How to restore the walking powers, and muscular movement generally : or a treatise on the relief & cure of spinal curvatures, injuries of joints, sprains, deformities, rheumatism, and paralysis / by F. Graham Bennett.

HOW TO RESTORE THE WALKING POWERS,

AND

MUSCULAR MOVEMENT GENERALLY;

OR

A TREATISE ON THE RELIEF & CURE

OF

SPINAL CURVATURES, INJURIES OF JOINTS, SPRAINS, DEFORMITIES, RHEUMATISM, AND PARALYSIS,

BY

F. GRAHAM BENNETT,

M.R.C.S.E.. L.S.A., ETC.,

SURGEON TO ST. JOHN'S DISPENSARY, BRIGHTON; BRIGADE-SURGEON TO 1ST MIDDLESEX ADMINISTRATIVE BRIGADE OF VOLUNTEER ARTILLERY; SURGEON TO THE ENGLISH AMBULANCE DURING THE FRANCO-GERMAN WAR OF 1870; AND EXHIBITOR OF INVENTIONS FOR CURING LOSS OF MOVEMENT, IN THE INTERNATIONAL EXHIBITION OF 1873.

SECOND EDITION:

Revised and Enlarged, with Seventy-six Woodcuts.

LONDON:
WHITTAKER AND CO., AVE MARIA LANE.

BRIGHTON:
G. WAKELING, THE ROYAL LIBRARY.

1874.

BRIGHTON:

PRINTED BY D. O'CONNOR, AT THE "GUARDIAN" OFFICE,

34, NORTH STREET.

CONTENTS.

CONTENTS,—*continued.*

PART II.

PREFACE.

Several years ago, I published a short pamphlet upon the subject of the special treatment I had, with great success, adopted in many tedious and difficult cases of injuries of the joints, deformities, rheumatic affections, and the various forms of paralysis. The explanations, which I then offered, were in many senses sufficiently ample, and might cause me to rest satisfied with issuing a second edition unaltered. I prefer, however, to attempt a still more

clear and concise statement, which will, I hope, be rendered complete by the numerous woodcuts introduced, all of which are copied from photographs, or casts of cases under my treatment.

From the time when I first entered into practice, I was painfully struck with the fact that medical men, for the most part, paid little attention to this particular branch of surgery, and that patients, who were suffering from the distressing affections above enumerated, or from any kind of loss of motive power, were too frequently allowed to pass into the hands of professional rubbers, gymnasts, or surgical instrument makers. Feeling such a course to be most unsatisfactory, I have, after much thought and study, perfected a mode of treatment, to meet all these cases, consisting of a proper application of bandages, stays, steel supports, mechanical boots, walking machines, and instruments for producing the normal exercise of any part of the body.

The beneficial results of all these appliances have far exceeded my expectations.

I am fully aware that a strong prejudice exists against the use of instruments generally, a prejudice which may well continue so long as surgeons do not themselves superintend the construction of them, and, from their own knowledge, adapt them to each individual case.

There are many persons who, on account of this prejudice, as well as through ignorance, resort to the professional rubber; they are satisfied for a time with the soothing influence exerted, and think they are being cured; but they have, too soon, to find out that, beyond a mere improvement of the superficial circulation, no possible good can result, and the very delay in using proper remedies has done their cases temporary, if not permanent, harm.

There are others also who place themselves under self-styled medical gymnasts,

and electricians, who profess to cure deformities and nervous complaints, but it is too evident that their want of real medical knowledge must lead to very injurious results.

I will only say, in conclusion, that the different supports and appliances, illustrations of many of which are to be found herein, are all made under my own direct supervision. The bandages are put on and adjusted by myself, and all the mechanical instruments for developing muscular power are made by my own workpeople, and carefully arranged and modified to suit each particular action required. The walking machines are also adapted to the requirements of each individual case, and are often found invaluable, not only in giving confidence to the timid and nervous, but in enabling many to walk who otherwise would remain hopelessly crippled.

With these introductory remarks, I ask the careful perusal of this pamphlet,

which I confidently submit to the consideration of those whom it may directly or indirectly concern.

F. GRAHAM BENNETT,
M.R.C.S. & L.S.A.,
28, Grand Parade, Brighton.

July, 1874.

INTRODUCTION.

The treatment adopted by me in Injuries of Joints, Diseases of the Spine, Spinal Curvatures, Deformities in General, Rheumatism, both Acute and Chronic, and Paralysis, is one of support and exercise; all the suffering and weak portions of the body are supported by bandages, stays, boots, or steel and gutta percha splints, which are so arranged as to give the necessary support without impeding the movements of the body. I have invented various instruments for exercising the muscles of every part of the human frame, and for enabling severely injured and paralysed patients to move

about, adapting them as required to each particular case ; while, at the same time, I pay great attention to the general health of the patient.

The first part of this pamphlet describes the bandages, stays, boots, steel, and gutta percha splints of which I make use.

The second part gives a short description of the various diseases and injuries referred to on the title page, with the proper application of my treatment to each, and the details of some of the many cases in which I have been successful.

PART I.

BANDAGES.

The principal and most important part of my treatment is the support of the suffering portions of the body by adhesive bandages. These consist of chamois leather very thinly spread with a certain composition, unirritating, soothing, and pleasant. This leather is applied to various parts, with pressure and manipulation of the skin while adjusting it, so as to render it fully influenced by atmospheric pressure; it can be so beautifully adjusted as to look like a continuation of the skin, its pliability enabling it to be fitted to any part of the body, and, when so

applied it excels all other plaisters, bandages, and instruments, by the equal and great support, together with the warmth and comfort it gives to the parts it covers. In no instance does it ever stop the circulation. I mention this fact, as there are many who are under the impression that it does, and is, therefore, injurious. An ordinary plaister spread on linen, even with the most skilful handling, frequently has this effect, but with my plaister it is impossible. The leather used in its composition, being the best chamois, is, naturally, very elastic, and, in the course of manufacture, undergoes no process tending to destroy its original properties. The application of the bandages requires a certain amount of practice, and also a knowledge of the particular parts that require support, as in sprains, injuries of the spine, and deformities. Without accurate knowledge you may continue bandaging a patient for months, and not impart any other relief than that which accrues from covering a portion of the body with a bad conductor of heat.

The plaisters are changed as soon as they become hard or stiff, and the part which was covered is thoroughly cleansed with a lotion that dissolves anything which may be adhering to the pores of the skin, and a fresh plaister is quickly fitted, in order to insure as little atmospheric action as possible; by this means the skin can be kept for months or years at a temperature many degrees above its ordinary standard, and the weak and diseased portions of the body thus receive immense comfort from the warmth and support of the plaister.

The plaisters are put on either whole, or in strips, or in small pieces, according to the part to be covered. Perhaps the best way to produce a clear idea of the way they are used is to give a short description of the different forms of bandages, and the manner in which each is applied.

To begin with the feet: in bunions, where the great toe is turned under the next, I take a piece of plaister, about six inches by five, and fit it round the toe, first cutting wherever necessary to facilitate its

fitting. When the toe is covered I pull the loose plaister towards the inner side of the ankle joint, making it fit, and covering the inner side of the foot; this form of bandage

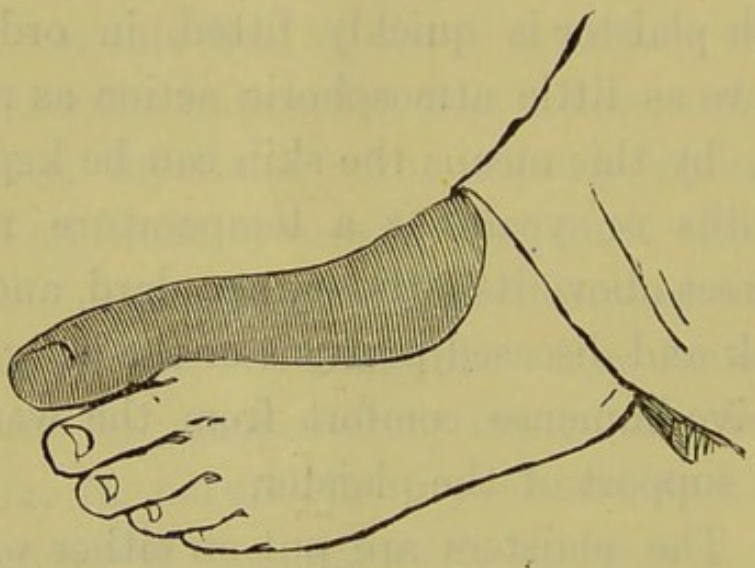

Fig. 1.

helps, with a properly adapted boot, to bring the toe back to its natural position, besides restoring perfect circulation, and softening the hardened skin which, very often, collects on the ball of the great toe.

In sprained ankles, the plaister is used with great success, as the muscles relaxed by the sprain can be readily pulled into their proper places, and kept there by it. There

are several ways of bandaging the ankle, according to the nature of the sprain. The

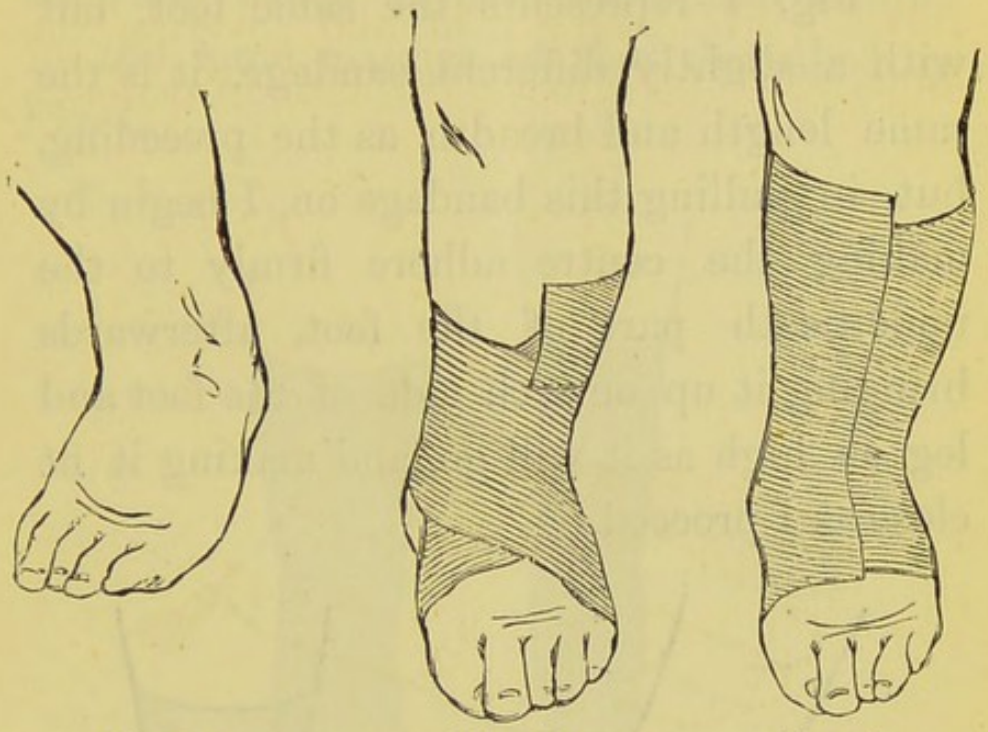

Fig. 2. Fig. 3. Fig. 4.

above drawings, Figs. 2, 3, and 4, will show the strength and pulling power of the plaister—they represent the deformed foot of a child, with the bandage, and without: this form of bandage is a long strip twenty-three inches by six, it commences either on the inner or outer side of the ankle, as the case may require, and is passed across the foot, round it, under it, and back to the opposite side from that on which it started,

being made to adhere and fit at the same time.

Fig. 4 represents the same foot, but with a slightly different bandage, it is the same length and breadth as the preceding, but, in pulling this bandage on, I begin by making the centre adhere firmly to the underneath part of the foot, afterwards bringing it up on each side of the foot and leg as high as it will go, and making it fit close as I proceed.

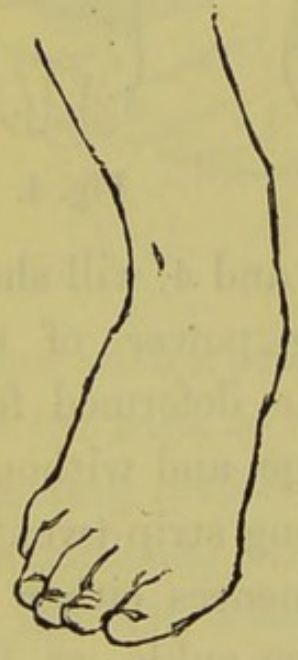

Fig. 5.

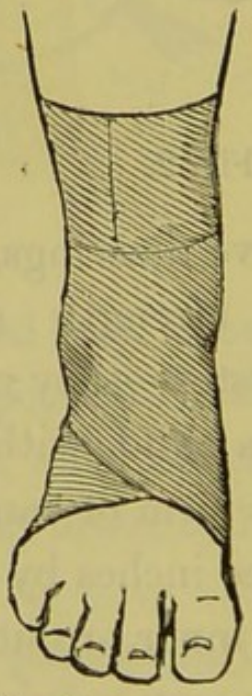

Fig. 6.

Figures 5 and 6 represent a deformed foot

twisted in an opposite direction to that in Fig. 2, with and without the plaister bandage, which is made to adhere and fit in the same manner as that described by Fig 4.

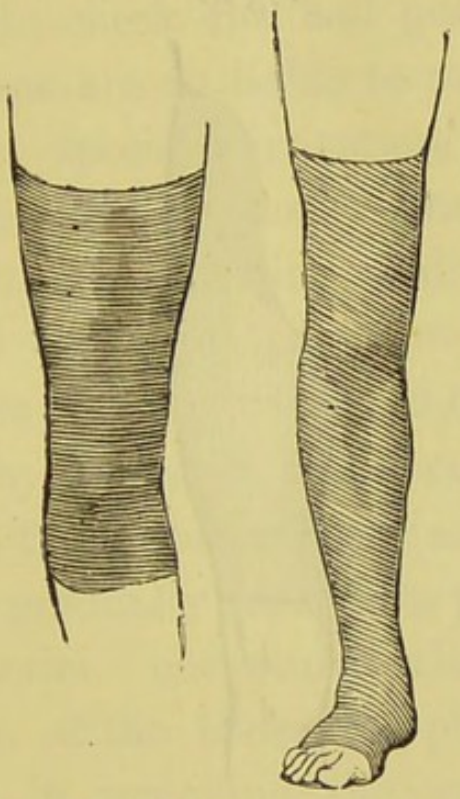

Fig. 7. Fig. 8.

The knee requires to be bandaged for various strains and injuries. I use a piece of plaister about twenty inches by thirteen, wind it round the joint loosely or tightly, beginning either from the inside or outside,

as the case may require. Sometimes I use an entire skin of plaister, and, when this is the case, I cover the ankle as well as the knee, making the plaister fit like a stocking.

Fig 9.

The hip has to be plaistered in various inflammations and injuries: for this, a whole skin is used and I begin just below the last rib, fitting it well round the loins, then pull the plaister tightly down over the hip, and wind it round the thigh to within an inch

of the knee joint, sometimes the bandage is continued below the knee.

Plaister bandages are of great benefit to the spine, forming a strong and comfortable support, and serving, in a great measure, to check the bad positions which weak spines are so liable to assume. For cases of special irritation, they are invaluable, from their warmth-giving, absorbent, and supporting qualities. Again, in lateral curvature they are most useful, as, in the lighter cases, the spine can be kept by them, in a correct position, for weeks and months, without an instrument, and thus gradually regain its proper shape. In posterior curvature, the effects of ulceration of the bones, the plaister is very valuable, in removing the weight of the head and shoulders on to the hips, and in restoring the muscular power, when the spinal bones have recovered their strength. The spine can be plaistered, in various ways, according to the complaint. Sometimes a narrow strip about twenty inches by seven is used, as in lateral curvature,

which extends from the shoulder to the hip of the same side, and which pulls the higher shoulder down, restoring the back to its natural position. Again,

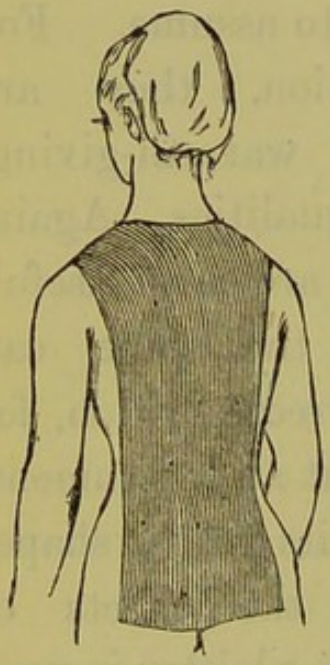

Fig. 10.

