

CHAPTER X

EXAMINATION OF THE BACK

ONE of the great difficulties in the examination of cases of alleged injury to the back is that with a large, stout individual, such as one often has to deal with, it is far from easy to make a satisfactory examination of this part of the body, and one is tempted to accept the man's own statement (which under the circumstances of a medico-legal examination is of little value) that he experiences pain at some particular spot.

It is not always easy to discover what is amiss, even when there exists an actual physical cause for the pain complained of; but our worst difficulties commence when we come to determine whether the stiffness and pain alleged are real or feigned.

When disease exists in the spine, Nature's warning is pain. When pain exists, stiffness and rigidity naturally follow, as in the well-known condition of abdominal rigidity in appendicitis. It is reasonable, therefore, to believe that if there is no stiffness and no rigidity there is no pain, and consequently no actual disease.

After middle life the spinal column gradually becomes less elastic, and in old age movements are always performed with difficulty, but not necessarily with pain.

Osteophytic arthritis is a common cause of limitation of movement of the spine in working-men.

The small anatomical difference in the length of the lower limbs, which is much more common than is generally supposed, is, when it exists, compensated for by slight curvature of the spine. A lateral curve often gives a useful cue to an unsuspected asymmetry of the body (see Chapter XVIII.).

When there is no complaint of pain on percussion over the spinous processes of the vertebræ, it may be assumed that there is no gross damage to the neural arches.

The following surface landmarks may be useful:

1. None of the cervical spines (except the seventh) can as a rule be palpated. The spine of the seventh cervical vertebra is prominent, but it should not be forgotten that the first dorsal is often equally so. It is therefore unsafe, in counting the spinous processes, to assume that the prominence felt is the seventh cervical.

2. The third dorsal vertebra is on a level with the spine of the scapula, and the seventh is on a level with the lower angle of the scapula.

3. There is usually a distinct dimple over the posterior superior spine of the ilium. A line which joins these dimples on either side corresponds with the level of the second sacral spine. Above the level of this line is the first sacral vertebra.

4. A line drawn horizontally round the body at a level with the highest point of the iliac crests covers the fourth lumbar spine. From this point the vertebræ may be counted upwards.

5. The lumbar spines correspond in level with their bodies.

Where Fixidity occurs.—In the normal state there is practically no widening of the spaces between the dorsal spines when the patient bends, and there is therefore *no flexion in the dorsal region*. Flexion of the spine takes place almost entirely at either the cervical or lumbar region, or at both. *This is an important fact to remember when examining the back for injury.*

Inability to move the cervical vertebræ is seldom fraudulently alleged, and the comparatively few cases which arise are easily dealt with.

The lumbar region, therefore, demands careful and, in the absence of alleged injury of the neck, exclusive attention in cases where it is stated there is inability to stoop.

A common experience in these cases is that a claimant, who alleges that months before he strained or injured his back, stoutly affirms that he is quite incapable of bending his back. When asked to do so, he makes a slight forward inclination of his body from the hips, and then resolutely declines to make any further attempt at movement. If he is simulating incapacity, the difficulty of proving it is great.

Obviously, such incapacity is not associated with the cervical region. We have seen that the dorsal region does not contribute

to the flexion of the spine, and therefore the alleged difficulty in stooping must, if it exists, be confined exclusively to the lumbar region. If this is remembered it enormously simplifies the investigation of these cases, for the attention of the examiner may be wholly concentrated on the five lumbar vertebræ.

Tests for Fraudulent Stiffness of the Lumbar Vertebræ.—I am indebted for many of the following observations to Dr. A. McKendrick, from whose book on Back Injuries I have obtained much assistance.

Simulated fixidity of the lumbar region may be exposed by the following: The patient should be laid absolutely flat on his back; his heels, *knees*, buttocks, and shoulders, should touch the table. The natural forward lumbar curve is in this position apparent. *It will at once disappear if the thighs are flexed on the abdomen*, unless fixed by injury or disease.

If, whilst lying flat on the table in the position above described, the patient is told to keep his knees straight and assume the sitting position, and then bend the upper part of his body a little forwards, the normal forward lumbar curve, if not fixed by injury or disease, will entirely disappear.

The patient is induced to sit in an upright position on a chair; if both knees are now extended, the normal forward lumbar curve disappears if not fixed by injury or disease.

The value of these three tests is great, for the positions which the patient has in each been induced to assume are, from an anatomical point of view, exactly the same as those which he has probably declared were impossible to assume when asked to perform them when standing. It is obvious that if, when lying on his back, the patient's thighs are bent on the abdomen, the position is the same as if he had stooped so low, *when standing*, that his head would approach the ground; and that if he can be induced to sit bolt upright, either on a table or on a chair, with his knees extended, he is in fact bending his body at a right angle to his thighs, and would, were he standing, be making a very low bow.

There is, however, this difference, that in stooping forward in a standing position the body would fall, as it were, by its own weight, were it not restrained from doing so by the erector spinæ and other extensors of the back; whereas in assuming the sitting posture from the prone, the body is raised against

gravity, and the flexors of the spine—*i.e.*, the abdominal muscles—are brought into action. The fact, however, that a different set of muscles is brought into use does not diminish the value of the tests as far as capacity or incapacity to stoop is concerned.

Although these facts may be demonstrated to the satisfaction of the examiner, it is a matter of much importance, in cases where arbitration proceedings are pending, that indubitable *proof* should be forthcoming, and this, fortunately, can be procured. It is found, in radiographing the lumbar region, that when it is impossible to get a patient to move his lumbar region voluntarily, so as to come in contact with the X-ray plate, a better result is obtained if the knees are drawn up; this, as already stated, obliterates the normal forward convexity of this region, and brings the vertebræ more in contact with the X-ray plate.

McKendrick points out that a permanent record of the fact that a patient, who alleges he cannot stoop, is in fact able to bend this portion of his spine, may be obtained by taking an X-ray photograph first in the position which the patient alleges is the fixed one, and second with the knees drawn up. A permanent photographic record of the difference in the position of the vertebræ is thus obtained. When the lumbar vertebræ are in their natural position—*i.e.*, curved forwards—a radiogram shows that the spinous processes approximate each other; but when the thighs are flexed on the abdomen, and the natural lumbar curve forward is straightened, the spinous processes are separated. Comparative measurements taken between the shadows of the spinous processes in the two plates will prove that movement *has* taken place. In radiography stout men are always a source of difficulty, but with "screen plates" I am informed it is usually possible to demonstrate that movement has taken place. These "screen plates" do not, of course, show the finer details necessary for demonstrating disease of the bones, but are sufficient for the purpose indicated.

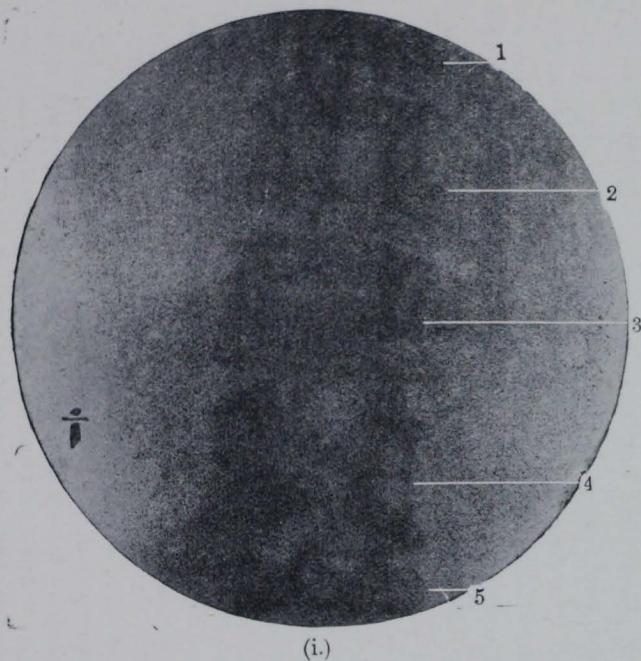
I am indebted to Dr. McKendrick for preparing for me skiagrams which illustrate the point. It is obvious, however, that reproductions of a skiagram are of less value than the evidence afforded by the plate itself.

He points out that it is important that the technique of the X-ray examination be appreciated. The plates of the skia-grams were taken with the tube 60 centimetres distant from the plate, the distance and the focal point being the same in each case. In Fig. 11 (i.) the back was arched, as it naturally is when a patient lies in the ordinary way on his back. In Fig. 11 (ii.) the lumbar vertebræ were brought in contact with the plate by flexing the thighs on the abdomen, thus straightening the normal anterior curve of the lumbar region. On the plates the distance between the tips of the spinous processes can readily be located and measured; even on the prints a difference can be detected, and it will be seen that in Fig. 11 (ii.) the spinous processes of the fourth and fifth lumbar vertebræ are wider apart than those of Fig. 11 (i.).

If the breadth of the third lumbar vertebra in Fig. 11 (i.) is compared with that of the same vertebra in Fig. 11 (ii.), it will be seen that the body of the former is the larger, for owing to the natural curve it was further removed from the plate. For the same reason a larger area of the inferior surfaces of the second and fourth vertebræ is shown in Fig. 11 (i.) than in Fig. 11 (ii.).

In examining the spinal column, it is not sufficient to place the hand on the patient's back, to ask the patient to bend forwards, and then to note that there is immobility, or what is called "boarding," in a certain region. This, McKendrick points out, is only half the truth, and recommends that the examiner's hand should be kept for at least a full minute on the patient's back, which should be bent as far as possible. The back may remain absolutely stiff from disease or traumatism, or, on the other hand, the muscles beneath the examiner's hand may begin to twitch, followed by a "giving" of the spine. At first the relaxation or "give" is very short, and this is followed by a slightly longer one, and so on until the spine is fully bent, indicating that the erector spinæ has been voluntarily kept in action. The muscle, the erector spinæ, which produced the "boarding" has gradually become tired out, and finally exhausted. This condition, he states, is often found in malingering and in hysteria, but never in traumatic neurasthenia. On the other hand, when the rigidity has been due to either rheumatism or strain of the spinal

Natural curve.



Curve straightened.

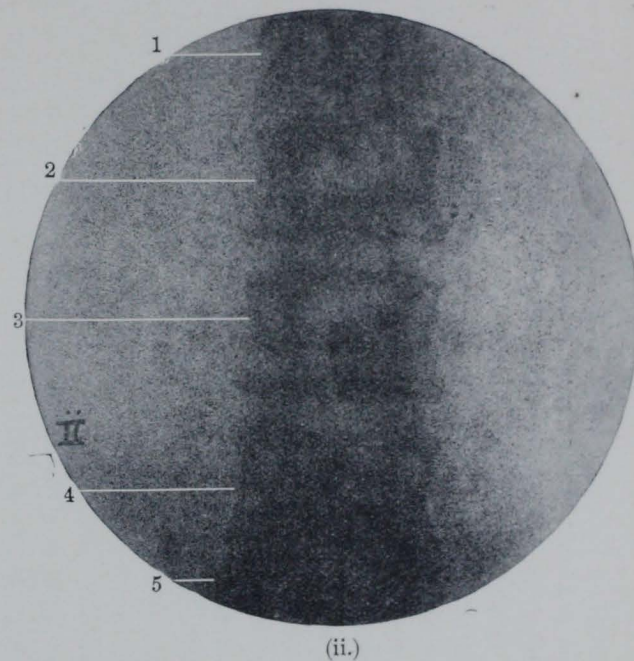


FIG. 11.—RADIOGRAM OF LUMBAR REGION.

joints, the "give" is more or less gradual, each becoming shorter than its predecessor until the back is fully bent.

If a man really has pain in the cervical or upper dorsal region of his back, it can generally be elicited by bending the head forward while the trunk is held rigid, thus stretching the vertebral muscles; if this can be done without producing pain, the probabilities are that the pain alleged is not due to physical causes.

When the back is bent, each separate vertebra in the cervical and lumbar regions moves a little upon its fellow, and each spinous process is separated a very short distance from those of the neighbouring vertebræ. If, therefore, when a patient stoops, the fingers of the examiner's two hands are pressed between the spinous processes, first of the cervical and then of the lumbar region, and the patient is asked slowly to raise himself to the erect position, and the spinous processes are found to separate upon flexion of the spine, and approach each other as the spine is straightened, and this without pain, it goes a long way towards proving that there is no disease at the particular spot examined.

In cases where the only complaint is of subjective symptoms, it is seldom that one examination is sufficient to enable a definite conclusion to be arrived at; and the examination should be repeated, if practicable, as many times as are necessary to enable a correct opinion to be formed. I have set out the following case in some detail because it shows the value of patient and persistent effort in exposing alleged incapacity based upon subjective symptoms alone:

C. F. was sent to me complaining of a "terrible pain" in his coccyx, which extended all round to the front of the abdomen, and up his spine to the back of his head; he declared that he could not walk on account of a "dead" feeling, that he had no appetite, and had lost weight.

