the leg on the extended thigh till he is able forcibly to flex the leg so that the foot rests on a bar or article of furniture, 28 inches in height for tall persons, but a varying lesser number of inches for shorter or elderly persons from whom feats of suppleness could not be expected, even under circumstances of perfectly sound limbs.

This exercise of backward leg flexion is important, especially in the very common cases of enfeebled hamstrings following on sciatica.

Poising alternately on the affected and sound limb.

Tiptoe exercise.—This is especially valuable in cases where the calf muscles have been particularly affected, and for strengthening atonied glutei.

Walking and running, on a level plane over 'Schreiber's obstacles,' and up and downstairs both forwards and backwards.

When the convalescent from sciatica can accomplish these various exercises, and such others

as the particular complications of each case may demand, without any appreciable lack of equal use and symmetry of action in both limbs, the cure may be said to be complete, and this has been achieved without failure in all the eases of sciatica for which the writer has employed systematized rest, massage and exercises with or without galvanism, faradism, and drugs external and internal, as their use has been indicated by the circumstances arising in the course of treatment. In the majority of cases the sciatic affection has existed for many months, and has proved unamenable to any other form of treatment. In some few the patients have come under treatment almost immediately after the first symptoms of sciatica have declared themselves, while in four severely acute cases of recent origin the writer has employed the treatment from the onset of the malady with success in restoring the painless use of the limb.

It may appear presumptuous to allege successful results in all cases of sciatica treated by rest and massage ; but the fact remains that out of sixty-eight cases of sciatic affections not arising from visceral or pelvic disease, uncomplicated by disease of the hip-joint, neuromata, or complete destruction of nerve-tissue, sixty-three cases have been freed from all pain, lameness and stiffness, and have

remained free from any trace of sciatica for periods varying from three months in forty-one cases, including some of the more severe examples, to six years in five cases. Six patients have suffered from recurrent sciatica after periods varying from six months to four years, four of whom have subsequently been subjected to the same treatment with good results, while ten have experienced occasional relapses, which have yielded to rest in bed for a few days. Of the remaining cases no record can be given, as treatment has not yet been concluded in three, and the others have been lost sight of.

Such results may fairly be regarded as sufficiently successful to warrant the assertion that in all cases of uncomplicated sciatica treated by the method advocated in the foregoing pages no failure has been encountered where the treatment has been thoroughly carried out. Unfortunately, success depends on the assiduity, attention to detail, and intelligence with which the treatment is applied to meet the requirements of each individual case. Failure must follow the mere perfunctory performance of routine methods, even though the remedies employed are simple and easy of application; indeed, the more simple the means adopted for the relief of suffering, the more frequently one sees them effectually successful in the practice of one individual, while they are unproductive of any

result save disappointment and failure in the hands of another. So it is in the treatment of sciatica by the simple means advocated in these pages; it is equally affectation to pretend that success will follow on their careless and unskilful adoption by all and sundry as it would be to assert that there is anything in them which demands more than ordinary skill, experience, and judgment in their application.

Judging from the multitude of remedies which have been advocated for the relief of sciatica, it would appear that the malady is not easily curable, and certainly the numbers of chronic cases met with bear out this belief. If, then, in combining certain of these remedies the curability of sciatica may be facilitated, it will perhaps justify the publication of these few pages by one who has proved the efficacy of the methods herein advocated.

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THE END.

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