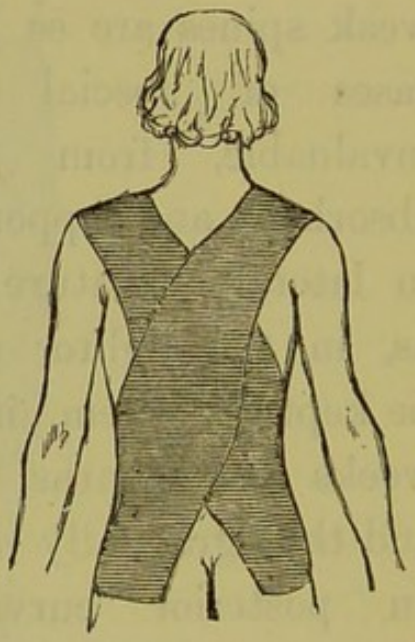

Fig. 11.

two strips of the same length and breadth as the last may be used, extending from each shoulder to the opposite hip, like a pair of braces (as in Fig. 11); this form of bandage is very useful in cases of weak spines, as it

brings the shoulder-blades together, and helps the patient to keep in an upright position. Another way of bandaging the spine is by a wide strip, about twenty inches by ten (as in Fig. 10), which begins at the top of the back, covers both shoulder blades, and extends down to the loins. This form of bandage has the same object as the last, but is sometimes preferable in cases where so much tension is not necessary, and it is especially useful in irritation of the spinal cord. There are many other ways of bandaging the back, the plaisters being capable of assuming every variety of shape. All the different forms of bandages may be used alone or together. Of course, the particular forms to be used in each case depend on the nature of the complaint, and the amount of force required to bring the parts back to their original position.

The shoulder joint should be bandaged after various injuries, as the plaister, by its strength and support, keeps the muscles in a correct position, and prevents the joints becoming relaxed, a circumstance which

very frequently occurs, when an inflamed or sprained joint is left to itself. The

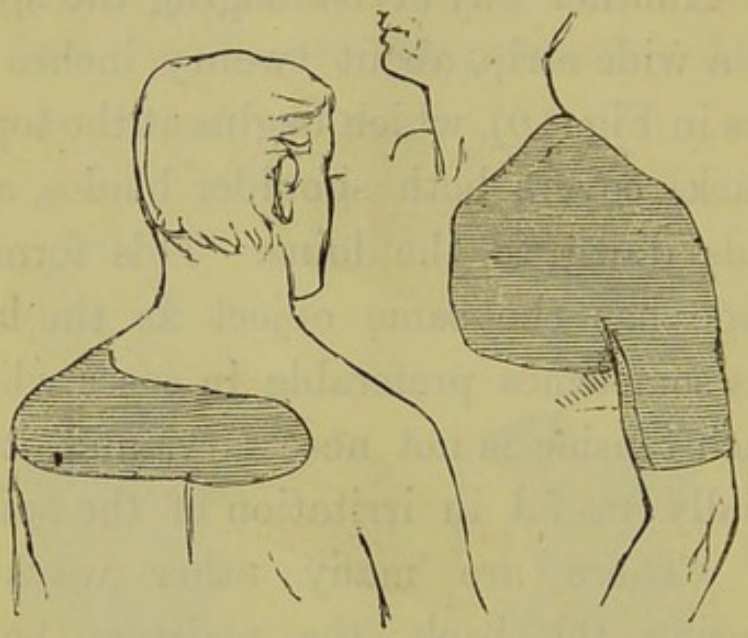

Fig. 12. Fig. 13.

plaister used for the shoulders is a triangular shaped piece, the narrow part of which is pressed firmly on the shoulder blades; it is then brought over the collar bone and upper part of the chest, and, when it thoroughly adheres, I fit the remaining portion round the shoulder joint and arm, to within an inch or two of the elbow.

The elbow is bandaged in various injuries, sprains, and strains, and a broad piece

of plaister is used, which is simply wound round the joint as in Fig. 15, beginning either from the inside or outside as required.

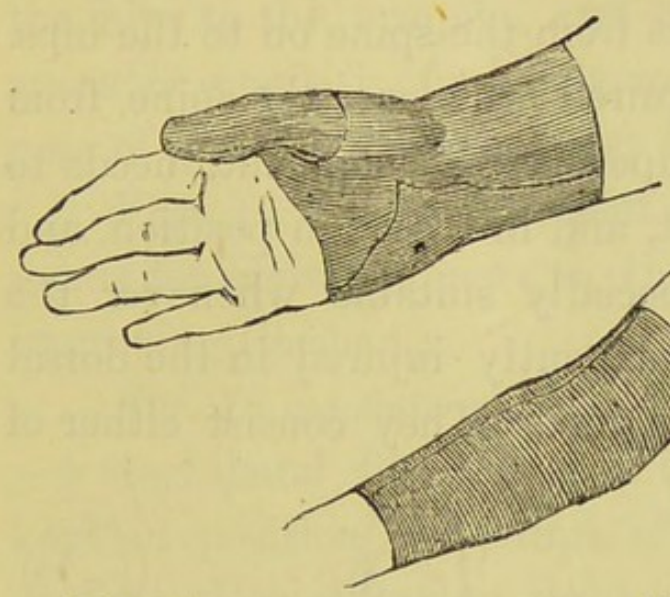

Fig. 14.

Fig. 15.

The wrist, the palm of the hand, and the fingers and thumb require, in certain injuries, to be supported by bandages. The method of proceeding is just the same as in other cases, and, with care, the plaister can be made to fit so closely as to look like a glove.

There is scarcely any injury or deformity of the lower and upper limbs, or of the spine, which does not derive great benefit from the use of this invaluable remedy.

MECHANICAL SUPPORTS FOR THE BACK.

The use of mechanical supports for the back is to remove the weight of the head and shoulders from the spine on to the hips. They are required whenever the spine, from injury or imperfect development, needs to be kept quiet, and in a certain position, and they are especially suitable whenever the spine is permanently injured in the dorsal or lumbar region. They consist either of

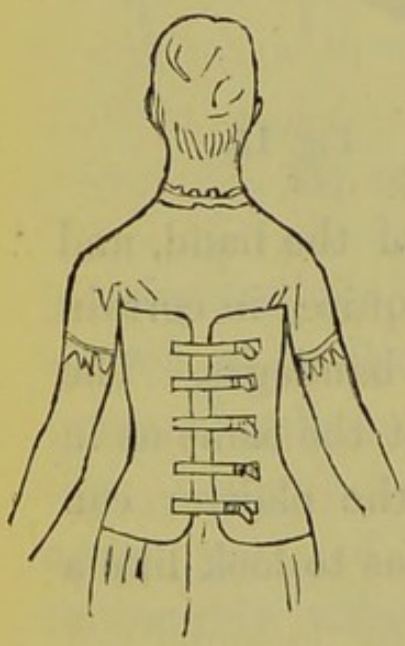

Fig. 16.

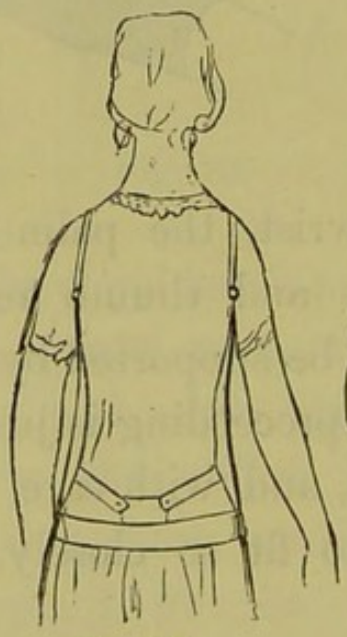

Fig. 17.

Fig. 18.

ordinary stays stiffened on one or both sides between the armpit and hip, or of very slight steel supports.

Fig. 16 represents a pair of the usual medical stays. They are ordinary stays made a little longer in order to reach from the hips to the armpits, and supplied with an extra quantity of whalebone for the purpose of giving greater support to the back.

Figs. 17 and 18 represent steel instruments for giving support to the back, and improving its shape.

Fig. 18 consists of three pieces of steel —a steel band fitting round the hips, and kept in position by straps of leather; an upright piece of steel at right angles to the band, and riveted or screwed on to it; a thin steel rod fastened in the centre to the top of the upright piece, and bent round so that the ends fit under each armpit, and form a crutch. This instrument weighs less than the ordinary medical stays shown at Fig. 16, and, its extreme lightness makes it very useful, and, besides taking the weight of the head and shoulders off the back, it can be made to bring the shoulder-blades together, and so enlarge the chest.

Fig. 17 is precisely similar to Fig. 18 in its effects, but is slightly different in make; it has a steel band fitted round the hips, and two steel crutches reaching from the hip to the armpit, it is a stronger made splint than the last, and is very useful for patients who have to carry weights, or to do heavy work, as it will stand almost any amount of pressure, without bending or breaking.

All these three supports are used to keep the back in a good position, and to give it the rest necessary, after certain injuries to which the back is liable, as, with either of these instruments, the patient can move about, without fear of bad effects.

In cases of Lateral Curvature, I very frequently use one crutch, as in Fig. 20, which is riveted on to a steel band fixed to the hips by means of straps. This steel crutch raises the lower and stronger side, and thus, by forcing the weak side to bear the weight, the muscles are gradually brought into play and recover their normal use. Sometimes, in addition to the crutch, I use a pad which presses

on the projecting portion of the spine, as in Fig. 21. By means of a strap, this pad can

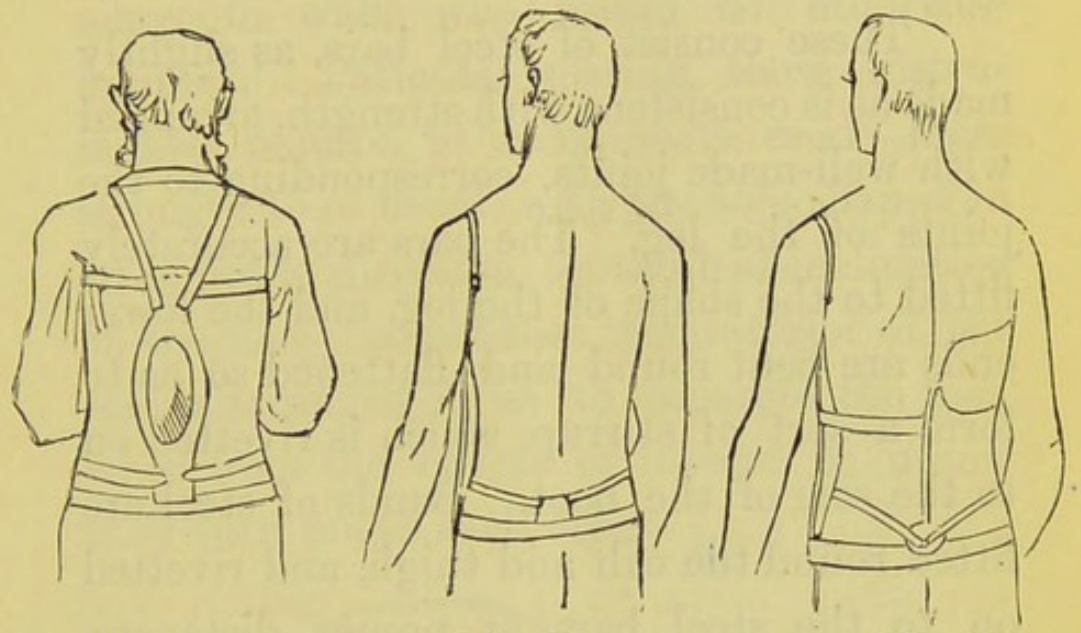

Fig. 19. Fig. 20. Fig. 21.

be pulled nearer and nearer to the crutch, and so the projecting parts can be brought more and more into their right position.

In Posterior Curvature, I use a support like the one depicted in Fig. 18, only the upright piece is differently shaped, as will be seen in Fig. 19. It is widened where the deformity exists, and a hole is cut through the steel, to allow the projecting portion of the spine to come through. It is a very comfortable form of support, and is much liked by the patients to whom I have fitted it.

INSTRUMENTS FOR THE LOWER LIMBS.

These consist of steel bars, as slightly made as is consistent with strength, arranged with well-made joints, corresponding to the joints of the leg. The bars are accurately fitted to the shape of the leg, and the lower ends are bent round and flattened so as to form a sort of stirrup, which is rivetted on to the sole of the boot. Bands of steel are fitted round the calf and thigh, and rivetted on to the steel bars at proper distances, and when the instrument is carried up to the armpits, another steel band is fitted to the hips. These bands are furnished with straps and buckles, and serve to keep the instrument in its place. An instrument of this description, if accurately fitted, will keep the patient in a proper and healthy position, and, if worn for a sufficient length of time, the affected parts will gradually regain their natural shape, and retain it after the instrument is discontinued. In addition to these advantages, such an instru-

ment assists the legs to bear the weight of the upper part of the body, and thus enables many to walk who would be otherwise helpless. Patients, wearing these instruments, require to have boots made more strongly than usual, with the sole shaped in an opposite direction to the bad inclination of the foot; sometimes the interior of the sole is arranged so as to separate the toes, when from the effects of disease or injury they turn under each other.

Fig. 22.

For deformities of the feet, I use a slight steel bar fitted on to a well-adapted

boot, and having, at the top, a band of steel, shaped out to the leg a few inches above the ankle (as shown in Fig. 22). It keeps the foot in a good position, and enables the patient to tread on the flat of the foot in walking.

In certain cases of deformed feet, the whole leg turns in, and sometimes crosses over the other leg. When this is the case, I continue the instrument up to the hips, making joints at the knee and hip.

Figs. 23 and 24 show the feet of a young lady with and without theinstrument.

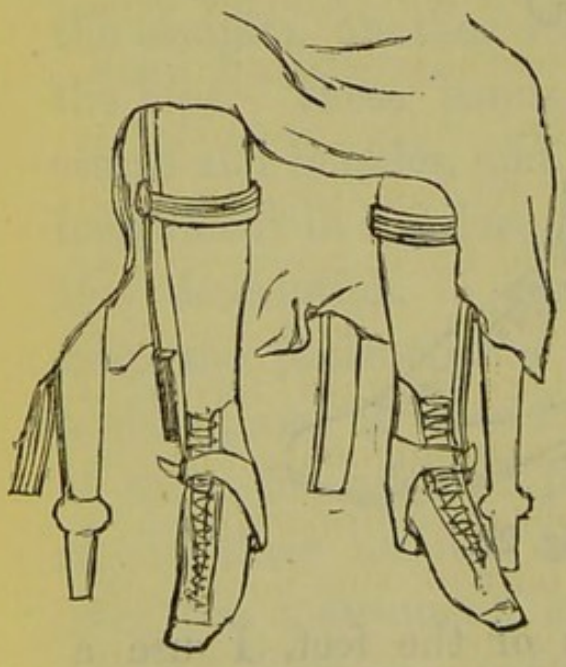

Fig. 23.

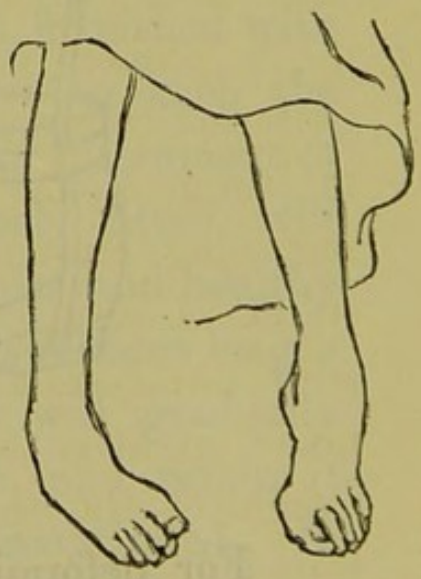

Fig. 24.

She had caught a cold, when very young, during an attack of scarlet fever, and paralysis followed; from continually bearing weight on the feet, without proper support, they acquired the distorted shape as shown in Fig. 24. I adapted an instrument (as in Fig. 23), which, when worn, kept her feet in a right position. The case was photographed, and these woodcuts are copied from the photographs.