It was alleged that two years previously he fell over the step of a door on board ship. The accident was not reported for five days, and five weeks later a medical man stated that he was unable to work owing to an injury to the coccyx. Ever since he had been comfortably off—in receipt of nearly a pound a week in half-wages under the Act, and also a considerable amount of club money. The shipping company's doctor examined him several times, and said there was no means of ascertaining whether the alleged pain was genuine or not. Various attempts were made to settle the case for a small sum, without success. Four months before I saw him, he was found in bed suffering

from what he described as an "attack of paralysis," which had lasted a fortnight, and gave a history of similar attacks previously, but the company's officer who visited him remarked that C. F. "looked remarkably well, considering he is said to suffer from occasional delirium, partial paralysis, loss of sleep, loss of appetite, and loss of flesh."

Examination.—This claimant was a typical traumatic neurasthenic, with a very considerable spice of wickedness thrown in. There was not the slightest doubt that he had made no attempt to ignore the many morbid sensations which were the outcome of his own brooding, for he was fully aware that as long as these allegations were sustained the Workmen's Compensation Act might be construed in his favour.

During the examination, when firm pressure was applied in the region of the coccyx, he turned round, glared at me, spoke rudely, saying gruffly that he "would not be pulled about." He was told with the utmost deliberation and calmness that in that case I should not proceed with the examination, and that, in accordance with the provisions of the Workmen's Compensation Act, his pay would be stopped if he did not submit to examination—that it really did not matter to me whether I examined him or not. The effect was magical; not only did he allow an equal degree of pressure without even wincing, but he became perfectly amenable to a thorough examination.

There was not the slightest organic basis for any of his symptoms; indeed, it was impossible that the pain which he described could arise from the coccyx, for the alleged pain did not follow the line of the nerves therefrom.

As far back as a year previously this man had been X-rayed, and a very definite statement was then obtained from his medical attendant that he had no organic disease at that time. It was unlikely that he should have remained ill, and that no physical signs should have developed during a whole year.

My opinion was that C. F. was suffering from a functional neurosis—that is, a neurasthenic condition, the proper treatment for which would be return to work. Neurasthenia following an accident varies very much in degree, and I satisfied myself that the present condition of the claimant did not preclude his undertaking light work. Under these circumstances, I thought it my duty to tell him very frankly my opinion, and when he saw that I was assured of this, he eventually agreed that he *was* fit for light work, and would do it if any could be found for him.

Three months later he was sent to me again for examination. It appeared that he had been induced to start work several times, but would not settle down, and finally stated that his health would not permit him to do any more.

In addition to the pain in the coccyx, he now complained of blood-spitting and frequency of micturition.

Having been idle for two years, he had now become obsessed with the idea that he was wholly incapable of working; unfortunately also his wife was a genuine believer in his disabilities.

His doctor informed me that he had attended him for hæmoptysis,

but in spite of repeatedly examining him when the hæmorrhage took place, he was unable to discover any cause for it. In my opinion, the hæmorrhage was unconnected with the accident, and I believed that ultimately it would be found to come from the throat or upper air-passages.

I was of opinion this was not a case to fight for the following reasons :

1. C. F. was somewhat pale, and would have the sympathy of the arbitrator.

2. His own doctor was prepared to swear that he was ill, and fit for nothing but light work, and did not disassociate the hæmorrhage from the accident.

3. It would be impossible to deny that the man was still neurasthenic, and, rightly or wrongly, the Court would hardly listen to the suggestion that he had contributed to his own incapacity, still less to the suggestion that the best treatment for it was diversion of the mind by resumption of light work.

4. The applicant would probably call the surgeon at the hospital, with whom his own medical attendant had been in communication, and one had to bear in mind that the surgeon hinted at chronic arthritis of the spine, which is the latest refuge of those who are destitute of a diagnosis.

5. He would bring his wife, who would "prove" his utter incapacity to do anything.

With regard to the future, I believed there was ground for hoping either that his courage would be re-established, or, more likely, that his doctor would get tired of him.

Fifteen months later I re-examined him. C. F. did not in any way appear to be an ailing man ; he was ruddy, healthy-looking, and had his moustache waxed ; wore a gold ring on his finger ; his manner was aggressive, and on more than one occasion he spoke in a loud blustering tone of voice. He insisted on his wife being present during the examination.

He declined to give any information as to what medical attendance he had recently had.

He complained bitterly of being subjected to so many medical examinations ; but when it was pointed out to him he had not been medically examined for over a year, and that his employers were legally entitled to an examination every two months, he shifted his ground, and complained of having been induced to attempt light work.

With regard to the alleged pain in the back, on thorough examination nothing could be found to indicate disease of any sort, and it was interesting to note that he did not now complain of pain in his coccyx as he had formerly done.

He now complained of pain over the bladder and incontinence of urine, and seemed to rely strongly on this as an evidence of continuing disability. He had in readiness for me one or two pairs of pants, which he stated showed evidence of this, and was genuinely distressed when I refused to examine those which he had in readiness, but

insisted upon examining those which he was then wearing, which disclosed *no* signs of urine-stains. Although he stated this symptom had lasted for two years, I noted that he had not mentioned it at my first examination.

Incontinence of urine is not infrequently complained of by men of this type, who know that this symptom is one often associated with serious disease, and it is a common practice to feign it. What this man did not know was that it is a *late* symptom following on serious nerve disease, the presence of which could be detected by the ordinary physical examination of the nervous system. He was subjected to the usual tests for disease of the nervous system, with negative results, except that his knee-jerks were exaggerated. It transpired that his doctor had sent him to hospital on account of the hæmorrhage, and the claimant thought it unfair that I should have any information with regard to this, for he felt sure I should write to the hospital doctor for his views. It appeared that he took his own discharge after four weeks, and that his exit synchronized with some inquiries which the authorities of this institution made with regard to his alleged continuing disability from his accident.

When he entered the hospital, he gave a history of many hæmorrhages, one being as much as a whole pint of blood, but during his stay no tubercle bacilli were found, no hæmorrhage occurred, and no disease of coccyx, testicle, bladder, or rectum was found. In consequence of his complaining of incontinence of urine, the surgeon at the hospital ordered that a steel bougie should be passed each night, and one of his reasons for leaving was his objection to this. This treatment was, no doubt, ordered under the belief that the alleged incontinence was of the nature of a mental condition, and was intended merely to have a moral effect.

It appeared that he then went to several hospitals trying to get an opinion that he had phthisis, though it is hardly conceivable that even the wide meshes of the Workmen's Compensation Act would include traumatic tuberculosis in a case of this sort.

I ascertained that soon after obliging me to visit him he resumed work, possibly with a view to stating in Court that he had once more tried work and been unable to do it. He refused to give me the name of his employers, stating that he did not want the firm to know that he was receiving compensation, and admitted that he had made a misstatement to this effect when filling up one of their forms.

A month later I saw him in consultation with a surgeon, who entirely agreed that there was nothing the matter, and was prepared to substantiate the view I had already expressed.

It appeared that his present doctor had been attending him for some time *without knowing of any supposed accident*. This was either artfulness on C. F.'s part, or might be construed into a tacit admission that the present condition was not caused by accident.

His present doctor then admitted that C. F. had brought himself into a weak state by not resuming work six months after the accident.

In short, here was a man who more than three and a half years after

the accident still declared himself wholly unfit for work on account of it, but did not present any physical signs, and now made no mention of his original complaints. The previous symptoms of neurasthenia having now wholly disappeared, he had in my opinion degenerated into an artful malingerer; his doctor, as I had anticipated, had got tired of him, and I believed the time had come when further payment should be resisted.

Result.—The case was taken to Court, and resulted in judgment for the employers.

With regard to movements of the spine, a claimant will probably declare that anything but the slightest movement is painful to him. He should be asked to bend forward as far as he can without causing pain, and the amount of flexion should be noted. Subsequently, while he is engaged in conversation and his attention distracted, he should several times be asked to bend his spine, when it will generally be found that the amount of movement made varies widely.

The power of rotation of the cervical vertebræ can be elicited by asking the patient, when standing with his back directed to the examiner, and his feet placed closely together, whether since the accident he has had any trouble with his hearing. The auricles are alternately taken between the finger and thumb, and the head gently pulled well to one side and then the other, under the pretence of getting a good light into the meatus. This little manœuvre rotates the whole spine, and has the advantage of being easily demonstrated to the applicant's doctor if this is thought desirable.

A good plan in examining a spine is to fix the pelvis with both hands, and ask the patient to rotate the body by inducing him to look over his right shoulder and then over his left. Patients, as a rule, do not appreciate the importance of movement in this position.

Sometimes patients can be induced to stand on their tip-toes, and then come heavily down on their heels. No question should be asked as to whether pain has been produced: for if it has, there is no doubt it will be mentioned or can be gathered from the facial expression; if it has not, there can be no very tender area.

It has been suggested that the converse of the experiment for testing the height to which the arms can be raised while ostensibly examining the back, described in detail on p. 299,

may be used for obtaining an extension of the spine. In this case the patient's attention would be riveted upon the endeavour to extend his arms above his head, while he is induced to extend his spine by gradually stepping back from the chair.

History.—C. D., a labourer, aged thirty-four, was said to have strained himself whilst assisting to lift a pail over a wall. He was taken to hospital, but not detained. This occurred six and a half months previous to the date on which he was sent to me by an insurance company for examination on behalf of the employers.

Examination.—When he entered the consulting-room, and during the first part of the examination, he held himself stiffly, but gradually assumed an easy posture as the examination proceeded.

He told me that on bending or twisting the body he had a pain in his back, and that he was unable to lift weights.

He complained when his back was touched even lightly. No anatomical change was found in the muscles of the back. With some difficulty he was induced to lift a heavy gipsy coal-scuttle, weighing 28 lbs., and it was perfectly obvious from his manner of doing so that the alleged difficulty was a mere pretence. When asked to move, bend from side to side, and stoop freely, he gave no sign of muscular restraint or painful action. It was noticeable that when he thought he was unobserved the movements were much more free than they had been in the first instance. As an evidence of his want of veracity, it may be mentioned that when the battery was applied, he repeatedly said he felt pain from the current when, in fact, it was not running.

Every organ of this man's body was healthy. There was no evidence forthcoming that he was suffering; on the other hand, there was the strongest presumption, not only from the facts disclosed by my examination but on theoretical grounds also, that any strain (or even tear) of tendon or muscle which this man might at one time have sustained must have wholly recovered many weeks previously.

Here was a strong man, with well-developed muscles ready and waiting to be used, who had made up his mind he would not use them so long as he could obtain 16s. 9d. a week without exerting himself.

Result.—In this case the employers entered into an agreement with the claimant to pay him a sum of £18, which agreement, when filed with the Court, was objected to on the grounds that it had been obtained by undue influence, and that the amount was inadequate. As it turned out, the man ultimately accepted a lesser amount—£15—than that mentioned in the agreement.

Recently, in dealing with a most determined malingerer who for months kept his back so bent that his face always looked to the ground, I was able to induce him, when stripped, to lie absolutely flat on a sofa without complaint. Subsequently

most of the man's clothes were placed under his back, thus arching it in exactly the opposite direction to that in which he held it before, and this without any complaint.

It is curious to note how often one who wishes to allege spinal injury complains of pain at the tips of one or more of the spinous processes of the vertebræ. The places indicated first should be marked, counted, and carefully noted, and the results compared at intervals, both at the examination and at subsequent interviews. The use of different coloured chalks is of assistance in making these records.

There are many apparently innocent means by which a man may be induced to bend his back directly he enters the room, and before the formal examination has commenced. I have repeatedly ascertained the flexibility of a spine before the patient knew it was being tested.

As a rule, working-men bring their cap or hat into the room when they come to be examined. In a casual way he is instructed to put it *below* the chair on which he is offered a seat. It never strikes a working-man that this is in any way an unusual proceeding. Indeed, he seems to think that it is the correct place for his hat. Under the assumption that the examination has not yet commenced, he often forgets himself, and when he stoops I casually remark, often in a low tone, speaking, as it were, to myself: "Cannot be much the matter with his back *now*, anyway, judging from the way he can bend."

It is surprising how large a number of cases, in which the whole question of further examination, diagnosis, treatment, and alleged continuing disability, is finally settled by this procedure, and the explanation follows that, whereas the back has been "bad," it has now recovered, a line of least resistance in which I willingly acquiesce, and sometimes even suggest. It has always struck me that it is a waste of time and bad policy to examine thoroughly a claimant who admits that he has recovered, and I commend this little manœuvre as a time and labour saving expedient. This remark does not, of course, apply to cases sent for medico-legal examination, but only to those where an opinion is sought, by large employers of labour, as to the continuing disability of their employees.

