Further observations on the lateral or serpentine curvature of the spine, and on the treatment of contracted limbs. With an enquiry into the effects of various exercises, and other means which are used to prevent or cure these deformities. Being a supplement to the work on distortions of the spine and bones of the chest / by John Shaw.

FURTHER OBSERVATIONS

ON THE

LATERAL OR SERPENTINE

CURVATURE OF THE SPINE,

&c. &c.

LONDON:
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BEING

A Supplement

TO THE WORK ON DISTORTIONS OF THE SPINE, AND BONES
OF THE CHEST.

By JOHN SHAW,
SURGEON, AND LECTURER ON ANATOMY.

LONDON:
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PREFACE.

THE object of the preceding volumes was to endeavour to establish by demonstration, certain facts regarding the diseases of the spine. I had hoped that this was fulfilled; but more extensive opportunities of ascertaining the views of the profession on these questions have shown me that many important points are still undetermined; I have been therefore induced to follow up the inquiry, and go more minutely than formerly into certain subjects.

Some of these may at first appear trifling, and not worthy of being discussed in a professional work; but when investigated, their importance will probably be acknowledged.

A few of the observations made in the preceding volume have been again introduced; their immediate connection with many of the points in question, will, I trust, be sufficient apology for the repetition.

London, April 1825.

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* The work to which this is a supplement, is comprised in an octavo and a folio volume. In the first, I have endeavoured, by entering fully into the pathology of the spine, to demonstrate certain effects of distortion; and to prove that the *lateral curvature* does not depend so often on a specific or constitutional disease, as upon causes which may be counteracted. The method of treating each variety of distortion is particularly described.

In the folio, which contains thirty-four figures, with full explanations, there are engravings of thirteen specimens, exhibiting so many varieties of curvature of the spine. To these are added, sketches from the living body, in illustration of the causes, and of the changes produced in the form, by the different degrees of distortion, with etchings to explain the various mechanical contrivances which have been found useful in their treatment.

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LATERAL OR SERPENTINE

CURVATURE OF THE SPINE.

When the spine of a girl about the age of twelve or thirteen is becoming crooked, the attention of the mother or governess is at first attracted by the state of the shoulders or breasts: at this age, indeed, most frequently by the latter; one breast either appearing larger than the other, or growing so unequally as to lead to a suspicion that it is diseased, or that "one of the breast-bones is growing out of its place." But in a younger girl, the shoulders attract attention first, as the right appears enlarged, and when the shoulder-blades are compared, the right is generally found farther removed from the spine than the left, and

with its inferior angle lying flat upon the ribs, while that of the left projects.

When the shoulders are thus affected, there is almost invariably a curve at the loins on the left side, which causes an apparent enlargement of the left hip; and it is in consequence of this, that a mother describes the state of her child, when the spine is slightly distorted, as "a *growing out* of the right shoulder, and of the left hip."

When a girl so affected is in certain positions, one leg appears shorter than the other*; when she walks, there is not only a constrained position of the head and neck, and an inclination to one side, but there is also an inequality in the step, so

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* The shortening of the leg is only apparent, and depends on the curve at the loins altering the position of the pelvis, as may be demonstrated in two ways. If the patient be laid on the moveable plane, and the shoulders fixed, the curve at the loins may be made straight by pulling upon the lower board; both legs will then appear of the same length: but if the patient be laid on the carpet, and the curve at the loins increased by pushing the pelvis towards the shoulders, one leg will appear much shorter than the other.

that the body is carried obliquely forwards, or with one side rather more advanced than the other. It may be frequently observed, that girls in this condition have a habit of putting one arm behind the back, and taking hold of the inside of the other elbow, thus assisting to balance the figure, by pulling down one shoulder and elevating the other.

If the back be examined, the spine will be found curved nearly in the form of the italic *f*, and perhaps with a slight bend outwards, which will be most observable in the loins, and especially when she is sitting. The whole of the right side will be of a rounded and barrel-like form, while the left is diminished and contracted, the ribs being closer together than is natural. There will also be a depression or sinking in of the right, and a fulness between the ribs and hip of the left side, so that the whole space between the left hip and armpit is nearly in the same line, and considerably shorter than the space between the same points on the right side. If the girl hold both arms above her head, the difference in the shape of the two sides will

be more distinctly marked; and when the arms are brought down close to the sides, we may see between the left side and arm, but not between the corresponding parts on the right.