Fig. 25 represents an instrument used to counteract an ingrowing or outgrowing of the knee. This instrument is also useful in infantile paralysis, when the legs cross each other, as it keeps them separated, and in a proper position, till the nervous irritation passes off; the legs, then, instead of being contracted and fixed, are ready for regaining muscular power. This form of splint is also useful in certain forms of adult paralysis, as, by arrangement, it can be made greatly to assist in supporting the weight of the upper part of the body, and thus help patients to walk, besides enabling their attendants to move them about more

easily. Sometimes the steel splint is made

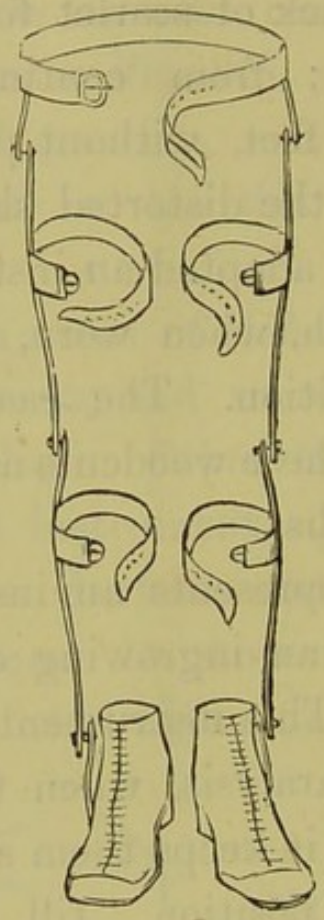

Fig. 25.

to come just above the knee, as in Fig. 26, with or without a joint at the knee, as may be required. It gives great support, and, if rightly adjusted, keeps the ankle in a correct position during walking. It is useful in cases of paralysis and rheumatism to keep the joint firm in the act of walking. I also use it in certain affections of the

knee-joint, when the joint has been permanently injured through inflammation. The padded steel bands, which enclose the

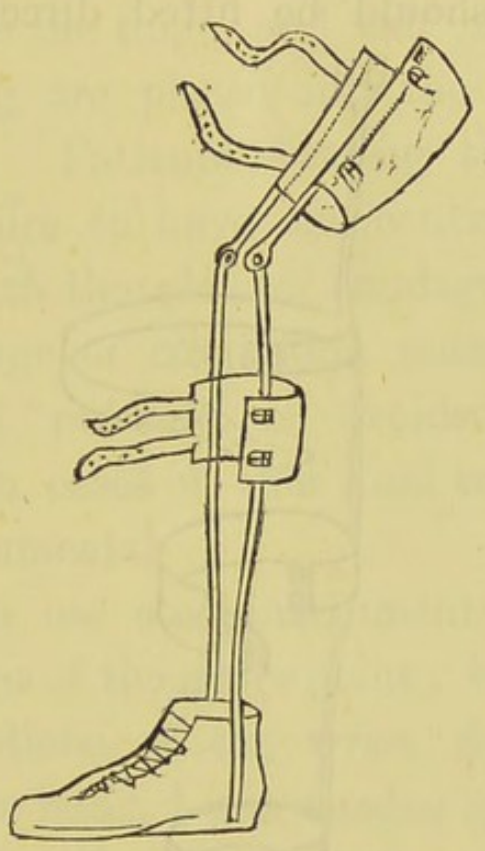

Fig. 26.

calf and thigh, can be so adjusted as to prevent any possibility of the joint getting out of place, an evil effect commonly attending this complaint, when such means are not adopted.

CONTRACTED KNEES.

In reducing contractions of the knee or hip by instruments, it is necessary that the steel rod should be fitted direct from the

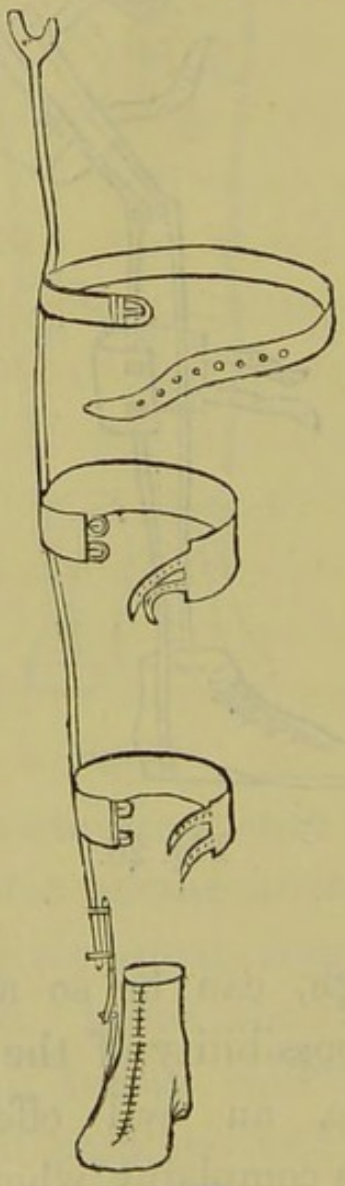

Fig. 27.

armpit to the sole of the boot. I generally

make use of the instrument shown in the annexed drawing. It consists of a bar of steel, jointed at the hip, and having three steel bands, one of which is fitted round the hips, while the thigh and calf of the contracted leg are placed into the two others by straps. Patients wearing this instrument require to have the contracted joint covered with the plaister bandages, as then the stoppage of circulation consequent on mechanical pressure is avoided, an evil common in cases of this kind treated only with instruments.

I also use steel instruments to reduce contractions of the elbow joint; but in cases of contractions of the wrist, fingers, and palm of the hand, I use wooden splints, as I find them preferable to steel, on account of their simplicity and inexpensiveness.

GUTTA PERCHA SPLINTS.

I use these splints to keep joints at rest and in a good position during inflammation. The gutta percha is made pliable by

immersing it in boiling water, and it can then be moulded to any part of the body.

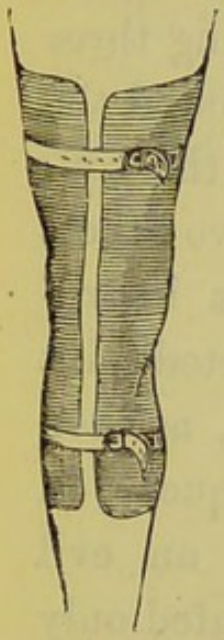

Fig. 28.

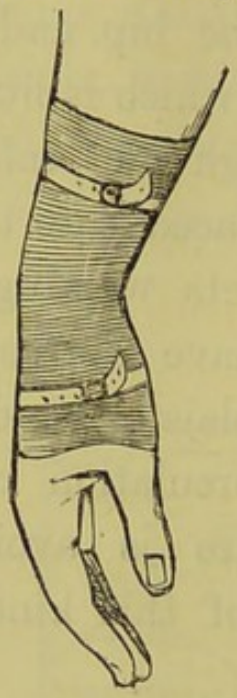

Fig. 29.

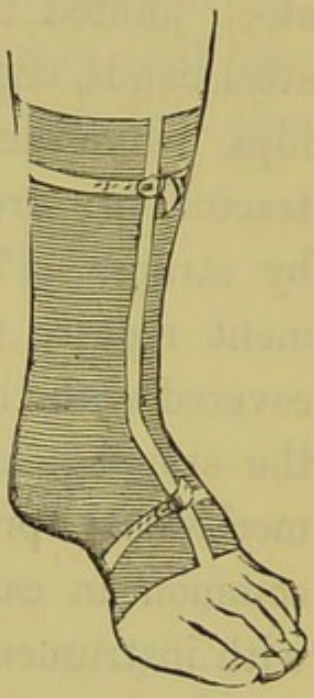

Fig. 30.

This form of splint is especially suitable for the wrist, knee, and ankle joints; the splint is kept in position by two or more straps.

INSTRUMENTS FOR CULTIVATING AND IMPROVING MUSCULAR POWER.

The instruments used for exercising the different joints of the upper and lower limbs are so arranged as to meet the requirements of each case. They are intended to supply the natural action of the joint in

as easy a manner as possible, so that a joint, weakened by the effects of inflammation or loss of nervous power may be properly exercised without over exertion ; and, when the prostration of muscular strength is such that the muscles are incapable of acting, they can be supported and exercised in instruments worked by an assistant. The instruments used are so beautifully made as to move with the slightest exertion. Thus, I have had patients, who have not walked for many years, who have entirely recovered the use of their limbs by the aid of my machinery and other treatment, after the treatment of many eminent medical men has failed. The instruments I use are, without exception, my own inventions and are of various kinds.

INSTRUMENTS FOR EXERCISING THE FEET.

The toes, and especially the great toe, often become stiff from the effects of disease, and if not exercised become in time anchylosed. In treating cases of this description, therefore, this is an evil very necessary to guard against,

and, for this purpose, I have invented an instrument like Fig. 31, which moves the toes up

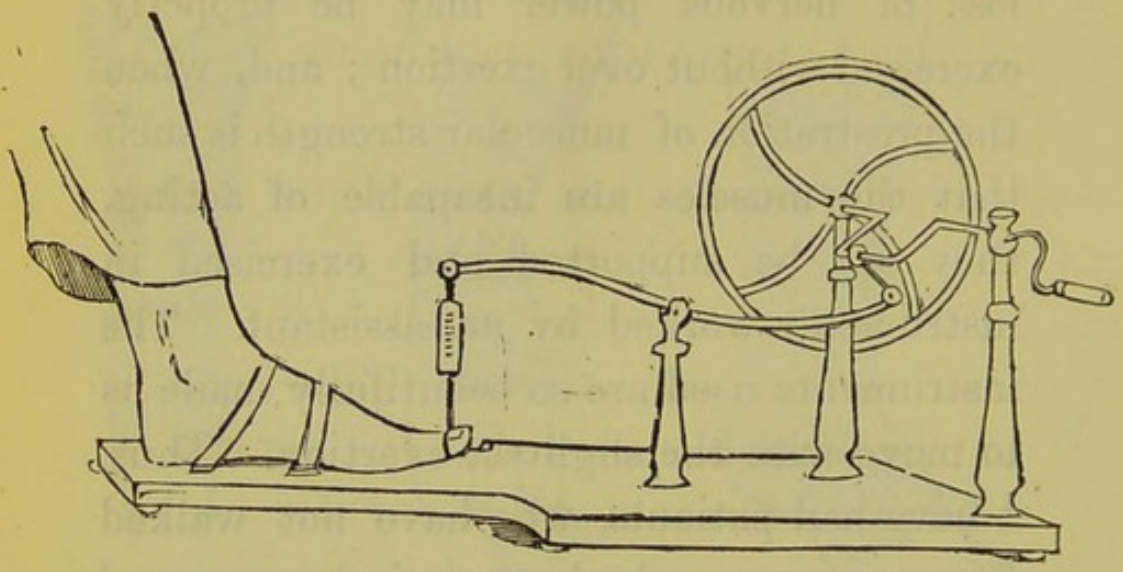

Fig. 31.

and down, and which restores the powers lost with very little trouble and inconvenience to the patient. It consists of a lever, one end of which is attached to the affected toe, and the other to a crank. The foot is strapped on to the board which supports the instrument, and a little padded band is fastened round the toe. By turning the wheel of the crank, the lever is made to move up and down, carrying the toe with it. The instrument can be so regulated by a screw, that the lever can be made to move from an eighth

of an inch to an inch and a half, and thus the restoration of the movements of the toe can be performed so regularly and gradually as to be hardly felt by the patient.

INSTRUMENTS FOR EXERCISING THE ANKLE JOINT.

The ankle joint requires exercising after certain sprains, and especially after inflammation has existed. The instrument used is a lever crank, represented in Fig. 32. The patient lies down on an inclined plane, and the feet are strapped on to clogs fixed

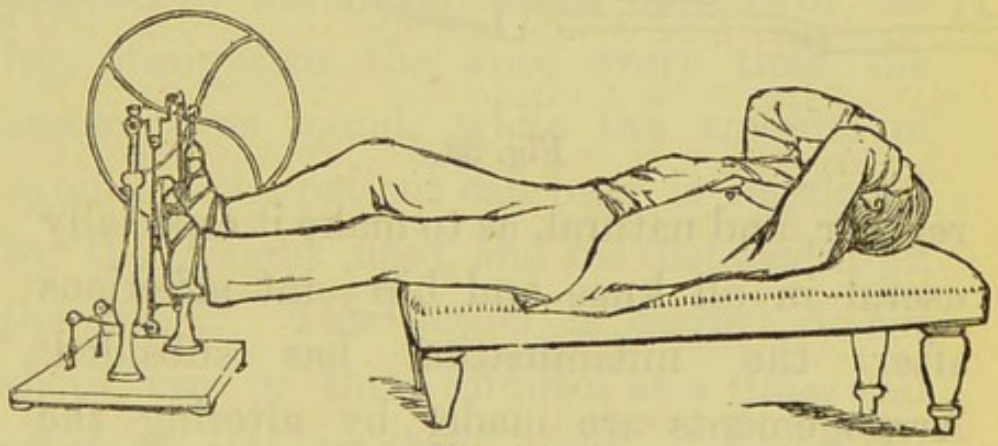

Fig. 32.

to the instrument. The clogs which support the feet are placed in an opposite direction to the bad inclination of the feet, and the action produced is exactly that of walking.

INSTRUMENTS FOR EXERCISING THE KNEE AND HIP.

Fig. 33 is a double action crank with a sliding bar movement; the rods to which the feet are fastened are very strong and firmly fixed, and the action is so easy,

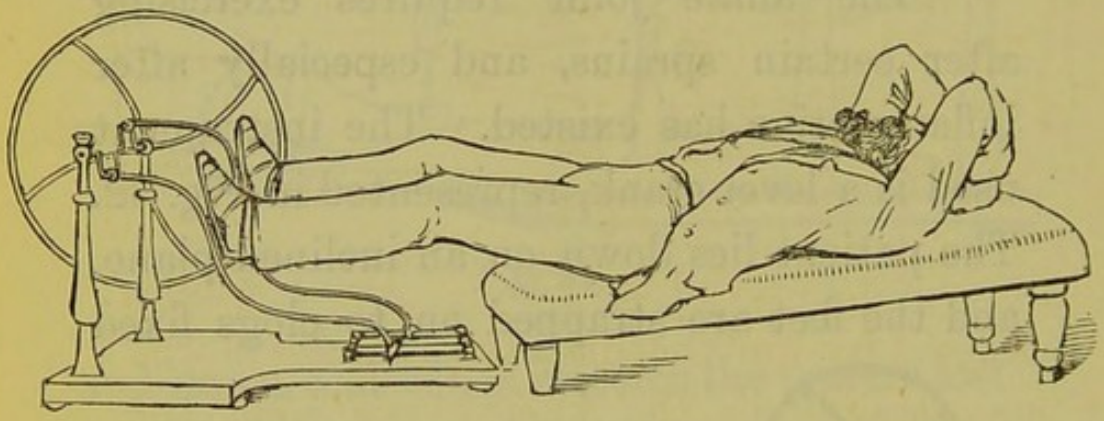

Fig. 33.

regular, and natural, as to make it especially useful in all knee and hip joint affections after the inflammation has subsided. Arrangements are made, by altering the position of the clogs, to enable the legs to be exercised at any angle. When the knees or hips are stiff from rheumatism, or the effects of inflammation, or muscular contraction, and, in consequence, the legs

are not straight, I use a crank like that in Fig. 34, only the feet are placed higher up on the crank bars, and a weight is attached by straps underneath the contracted knee,

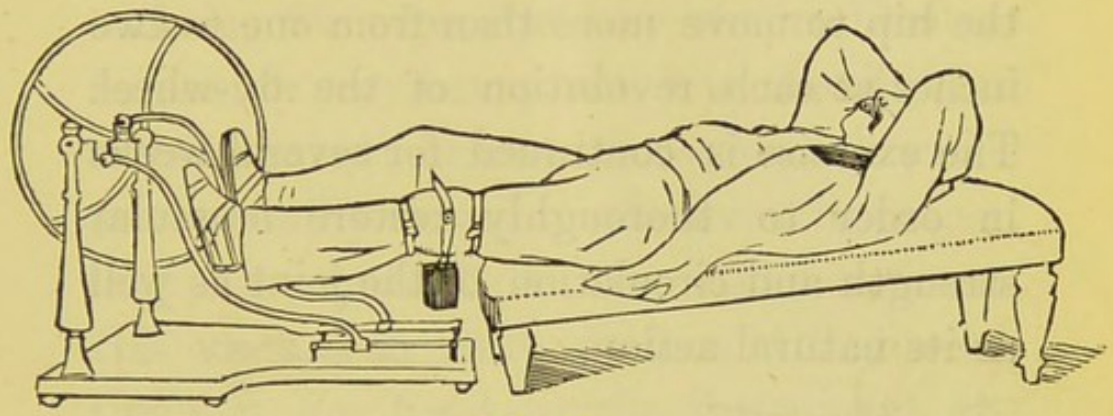

Fig. 34.

as shown in Fig. 34. The weight, assisted by the uncontracted muscles of the leg, straightens the knee every time the crank turns round, while the amount of extension the patient can bear is regulated by the weight used, and his distance from the crank. This action is carried on for about two or three minutes at a time, and repeated two or three times a day: the exercise gradually overcomes the force of the contracted muscles, and the limb becomes straight. After hip-joint disease, when it is thought desirable that the patient should attempt to walk again, I exercise the

hip gently in a crank, taking care first that all the inflammation has subsided I use the same style of crank as Fig. 33, but one with a very much smaller throw, so as not to allow the hip to move more than from one to two inches at each revolution of the fly-wheel. The exercise is continued for several weeks in order to thoroughly restore muscular strength and circulation to the joint as well as its natural action.