There are occasions when one is quite convinced that there

is absolutely nothing the matter with a man, but the positive proof required to demonstrate the fact is lacking. In such cases, if one is in a position of authority, a good result may sometimes be obtained from a frank avowal of the position and the offer of a bargain. Let the man know your difficulty, tell him candidly you have not for the moment the requisite proof in your possession to report him as a malingerer, hint that in the event of his speedy recovery the case will be treated as a recovery, and that no adverse report will in that case be made. He should be given to understand, however, that the alternative implies, of necessity, a renewed effort on your part, and the inexorable exercise of your powers when successful, and that this is only a matter of time. My experience is that this offer is often readily accepted, and a graceless retreat is made from a position which it is appreciated is really untenable. The plan has the obvious advantage that the real sufferer is at no disadvantage; for should the case be a genuine one, continued investigation would demonstrate the truth of his allegations.

The almost transparent device of accidentally dropping a pencil, in the hope that the patient will unconsciously pick it up, or the more artful method of surreptitiously dropping a coin or small article of the patient's clothing on the floor, often shows the functional activity of the extensors of the spine in a way which more scientific methods fail to elicit.

E. Z.—On one occasion, when examining a back which was said to be stiff, I dropped my pencil intentionally, early in the interview, and the claimant nimbly picked it up. Later, when examining his back, he alleged that all stooping was impossible, and would not even attempt to bend his back. I said nothing, but had him cross-examined at the trial on the incident. He then swore that no such incident occurred. I believe he had never noticed, or had no recollection of, the little courtesy he unwittingly paid me.

The trap, however, into which the most hardened malingerer will sometimes fall is (his trousers and pants having been, during the examination, dropped to his ankles) to indicate, in a tone of relief and finality, that the examination is at last concluded. The examiner should at this moment turn his back on the patient. If a mirror should happen to reflect the movements of the patient, much satisfaction will often be caused by seeing the man stooping to reach his clothes with

an agility which no amount of coaxing had previously produced

Simple ruses such as these will often succeed, though their chances are becoming more and more remote, as applicants are now too often coached in the part they have to play.

A patient who is alleging pain at a definite spot in his back, which does not exist, may be detected by the simple expedient of asking him to place the point of the forefinger of his right hand on the spot, and marking it, and subsequently, after another part of the examination has been undertaken, asking him again to indicate the spot, but this time with the point of the forefinger of the *other* hand. The result is often edifying, because he may point to a spot several inches away from the first one.

When the alleged painful area has been indicated, with more or less exactitude, complaint will probably be made of the lightest touch in that region; it is therefore necessary to resort to various devices for withdrawing the attention from the locality presumed to be affected. One way is to ask him whether the other side pains him, at the same time applying firm pressure to it. His attention being diverted to the sound side, it may be possible to put considerable pressure on the other side without eliciting evidence of pain.

Another method is to leave the back altogether and go over the chest with the stethoscope, commencing in front. On auscultating the back it will quite likely be found that the claimant will bear firm pressure with the stethoscope on a spot previously declared painful to the lightest touch. Another most valuable method is the use of the battery, as described in Chapter XXXIII.

History.—C. C., a ground-workman in the employ of one of the Metropolitan Borough Councils, stated that a tar-tank collided with the barrow he was wheeling, knocking him over, and injuring his back and abdomen. I was asked by the Borough Council, nineteen months after the occurrence, to examine him, as he had not even then resumed work. The examination took place in the presence of a medical man, who is also a lawyer.

Examination.—C. C. told me he had difficulty in passing water, and had pain in the back and hip. I asked him to pass water in my presence, and from the smallness of the stream suspected stricture. He admitted having had gonorrhœa a long time ago, and the appearance of the urine, which I took home and examined, was clearly indicative

of an old-standing condition consistent with gleet and stricture; it was also consistent with enlarged prostate gland, but wholly inconsistent with any condition which might arise from traumatism.

There was no physical sign of injury to the hip; he allowed, without protest, free flexion of the thigh upon the abdomen, and rotation outwards of the hip to a degree incompatible with the presence of any disease in the joint.

There was no evidence of any sort to support the allegation of pain in the back. Pain is a subjective symptom, and when complained of for a long period in a medico-legal case of this sort, with nothing objective to account for it, may not unreasonably be viewed with grave suspicion. Here was a man who complained of pain in his back whose muscles were not wasted, who early in the examination bent his back freely, touched his toes, and took off his boots with perfect freedom; but who, when his attention was drawn to his back, stated that he could not bend it at all, and when pressed to do so bent a little way, and then said it was impossible to bend farther. It was particularly interesting to note that when the whole examination was over, upon my suddenly re-entering the room I found him with his back freely bent in the act of lacing his boot whilst the foot rested on the floor.

He complained of pain in his back on the slightest pressure, but when his attention was centred upon determining whether the faradic current of my battery was or was not flowing, he allowed firm pressure with the handle of the electrode upon the same area without protest. Again, whilst the battery was buzzing loudly, unknown to him the current was turned off by a switch in the handle of the electrode, and he still complained bitterly of the current, thinking, no doubt, that he ought to make a complaint if the current was being applied to the spot which he had alleged to be tender. I reported that he was neither accurate nor truthful, but a malingerer.

Result.—Arrangements were made for an examination by a medical referee of great experience, who agreed with me, and supported my evidence at the hearing of the arbitration proceedings.

At the hearing the medical assessor, who sat with the Judge, said he agreed with our evidence, and judgment was given for the Borough Council.

In a report of a case by Dr. Handson, which was subsequently submitted to me for an opinion, I find the following astute observation, which I quote literally :

“The situation of the pain varies on the two sides. On the right side it is extremely localized, and is brought on either by movement of the joint or by pressure. From his exclamations and facial contortions, the pain amounts to agony, but it had one very peculiar feature.

“To test him, I suggested that if the pressure was localized to the tender spot, the pain was very intense; but if by putting all my fingers of both hands together I made a long line of pressure, the centre of

which line of pressure was over the tender spot, then, no matter how hard I pressed, though, of course, the tender spot was pressed on, there was no pain. It was interesting to find, as I suggested, that the latter experiment was painless.

"Later, again with my fingers in line, I pressed very lightly with all my fingers but one. With this one I pressed hard on the tender spot, but again he agreed that there was no pain. I then lifted all the fingers but the heavily pressing one, when, as before, only one finger being in place, the agonized contortions recommenced.

"The test discredits there being any pain on pressure worth considering."

The spine is often forcibly bent forward as the result of a heavy weight suddenly falling on the shoulders. This is common in coal miners, who are liable to falls of stone or coal from the roof. Many soldiers suffer from this injury as the result of being buried under sandbags.

It is scarcely possible to tear the elastic ligamenta subflava on the cadaver by forcible flexion of the spine. The most frequent result of this injury, owing to the resistance of the posterior ligaments, is a compression fracture of the anterior aspect of the body of a vertebra.

When an injured muscle is actively put into contraction, or when it is stretched, pain is produced. If the erector spinæ is injured, and the patient actively tries to *straighten* the back, or if the spine is flexed, thus stretching the injured muscle, pain will be complained of.

The man who complains of severe pain in the erector spinæ or its prolongations, and keeps his back bent many months after an injury, lays himself open to grave suspicion.

When patients allege a tear in the neighbourhood of the erector spinæ, instead of complaining, as so many do, when the back is straightened, they ought to be grateful, for, if any of the fibres of this muscle are really injured, the effect will be to relax the fibres.

Sometimes the following experiment (which is set out in full detail on p. 67, case B. C.) is of use. The man who declines to assume the erect position may be induced to do so unwittingly, by being asked to kneel on the floor and rest his elbows upon his folded clothes, in such a position that his back is straight.

A good deal may be gained from a careful consideration of which muscles are used for the purpose of bending the spine.

It must never be forgotten that the muscles which produce lateral movement are exactly the same muscles as those which produce extension, and therefore if a claimant says he cannot straighten his back, but is able to touch the ground first on one side and then on the other, it is obvious that the disability, if genuine, is not in the erector group of muscles of the back.

When one side of the back is said to be strained, the following test will be found very useful. We shall assume that the pain is complained of over the *left* erector spinæ.

The patient is directed to stand erect and to *attempt* to bend to the left side, whilst the examiner resists and actually prevents any movement of the body to the left. If the muscle has been injured, the fact that it has been thrown into action will certainly cause pain by "compression" of the injured region within the muscle substance. A similar attempt to bend the right, also against resistance, will be painless.

Working-men are, of course, unaware of the anatomy and action of the muscles involved, and I have known a malingerer pretend, a year after the happening of a slight accident, that his back muscles were so painful that, not only could he not straighten them, but any attempt to extend passively the spine produced the most intense pain. The whole back was bent forwards, but it was evident that the spinal column was bent forwards from the hip-joints, and this was demonstrated by putting the hand on the lower part of his abdomen and at the same time attempting forcibly to straighten the back, when the powerful abdominal muscles which are the flexors of the spine were found to be in violent contraction. The following full details of the case will be of interest:

F. A., a ship's carpenter, aged twenty-five, complained of feeling a click in his back on the left side whilst moving timber, and that in consequence he was unable to move. He was removed from the dock on a barrow, and remained in bed six weeks.

Four and a half months after the accident he was sent to me for examination; he then complained of an indefinite pain in his left side, inability to hold himself straight, and that occasionally he limped. His back was bent and twisted to the left side, and his facial expression was one of suffering. When asked to straighten himself he groaned, and spoke of the distressing effect his accident had on his "pore little children."

When asked to lie flat on his back, he did so without complaint,

showing that the bent position was, as I suspected, assumed. Next he was induced to hold on to a small trapeze by both hands; when raised off his feet by block and tackle his back became quite straight. He was then lowered slowly against a wall, when he stood with his back quite flat against it; this was pointed out to him, and he did not bend his back again. When asked to walk about the room, he did so in a stilted, strained manner; but on each deviation from the normal being pointed out and mimicked, his gait gradually improved, until after the lapse of twenty minutes the difference was very marked. He was instructed to bend his back and touch his toes, and he deliberately feigned to lose his balance. When asked to stand with his heels and toes together, under the pretext of examining first the right and then the left ear, he was induced to twist his spinal column first to one side and then to the other, without the least complaint or appearance of pain. When told to touch the ground with his right hand on the right side, and then with his left hand on the left side, he did so without complaint. When instructed to lie flat on his face, he did so; indeed, on one occasion during the examination he actually arched his back, a movement which was obviously painless.

The two poles of an electric battery were applied between his shoulders, and, as one of them gradually approached the neighbourhood of the alleged painful spot in the small of his back, the current was cut off by a switch in the handle, still leaving the battery in noisy action; and yet he complained bitterly of the electric current, which he supposed was still running, stating that it produced knife-like sensations even when one of the poles lightly touched the alleged painful part of his back.

It was evident that F. A. was a malingerer, but being one of those dull, stubborn, inert individuals in whom obstinacy and intelligence are about equal, it was quite possible that he had convinced himself that his back did pain him. I pointed out to him that there was no doubt he had at one time sprained the muscles of his back, but, having recovered from the sprain, the time had now come when he should resume work. I offered, if he would return to work, to ask his employers to allow him to go easy at first, but his mental attitude was very well illustrated by his saying in a dogged sort of way, "There is no light work at my job." It was explained that, as he was well and fit for work, it was not proposed that he should have light work, but merely that he should be allowed to go easy. His reply that he could take no steps "as the matter is in the hands of my solicitor" was characteristic of his type. As he subsequently refused to attempt any work, his half-pay was stopped, and he instituted arbitration proceedings.

Some seven weeks later the medical referee who sat with the Judge did not recognize that F. A. was a malingerer, and advised that he was fit for "light work only," with the inevitable result that the Judge decided in favour of the workman. The County Court theory apparently is that there is no such thing as "light work."

Three and a half months after the arbitration proceedings I was again asked to examine the man with a view to an application for review, when he reiterated his old complaints, still kept his back bent, and said he was unable to straighten it. When asked to place his hands on a trapeze suspended from the ceiling, he complained that he could not reach it, but did so when reminded that he had done it on a former occasion. When suspended by his hands, his back again became straight and he made little or no complaint, nor was the expression of his face one of pain. Now, had his back been bent on account of genuine disability, and had it remained so, as he alleged, for eight months, it must have pained him when it was put in a straight position. When lowered to the ground from the trapeze, he made a great pretence of being in some mysterious way agonized as the result of the suspension; the first time he held his arms at a right angle until told to desist, and the second time he held them high above his head for some little while. When lowered to the ground he at once bent his back. After being told to put his feet close together, he was induced to screw his body right round, first to one side and then to the other, without complaint; and when pressure was exerted along the length of his back, no serious complaint was elicited. At the examination many months before he had been easily induced to lie flat on his back, and no doubt he remembered my explaining to the Court the conclusion I had drawn from this, for on this occasion I had difficulty in inducing him to do it, but ultimately succeeded, though he attempted to effect a compromise by keeping *his head* somewhat raised. It was also interesting to note that, having heard me describe the battery test at the arbitration proceedings, he now did not complain when the current was cut off. When he thought he was unobserved, he raised himself from the prone position on the floor to the vertical in a manner that was wholly incompatible with his suffering from any genuine trouble in his back, and I noticed that when the examination was completed he lifted his coat, from a peg placed 6 feet from the ground, with an alacrity which would have been impossible if there was any foundation for his alleged inability to straighten his back.

Ineffectual efforts were made to settle the case for a reasonable sum, and three months later I again examined him in the presence of the doctor retained by his union, who had given evidence in his favour at the arbitration proceedings, and was able to convince him that the workman was not suffering as alleged; he would not agree, however, that the man was fit for full work, but volunteered the statement that he was now fit for *some* work. I pointed out to the doctor that, assuming a tear in the muscles, it was preposterous to suggest that the remains of it could produce a disabling effect a year after the occurrence. He was much impressed when I demonstrated that F. A. could easily touch the ground on each side, first with the right and then with the left hand, showing the painless action of both erector spinæ. He alleged that the man had not been able to do so formerly, and admitted that he had much improved. F. A.

had, in fact, eight months before, and prior to the first arbitration proceedings, performed these movements in my presence.

I put to the man's union doctor the following questions: "If, whilst driving a motor-car, you had knocked down this man a year ago, causing him to sprain his back, and you were not insured, would you be satisfied to continue to pay him £1 a week after what you have seen him do to-day? Do you see any evidence of physical disease of any kind? Is there any prospect of his ever recovering if he continues to receive £1 a week in his present circumstances? Is it fair to the man himself to assist him to eat the bread of idleness?"

As the doctor persisted in stating the man was only fit for light work (the effect of which on the mind of a County Court Judge we both appreciated), I insisted that F. A. should enter a hospital for treatment. I hoped to be able to *prove* him a malingerer.

The doctor who acted for his union had always made much of the point that in his opinion F. A. could not straighten his back without pain, but whilst he was in hospital the house surgeon, in my presence, sat on F. A.'s bed, took him between his knees, put both his arms over his chest and straightened his back, and I noticed from his facial expression that the procedure gave no pain! A few days after his admission he insisted on leaving the hospital, and declined to state any reason for wishing to do so. He had entered the hospital in a bad spirit, for when reminded that he had not brought with him the very small amount of linen required, he answered in a sulky way that "he had nothing," and that "those who sent him there should supply it"—an attitude quite inconsistent with a genuine desire to get well. He reiterated his willingness "to do *light* work," but always took care to add that there was no light work in his occupation.

Three weeks later he was seen by a surgeon, who agreed with my view that there was nothing the matter with him, and that he should be made to return to his former work.

A month later, at the hearing of the application for review, the medical referee made the astute observation that F. A. was really using his abdominal muscles to perpetuate the original fraud with which he had deceived him and the Court a year before, and advised the Judge to terminate the award, which he did.

I happened to chat with a benevolent-looking gentleman who sat next me in Court whilst the hearing was proceeding, and suggested that from his appearance he must be a doctor, to which he readily assented, adding, "I am F. A.'s family doctor." It was somewhat significant that his own side had not called him, but had relied upon the evidence of the doctor retained by the man's union, who had only seen him on two occasions. A few weeks after the termination of the award I ascertained that F. A. was doing full work in the yard of a firm of timber merchants.

In old-standing cases, if a patient complains of pain when an attempt is made by the surgeon to extend the spine, the injury, if any injury there be, is in the flexors of the spine—

i.e., psoas, rectus abdominis, external oblique, internal oblique, transversalis, or the anterior common ligament.

F. B.—On one occasion a malingerer who had kept his back persistently flexed from the lumbar region for many months, when lying *on his face* on the examination couch, permitted the pillow to be gradually raised. The position not only straightened his back, but actually curved it in the opposite direction, without any complaint of pain either in the flexors, extensors, or in the spinal column itself.

The latissimus dorsi is the chief muscle used in giving a downward blow or thrust. When this muscle is injured, pain is produced on moving the arm or in drawing it backwards. Backward movement of the shoulder is also painful.

It is possible that a sudden strain may tear some of the slips of origin, from the vertebral column, of the trapezius or latissimus dorsi.

Mr. A. S. Morley has pointed out, in his paper on "Injuries to the Back in their Medico-Legal Aspect,"* that, when muscles other than those of the back are torn, the correct surgical treatment—that of fixing the limb in a position of relaxation of the muscle—is always followed. But these surgical principles are seldom, if ever, applied to torn muscles of the back. The usual treatment for a patient with a torn erector spinæ is to put him on his back with pillows under his head and shoulders. This, by flexing the back, puts the injured muscle on the stretch, leaves it in the worst possible position for repair, increases the tendency to hæmorrhage at the seat of rupture, delays absorption, and renders massage impossible. The prone position, with pillows under the shoulders and pelvis, is obviously the correct physiological position for injuries of the muscles of the back, and, as Mr. A. S. Morley points out, this position admits of the employment of massage *from the very beginning*, without undue disturbance of the patient; for it is as unjustifiable to keep an injured muscle of the back fixed without treatment as it obviously is to keep a sprained ankle or a fracture immobilized.

The following is an almost daily experience with those who see much of medico-legal work:

A working-man falls whilst at work, injures his back, or it

* 18th Internat. Cong. Med. Trans. (Section of Forensic Medicine).

may be he sprains it whilst lifting a weight. The pain at once compels him to keep his back in a stiffened position. He consults a doctor, who enjoins the most complete and absolute rest, and perhaps prescribes the recumbent position in bed. Now, it is obvious that during the first few days, when the exudation in the fibrous tissue is being poured out, rest is essential, but if massage and movement are not soon systematically and daily performed, the absorption of the exudation will not be encouraged. The longer the rest, the greater will be the subsequent pain and the difficulty in resolving it.

The difficulty, as already explained, is that movement and massage, even after the acute stage, at first, but only for a short time, increases the pain. Unless, therefore, the patient has great confidence in his medical adviser and the masseur, has some pluck and a really genuine desire to be cured, this method of treatment fails because it cannot be properly carried out. The principle involved is really well known, and is, indeed, carried out daily in the modern method of treatment of a sprain of the ankle-joint. Everyone now knows that, apart from the rest necessary during the first few days, the earlier natural movements are resorted to, the shorter will be the duration of the disabling effects. Yet one finds strong, healthy, able-bodied men, who have had a strain of the muscles of the back, keeping their backs rigid for weeks, months, and sometimes even for years, for no other reason than that the steps above indicated have not been taken. They could be rapidly cured by active, vigorous, and intelligent treatment.

Shufflebotham has for a long time advocated the employment of systematic exercises, and, where there is much wasting, electrical stimulation. Passive movements and early massage promote absorption of effused blood, relieve pain immediately, improve nutrition, and certainly effectively prevent adhesions. The patient after a little time should be encouraged to perform gradually increasing movements, and later the use of light dumb-bells, exercises such as touching the toes, extending the shoulders, etc., should be practised.

To keep a patient, who has injured one of his back muscles, in bed for a lengthened period in a semiflexed position, to apply porous or "poor man's" plasters, reminds one of Sidney Smith's reply to the little girl who was stroking a

tortoise's shell "because the tortoise liked it." "As well stroke the dome of St. Paul's," said he, "to please the Dean and Chapter."

It must never be forgotten, in dealing with pain in the back after an alleged accident, that, long after the physical phenomena have disappeared, the psychic effects of unintelligent treatment, misplaced sympathy, and sick-pay, often leave their effects of a perverted mental outlook and a morbid introspection, which can only be eradicated by isolation from sympathizing friends and the usual concomitants preparatory to legal proceedings. Treatment in a hospital is undoubtedly the best means of bringing this about.

Radiography of the Spinal Column.—There are very few back cases in which X-ray photography is not a valuable adjunct to the physical examination, because not only does it occasionally render certain the existence of a condition previously only suspected, but it frequently reveals a state of affairs which no amount of external examination could discover. For instance, a skiagram may reveal the presence of periosteal elevations where the muscular attachments have been torn from the bone. In connection with the use of X-ray photography, one must not lose sight of the fact that there are sometimes to be found connected with the bodies and transverse processes of the spinal vertebræ of perfectly healthy individuals a considerable number of unsuspected osteophytic outgrowths which cause no inconvenience or pain. I know of a medical man who boasts of a large number of these excrescences, which cause him no inconvenience of any sort, and which were only discovered when a radiograph was taken for the purpose of examining the kidneys for suspected stone. When such a condition is disclosed as the result of X-ray photography, there will be a great endeavour to make the most of it on the claimant's behalf; and the more extensive the excrescences appear to be, the more will be made of them. If the case comes into Court, the Judge or jury, not appreciating the true nature and significance of the condition disclosed by the radiograph, are liable to be misled into awarding heavy damages, unless the position is made abundantly clear to them. As the growth of these excrescences must necessarily be slow, the larger they are the less should be the difficulty

of proving that a recent accident had no part in their production.

The fifth lumbar vertebra is, from an X-ray point of view, a stumbling-block. It never gives a clear outline, on account of an obscure shadow which it causes on the plate. Some 20,000 radiograms of the vertebral region taken by McKendrick, the majority of which he took, not for the examination of the condition of the spine, but for the purposes of diagnosis in genito-urinary and other cases, showed that almost in every case the fifth lumbar vertebra presented the appearance of having been crushed, whereas, in his experience, it is relatively immune from injury.

Movable Kidney.—It is almost impossible that any exertion, however violent, could displace a normally fixed kidney. Judging from a considerable number of cases in which I have known this condition to be alleged as a result of traumatism, it may be stated with some assurance that clinically, if it is genuine, the condition must be accompanied by grave signs of injury.

Displacement of a kidney is attended by severe pain over the renal area, not infrequently by bruising, and hæmorrhage into the bladder, and, as a rule, a very considerable amount of shock.

It will be remembered that normally the kidney cannot be felt by palpation.

A floating kidney occupies a lower site than the normal when the patient is erect. Its presence may be detected by placing the patient on her back with the thighs semiflexed on the abdomen, and the abdominal muscles relaxed. The palm of one hand is placed against the loin between the lower ribs and the iliac crest, whilst the palm of the other is placed at right angles to the skin of the abdomen, immediately beneath the costal arch in front. The patient is then directed to relax the abdominal muscles, to take a long breath, and then to breathe out slowly. As the air leaves the chest, the free edge of the examining hand in front is pressed into the abdomen so as to meet, as near as may be, the examiner's other hand on the loin behind. If the kidney is displaced, it will be felt to move between the two hands during the act of expiration.

It is an interesting observation that a movable kidney can sometimes be made out only by a "surprise touch," and will often escape palpation if handled roughly.

Some men, and a great many women, have a displaced kidney without feeling anything wrong in relation thereto, and in a large number of cases it produces no symptoms. Not infrequently, however, the condition is accidentally brought to light in the course of a thorough examination after an accident. The discovery of pain in the renal area is followed by a careful examination; a displaced kidney is found, pain is admitted, there may be some external bruising, and the hasty and serious diagnosis is at once made that the patient is suffering from a traumatic displacement of the kidney.

If the patient is told that she has a floating kidney, a train of subjective symptoms is set in motion, and large damages are, of course, claimed. Such cases ought not to be considered fraudulent. The mistake is not that of the patient.

In the vast majority of cases no operation is necessary, and, indeed, it would do no good. It is only when the position of the kidney leads to a kinking of the ureter, with the danger of a consequent hydronephrosis, that operative interference is necessary.

Other Causes of Pain.—Certain affections of the kidney, liver, stomach, and intestines, internal growths, fissure-in-ano, hæmorrhoids, and other rectal diseases, and, in women, diseases of the generative organs, are made manifest by pain in the back; these should be kept in mind, and, if necessary, examined for.

It should not be forgotten that malignant disease of the vertebra is sometimes caused by obscure pain in the vertebral column. It occurs equally in both sexes, and at its initial stages is very difficult to diagnose. An X-ray photograph should always be taken in doubtful cases.

The late Sir James Goodhart on one occasion informed me that he was much impressed with the large number of cases of obscure, ill-defined, and undiagnosed complaints which he had found to be due to malignant disease of the rectum.

CHAPTER XI

PAIN IN THE BACK

PAIN in the back is the most common element in claims for compensation which are litigated in the Courts. The number of complaints to which pain in the back is added as a species of make-weight is surprising. A friend of mine was told by a workman that, prior to his visit for the purpose of being examined, he received the following sage advice from a "pal": " ' When yer git 'urt,' 'e says, ' say it's yer back; the doctors can't never get round yer back.' " However true this statement may have been formerly, the mere allegation of pain in the back is not such a bogie to some of us *now* as it was; but experience shows that the idea that doctors cannot " get round " the back still prevails with a large number of those who are prone to malingering.

Back cases appear to be uninteresting to everyone except those who suffer or who have to pay. The idea seems to be that little or no kudos is to be got out of them in either the indoor or outdoor hospital departments; hence they are usually relegated to the care of the junior, and therefore the less experienced, members of the hospital staff. As a matter of fact there is quite a fascinating interest in tracing an inadequately defined pain to its true source, or proving its non-existence.

The mechanism of the back is of such a nature that, when thoroughly appreciated, it enables a correct diagnosis to be made in the majority of cases; but this entails a careful study of the entire structure, so that the parts unaffected may be eliminated in order that the true seat of the trouble shall be determined.