INSTRUMENTS FOR RESTORING MUSCULAR POWER AFTER PARALYSIS & RHEUMATISM.

For these complaints, the cranks I use are adapted so as to enable the patient to

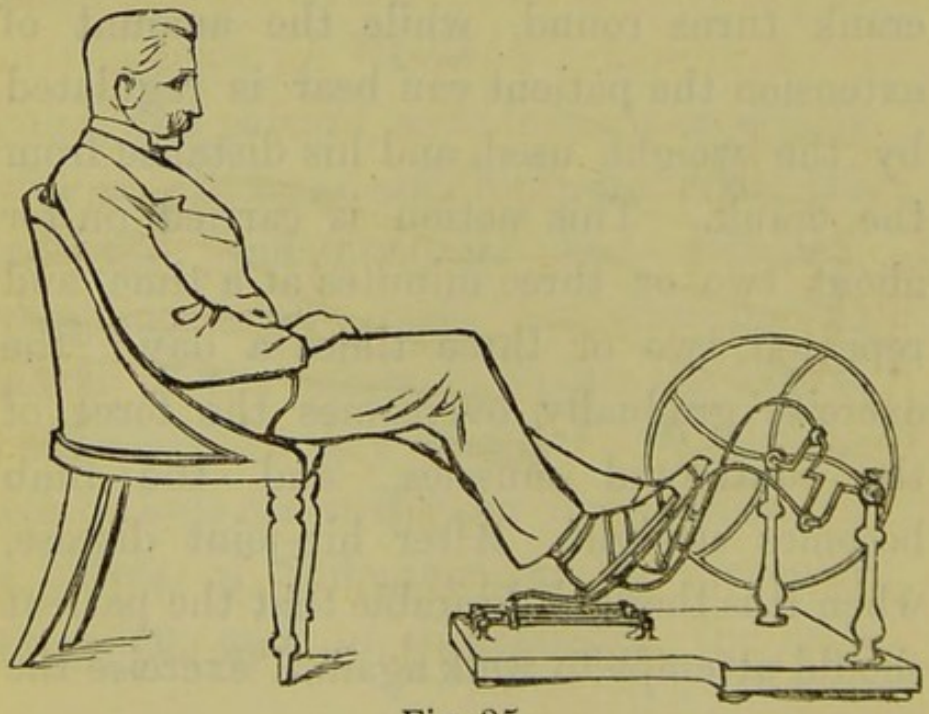

Fig. 35.

exercise either in a sitting or recumbent posture. The crank, shown in the above drawing, Fig. 35, is similar to Fig. 33, but made on a much smaller scale. Patients suffering from paralysis or rheumatism are frequently very heavy, and it is, therefore, an advantage in these cases to use a crank which can be readily moved to wherever the patient may happen to be sitting. The action of this crank is so easily performed that when the feet are fixed to the instrument the slightest effort on the part of the patient is sufficient to start it and keep it in motion. In this manner the muscles can obtain daily exercise without much exertion or too much loss of muscular power. As soon as the

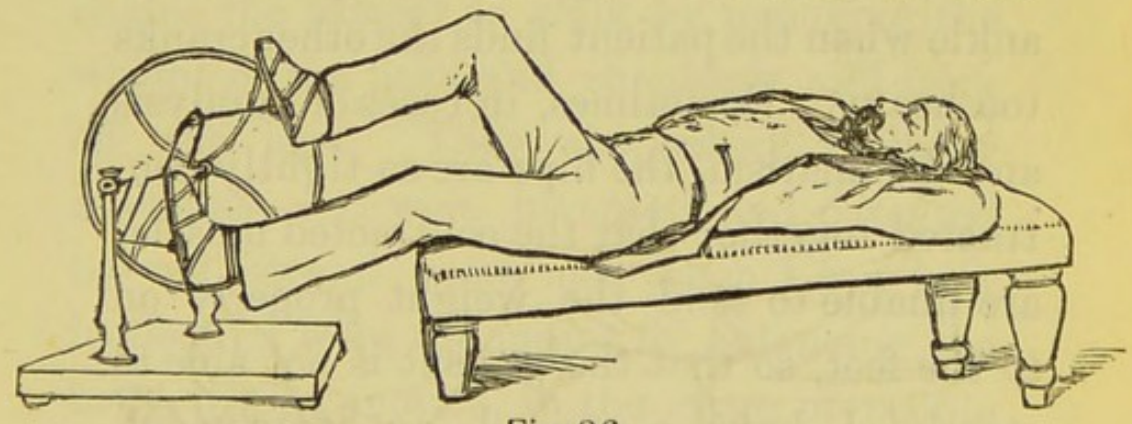

Fig. 36.

patient, by the aid of this exercise and other treatment, gains a little strength, I make

him use a crank, like Fig. 36, in a recumbent posture. The feet are fixed directly on to the crank, and it is more difficult and requires more strength to propel than Fig. 35. In

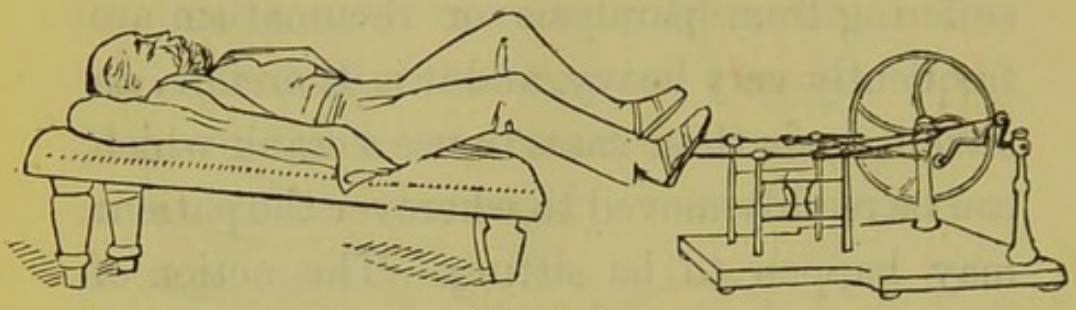

Fig. 37.

cases where patients drag the legs in walking, I find the crank depicted in the annexed drawing, Fig. 37, very useful. Its action is to lift the legs up and down and to give the natural exercise of walking up and down stairs. It is also used to strengthen the hip, knee, and ankle when the patient finds the other cranks too heavy. Sometimes, in cases of paralysis and rheumatism, the hips are so tightly contracted together that the contracted muscles are unable to send the weight properly on to the feet, so that the patient is not able to stand. I have contrived an instrument, Fig. 38, on the lever principle, by means of which I can gradually stretch these muscles,

and so overcome the great difficulty of reducing the contraction.

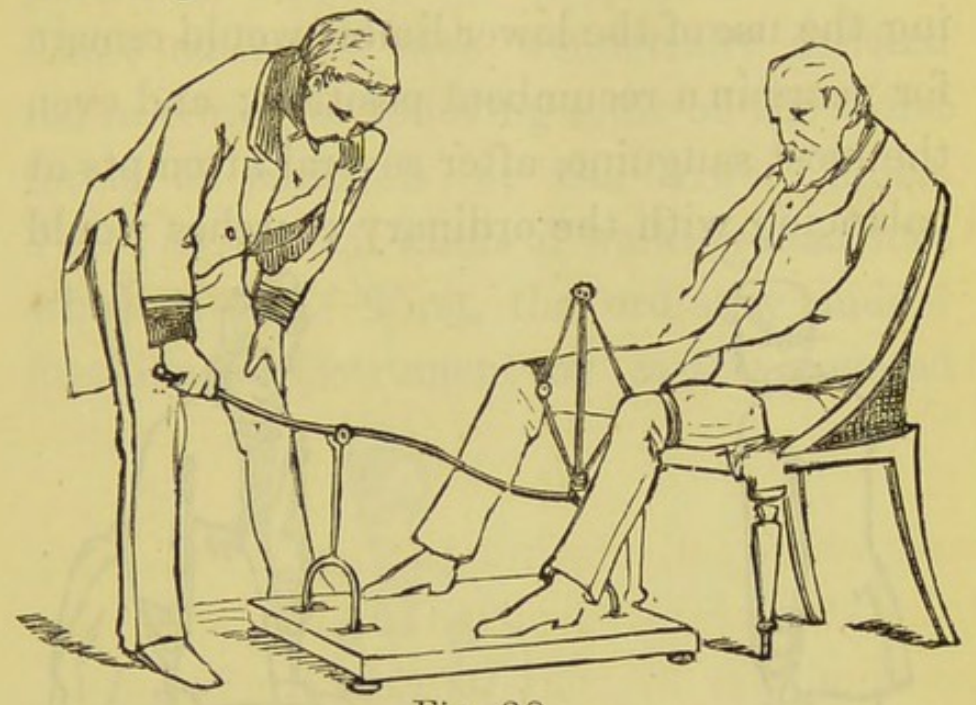

Fig. 38.

With the instruments for exercising the lower limbs, may be mentioned those which enable the patient to walk by removing the weight of the head and shoulders and back off the legs. They are called Walking Machines, and were invented and patented by me several years ago, when I saw how ineffectual were the means for balancing the body, during motion, in the cases of people who had lost the use of their limbs from paralysis and other causes, and that many persons, for the want of something safe to

support the weight of their body, in severe cases of paralysis, and other diseases affecting the use of the lower limbs, would remain for years in a recumbent position ; and even the most sanguine, after several attempts at balancing with the ordinary crutches would

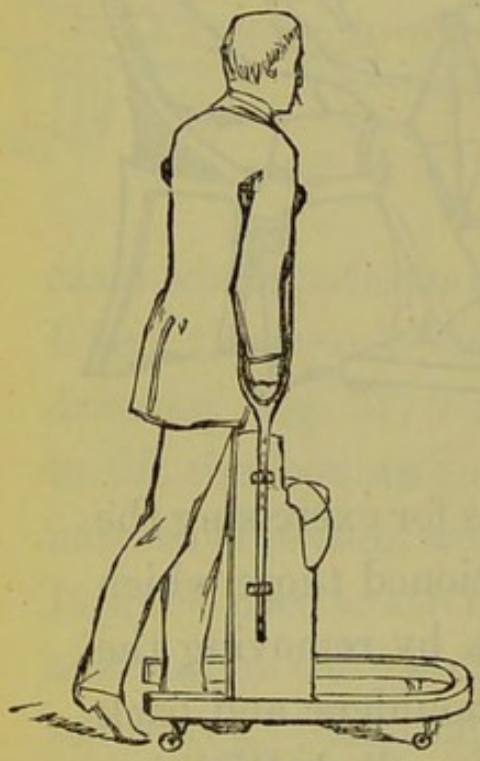

Fig. 39.

Fig. 40.

make up their minds that they would never walk. These walking machines consist of a pair of crutches placed upon wheels, and so balanced as to preclude all possibility of the patient falling when in the machine, or of overturning it. The wheels and different parts are so perfectly fitted and arranged,

that very little effort on the part of the patient is sufficient to propel the machine. These machines have wonderfully assisted me in curing or relieving some of the worst forms of paralysis of the lower limbs. There are several kinds of walking machines which I use. First, the ordinary indoor machine, an instrument on castors covered

Fig. 41.

with india rubber (like Fig. 39) and sometimes on wheels (as in Fig. 40) with the front one revolving. This is a very useful machine, especially in the case of nervous patients who object to make their first trial

of returning strength out of doors. Fig. 41 is the ordinary outdoor walking machine : it has the front wheel fixed, which I find more convenient for outdoor use, because much turning is not required, and the patient is better able to keep a straight direction than he would if the front wheel were revolving.

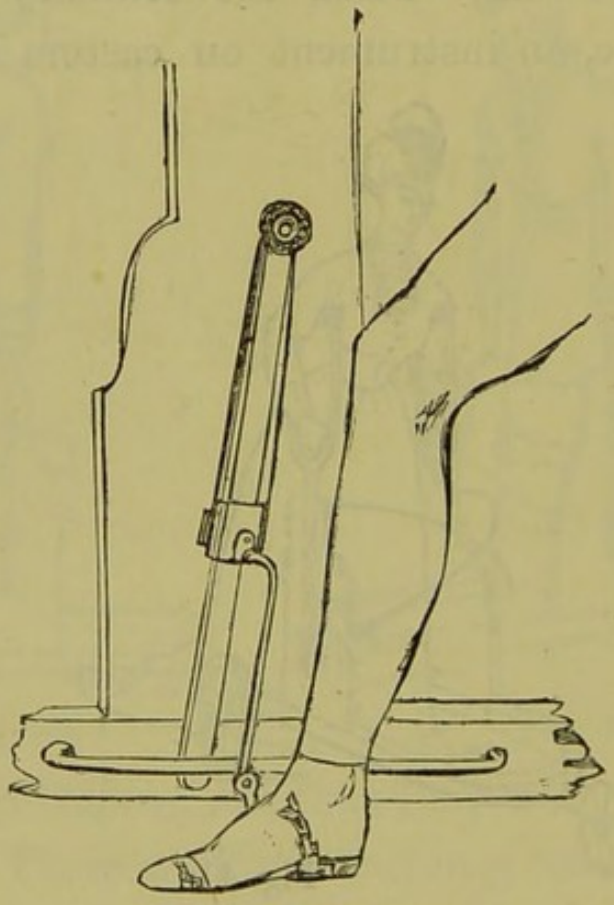

Fig. 42.

Fig. 42 shows an adjustment which is sometimes fitted on the indoor or outdoor walking machine. It keeps the foot in its natural

position, at the same time allowing it movement in every direction except lateral. This adjustment is very useful in cases of paralysis where deformity of the feet exist.

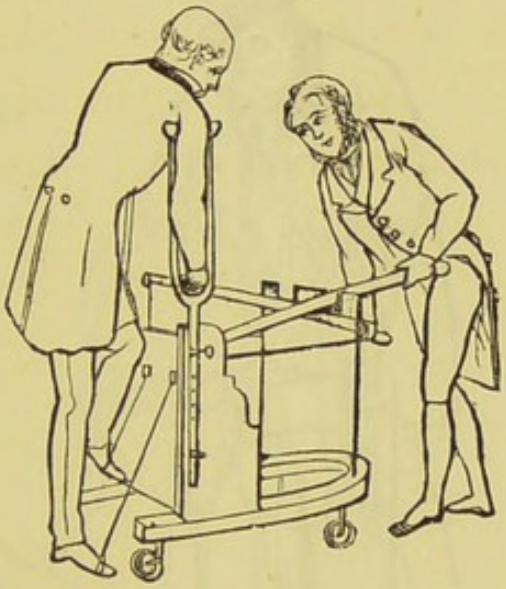

Fig. 43.

Fig. 43, represents an instrument for restoring the power of movement when it is entirely lost by the patient, An attendant, by means of two levers, pulls the legs alternately up and down, and thus makes the patient walk. In rheumatic disease of the knee and hip joint, the patient, upon attempting to walk, finds himself unable to put his legs under the body from certain contractions which are the consequence of

this disease. For cases of this description, therefore, I adjust a board to the machine as in Fig. 44, which prevents the legs getting

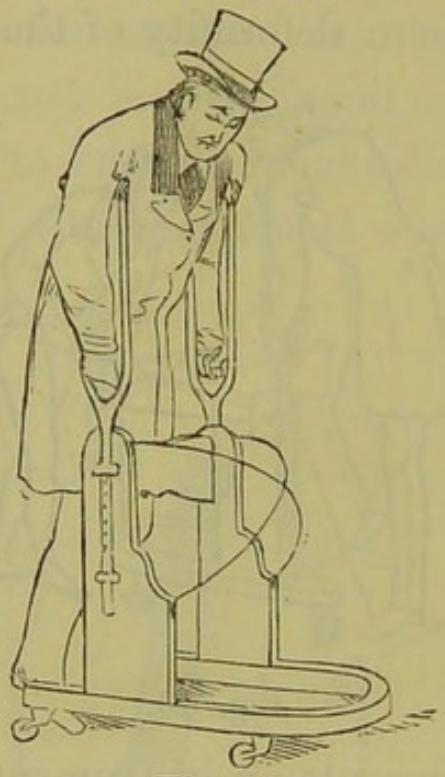

Fig. 44.

in front of the body, and enables the patient to walk more easily. Sometimes, in cases of rheumatism, the arms are affected as well as the legs, and in such cases, if too much weight is put upon the armpit, it presses on the nerves which lead to the hand, and this, if continued, gradually weakens the hand and elbow, in direct ratio to the weight borne by the armpit. To meet this difficulty,

therefore, I have arranged a machine like fig. 45, which causes the patient to bear the weight of the body on the fore-arm and

Fig. 45.

hand, where there are less important structures than at the armpit; and rheumatic patients can learn to walk, by this method, more easily than with the ordinary shaped crutches. Sometimes paralysis is accompanied by lateral curvature of the spine. Fig. 46 is an adaptation of the machine to this complaint, by means

of a strap and board which respectively press on the two projecting portions of the body,

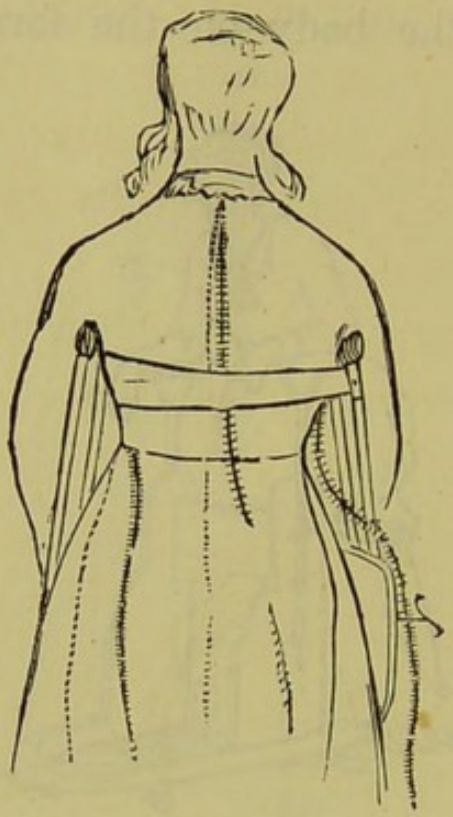

Fig. 46.

and keep the back in a good position during exercise.

INSTRUMENTS FOR EXERCISING THE BACK.

In cases of lateral curvatures and weak spines, provided there is no irritation or disease of the spinal cord, exercise is one of the chief agents in restoring the muscular

equilibrium, and any instrument which helps in expanding and enlarging the chest overcomes many difficulties in the cure of these complaints. In lateral curvature, the muscles of the weak side only ought to be exercised, and very carefully at first, so as not to overtax their powers.

The instrument shown in fig. 47 is a chair for developing the chest.

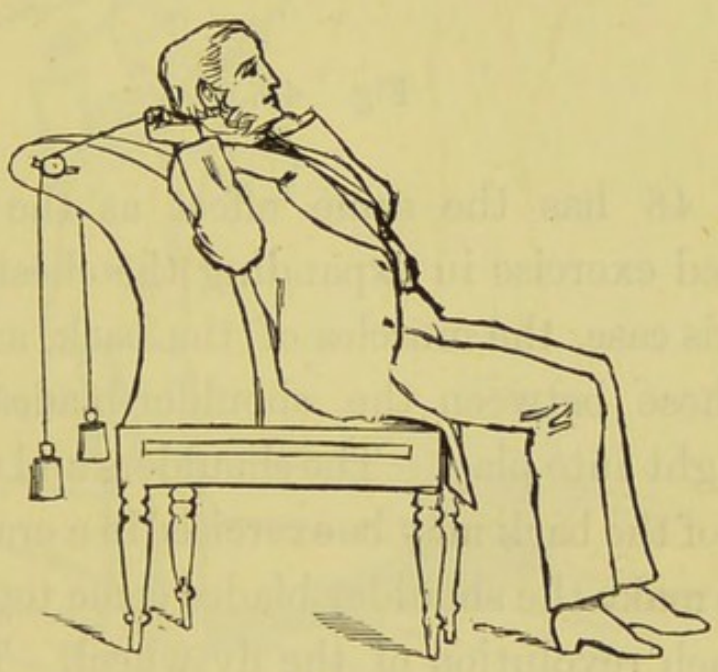

Fig. 47.

The patient, when seated in it, has to pull one or two weights up and down, moving away his back each time from the back of the chair. This exercise is especially

beneficial to persons who stoop and have what are commonly called round shoulders.

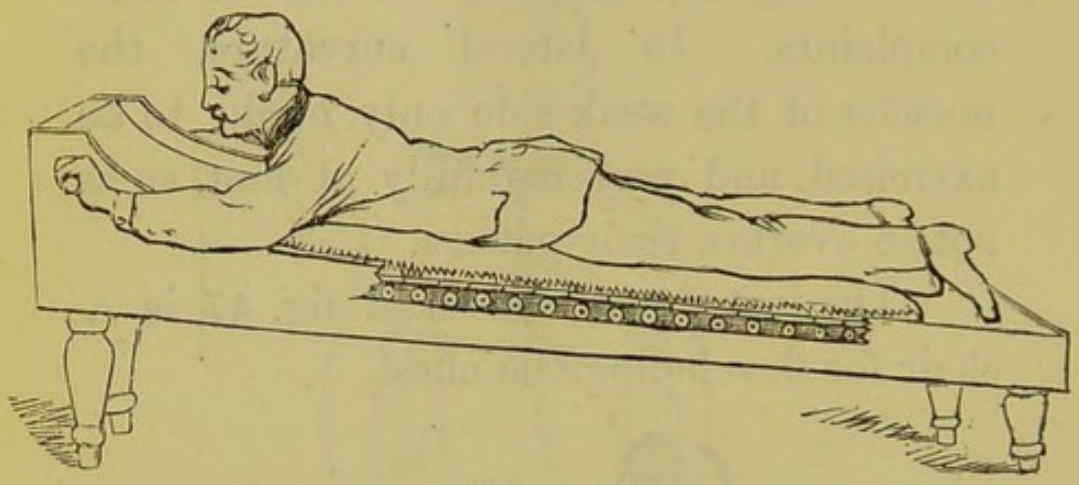

Fig. 48.

Fig. 48 has the same effect as the last-named exercise in expanding the chest, but, in this case, the muscles of the back, as well as those between the shoulder-blades, are brought into play. The shoulders and upper part of the back may be exercised in a crank, so as to make the shoulder blades come together at each revolution of the fly wheel. This is done by two iron rods, about four feet in length, attached to a crank fixed in the wall above the patient's head, as in fig. 49. These rods move in every direction. The patient stands with his back to the crank,

and, taking hold of the handles at the ends of the rods, turns the crank round and

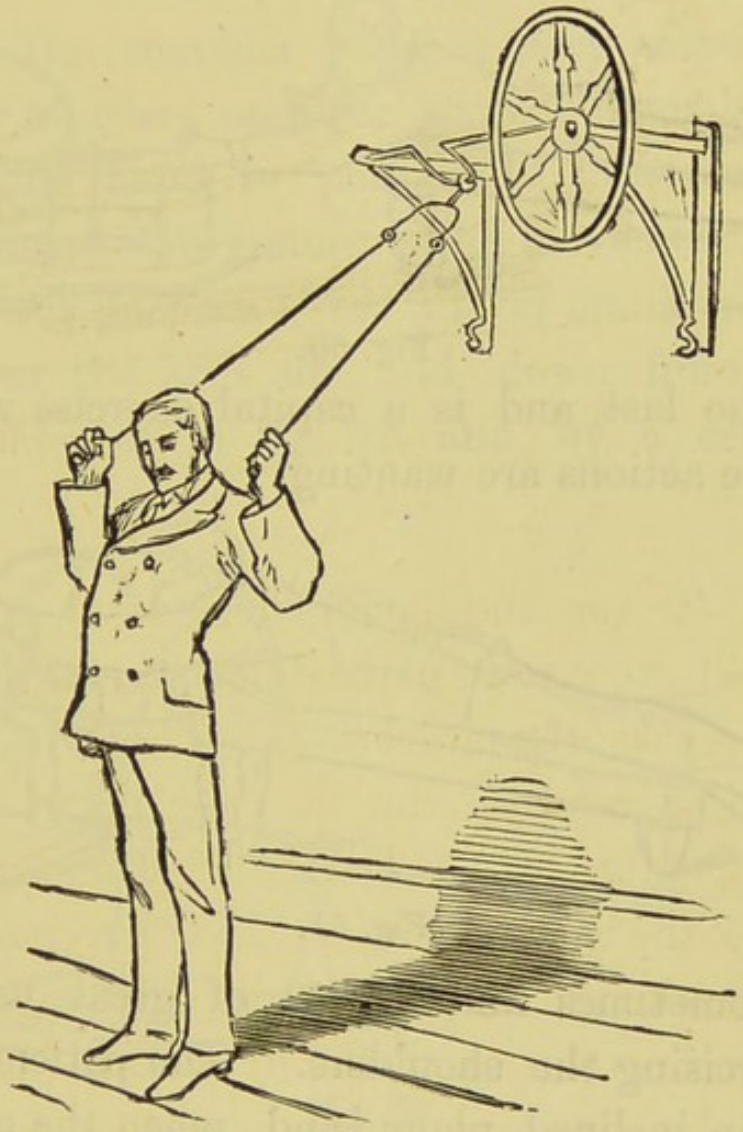

Fig. 49.

round, thus exercising all the muscles of the upper part of the back.

The crank shown in fig. 50 is very useful in developing the muscles of the

arms and shoulder joints. The movement is backwards and forwards, not circular, as

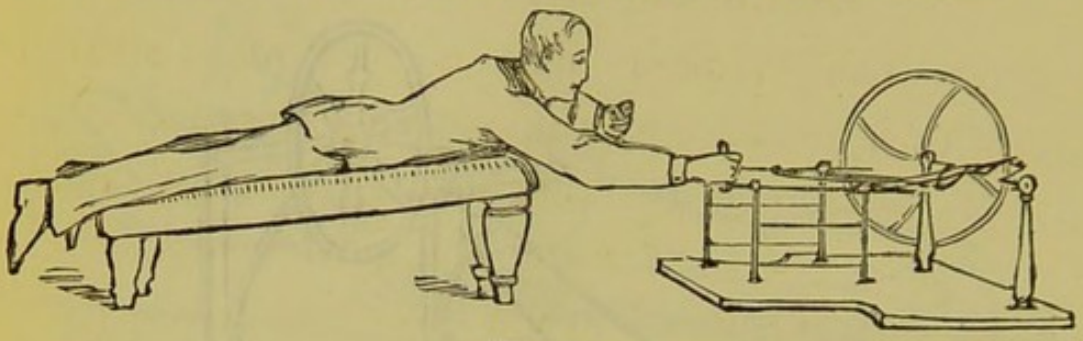

Fig. 50.

in the last, and is a capital exercise when those actions are wanting.

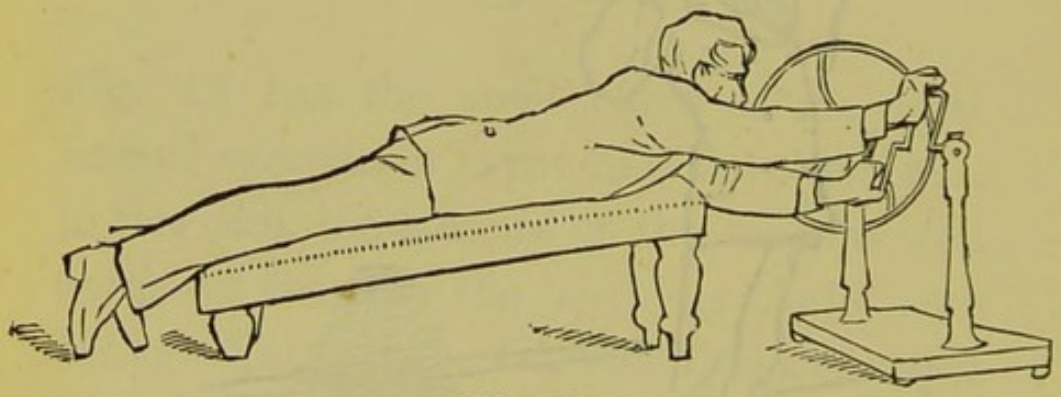

Fig. 51.

I sometimes find fig. 51 of great use in exercising the shoulders. The patient lies on an inclined plane, and, when the crank revolves, the shoulder and whole arm are more or less exercised.

All these five instruments are used in developing and strengthening the muscles of the back, in certain forms of weak spine.

INSTRUMENTS FOR EXERCISING THE SHOULDER, ELBOW, & HAND.

The shoulder joint is very often stiff after injuries, and the patient is unable to lift the hand to the head. Exercise is necessary for restoring the movement, and for this purpose I use a lever crank, which moves the arm up and down from the shoulder as in fig. 52, and, by a certain

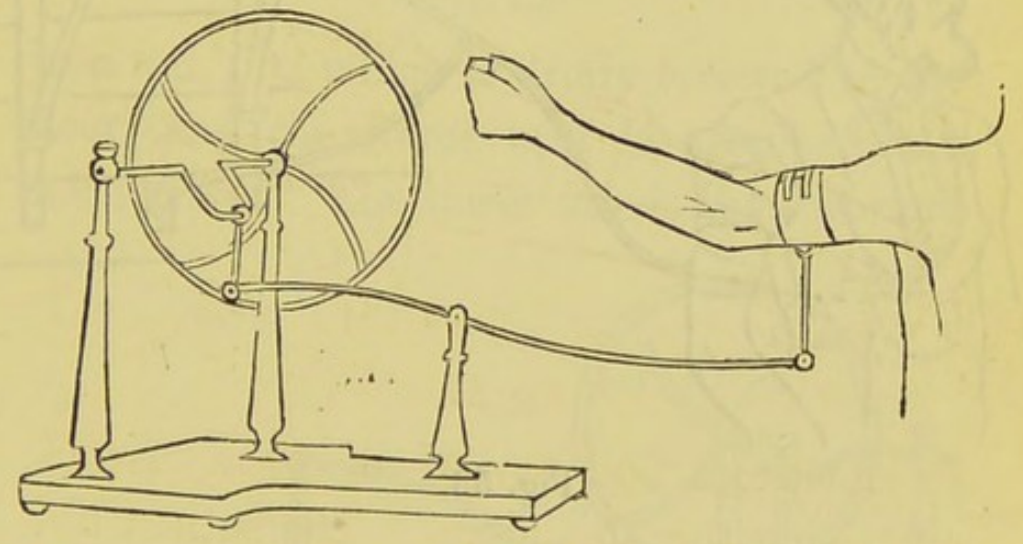

Fig. 52.

adjustment attached to the crank, the movement can be increased daily, until the entire power is restored. Sometimes the patient has lost the backward movement of

the arm, and in that case I use an adaptation of the crank as in fig. 53. The first crank (fig. 52) gives an upward and downward movement, and the second (fig. 53) a backward and forward movement.