The somewhat haphazard method, which has hitherto largely prevailed, of grouping all injuries of the back into the category

of "ricked" or "sprained" back, with no attempt at accurate or scientific diagnosis, has not unnaturally created an impression that when this is done it exhausts all the knowledge of the profession concerning injuries in this region. No other part of the body has been the subject of so much unskilled and random diagnosis, for the exact pathological condition present seldom seems to engage particular attention.

There is no doubt that "back cases" bristle with difficulties, and may be so complex as to lead to greatly divergent views, because the failure to observe one apparently unimportant factor may lead to an entirely wrong conclusion.

The following interesting case is related by Dr. Byrom Bramwell, and it exemplifies at once the difficulties connected with these cases, and how even honest and skilled surgeons may be misled:

E. Y.—A man, aged thirty, fell from the mast of a ship in January, 1902, and sustained a severe injury to the lower part of the back. He was awarded £1 a week as compensation. In April, 1904, the insurance company applied at the Liverpool County Court for the review and diminution of this weekly payment. It was stated that, unless the case were reviewed, this man, aged thirty-two, might go on drawing this compensation of £52 a year for the next forty years, and the sum of £2,000, which would thereby be involved, was very substantial compensation for an accident the compensation for which, had the man been killed outright, would have been only £300.

Professor Paul and Sir James Barr were called on behalf of the insurance company. They stated that, in their opinion, the man's bent condition and general crippled appearance were due to a mental delusion on his part, and not to any organic change.

Sir William Banks was called on behalf of the man, who appeared to be a perfect cripple, and could only walk with the assistance of crutches. Sir William Banks had no reason to think that his condition was due merely to a mental delusion on his part; he thought that he was suffering from a chronic inflammation of the bones and joints at the bottom part of the spine, and that they had become so fixed that they would not properly unbend. He was of opinion that, in all probability, the patient would never be again fit for the kind of work he had hitherto followed, but he might in time sufficiently recover to do some light work. He did not think the man was shamming. In July, 1910, the claim was settled for £600; £571 had been previously paid in compensation and costs.

The patient continued to go about on crutches until June 13, 1911. He was then cured "like the shot of a gun," to use his own words, by bathing in the holy well at the shrine of St. Winifrede. For eight years he had been hobbling about on crutches; when he got

out of the water he was able to walk back to the hospice, leaving his crutches in the crypt of the well.

He was seen by an inspector of the insurance company on August 12, 1911; he then looked the picture of health, was upright, was walking at a quick pace, and was able to walk several miles a day driving sheep.

Dr. Byrom Bramwell adds: "Now, if experts differ in this way, it is impossible to expect the ordinary general practitioner to come to a correct conclusion as to the nature of many of these most difficult cases."

It is hoped that a perusal of this and the following chapters will be helpful in this class of case.

For a successful diagnosis several things are essential. First: One or more careful physical examinations, bearing in mind the conditions which may arise from natural causes which are with difficulty distinguishable from those of traumatic origin; secondly, an appreciation of the psychology of pain; thirdly, a full history of the injury alleged; fourthly, a knowledge of the actions of the chief muscles of the back. So important is this last requirement that the matter is dealt with concisely, in its main aspects, in a subsequent chapter.

In dealing with back cases, we have, broadly speaking, to make up our minds on two points: the first, whether the pain is real, psychic, or assumed, and the second, whether, if present, it is due to disease or accident.

In the vast majority of cases alleged pain in the back is mental, not physical. The idea of a tender spot, or of pain, takes possession of the patient, and has the same effect and requires the same treatment as similar obsessions in regard to other parts of the anatomy. In the absence of X-ray evidence of injury or osteophytic outgrowths, tenderness in the region of the spine after an accident, which is unaccompanied by deterioration of health, is not confined to one spot, and is complained of upon repeated examinations, is likely to be psychic.

The injuries resulting from a fall or a blow on the back run a very definite course, and the symptoms and their duration correspond to those of injuries produced in other parts of the body by similar means; but when an injury to, say, the head, shoulder, or knee, is, when the back has not been injured, accompanied by backache, the pain is but the expression of

a mental state; it has no organic basis in the spine, but is merely *referred* to it.

The treatment for this latter condition is psycho-therapeutic, and this particular department of medicine is not only difficult from the point of view of the medical man, but is one which demands the active co-operation of the patient, a co-operation which many of us who deal with compensation cases find too often conspicuous by its absence.

The determination of how much of a painful condition of the back is due to the alleged injury, and how much, if any, to mental causes, is of the utmost importance. It is doubtful whether pain in any other part of the body is more frequently alleged to be the direct or indirect consequence of injury. Knowledge of the exact nature and position of the injury said to have been inflicted is of assistance in arriving at a conclusion on this point. The mere history of a blow in the back is not sufficient; the exact locality of the injury, the direction and force of the blow producing it, the position of the recipient, whether standing or sitting, and whether the back was flexed or straight at the time the injury was inflicted, are all important.

The patient should be asked to put himself in the position in which he was at the time of the accident, and the muscles which must have been involved should be studied.

Rheumatoid arthritis, osteo-arthritis, and spondylitis deformans, are coming to the front as conditions which are said to have their origin in traumatism. A careful study of the possibilities of deception in this particular region will well repay the student.

It frequently happens that a healthy working-man with commencing rheumatism of his spine gets such a knock or a blow as any member of a football team may sustain unnoticed during a match; but, remembering the Workmen's Compensation Act, the workman puts himself on the sick-list, keeps his back stiff, becomes introspective and self-centred, and then draws from clubs and insurance companies sick-pay which, in the aggregate, may amount to as much as, if not more than, the wages he earns whilst at work.

The experience of those who have examined many injuries due to accidents leaves little doubt that the method adopted by so many members of the working-classes, of maintaining

a persistent rigidity of an injured part, postpones, sometimes indefinitely, the restoration of function. In most cases some inconvenience, or it may be some degree of pain, is experienced at the initial stage of the endeavour to resume movement; this to the patient is, of course, indistinguishable from what may be serious trouble, and often he becomes obsessed with the *idea* of the disablement, refuses to bend the back or use the limb, a course of inaction which accentuates rather than cures what should be a comparatively slight disability. When an ordinary sprain occurs to an artisan, how often is the fixidity and rest of the affected part the first factor in causing an unnecessarily prolonged incapacity, and thereby much physical and mental suffering to the individual, and privation to those dependent on him.

A similar condition frequently arises without any accident occurring. If in middle life a man who feels his back beginning to get stiff gives up every form of exercise and all free movement, the back will in many cases become gradually more and more fixed, until movement without pain becomes impossible.

In the vast majority of cases, the nature of the injury is readily ascertained, especially when the examination is made at an early stage.

Fracture dislocation is a serious injury. The nature of the accident and the condition of the patient immediately after its happening are alone sufficient to prevent any likelihood of the condition being missed. Paraplegia would, of course, tell its own tale, and even the occurrence of girdle pains would be suggestive.

Fracture of a spinous or articular process, or one of the laminae, is not likely to be missed if the case is seen early. The difficulty is that those who, like myself, examine for insurance companies do not see these cases until long after the happening of the accident. These fractures, if recovery is to take place, are not long in uniting. When a patient gives a history of pain which has been constant over one spot, this, taken in conjunction with the nature of the accident, the subsequent history, and probably the presence of some amount of callus, lessens the difficulty of diagnosis.

It is well to remember that simple fractures of the vertebræ

are sometimes discovered by X-ray photographs when nothing has been complained of but pain and stiffness. In doubtful cases, therefore, an X-ray examination should always be made.

Torn Muscles.—In cases of accident, the most usual injury is a tearing of the fibres of some of the lumbo-sacral muscles, or a sprain of one of the numerous vertebral joints or of the sacro-lumbar joint. It is, however, ridiculous for anyone to allege, as I have known done, that a sudden wrench tore a muscle or produced a sprain in the back, the pain of which only manifested itself after an interval of some hours. Anyone who has torn a few fasciculi of one of his own muscles will have no sort of doubt about this. On two occasions patients who suddenly ruptured a few fasciculi of the gastrocnemius have told me that they were confident that someone had thrown a stone from a distance and suddenly struck them on the calf of the leg, and that they were wholly incapacitated then and there. If a rupture of a muscle is recent there are certain conditions which must inevitably accompany it: sudden pain, a gap at the seat of rupture (especially when the muscle is put on the stretch), a hæmatoma with consequent swelling, tenderness, and loss of function. The pain is likely to last, if at all severe, several weeks.

A torn muscle of the back produces a considerable amount of swelling and effusion. The injury may involve other structures, such as ligaments or nerves, and the patient suffers severely. At this stage no dispute as to the condition ever arises, for employers and insurance companies seldom suggest simulation at the acute stage of a disability following an accident, and as a rule it is only many months afterwards, when the condition may be termed more or less chronic, and when the difficulty is greater, that the medico-legal expert is called upon to make a diagnosis.

It should be borne in mind that a muscular tear or rupture is invariably single, and therefore *unilateral*.

A strain is merely a stretching of tissue beyond its physiological limit.

Notwithstanding the fact that the belly is the point at which there is the greatest tension when a muscle is brought into action, yet the mechanically weak spot is where muscular joins fibrous tissue,

The lumbar fascia has this in common with all muscles and ligaments—viz., that there is a point which can be definitely located where a tear or strain has taken place; that is, there is always a point of maximum tenderness or pain.

Fibrositis (Lumbago).—Lumbago is a popular name for pain in the muscles, joints, and fascial sheaths of the back. It is common, has often a very acute onset, and frequently shows itself first when an attempt is made to rise from a stooping position. We can therefore easily understand that even an honest man engaged in some hard manual toil, when suddenly affected with an acute pain in the back, readily assumes that it must be due to some effort he has just made. A dishonest man, with the Workmen's Compensation Act before his eyes, can without much difficulty remember a history of some effort, strain, or sudden slip, which will account for his pain.

Dr. T. R. Taylor has aptly remarked: "Lumbago is pain and stiffness in the back not due to an accident. A sprained back is an accident with pain and stiffness, and the distinction is subtle."

The distinguishing features of lumbago are that it is invariably bilateral, widespread, relieved by pressure, and mostly experienced when making certain movements; that it usually yields to treatment, rest in bed, salicylates, massage, and so forth; and that there is generally a history of the patient's having worked in a damp and unhealthy place. If the pain complained of is unilateral, with a maximum point of tenderness, it is absolute proof that there has been an injury.

The erector group of muscles and the lumbar fascia are involved in lumbago, and the stoop of a man with lumbago is characteristic. Any attempt to straighten his back is an exceedingly painful process, and the mere suggestion of it is resented; for the back is straightened by means of the erector spinæ and other muscles, which are in an acute stage of fibrositis.

The actual tissue inflamed in lumbago is the fibrous tissue surrounding the fusiform nerve-end organs which lie between the muscle fibres. This explains the severity of the pain and its close relation to movement.

Lumbago is, during the first few days, accompanied by a rise in temperature, but no clinical examination can, after that

period, distinguish between lumbago and injury, unless it is alleged to be unilateral and there is external evidence of bruising. Unfortunately, many of the cases of alleged pain in the back, where the question of compensation has arisen, are seen many weeks, or it may be months, after the accident, by those who are called upon to examine them at the instance of employers or insurance companies.

C. A., aged thirty-five, was sent to me for examination in respect of an alleged accident on duty, for which he had been on the sick-list twenty-eight days. He said that whilst at work he felt something "give way" in his back. Admittedly he had had no medical attendance during the past sixteen days. He reported himself unfit to visit me, and was examined at his own house. Later, although reported as fit to do so, he again refused to visit me when ordered, and declined to furnish a medical certificate from his doctor unless his employer paid for it. Finally, he was brought to my house in a cab.

Examination.—He was a healthy, powerful man, who showed no signs of disease. He complained of pain when touched anywhere. There was on his back the remains of a plaster. On the pretext of removing this, his back was vigorously scrubbed, and he made no complaint of tenderness. Later, although he said he could not stoop, I induced him to touch his toes on two occasions. Whilst his attention was taken up with the question as to whether the electric current was or was not flowing, he made no complaint of firm pressure with the metal electrodes along the spine.

He was obviously deliberately malingering, and I certified him as fit to resume duty at once. He returned to work a few days later, did light duty for two days, and then stopped. After a few days he resumed work at window-cleaning, but continued to attend the electrical department of a hospital. He was submitted to me for re-examination. I arranged for the presence at the consultation of the surgeon in charge of the electrical department of the hospital he was attending. The man now complained of pain in his loins. As the result of careful physical examination, we satisfied ourselves that there was nothing the matter with him. When told that he would therefore have to go back to full duty, he at once agreed, saying he was "happy to do so." He evidently felt the game was up. This employee had deliberately malingered; his defiance of authority, and his readiness to take full duty when detected, proved him to be a most undesirable servant. He was therefore dismissed.

Result.—He commenced arbitration proceedings against his employers, and the case was heard at the County Court four and a half months later, resulting in a decision in favour of the employers.

A few weeks subsequently I was examining one of this man's fellow-workmen, who volunteered the following interesting piece of information: that C. A. informed him, *three days prior to the alleged straining of his back*, that he was suffering from lumbago!

In the fibrositis (lumbago) which follows sprain, it is always extremely painful for the patient to rise from the stooping position by his own exertion; whilst if the movement is performed passively, through the intervention of another, it is much less painful.

Fibrositis generally is dealt with in detail in Chapter XIII.

Spondylitis Deformans in Elderly Manual Workers.—Spondylitis deformans may, and apparently often does, exist for many years without any symptoms other than the moderate amount of backache which is so often attributable merely to work. This condition is, of course, liable to exacerbation from even a slight accident, or it may be from prolonged exposure alone.

Rigidity of the spine occurs mostly in men who are nearly always employed in manual labour. It has been variously attributed to rheumatism, gonorrhœa, syphilis, hereditary tendencies, and to injury; but a very large number of cases are found in which the disease cannot be traced to any of these causes, and where hard laborious work itself seems to determine the onset. When the work involves keeping the back bent for considerable periods on end, rigidity is very prone to come on, as in gardeners and agricultural labourers. We are all familiar with the bent spine and characteristic gait of the elderly workman who is the subject of the deforming effects of what, for want of a better name, has been called "rheumatism."

Rarely indeed do we have to deal with a condition of this sort as the result of accident. The symptoms of spondylitis deformans have been set out in some detail for the purpose of indicating the type of the disease which in a milder degree is often met with on thorough examination of any patient, be he the subject of an accident or not. The occupation, for instance, of a carman predisposes to stiffness of the spine, possibly by the inevitable exposure, or it may be by the incessant jolting of the springless vans that are driven. There is no doubt that in anyone whose back is becoming stiff a jar, fall, or blow is liable to produce a certain amount of temporary disability, which is commonly attributed to lumbago, sciatica, etc. Pathologically, the condition seems to consist of osteophytic outgrowths from the free margins of the vertebræ and from the

intervertebral articulations. If these bony outgrowths are extensive, they sometimes meet, producing ankylosis of contiguous vertebræ.

There may be, in addition, ossification of the ligamenta subflava, and, indeed, of any of the ligaments of the spinal column. Ossification not infrequently penetrates the capsules of the intervertebral joints, and of the joints between the ribs and the vertebræ. These ossifications are well shown by X-rays, which in these cases are invaluable. There is no mistaking the symptoms: the spine is rigid either as a whole or in part, and may be straight, as in the well-known poker-back, or bent (as is sometimes seen) to a painful curve. The disease, although usually confined to the spine, sometimes extends to the hips and shoulders, and abnormal sensations, such as numbness, pins-and-needles, formication, etc., are no doubt due to pressure on the nerves as they leave the foramina.

The following case exemplifies the extreme difficulty there often is in dealing with these cases:

C. E. stated that, as the result of an accident three years and eight months previously, he had been unable to work at his occupation of a scaffolder's labourer.

This man had been subjected to many examinations by various medical men, and was said to be suffering from traumatic neurasthenia.

I was asked to examine him in conjunction with a surgeon of eminence.

At the time of our examination, he complained of pain between his shoulders and on each side of his neck; of stiffness in his neck and the upper part of the back; of giddiness on walking or sitting still; that his head would swim when he lay down; that he felt fidgety and irritable; that he was "nervous as a kitten," and constantly apprehensive of something behind him. Later in the course of the interview, and obviously as an afterthought, he added that he vomited every morning, that his appetite was bad, that he had sleepless nights, and that he passed "matter" from his bowels.

He gave his age as forty-seven, but looked older, and stated he had a large family, ranging in age from twenty-six to three and a half years.

Examination.—He was well nourished, his eye was bright, his skin clear, and circulation good. He held his back stiffly. In the course of the examination he allowed considerable movement of the lumbar spine; but when picking up his boots at the close of the examination, he did so by kneeling on the ground and going through contortions which were quite unnecessary, considering his own statements with regard to his back. The stiffness in the cervical region was, however, a definite symptom, and an X-ray photograph of that region of the spine, taken at my instigation, showed definite ankylosis between

the fourth and fifth cervical vertebræ. This condition is generally associated with similar changes in other joints. In this case there was a certain amount of osteo-arthritis, a similar condition, in one of the claimant's shoulders. The relationship of this condition to injury is always an extremely difficult one to determine; it often occurs in patients in whom there is no suggestion of traumatism, but occasionally it appears to follow a definite injury. In this particular instance it appeared to have reached its highest development in an area of the spine (cervical) remote from the part injured, which, according to the history of the accident, was the lower part of the spine.

The claimant's account of himself and his condition was full of inconsistencies, and we believed his account of many of his symptoms to be distinctly exaggerated. Whether he suffered from traumatic neurasthenia, as alleged, immediately after the accident, three years and eight months previously, it was difficult to say, having regard to the lapse of time; but it appeared extremely improbable that any patient, after suffering so long from severe traumatic neurasthenia, should look so well as this man did at his examination.

It appeared to be a case where spondylitis deformans had gradually developed during a long period of rest, and commenced about the same time as the injury occurred. There was no real evidence to connect the condition of the back with the injury, beyond the fact that the one was discovered after the other; but it would be almost impossible to say that the injury had no influence whatever upon the condition of the back. It would also be impossible to say whether, had he resumed work when he was first asked to undertake light work, the oncoming of the present condition of the back might not have been very considerably delayed.

He was not now capable of doing a good day's work at his former occupation, partly on account of his back, and also because of the irregular and loafing habits acquired during the last three years. He probably realized this, and, in order to retain his compensation, exaggerated such symptoms as did exist, and introduced others for which no physical foundation could be discovered.

I therefore hesitated to advise strong measures, not because I thought him wholly incapacitated, but because I feared we might not be successful in Court.

A few weeks later, I was informed that this man had been caught stealing from *his master* (who had been paying him compensation for nearly four years), and taking away *on the back alleged to be injured* a bag of lead weighing some 49 pounds. He was convicted, and sentenced to six weeks' imprisonment. I visited him in prison, and had a consultation with the senior physician there. The doctor stated that he had not chosen the particular work the prisoner was engaged in on account of any alleged disability connected with his back!

Here was a man who for just on four years had received half-wages from his employer; who declared himself unfit for even light work; who had recently been caught carrying nearly 50 pounds of lead on a back alleged to be injured; who, on being sent to prison, performed

the ordinary prison tasks, which included cleaning his cell, without grumbling or protest.

Result.—On his leaving prison, the case was set down for arbitration, and was settled for a small sum.

Organic Nerve Disease following Injury to Spine.—Sometimes organic nerve disease is alleged as the result of a blow on the sacrum or coccyx, and I have often heard medical men, when giving evidence in Court on behalf of working-men said to be suffering from jars, bruises, or trifling injuries in the lumbar or sacral region, state with amazing confidence that cerebro-spinal disease has been set up as the result of the accident. Now, the cord ends at the lower border of the first lumbar vertebra, and it is impossible to have any pyramidal trouble as the direct result of a lesion of the sacrum. The only possible way in which anything serious can be brought about would be an injury to the cauda equina, and, following this, an inflammatory lesion travelling upwards towards the cord; but it must be remembered that before a condition of this sort could be brought about one must of necessity have a considerable amount of meningitis and neuritis, with consequent wasting of the muscles.

The above possibility, even in the absence of any symptoms, is by no means too far-fetched for suggestion in the witness-box with a certain class of witnesses, and it is well, therefore, to remember that in a case of this sort the presence or absence of degeneration of muscular tissues is of very great moment.

It cannot be denied that grave organic disease may follow a jar to the spinal cord, but it is Ferrier's experience that the pre-existence of syphilis in all such cases is a *sine qua non*. This authority states that in his experience locomotor ataxia, disseminated sclerosis, paralysis agitans, or progressive muscular atrophy, may follow a jar to the cord, provided a syphilitic taint is present.

There can be little doubt that the inconvenience from a slight jar to the spinal column will pass off under proper treatment—*i.e.*, rest. Most cases of this sort can be cut short within a few days, or at most a few weeks, if the medical man in charge has the courage to speak frankly, and the patient has sufficient incentive to return to work before he becomes obsessed with the idea of a seriously injured back.

What in the days of Erichsen used to be called "railway spine" or "concussion of the spine" (by which was meant concussion of the spinal cord), and was supposed to be based on organic changes in the spinal cord, is now known as "hysterical spine," in which there is alleged hypersensitiveness over various areas, generally the sacro-lumbar region. It is, in truth, merely a psychical condition, which is particularly intractable to treatment. There can be no doubt that in former days railway companies were mulcted in large sums, and that introspection and gross exaggeration brought heavy damages in their train. Modern methods of psycho-therapeutics would have led to different results.

In the ordinary so-called "railway spine" there is no proof that the spinal cord has been jarred; and the analogy between concussion of the brain and alleged concussion of the spinal cord is far too readily accepted. The brain is a soft organ in a hard box which it fully fills; it can therefore be injured either by direct transmission of a jar through the bone, or by *contrecoup* against the side of the skull opposite to that which was struck. The anatomical conditions of the spinal cord are, however, entirely different. The cord does not nearly fill the spinal canal, but is surrounded by a large quantity of cerebro-spinal fluid, and is suspended in the fluid by lateral ligaments at intervals throughout its whole length. The cord is thus particularly well protected.

Frequency of micturition is very often complained of when pain in the back is alleged, but this alone is of little significance. Difficulty, incontinence, or retention occur often in association with definite disease of the nervous system, but when so associated the obvious results of injuries can easily be recognized. Yet time after time robust, healthy men complain of either frequency or incontinence of urine, thinking in their ignorance that it might fairly be attributable to some alleged disease of the spine.

Duty of Workman to co-operate in Treatment.—If a working-man finds his back stiff, and he believes that it is so as the result of an accident whilst at work, he will as a rule systematically avoid bending it, if by any chance it hurts him to do so. I hold that a workman ought to understand that it is his duty to himself to put up with some slight incon-

venience, and return to work for the sake of maintaining his efficiency.

It is probable that at this stage his disinclination to submit to curative movement has no relationship to the question of malingering. It is difficult for a half-educated man to understand that even painful exercises may be remedial. Moreover, it must be remembered that he probably knows of a certain number of cases in which fellow-workmen have met with serious back injuries, and not unnaturally he is apprehensive.

Those familiar with actions for damages are frequently confronted with cases of which the following is a hypothetical example :

The recipient has a compound fracture of the tibia and fibula, and, after say three months, fairly good union has been obtained. By means of a couple of crutches, he moves himself with much care and deliberation. The ankle-joint has become stiff. So-called massage is imperfectly performed by an unskilled attendant or by a relative. Time passes, and perhaps about the seventh or eighth month the employer becomes impatient, and sends his medical man to examine and report on the claimant. The suggestion is then made that he ought to be fit for work in a few weeks. The bare audacity of such an unsympathetic attitude is bitterly resented, and further medical evidence is sought to controvert, in Court if necessary, the evidence of the employer's doctor. Some stiffness or rigidity of the back is discovered by the plaintiff's doctor. The back is X-rayed, and a few osteophytic outgrowths are discovered in the neighbourhood of the sacral or lumbar region. Hey presto ! From that day the case takes on a totally different aspect. The statement of claim is amended to include injury to the spine. Not unnaturally, under the influence of suggestion, the back becomes stiffer, and the crutches which had been discarded before the employer's doctor saw the claimant are unearthed and again brought into use. At the trial an X-ray photograph is produced. No X-ray expert is called, who would, if asked, inform the Court that these osteophytic outgrowths are not indicative of any disease due to traumatism, but are frequently met with when X-ray photographs are being taken for other purposes, such as the examination of the kidney. The Judge and jury see the osteophytes. The plaintiff is asked if he ever felt anything the matter with his back before the accident. The jury cannot get away from the idea of the crutches, the pitiful tale and counsel's eloquence, and heavy damages follow. If our legal friends and sympathetic jurymen knew more of the sticks and elaborate dressings that are sometimes left behind in medical consulting-rooms, they would be less sympathetic with doubtful cases. The law is that the defendant should have the benefit of any doubt, but what the defendant objects to is that the plaintiff so often gets the benefit even when there is not any reasonable doubt.

CHAPTER XII

LIGAMENTS AND MUSCLES OF THE BACK

It is probable that many medical examiners have forgotten the details of the anatomy of the muscles of the back. These, apart from their importance when considering alleged sprains and injuries to the back, are uninteresting, and as set out in textbooks of anatomy are dreary and difficult to remember. Yet, if we are correctly to diagnose the origin of alleged pain in this area, some intelligent understanding of how the back muscles act is essential, especially when, as too often is the case, we have to deal with pain which is either psychic or assumed. In medico-legal cases, what I sometimes call "County Court pathology" is often advanced. The favourite refuge of the destitute of diagnosis in spinal affections is the intervertebral ligaments, and the "running down" solicitor's doctor oftentimes suggests that one of these ligaments is strained; he knows that they can neither be seen nor handled, and presumes that what he prides himself is a highly scientific diagnosis cannot be controverted.