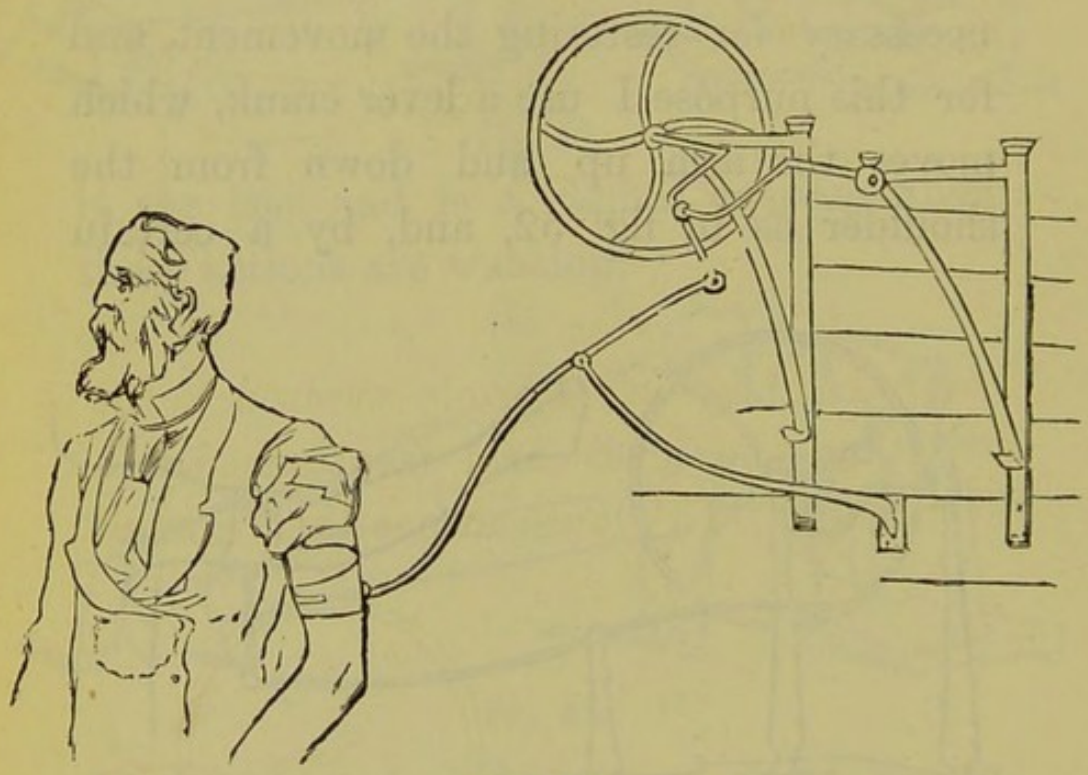

Fig. 53.

The elbow joint, like the shoulder, sometimes becomes stiff, either from rheumatism, or muscular contractions, and requires exercise in order to restore the movement.

Fig. 54 is a drawing of the crank used in these cases. The upper arm of the patient is fixed, by a strap, to an upright

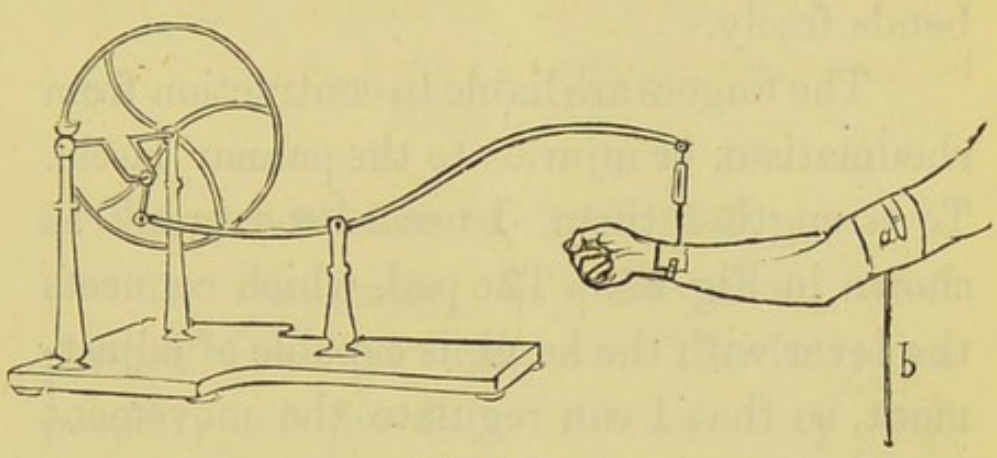

Fig. 54.

iron rod (*b*), which is firmly screwed to the floor, and the lower arm is attached to a lever crank. The lower arm is then worked

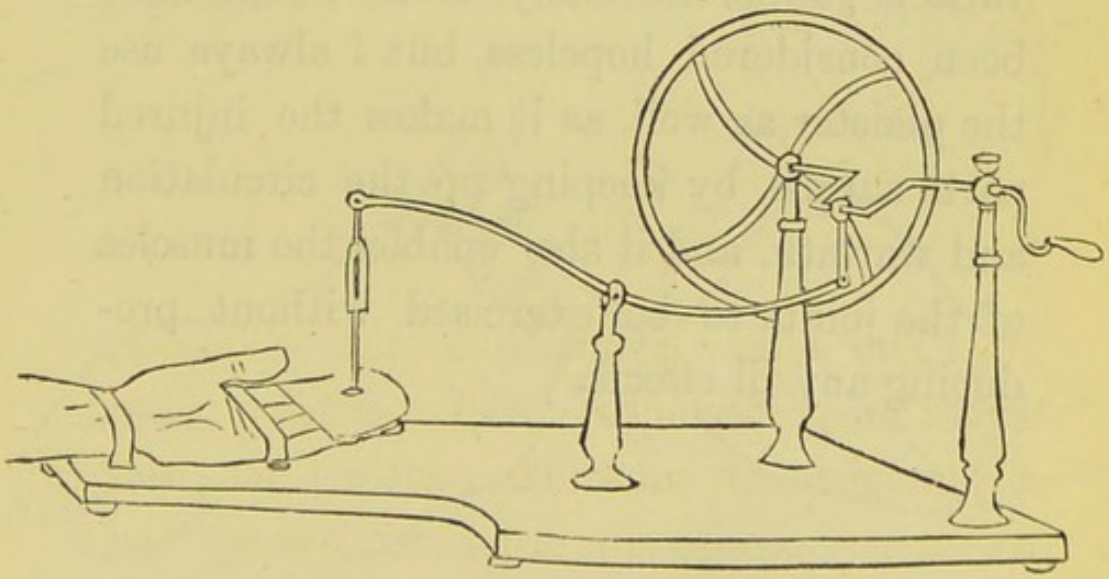

Fig. 55.

gently up and down at each revolution of the crank, and every day the movement is increased, till, by degrees, the elbow joint bends freely.

The fingers are liable to contraction from rheumatism, or injuries to the palmar fascia. To strengthen them, I use a lever crank as shown in Fig. 55. The pad, which connects the lever with the hand, is capable of adjustment, so that I can regulate the movement required by the fingers.

With the above mentioned instruments I have been able to reduce muscular contractions, and to restore the actions of the various joints, in many cases which have been considered hopeless, but I always use the plaister as well, as it makes the injured parts supple, by keeping up the circulation and warmth, and it also enables the muscles of the joints to be exercised without producing any ill effects.

PART II.

INJURIES OF THE FEET.

It frequently happens that when persons bear the weight of the body improperly on the foot, or when they wear boots badly made, the toes are pinched together and are made to cross each other during the act of walking, and by degrees they grow into the malformed shape represented in the annexed drawing.

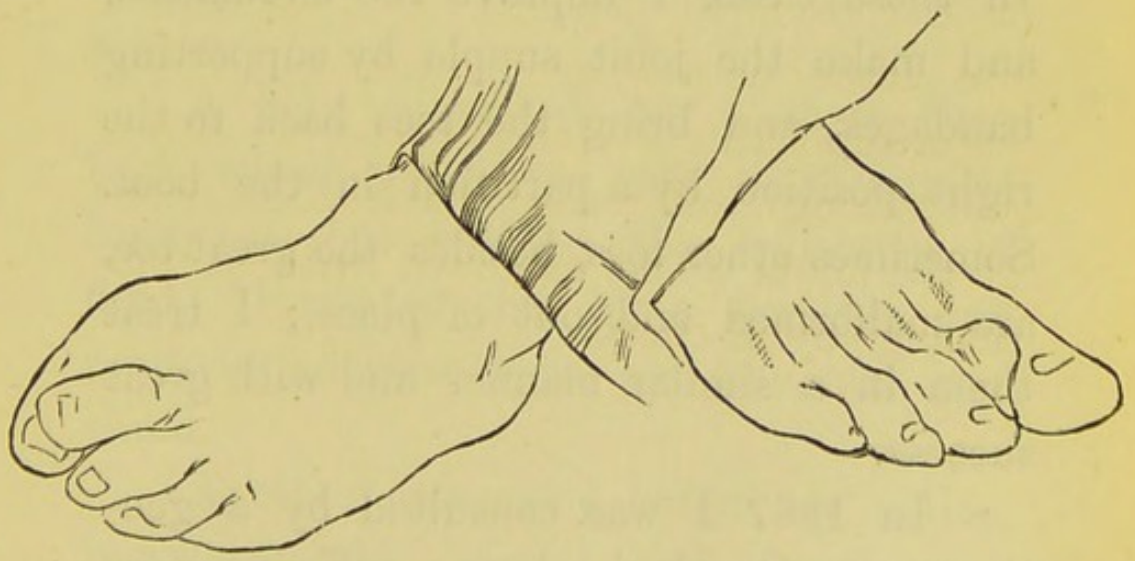

Fig. 56. Fig. 57.

This complaint, when the great toe is affected, is generally known by the name of bunion. When the toe gets into this condition, the patient seems unable to tread on any other part of the foot than the ball of the great toe, and, from continually bearing excessive weight on this part, inflammation sets in, and the skin, covering that portion of the foot which touches the ground, thickens or, in other words, forms a corn which complicates matters, sometimes causing such pain as to prevent walking, and until the toe is brought back to the position it was intended to assume by nature, the sufferer cannot tread on the flat of the foot. In these cases, I improve the circulation, and make the joint supple by supporting bandages, and bring the toes back to the right position by a partition in the boot. Sometimes other toes, besides the great toe, are malformed and out of place; I treat them in a similar manner and with great success.

In 1867 I was consulted by a gentleman, who had been suffering for

several years from enlargement of the ball of the great toe. The toe itself turned under the second toe, causing serious inconvenience and pain when walking. I examined the swelling, and found it to be soft and yielding to pressure, clearly showing that some fluid was there. I lanced the swelling, and pressed out about a teaspoonful of thick transparent fluid. After this, I covered it with a bandage to preserve the circulation, and to produce a pressure on the swollen part sufficient to prevent the fluid reforming. The foot was then placed in a boot with a partition between the first and second toes. This treatment in a very short time produced a cure.

A lady consulted me a short time back whose great toe was in a similar condition, but without the collection of fluid. I treated this by a bandage and properly adapted boot, and she also was cured.

Another case came before my notice, in which the second and fourth toes

had been crossed over the third toe for many years. The patient had consulted a great number of doctors, but without relief. She, at last, came to me for advice, and I found that the third toe was much wasted, and that from the pressure of the other toes corns were continually forming upon it, causing great pain and difficulty in walking. This case I treated with strapping and a partition in the boot. The patient entirely recovered.

SPRAINED ANKLE.

There are no cases which come under my notice so frequently as the above-named complaint. The plan of treatment I adopt is to bandage up the foot with my adhesive plaister, so as to bring the stretched muscles into a contracted state. I also adjust the sole of the patient's boot in such a way as to make the ankle act naturally in walking, and where the action of the ankle joint is disturbed, in consequence of inflammation, I

exercise it in a crank suitable for bending it, as soon as the inflammatory symptoms have subsided.

Some years ago I was consulted by an Oxford student, who had been suffering from a sprained ankle for about three years. He had been treated by various medical men, both in London and Oxford, without success. I supported his ankle with bandages, changing them twice a week, and within four weeks he was perfectly cured. He afterwards went on a walking tour through Switzerland without return of the symptoms.

About the same time, a lady came to me with a sprained ankle, caused by slipping off the kerb stone. The injury had occurred more than a year previously, and, during the whole of that time, had been treated by her usual medical practitioner without any relief. This case I treated in the same way as the last, and in three weeks she was completely cured.

Another form of sprain which has frequently come under my observation is

that in which the "tendo Achilis" has been injured. I will relate one among the many instances of this complaint in which I have effected a cure.

In the spring of 1870 a lady came to me complaining of great pain and tenderness at the back of her heel. Upon examining the foot I found the skin covering the tendon inflamed and the tendon itself much enlarged. She had been unable to walk on the foot ever since the injury had been sustained. I bandaged it up, after applying a soothing lotion to reduce the inflammation. This process was repeated twice a week for four weeks, when a cure was completed.

I could mention hundreds of like cases in which the treatment has been successful, but I think these enumerated are sufficient to prove its efficacy.

THE KNEE JOINT.

The knee joint is very liable to inflammation, and injuries of various kinds; and, in certain constitutions, these inflammations

occur without any apparent cause. When inflamed, the joint is enlarged and puffy all round the knee cap, which seems to be

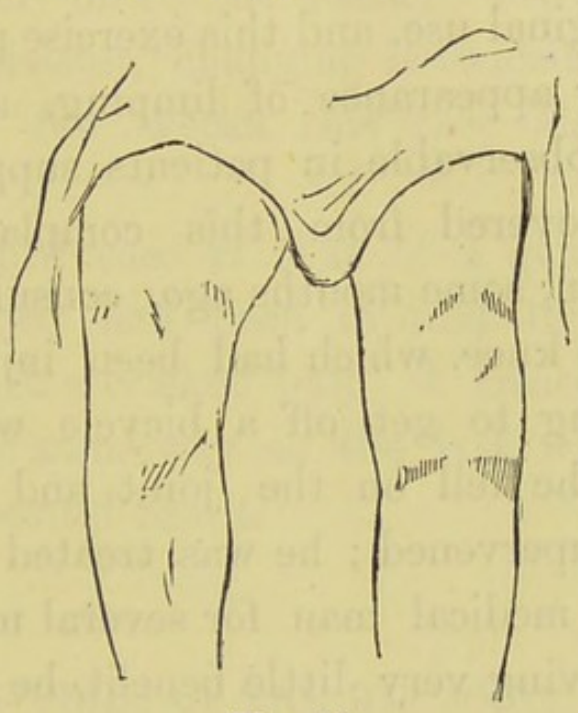

Fig. 58.

pushed away from the knee joint; there is pain, heat, and redness, and until the inflammation subsides the patient moves the limb with difficulty, and is unable, without pain, to bear weight on the joint. In these cases I bandage the limb down to the ankle so as to put an equal pressure from the foot to above the knee; and, when the inflammation is very severe, I splint the knee for a time in a gutta percha splint, and within a very

short time the inflammation subsides ; when it has entirely disappeared, I exercise the joint in a crank to bring the muscles back to their original use, and this exercise prevents any after appearance of limping, a defect so often observable in patients supposed to have recovered from this complaint. A gentleman, some months ago, consulted me about his knee, which had been injured in attempting to get off a bicycle while in motion ; he fell on the joint and inflammation supervened ; he was treated by his ordinary medical man for several months ; but, receiving very little benefit, he at last placed himself under my care. I found that the knee was contracted from the patient having kept it supported on a pillow while the inflammation lasted. I bandaged it with the plaister, which was changed twice a week, and gradually strengthened the leg by the use of a crank, with weights suspended to the knee. In four weeks this case was cured.

A lady came to me a few weeks ago with inflammation in the knee joint. She said

she had injured it in getting off a sofa (no doubt by bringing the weight of the body too suddenly on to the joint.) I bound it up with plaister, changing it twice a week, and in a few weeks this case also was cured.

A third case is that of a gentleman whose knee had been injured by being struck with a cricket ball. I treated this case in the same way as the last, with the same successful result.

INJURIES OF THE HIP JOINT.

This joint is very liable to inflammation of a chronic nature, which comes on gradually. There is at first pain on the inner side of the knee joint, and irritability of the iliac and psoas muscles, which causes them to contract, pulling the head of the bone so close into the socket as to make that bone excessively tender, and sometimes to ulcerate. There is elevation of the injured hip, more or less eversion of the foot, and difficulty in moving the joint about. A sufferer from

this complaint cannot raise the foot without everting the knee from the body, and when he attempts it, he experiences pain in the groin. In this complaint it is necessary to treat the back as well as the hip, muscles which originate from the vertebræ being involved. I plaister the back and hip and when the inflammation is very bad, use splints to keep the body in a good position. When there is no pain, nor any sign of inflammation, I get the leg back to its proper use, by exercising the patient in a crank adapted to the purpose.