In these pages I purpose confining myself solely to the mechanical bearing which the flexors and extensors of the spine have upon the question of alleged disability. The reader is referred to Chapter X., on the Examination of the Back, for the methods which it is suggested should be adopted for the detection of simulation.

In the following description (which is intended solely to assist those who desire to know what group of muscles or ligaments can or can not be affected when pain is alleged on certain movements) only the broad lines of origin, insertion, and action, of the ligaments and muscles of the back are set out; all detail is intentionally omitted, as also are many of the smaller groups of muscles, which have their use, but which

are not important from the point of view of functional pain or the injuries or disabilities in the class of case this work deals with.

LIGAMENTS AND LUMBAR FASCIA.

The Ligaments of the Vertebæ.—The bodies of the vertebæ are bound together by the powerful intervertebral cartilaginous discs.

The Anterior Common Ligament runs in front of the bodies. It is a broad ligamentous band, having fibres attached to each vertebra, from the axis or second cervical vertebra to the sacrum.

The Posterior Common Ligament runs at the back of the bodies of the vertebæ, and is therefore situated *within* the spinal canal. It is not so strong as the front ligament.

Both of these are ruptured in fracture dislocation of the spine.

The Articular Processes at their articular surface present a capsule lined by synovial membrane.

Action.—The movement of these joints is a gliding one. When the spine is rotated on its long axis, or bent to either side, these joints are brought into play. The joints may be the subject of synovitis, in which case movement produces pain.

The Spinous Processes, the Laminæ, and the Transverse Processes, are all bound together by ligamentous bands.

The Supraspinous Ligament connects the tips of all the spinous processes from the sacrum to the seventh cervical vertebra (which is easily recognized, for it is the most prominent); it is one long, continuous, strong band. From the seventh cervical vertebra to the occiput it is continued as a very thick and strong band known as the **ligamentum nuchæ**.

Action.—This strong ligament, running between the spinous processes, is put greatly on the stretch when the body is bent forwards.

The Ligamenta Subflava run between the laminæ of the vertebæ. They are composed of a large proportion of yellow elastic fibres.

Action.—These are put on the stretch when the body is bent forward, and, in virtue of their elasticity, materially assist the back muscles in restoring the body to the erect attitude.

The Lumbar Fascia consists of three layers, the *posterior* being attached to the tips of the spines of the lumbar vertebræ, the *middle* layer to the tips of the transverse processes, and the *anterior* to the front aspect of the roots of the transverse processes of the lumbar vertebræ.

Between the posterior and middle layers lies the erector spinæ, whilst the quadratus lumborum is situated between the middle and anterior layers.

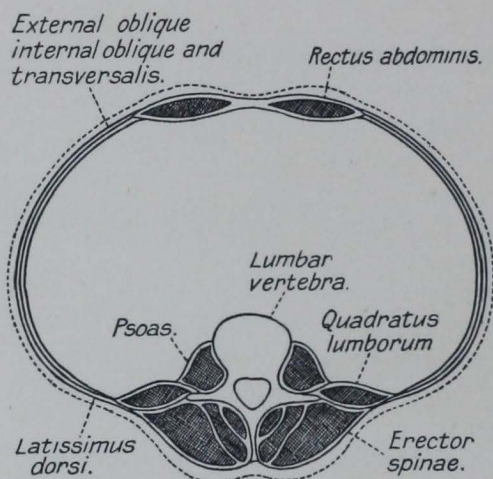


FIG. 12.—LUMBAR FASCIA.

Attachments.—Below, the lumbar fascia is attached to the iliac crest, and above to the ribs. Laterally the three lamellæ meet together to form the aponeurosis of origin of the transversalis and internal oblique muscles (see Fig. 12).

Action.—The lumbar fascia, which is the tendon of the internal oblique and transversalis, is clearly intended to act as a steadying influence on the muscles of the back, and braces them up as they sweep across the gap between the iliac crests and the ribs. It might thus be described as constituting a “straight-jacket” for the lumbar region.

MUSCLES.

The usual anatomical method of describing the muscles of the back is to describe them in layers from the skin downwards, and I purpose following this method, but varying the usual description by avoiding the minute details of the origin and insertion, and mentioning only those details which are of practical importance when dealing with the action of the muscles in question. No attempt is made at giving a complete list of all the muscles; the smaller and less important, many of which consist merely of a few fasciculi, are omitted. The omission does not detract from the value of this chapter, inasmuch as the movements they help to bring about are almost wholly performed by the large muscles dealt with.

First Layer.

These are two in number—viz., trapezius, latissimus dorsi.

Trapezius.

Origin.—Occipital bone; ligamentum nuchæ; spinous processes of the seventh cervical vertebra; spinous processes of all the dorsal vertebræ.

Insertion.—Posterior border of outer third of clavicle; inner edge of acromium; spine of scapula along the upper margin.

Action.—When the whole muscle acts, the shoulder is drawn backwards and upwards. The upper, middle, and lower fibres pull the scapula up, back, or down, respectively. After the upper limb is raised to the horizontal level by the deltoid, etc., the trapezius assists with other muscles in raising the limb above the horizontal.

Latissimus Dorsi.

Origin.—The spines of the lower six dorsal vertebræ; all the lumbar vertebræ; the back of the iliac crest of the sacrum.

The origin of this muscle in the lumbar and sacral regions is intimately associated with the very powerful aponeurosis which constitutes the posterior lamella of the lumbar aponeurosis.

Insertion.—Bicipital groove of the humerus.

Action.—It draws the arm backwards, at the same time rotating it inwards.

Both the trapezius and the latissimus dorsi utilize the spinal column merely as a fixed point of origin from which to produce their effective actions on the humerus and shoulder girdle. Their duties are mainly concerned with bracing backwards the shoulders.

Second Layer.

These are three in number—viz., levator anguli scapulæ, rhomboideus minor and major.

Levator Anguli Scapulæ.

Origin.—The upper four cervical transverse processes.

Insertion.—Upper fourth of the vertebral border of the scapula.

Action.—Elevates the scapula.

The Rhomboids.

Origin.—Ligamentum nuchæ and the seventh cervical and the upper four or five dorsal spinous processes.

Insertion.—Lower three-fourths of the vertebral border of the scapula.

Action.—These muscles elevate and draw the scapula inwards.

Third Layer.

The third layer is composed of the large **Erector Spinæ** group of muscles (1 in Fig. 13). This muscle divides in the upper lumbar region into three columns: The outer, or ilio-costalis (2 in Fig. 13); the middle, or longissimus dorsi (3 in Fig. 13); the inner, or spinalis dorsi (4 in Fig. 13).

Origin of All the Three Columns.—Lumbar vertebræ; back of sacrum; posterior third of the iliac crest.

Insertion of the Three Columns.—*First Column* (outer column, or ilio-costalis): The lower six ribs at their angles (2 in Fig. 13); the upper six ribs (accessorius) (5 in Fig. 13); transverse processes of the cervical vertebræ (cervicalis ascendens) (6 in Fig. 13).

Second Column (middle column, or longissimus dorsi): Partly into the ribs and partly into the transverse processes of the dorsal vertebræ (3 in Fig. 13); into the cervical transverse

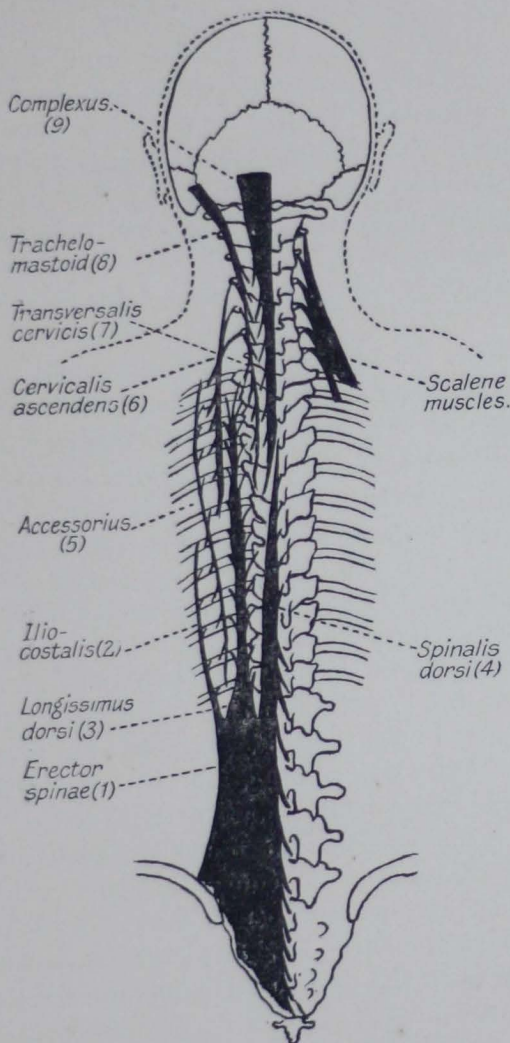


FIG. 13.—MUSCLES OF THE BACK.

processes (transversalis cervicis) (7 in Fig. 13); into the mastoid processes (trachelo-mastoid) (8 in Fig. 13); into the occipital bone (complexus) (9 in Fig. 13).

Third Column (inner column, or spinalis dorsi): Inserted into the spinous processes of the dorsal vertebræ (4 in Fig. 13).

The erector spinæ, which is the largest and most powerful muscle of the back, does nearly the whole work of weight-lifting; the others help. The surface form of the back is largely influenced by the erector spinæ and its continuations upwards. Its rounded vertical eminence on each side of the spinal column in the loins determines the depth of the spinal furrow. Above the muscle is gradually lost in a flattened plane, and below it tapers to a point, and becomes lost as it reaches the sacrum.

Action.—All three columns of the erector spinæ straighten the back.

This muscle or the lumbar fascia is sometimes torn when a heavy weight is being lifted, an action which throws a great strain on these muscles which extend the spine.

All three divisions of the erector spinæ, besides having a powerful effect in straightening the back, also, when acting *singly*, bend the body to the same side. It is important to remember that, when the body is being moved either to the right or to the left, the corresponding erector muscle of that side is performing the action. But it must not be forgotten that the opposing muscle is being tightly stretched; for instance, in an injury to the erector spinæ of the *left* side, the act of bending the body to the right side may be even more painful than bending to the left, although in the latter position the damaged muscle would be in a state of contraction.

The erector spinæ may be thrown unconsciously into action, producing a prominence on one side of the spine. This readily disappears when the patient bends forward. A unilateral prominence may be produced by slight lateral curvature, which also disappears when the patient folds his arms over his chest and bends forwards.

The spinalis dorsi, or innermost branch, has a special action in extending the spine in the thoracic region; whilst the prolongations of the longissimus dorsi up to the skull help to extend the head.

Fourth Layer.

These are two in number—viz., semispinalis dorsi (1 in Fig. 14), semispinalis colli (2 in Fig. 14).

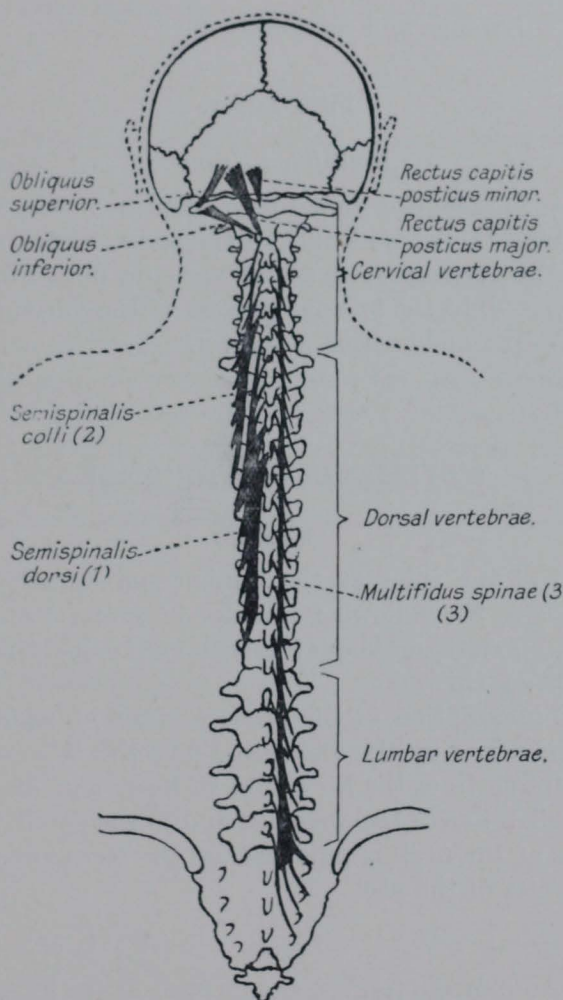


FIG. 14.—MUSCLES OF THE BACK.

Semispinalis Dorsi.

Origin.—From the lower thoracic transverse processes.

Insertion.—Into the upper thoracic spinous processes.

Action.—Extends and rotates the upper part of the spine.

Semispinalis Colli.

Origin.—From the upper thoracic transverse processes.

Insertion.—Into the spinous processes of the cervical vertebræ.

Action.—Extends and rotates the neck.

Fifth Layer.*Multifidus Spinæ.*

Origin.—This layer consists of a number of muscular slips which extend the whole length of the spine. Each slip arises from the transverse process of one vertebra (3 in Fig. 14).

Insertion.—Into the spinous process of the vertebræ above.

Action.—The main action is rotatory.

MOVEMENTS OF THE SPINE.**Flexion.**

Flexion of the spine at the lumbar and dorsal regions is performed by the following muscles in front: Psoas; rectus abdominis; external oblique; internal oblique; transversalis (to a slight extent).

With the exception of the psoas (details of which follow) the back is flexed by the abdominal muscles; these, as is well known, stretch from the lower ribs in front and at the sides to the median line of the abdomen and to the pelvis.

Flexion at the neck is produced by the sterno-mastoid and other muscles of the neck.

Psoas.

Origin.—From the transverse processes of the intervertebral discs, and the fibrous arches which extend from the upper to the lower margins of the bodies of the lumbar vertebræ.

Insertion.—The small trochanter of the femur.

Action.—Flexes the thigh on the trunk, and when the thigh is fixed flexes the trunk on the thigh.

This muscle is not a weight-lifter. Its action in flexing the

spine is supplemented by the rectus and other strong abdominal muscles attached in front to the lower ribs above, and the front part of the pelvis beneath.

The muscles which flex the spine also assist in raising the trunk when the body is in the recumbent posture.

Extension.

The extensors of the spine are—Erector spinæ; semispinales; multifidus spinæ.

If rupture or injury of these muscles takes place, it is generally when heavy weights are being lifted.

Any voluntary attempt to use these muscles when injured, as in the act of straightening the back, produces immediate and severe pain.

Flexion and extension of the spine are greatest between the third and fifth lumbar vertebræ. Above the third lumbar, movement is much diminished, and reaches its minimum in the middle and upper back. There is very little movement in the dorsal region of the spine.

Lateral Movement.

The muscles which bend spine to the same side are—Erector spinæ; semispinales; multifidus spinæ; psoas; quadratus lumborum; external oblique; internal oblique.

There are no special muscles which produce lateral movement.

Rotation.

The muscles which rotate the spine are—Semispinales; multifidus spinæ.

Rotation between individual vertebræ is slight, but when all vertebræ are rotated the total movement is considerable. Rotation is as a whole slight in the cervical region, freer in the upper part of the dorsal region, and wellnigh absent in the lower lumbar.

CHAPTER XIII

RHEUMATISM AND FIBROSITIS, AND THEIR RELATIONSHIP TO ACCIDENT

THE persistence of pain in muscles and in the neighbourhood of joints, long after the happening of an accident, often makes prognosis difficult, and a chapter on the modern views of what is called "rheumatism" is not out of place even in a work of this nature. I make no pretence of originality, but propose to state succinctly the opinions of those who for years have made a special study of the subject.

I am indebted to the writings of Drs. Stockman and Luff for all the pathology and many of the views expressed.

It will be useful to consider the true nature of that multiform group of symptoms known as rheumatism, chronic rheumatism, and so forth.

Rheumatism is often spoken of as "chronic." True rheumatic fever runs a definite course, and never becomes chronic. Certainly, it has such sequelæ as a leaking valve of the heart, or chronic pain in the fascia or the aponeurosis of a limb, generally in the neighbourhood of a joint, but acute rheumatism does not become chronic. What the acute rheumatic fever has left is a thickening of the white fibrous tissue either of the valves or other structures.

When a joint is said to be rheumatic, it is not the cartilage or the bone which is affected with rheumatism, but the fascia, and more often the fibrous insertions and aponeuroses, of surrounding muscles.

The essential pathology of this variety of rheumatism consists in an inflammatory overgrowth of the white fibrous tissue which enters so largely into the composition of muscle. This overgrowth or hyperplasia is probably brought about by the action of toxins conveyed by the blood, and multiplication

of the white fibrous tissue cells is produced, which is followed by serous exudation. Hence it is that tendons and sheaths of muscles, and the fibrous and ligamentous structures of the joints, become affected, and produce what is so often called "chronic rheumatism." These exudations, if fairly large, can be felt, more especially at such places as over the sternum or tibia, or other thinly covered bones, and are tender and painful on pressure.

They were first described, in 1816, by Dr. William Balfour, who recognized their importance in the treatment of rheumatism, and directed his whole treatment towards getting rid of them.

If *early* treatment is resorted to, they may be made to resolve readily enough; but the older and more fibrous they become, the greater the difficulty in treatment, and the less likelihood of cure.

The actual form of these hardened swellings, or nodules, as they are called, varies; the most common form is a definite, circumscribed, hardened spot the size of a split pea or a small shot, but they may be as large as an almond, or even half the size of a walnut. Often they are rounded or flattened, and may sometimes be felt like a beaded chain along the fibrous edge of a muscle or aponeurosis.

In the lumbar region, or in the fascia lata, large portions of subcutaneous fibrous tissue or of an aponeurosis may become uniformly thickened, and form a more or less prominent induration at certain parts. Sometimes these thickenings are deep, sometimes superficial. Occasionally those on the surface pucker the skin. When pressed upon they are always tender, and if vigorously rubbed they swell and become temporarily more painful.

When the white fibrous tissue becomes inflamed and proliferates, the condition is known as "fibrositis." As a result of the strain of a tendon or ligament, a local fibrositis is often brought about, which may persist for weeks. For instance, the fibrous tissue of the muscles of the arms and back are sometimes the subject of a local fibrositis, the result of a sudden strain whilst playing tennis or golf. A stiff neck and lumbago are milder forms of the same condition.

Lumbago is, in fact, a very typical form of fibrositis, the

milder type being confined to the fibrous elements in the lumbar muscles. A severe type, however, is that which starts as a localized affection of the insertions of the great erector muscles of the back at their fibrous attachments to the sacrum and neighbourhood of the sacro-iliac joints. This, as is well known, sometimes even finds its way to the sheath of the great sciatic nerve, producing the sciatica which so often follows lumbago.

In conducting the search for these nodules, it is necessary to smear the skin with oil or vaseline, and to see that all muscles are relaxed. If the thumb or tips of the fingers are then passed over the skin with firm but gentle pressure, the nodules or indurations can sometimes be readily felt; but they are not always easy to locate, even on deep pressure, which is often required. The most frequent sites are the lumbar aponeurosis, the fascia lata, and tendinous expansions of the thigh muscles, the trapezius muscle just above the supraspinous region, and the soles of the feet.

Chronic inflammation or fibrositis of the connective tissue of bursæ is common, and is sometimes found in the subacromial bursa. This condition is described on p. 301, and explains a painful condition of the shoulder which is often mistaken for a more serious complaint.

Muscular Rheumatism.—What is popularly known as “muscular rheumatism” is fibrositis and it matters not whether it is found in the muscles, or whether it shows itself as a stiff neck, a stiff back, or a painful side involving the intercostal muscles, the cause is always the same.

Luff points out that when the abdominal muscles are affected by nodular fibrositis the pain in the muscles may be either continuous or of a severe paroxysmal type, and he states that many such cases have been mistaken for appendicitis, renal or biliary colic, abdominal adhesions, gastric ulcer, etc. It is his belief that this is the explanation of the negative results of many laparotomies that have been performed.

Arthritis Sicca.—One of the commonest mistakes made in a medico-legal examination is to say that a patient is suffering from “rheumatoid arthritis” of the knee-joints, if crepitus on movement, and pain and tenderness on use, happen to be present. This condition of crepitus during movement of the

knee-joints is sometimes even heard as a patient walks. A medical friend tells me that he can *hear* his wife going up and down stairs, although she is apparently in perfect health! Anyone who has conducted many medico-legal examinations, and who, as a matter of routine, places his hand over the patellæ while the knee-joints are moved, will have noticed the number of times crepitus is elicited where no complaint of any kind referable to the joint has been made by the patient. The crepitation is due to the folds of a congested, flabby synovial membrane rubbing upon itself. It is a local condition, and very common in people over forty years of age, is frequently present in a marked degree without pain, inconvenience, or disability, and is known as "arthritis sicca." In advanced cases the capsule and ligaments of the joint may become somewhat relaxed, and small hernia-like projections of the synovial fringe may occasionally produce temporary locking of the joint when it is moved. Unfortunately, this condition is often mistaken for rheumatoid arthritis; but it differs from that disease in that there is no erosion of cartilage, no eburnation of the ends of the bones, and consequently no *bony* grating.

Dr. A. E. Garrod some time ago suggested as a means of diagnosis that the joint should be auscultated during movement, when the crackle or crepitus above described can be distinguished from the serunch or grating sound of rheumatoid arthritis.

Weakness of the back and symptoms of what is sometimes called "spinal irritation" are often due to nothing more serious than these fibrous indurations. I believe that the persistence of fibrositis in this region is a common cause of the refusal to work sustained for long periods—sometimes extending to years—by working-men who have had accidents.

Many women who are considered hopeless neurasthenics or martyrs to neuralgia, and who on account of continuous aches and pains gradually develop ill-health, have these fibrous thickenings to thank for their condition.

The condition is familiar, and, indeed, is often seen in an ordinary sprain or rupture of a muscle, where the fibrous hyperplasia gives rise to what are called "rheumatic" symptoms, which vary from time to time and under different con-

ditions, such as cold, damp, meteorological changes, muscular exertion, or even an acute attack of indigestion. The swellings probably exert pressure on the filaments of the sensory nerves, hence the pain. Hard nodules, if they involve a nerve, sometimes cause aching and shooting pain over a wide area.

It has been suggested that the reason why meteorological changes increase pain is due to variations in barometric pressure affecting the lymph pressure in the body, and so increasing or lessening the tension of the new white fibrous tissue.

A local injury may result in a fibrositis of an important aponeurosis or tendon, or a single severe wrench may start aching in a pre-existing nodule, which may last for weeks, but wear off on active exertion or on vigorous rubbing of the part. It frequently recurs, however, if rest and invalidism are adopted, or if, in the severe or chronic types, active treatment be not adopted.

Treatment.—Now that the pathology of this troublesome affection is understood, we may reasonably hope for good results from a rational and scientific method of treatment.

General massage is unnecessary. The massage movements should be confined directly to the painful parts—that is, where there are nodules and indurations. As a rule it is best to shave the skin and smear it with some oleaginous substance before beginning the treatment. The massage should be gentle for a few days, and gradually made more and more vigorous daily. In a short time the fibrous thickenings swell up and become both more obvious and painful. It is at this stage that it requires some fortitude to withstand the temptation to give up all treatment, because the inconvenience may last for ten days or even longer. The nodules immediately beneath the skin are particularly liable to become tender, and the treatment has to be carried out very judiciously, until the patient appreciates the undoubted benefit which is to follow.

At the acute stage, therefore, only very gentle manipulations are called for in order to promote the removal of exudation, and Luff holds that even this should not be employed where it causes pain *at the acute stage*. However, after this stage has been passed there is no question that very vigorous, even painful massage, pressure, and friction, are eminently successful in removing the tension of the tissues, and therefore the

stiffness. It undoubtedly in time makes the swollen fibrous nodules disappear.

Stockman writes:

“After a time they (the nodules) begin to shrink in size, and become more fibrous and callous; much more pressure can then be exerted on them, the fist or knuckles being used, and in process of time they become quite small and hard, and ultimately disappear entirely. The massage should be carried out daily, ten or fifteen minutes or more being devoted to each region affected; at the beginning and end about two minutes of gentle effleurage should be given, as it soothes the part and removes serous engorgement.”

To obtain a satisfactory cure the dispersion of the indurations must be complete; otherwise relapses occur, and these are a source of much disappointment. The length of time required to effect the dispersion varies very much.

Exercises.—An essential part of the cure is movement of the muscles and aponeuroses involved. This can be done by the aid of dumb-bells, Indian clubs, or a Sandow exerciser, and should never last less than half an hour a day.

The value of spa treatment, so far as the local conditions are concerned, is that the previous hot and vapour baths relax the tissues, and so permit of less painful, and therefore more vigorous, rubbing, in well-directed manipulations.

Muscular movement relieves the tension and temporarily relieves the pain; and although at first this returns after a few hours, daily repetitions of more and more vigorous muscular movement combined with massage have their effect.

The difficulty in the treatment is to get the patient to submit to massage and to movements which are painful, and the less intelligent the subject the greater the difficulty.

Septic absorption from pyorrhœa alveolaris is well known to be a fruitful source of fibrositis, and, as already pointed out, when present at the time of the occurrence of an accident, frequently retards recovery.