In 1868 a lady asked my opinion about her hip. She had been ailing for three years, and had consulted different medical men without success. She could only walk with great difficulty, and, even then, required the assistance of an attendant on one side, and of a stick on the other. She complained of pain on the inner side of the knee, and tenderness over the region of the groin. I bandaged her with the plaister from the hip to the knee ; the plaister was changed twice a week for about four months, at the end of

which time she had lost all pain, and completely recovered her walking powers.

Another injury of a similar character was incurred by a young lady, whose friends asked my advice about her. She had been suffering for two years, and experienced great pain at the knee and hip ;—the foot on the injured side was everted. I cured this patient, after a course of three months' treatment.

INJURIES AND DEFORMITIES OF THE SPINE.

The number of joints composing the spine, the extent of movement of each joint, the varied shapes which, in consequence, the back is enabled to assume, and the quantity of muscles which are necessary to control, support, and help to balance the bones one on another, render the spine very liable to injury. The progress of the disease in these injuries is marked by so little pain and discomfort, and, very often, by so little perceptible difference in the shape, that the deformity, the consequence of the injury,

appears before any medical man is consulted on the subject. There are two kinds of deformities of the spine; one is called *posterior* curvature, from the spine in this complaint projecting backwards; the other is called *lateral* curvature, from the spine projecting in a lateral direction.

POSTERIOR CURVATURE OF THE SPINE.

Posterior Curvature generally depends on ulceration of the bodies of the vertebræ from falls when the body is in a weak state; the treatment is to try and get the injured bones to unite by bony union, by the same process as a leg or an arm would mend after being broken. To effect this object, no hindrance should be offered to the parts coming together, the patient should be kept in an inclined position, so that the weight of the part of the body above the injured part should not, by its irritation, extend the inflammation. It takes generally from one year to three before the bones are strong enough to bear any weight, and during that time the patient must be very cautiously

handled, or otherwise the inflammation sets up afresh. Such cases as these are incurable, and the deformity is always permanent.

The treatment I adopt is to bandage the spine, which restores the muscular power after the long rest, and when the deformity

Fig. 59.

Fig. 60.

exists in the middle of the back as in fig. 59, I use a splint, shown in fig. 60, to protect the projecting portion from further injury, and to assist the spine in supporting the head and shoulders; when the deformity exists between the shoulder-

blades as in fig 61, the patient is designated hump-backed. Although no real cure can be effected in cases of this description, yet

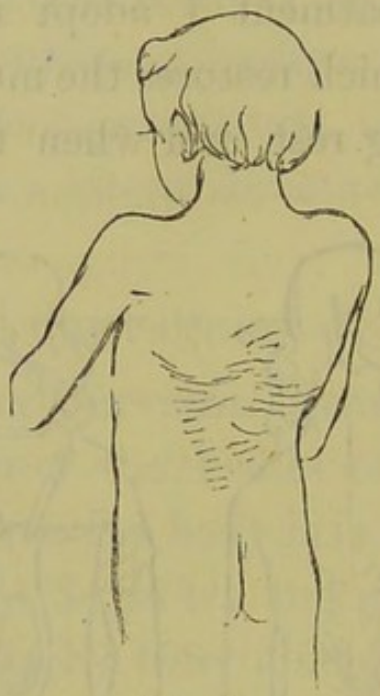

Fig. 61.

great relief may be given, and, with a properly made instrument, very little inconvenience need be felt.

LATERAL CURVATURE OF THE SPINE.

The back is divided into two equal parts by a middle line, corresponding to the spinous processes of the vertebræ, and on each side of this mesial line are two exactly

similar sets of muscles, whose functions are to balance the back properly on the lower part of the body, and to regulate it in its different movements on the legs. If in our daily avocations, we used these muscles equally we should have no injuries of the spine, except those arising from direct strain of the muscles, bones, or ligaments, or from debility of the bones themselves ; but as it is, we are, in our various occupations, and even in our amusements, continually using one set of muscles to the exclusion of the rest. Consequently, we not only put our backs in bad positions, but we keep them so sometimes for weeks and months. The muscles on the side most used contract, the bones and intervertebral substances absorb from being continually pressed together on one side, the pressure preventing these tissues getting their proper supply of blood, and lateral curvature of the spine is the result.

Lateral curvature may be produced by using one leg more than the other ; the leg most used becomes shorter, and serious

inconvenience in walking is the result. Curvature produced by this means may be called lumbar lateral curvature, because it occurs in the lumbar region of the back.

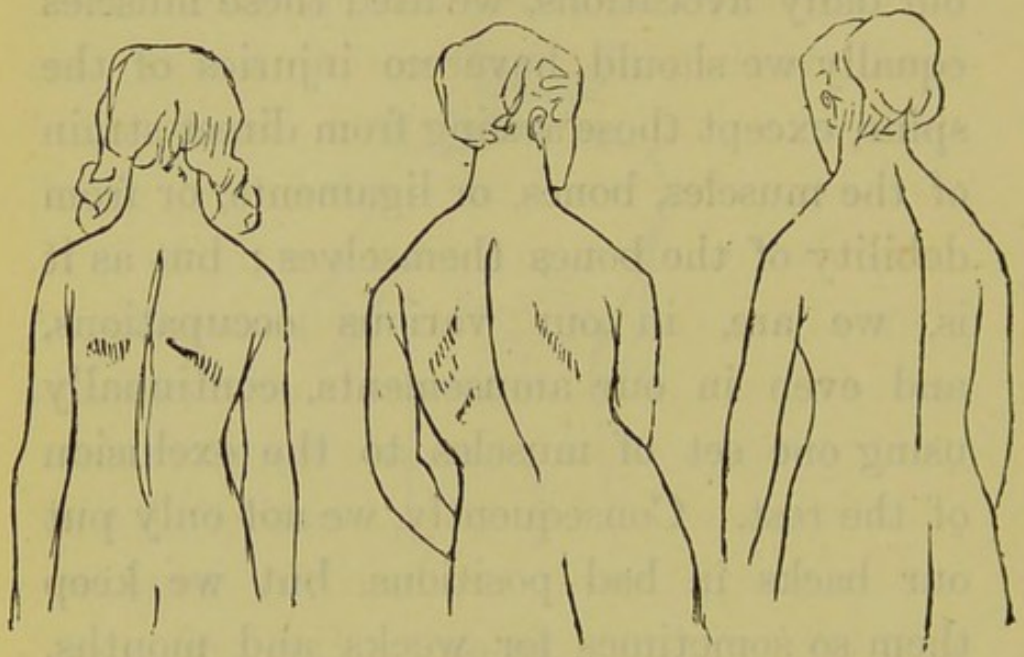

Fig. 62. Fig. 63. Fig. 64.

Fig. 62 gives the shape of a back two years after an injury to the left knee joint, which had become straight and ankylosed.

Fig. 63 shows a back after hip joint disease, several years having elapsed since the abscesses had healed. The left knee was slightly contracted, and the right leg, which bore all the weight, was stiff at the hip.

Fig. 64 represents a back after an injury to the ankle, causing the patient to walk too much on the heel, and the ball of the great toe.

Where the disease has not made much progress the plaister suffices for a cure, but where the hip is very much drawn up, I use, in addition, an instrument which extends from the armpit down to the heel. The object in using the instrument is to put the hip back into its relative position to the body, and to reduce the curvature of the spine. There is another lateral curve of the spine, produced by using one arm more than the other. The arm more used becomes lower than its fellow, and the distance between the armpit and the hip on that side visibly decreases. This curve is situate in the dorsal region of the spine, and may be called dorsal lateral curvature. It requires mechanical treatment, like lumbar lateral curvature, but not of so severe a kind. Indeed, in ordinary cases of this complaint, in the incipient stage, bandaging with the plaister, as shown in

the accompanying drawing, is sufficient to produce a cure. When, however, the curve has gone beyond a certain point, this treat-

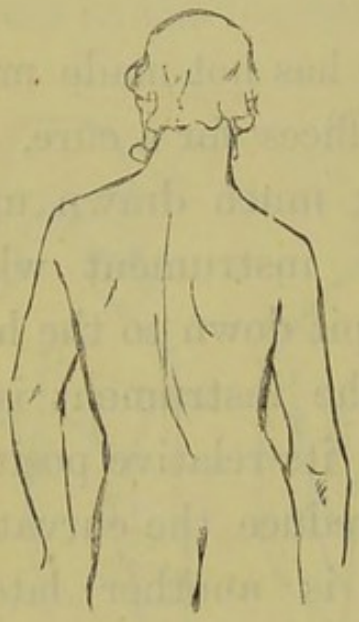

Fig. 65.

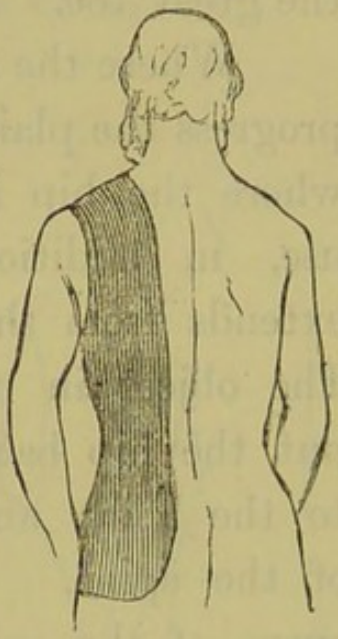

Fig. 66.

ment is not sufficient, and I therefore, in addition, fit a light steel crutch from the hip to the armpit, which makes the shoulder assume its proper height.

Fig. 67 represents a case in which the spine is curved from excessive use of the muscles of the left side.

Fig. 68 represents the same case, with a steel splint so adjusted as to keep the spine in the reverse position from that

which its bad inclination had caused it to assume. These two woodcuts are copies of photographs taken of the case.

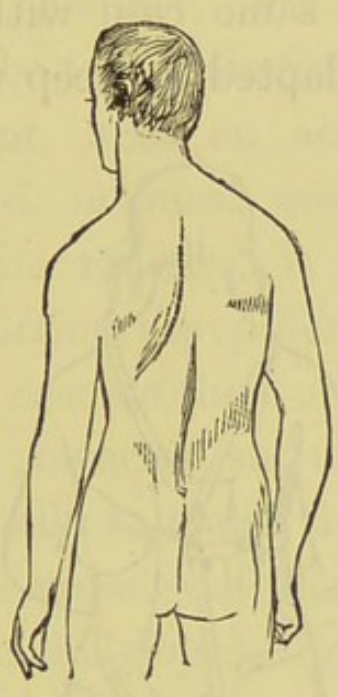

Fig. 67.

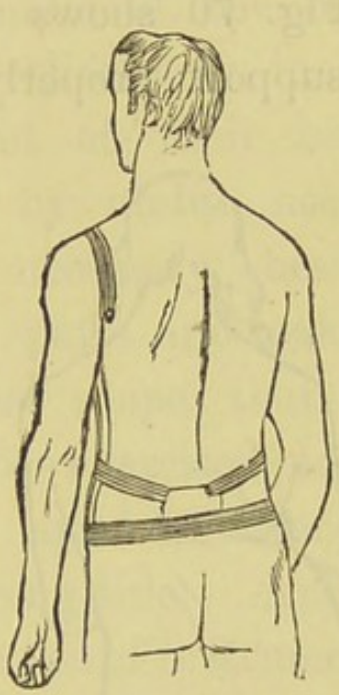

Fig. 68.

It may not be out of place to remark that the young man, whose case is represented above, was, when he first came under my notice, gradually getting thinner and weaker, but, after I fitted on the steel instrument depicted in the drawing, he experienced great relief, and in a few weeks was able to do twice the work he had

hitherto done, and gained flesh to the great satisfaction of himself and his friends.

Fig. 69 shows a severer form of lateral curvature than the last.

Fig. 70 shows the same case with a steel support, properly adapted to keep the

Fig. 69.

Fig. 70.

spine in its natural position. These two woodcuts likewise are copied from photographs of the case.

There are several other varieties of lateral curvature produced by excessive use of certain muscles on one side or other of

the back; as, for instance, that which occurs in the middle of the back, and which we may call central lateral curvature. These various curvatures, the curvatures of the hip, shoulder, and middle of the back, may be found, singly or collectively, in one patient, and, on account of their being caused, in most cases, by undue use of certain muscles, it is necessary, besides supporting the different parts and making them assume their original shape, that the weak muscles should be exercised so as gradually to make them equal in strength to the muscles of the strong side. And to attain this object, I make use of instruments of various kinds, expressly designed by me for exercising each case of lateral curvature.

By means of the above-mentioned treatment, I have been able to relieve and cure many cases before thought incurable. There is one form of lateral curvature of the spine, not yet mentioned, which fortunately occurs but seldom. It is produced by a softening of the spinal bones, from the absence of a sufficiency of earthy matter in

their tissue. This kind of curvature is, of course, more serious than that which arises from unequal muscular action, nevertheless, by a judicious use of mechanical treatment, it may be relieved, and even cured, providing the disease has not gone too far.

A lady consulted me, some years ago, about a weakness of the back. She was unable to hold herself up in sitting, and suffered great pain in the lumbar and dorsal region of the back. She had consulted various medical men without any success. I treated the back by bandaging it from the neck down to the hips, changing the bandages twice a week, and in six weeks she could sit up, and was perfectly cured.

Another lady applied to me for advice who had received an injury in lifting a sick relation. She had strained her back at the lower part on the left side, just above the hip. She suffered pain whenever she attempted to walk, which lasted for a considerable time. I treated this case as the last, and, in a very few weeks, effected a cure.

A lady placed herself under my care, who, for many years, had been afflicted with lateral curvature of a severe kind. The projection of the spine being immediately below the right armpit, she was weak and nervous, and overcome by the least exertion. I fitted her a light splint, the crutch extending from the left armpit to the left hip. By means of this instrument and the plaister bandages I entirely cured her.

Another case, in which the same treatment proved successful, was that of a lady suffering from lateral curvature of the lower part of the spine.

WRY NECK.

The cervical bones may be put out from their accustomed position by a series of undue muscular exertions of one side of the muscles of the neck. This produces contraction, and consequent deformity. The head is twisted round and the chin is drawn to one side. This peculiar condition is called wry neck.

The disease is aggravated by any derangement of the stomach, because the same nerve which supplies the contracted muscles, also contributes nervous power to the stomach. Consequently, when an indigestible substance is introduced into the stomach, it irritates the nerve, causing increased contraction of the muscles of the neck, and necessarily increased deformity. Sometimes the head drops forward on the chest, from insufficient power on the part of the muscles to keep it in its proper position; this chiefly affects persons of an advanced period of life, especially those who are, or have been, in the habit of reading or writing much with the head bent forward. Sometimes the muscle is subject to constant spasmodic contractions, causing the head to shake, and giving greater inconvenience and annoyance to the sufferer than if the head were fixed in a contracted position. These complaints are very difficult to cure, as it is almost impossible to devise an effective instrument which is unobjectionable in appearance. The head being such an exposed part of the body, an

instrument worn upon it cannot be concealed except the apparatus is covered with a cap.

Fig. 71.

Fig. 72.

INJURIES OF THE SHOULDER JOINT.

The muscles of the shoulder joint are very often sprained from putting weights suddenly on particular muscles, and, in consequence, great inconvenience and pain are felt when lifting or attempting to carry anything. In cases of this description, nothing does more good than support by bandaging ; the bandage keeps the joint in its place, and prevents the weakness of the

muscles allowing it to drop. The shoulder joint may become inflamed, and, after the inflammation has passed off, there is found an inability to lift the arm without moving the shoulder blade as well, and, if proper treatment is not adopted it is very difficult to recover the right movement of the joint. In these cases the shoulder and upper part of the arm are bandaged with the plaister, and the cure is completed by putting the hand through the different movements which it is unable to perform of itself. The shoulder joint may also be stiffened by rheumatism, in which case the joint is enlarged, and the same treatment as that detailed for stiffness after inflammation, applies also to this case.

Case 1.—Mrs. R., was thrown out of a pony chaise, and injured her shoulder joint, so that she could not raise it without extreme difficulty. She consulted me about eight weeks after the accident. I bandaged the shoulder and upper part of the back, changing the bandages twice a week, and in six weeks she was well.

Mrs. C., an old lady, slipped and fell upon her shoulder joint, which was very much injured in consequence, and very stiff. I treated this case like the last, but in addition to the bandages, I exercised the arm up and down in order to restore the movement. This treatment entirely cured her in a short time.

INJURIES OF THE ELBOW JOINT.

The elbow joint very often becomes stiff from the effects of inflammation or rheumatism, and in such cases it is necessary to apply an instrument to overcome the force of resistance of the contracted muscles; plaister bandages are also applied from the middle of the upper arm down to the wrist. When the arm is straight, I put it through a series of exercises in order to strengthen the extensor muscles. The muscles of the elbow joint are very often sprained from putting too sudden a strain upon them; this form of injury is generally accompanied by slight inflammation in the joint itself.

Cases of this kind are entirely cured by the support, warmth, and absorbing influence of the plaister.

Mrs. —— consulted me about her elbow joint, which had become very stiff, the veins of the forearm were enlarged from the difficult circulation through the elbow, and she suffered great pain. I bandaged the arm twice a week for about four weeks, and this treatment, with a little daily exercising of the joint backwards and forwards, entirely restored the movement of the joint, and brought back perfect circulation.

INJURIES OF THE WRIST.

The wrist is very liable to sprains and injuries, and also to rheumatic enlargement. The plaister, from its support and warmth, is very valuable in these cases, and where there is any displacement of the joint I fix a gutta percha splint from the middle of the forearm down to the palm of the hand; this is moulded on while the wrist is held in its normal position. Every day, provided there

is no inflammation, the wrist is taken out of the splint and made to go through the natural movement peculiar to the wrist joint.

INJURIES OF THE THUMB AND FINGERS.

The thumb is very often injured and sprained from falling upon it. The consequence of such an accident is, either that the thumb cannot be moved from the forefinger at all, or without pain.

The thumb may gradually get into a similar condition with persons who do much needlework, and in this case the fingers are very often contracted as well. The treatment adopted when the thumb is sprained is to bandage the thumb so as to draw it away from the forefinger, this bandage is changed two or three times a week, and, when tightly contracted, a little splint is added to remove the contraction. In the case of sprained and contracted fingers also, I adopt the same treatment, and with great success.

RICKETS.

Rickets is a peculiar condition of the body, caused by the absence of a sufficient

quantity of phosphate of lime, or hardening matter in the bones, which become so soft and yielding that they bend into various shapes. The disease generally affects children when very young, especially those who are heavy in the upper parts of the body. Sometimes, but rarely, it exists in middle-aged and old people. The bones of the legs are sometimes curved or bent, sometimes the joints give ; for instance, the knee may curve in or out ; when the knee curves in, owing to its touching the other knee while walking, the complaint has been called knock-knee. Sometimes the spine is affected by it, and lateral curvature is the result. Sometimes the upper portion of the spine (cervical region) is affected, and forms a posterior curvature ; the head, in consequence, is bent forward, and gives an awkward appearance. The treatment adopted, with children, is to remove them off their legs, and where the joints have yielded, to straighten them with splints. I also cover the parts with bandages, during and after this treatment,

dieting the patients, giving them medicines containing lime, and requiring them to have as much fresh air as possible.

RHEUMATISM.

Rheumatism is a peculiar condition of the body attended with inflammation of one or more joints; the inflammation passes after a time from an active to a chronic state. When it attacks the lower extremities, the hips, knees, and ankles lose their proper shape, and the muscles become contracted. In walking, the patient turns the foot out, has the knee slightly contracted, and bends the body forward. As the disease progresses, the knees and hips get more contracted, until the legs in walking cannot be brought under the body at all. The hands, arms, and shoulders are sometimes affected at the same time with the legs; they lose their shape, and get contracted. With this complaint there is much

constitutional disturbance; the pulse in the acute stage is very feverish, acid perspirations are frequent, and great care has to be taken to prevent the heart being affected. During the acute stage of rheumatism it is necessary to keep the joints as straight as possible. I generally put the legs into splints, and I find that the joints do not contract so much as without splints; but, as a rule, when these cases are brought to me, the patients have been suffering for some time and the disease has passed into a chronic form. The great thing, if the legs are affected, is to straighten them by well-adapted splints, and not to attempt to make the patient walk till the legs are straight. To attempt to walk while the legs are contracted is simply to increase the complaint. In order to prevent the splints making the legs stiff, they are taken off once a day for half-an-hour and the leg is exercised in a suitable crank. The splints are kept on for a short time after the legs get straight, which prevents the knees from contracting again. The knees, ankles, and sometimes hips, are

covered with the plaister bandages, as they tend to keep the joints more supple, and improve the circulation through the parts covered,. they are usually changed twice a week. Should either the digestion or the circulating organs, or any of the secretions be impaired, I assist them by suitable medicines. This treatment, if properly carried out, will often cure when all other means have failed.

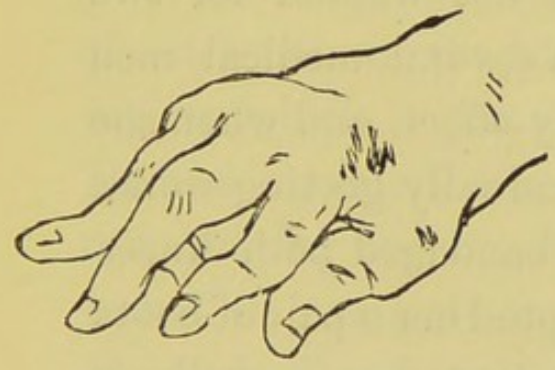

Fig. 73.

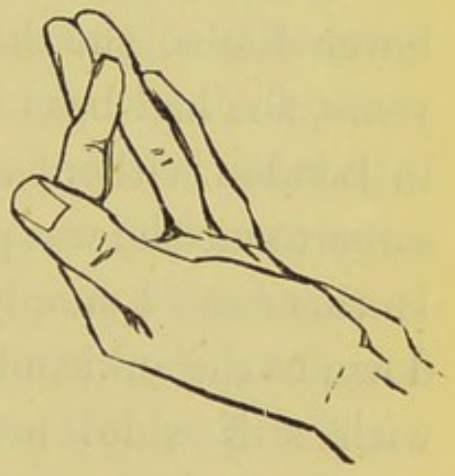

Fig. 74.

The above drawings, Figs. 73 and 74, show two cases of rheumatic disease of the hand.

The treatment of rheumatic affections of the hands, arms, elbow, and shoulder

joints, is on the same principle as that for the lower extremities. They are covered with plaister to improve the circulation, make the joints more supple, and aid in the absorption. All contractions are straightened by suitable instruments, and when the joints cease to be contracted are exercised gently to get back the muscular power they have lost.

Case 1.—Some years ago a lady consulted me about a rheumatic affection of her lower limbs, she had not walked for two years, she had been to several medical men in London without any effect, and when she came to me she was gradually getting worse. In this case, I simply bandaged both knees down to the ankle, adapted her a pair of boots with stiff sides and lent her a walking machine. In four months she was perfectly well. Two years afterwards I saw her and she was walking perfectly well.

Case 2.—In another instance a lady suffered intense pain down the nerve at the back of the left leg, the limb itself was drawn up so that she could not put the

heel to the ground. I bandaged the hip and leg down to the knee in this case, and exercised the leg in a suitable crank. This patient was entirely cured.

Case 3.—This patient was an old lady, whose knees were very much swollen from rheumatism. She had great difficulty in walking, and especially in getting up and down stairs. I bandaged her knees with the plaister and in three months she was quite well.

Case 4.—A gentleman consulted me about a pain in the back all over the lumbar region, which is commonly called lumbago. He had consulted several medical men without deriving any benefit, and when he came to me he was getting worse. I bandaged his back all over the painful part. This, with a little attention to his general health, soon cured him.

Case 5.—A lady consulted me about her arms which were rheumatically contracted. I bandaged them from the middle of the upper part of the arm down to the wrist, and adapted a splint with a screw and

ratchet joint at the elbow. This instrument enabled me in a very short time to straighten the arms.

Case 6.—A gentleman consulted me about the palm of his hand which was rheumatically contracted and gradually getting worse. The hand was partially closed and was becoming more useless every day. I bandaged it with the plaister and put the hand in a straight wooden splint, scooped out to fit the palm of the hand and fingers, pulling it by straps gradually down upon the splint. This was worn night and day for several weeks, after which time, I took the hand out of the splint once or twice a day and exercised it in a crank, which moved the fingers backwards and forwards and stretched the palm of the hand. With this treatment, and a little attention to his general health, his hands soon began to recover the power they had lost.

PARALYSIS.

The term paralysis is derived from a Greek word, signifying to relax. It is a loss

of power of different muscles of the body from irritation, or actual disease, of the nervous system. It attacks various parts of the body. All the muscles of one side may be affected, or again all the muscles of the lower half of the body. Sometimes the muscles of both legs, or of both arms, are attacked, sometimes the muscles of the head and neck. If one side of the body is paralysed, the injury may generally be traced to the brain ; if the legs are affected, to the spinal cord ; if the arms as well as the legs are paralysed, either the brain or the cervical portion of the spinal cord may be affected. The moving power of the muscle attacked by paralysis may be either diminished or totally gone; when the power is simply diminished, the muscles sometimes act spasmodically. Again, the sensation only of the muscle may be impaired, or the sensation may be impaired and the moving powers diminished, or both sensation and moving power may be totally lost. When a patient is first likely to have paralysis, especially if it is going to attack both legs, it

may be known by his walk, he does not bend the knee, and walks on the toes, sliding them along the ground; this mode of walking causes not unfrequently severe falls. When the paralysis is beginning to affect one leg the patient swings it round in a sort of half-circle, and if he bears any weight at all on the affected leg it is on the outside of the foot. If the arms and hands are becoming paralysed they gradually get weaker, and their actions every day become more imperfect, the wrists have no power to keep the hands up, and they hang down helplessly; in moving the arm from the shoulder it is swung to its destination.

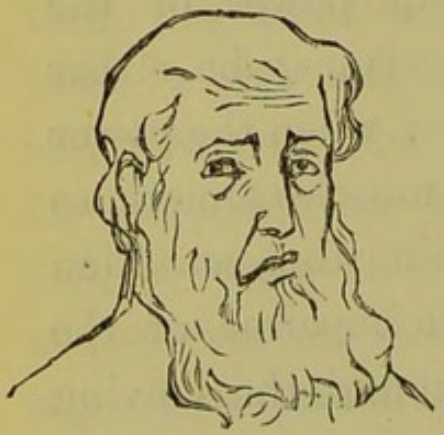

Fig. 75.

Fig. 76.

The above drawing, Fig. 75, shows a case of paralysis of one side of the face. Fig. 76,

shows the same case with an adjustment of straps to which a vulcanised hook is attached, the hook fits in the side of the mouth and pulls it into its proper position. If this splint is worn night and day for six weeks, the relaxed muscles contract and gradually regain their normal actions. The muscles of one side of the face are sometimes affected. The force of balance between the two sides of the mouth is disturbed, giving a peculiar appearance; that side of the mouth not paralysed is drawn up, and the distance between the lower margin of the eye and the angle of the mouth is different on the two sides of the face. The eye of the affected side is shut with difficulty, and the nostril closes when the patient attempts to draw up air through it; the muscles of the eyelid may be unable to lift it up, and, in consequence, the eyelid remains closed; or, the eye may be paralysed in such a manner as to prevent its closing. The tongue may be paralysed, and the distinctness of the speech be affected, or the vocal cords may

lose their power and the voice fail in consequence. Sometimes the loss of movement is preceded by pain in the back or head, sometimes the pain only manifests itself when the part is touched, as in certain cases of irritation of the spinal cord. When the bone over the place of irritation is suddenly touched the patient flinches and jumps away. In these cases, the movement of the lower limbs is, at first, very slightly impaired, beyond a continual weakness, and a disinclination to much exertion, and if there is any great loss of power it can be restored as soon as the tender parts get well. The causes of paralysis are direct injuries, such as falls, causing either fracture or injury of the bones enclosing the brain and spinal cord, sluggish circulation through the nervous system, softening and ulcerations of the brain or spinal cord, tumours pressing on any portion of the brain or spinal cord, and constitutional disturbances of various vital organs. The nervous system, in some organisations, is so sensitive and delicate that any severe mental strain, any very pro-

tracted mental exertion, or even any very excessive emotion of the mind may irritate it, and if the strain be continued long enough cause actual disease. Again, a weak spine, a lateral or posterior curvature of the spine, a continual stooping posture, the constant shakings attendant on much railway travelling, riding in carriages, etc., will in persons pre-disposed to it bring on irritation of the nervous system and consequent paralysis. Paralysis from irritation of the nervous system occurs much more frequently than paralysis from actual disease; but whether the patient suffers from irritation or actual disease of the nervous system, the results are exactly the same, with this exception, that the paralysis is not so easily cured when actual disease occurs. The treatment of paralysis, of course, depends on its cause. Irritation must be removed by giving the patient rest of mind and body during the exciting stages of the disease, and as long as any inflammatory action exists, the various secretions of the body must be attended to, and Nature must have every

chance of righting herself. Medicines must be given which absorb, without irritating, and tonics, if required, to build up the strength. In the course of the treatment I adopt, the back and legs are covered with plaister to draw off the circulation from the nervous system to the skin. And where the active symptoms of the disease have subsided, the legs are gently exercised in suitable cranks. The patient is afterwards assisted to walk by a walking machine.

CASE 1.—PARALYSIS FROM AN INJURY TO THE SPINAL CORD.

Mrs. B—— met with a severe accident in India, by some kind of conveyance falling on her back. Where the carriage struck, the bones went through a process of ulceration, and eventually joined together by bony union. She was paralysed beneath the point of the blow from the moment of the accident. She came over to England for advice, and consulted surgeons of Guy's Hospital, and others, without success. At

last I was called in, and I restored her walking powers,—and she was enabled, before leaving for India, to walk considerable distances, with the aid of one of my walking machines. This patient could not recover entirely, as the muscle in the back was more or less injured by a bed-sore which she had contracted in India soon after the accident.

CASE 2.—PARALYSIS OF THE LOWER LIMBS.

Miss T——, consulted me about her lower limbs, which had been paralysed for a period of twenty years. She had to be carried, and the slightest exertion brought on fainting fits which lasted for several hours, and left her prostrate for days and weeks. During this prostration, the stomach was so weak that she could not retain her food. One of these attacks occurred soon after her arrival in Brighton, brought on, no doubt, by the fatigue and exertion of travelling. I fed her during

the attack with nourishing liquids, and strengthened the stomach with electricity applied over the region of the liver and stomach, this after the first application stopped all sickness. Repeated applications of electricity, and bandaging the back and legs with plaister soon cured these distressing fainting fits. As soon as she was sufficiently recovered, I put her in a walking machine. A constant use of this (I had not then invented the crank machines for exercising the limbs) and a course of bandaging, cured her in twelve months, when she was able to walk up and down stairs without any crutches, although in the rooms and out of doors she used a pair of ordinary ones. Her parents little expected the result. On her return home they hired the same man who had carried her over a long platform to assist her in the same way. They were, however, agreeably surprised to see her get out, and walk by herself assisted by her crutches.

CASE 3.—PARALYSIS OF THE LOWER LIMBS FROM IRRITATION OF THE SPINAL CORD.

Miss C——, the sister of a medical man, who, I believe, had had the advantage of every opinion, was unable to walk for twenty-eight years, and during all that time had to be carried up and down stairs. I treated this case with bandages, changing them about twice a week, and with the help of a walking machine I quite restored her. She can now walk without crutch or stick, much to the astonishment of her relations and neighbours.

CASE 4.—PARALYSIS OF THE LOWER LIMBS.

Mrs. H——, consulted me about paralysis of the lower limbs, she could not stand, and walked with great difficulty between two persons, the feet were perfectly cold and had lost their sensation so that she could not distinguish which part of the foot I touched. Several medical men at Reading and London had given her up, telling her

that she would never walk again. I bandaged her back and both her legs, changing the bandages twice a week, and made her exercise in a crank. In six months she walked without assistance, and in a little more than twelve months was quite recovered.

CASE 5.—PARALYSIS OF ONE SIDE.

Mr. R——, consulted me about his son who was then about fourteen years of age. He had scarlet fever when seven years old, and had suffered from loss of movement of one arm and leg ever since. I bandaged his leg, arm, and back with plaister, removing the bandages twice a week; and with the use of a walking machine, he was soon enabled to walk without any assistance. I had also in this case, a boot adjusted to make the patient tread on the flat of the foot.

D. O'Connor, Printer, "Brighton Guardian" Office, 34, North Street.