In consequence of the alteration in the state of the shoulders being the first symptom of deformity observed, it is generally but erroneously supposed that the dorsal part of the spine is the first distorted. Indeed those who have lately written on this subject have fallen into this error, and have described the curve at the loins as the last which is formed.* In cases of *diseased*

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* "The first which is slight, usually begins in the cervical vertebræ, with the convexity towards the point of the left shoulder; a larger one is met with, in the dorsal towards the right side, and again a curve of less extent than the latter in the lumbar vertebræ, with the concavity towards the right ilium." — Ward on Distortions of the Spine, p. 41.

"As soon as the lateral curvature is formed in the dorsal portion of the spine, the ordinary centre of gravity of the body is lost, and in order to maintain its equilibrium, the patient inclines the cervical and lumbar portions of the spine in the reverse direction, and in the course of time if it be supposed the curve of the dorsal

vertebræ there may be a curve only between the shoulders, but it invariably happens in the common lateral curvature, that where one shoulder is protruded, there is also a curve at the loins; and I have shown by diagrams in the preceding volumes that this curve is not only the first formed, but that those in the upper part of the spine are consequent upon it. When the practitioner, under the idea that the dorsal part is the first affected, directs his attention principally to it, he is apt to neglect the root of the evil; for as the upper curves are the consequences of the lower, it almost necessarily follows, that if the lumbar part can be made straight, the dorsal and cervical vertebræ must also become so; if they did not, the head would be carried to one side. By taking this view of the formation of distortion, I was led to attend more to the means of remedying the curve at the loins than that at the shoulders, and I have found by experience that I was practi-

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portion be on the left side, the cervical and lumbar portions will form curves," &c. — Bampfield on Diseases of the Spine, p. 167.

cally right; for the only instances where the amendment of the curve between the shoulders has not followed the removal of the bend at the loins, have been where the upper ribs were much mishapen, or where anchylosis had taken place between two or three of the dorsal vertebræ; but even in those cases, the curve which remained between the shoulders has been so short and so acute, as to have little effect on the general figure. It is the curve at the loins, much more than that higher up, which gives the peculiar appearance to girls who are distorted; for, as this curve is near the base of the column, it throws all the parts above out of their natural line, and also affects the motions of the legs, as the great muscles which rotate and move the thighs forward rise from this part of the spine. This is probably the cause, why girls who are only slightly distorted, generally turn one toe out, and the other in, while walking or running.

The above description will be found to correspond with the condition of the spine and ribs when the distortion is very slight; but a little increase in the curvature of the spine produces a considerable change in the

general appearance. The effect is most remarkable in the alteration of the position of the right scapula; for this bone, instead of being farther removed by the increase of the curve, is brought nearer to the spine; and hence, although the right shoulder be higher than the left, it is not now so broad. But there is considerable variety in the state of the shoulders, even in cases of slight distortion: — In some instances, the lower angle of the right scapula projects, so that the hand may be put between it and the ribs, while in other cases the scapula clings close to the ribs, and gives a roundness instead of a flattened appearance to the shoulder.

The elevation of the right shoulder is sometimes made more remarkable by the depression of the upper part of the left scapula, and by the projection of its lower angle. The first is a consequence of the change in the condition of the upper ribs; the second is caused by the sinking in of the spinal ends of three or four of the middle ribs. This is especially worthy of attention, as it proceeds from the transverse processes of the dorsal vertebræ (to which the ribs are

attached), being thrown towards the fore-part of the chest by that peculiar twist of the spine on its axis, which always accompanies even the slightest degree of serpentine or lateral curvature.

This change in the position of the transverse processes also produces a considerable alteration in the appearance of the two sides of the spine. The muscles in the left loin being raised or projected, give it a swollen appearance, while those on the right side being depressed, leave a hollow. The muscles on each side of the spine between the shoulders, are in exactly the reverse condition, as the twist of the spine on its axis is here in the opposite direction. The fullness of the left loin, and that on the right side below the scapula, have been referred to increased muscularity by those who consider distortion of the spine to depend on an irregular action of the muscles; while, by machine makers, they are generally mistaken for tumors, which they conceive may be repressed by instruments. It is necessary to be aware, that these appearances of distortion will be increased or diminished according to the state of the muscular system.

When the spine is distorted to the degree represented in the first plate in the folio volume, the right side of the neck also appears swollen. In some instances, this swelling has also been mistaken for a tumor; and I have in another place, related a case where the practitioner was so much deceived as to attempt to remove the swelling by bleeding and blistering. But the enlargement, as demonstrated in Plate II. in the folio volume, is caused by the change in the position of the upper ribs, and of the muscles which lie upon the transverse processes of the cervical vertebræ.

Even in cases of slight deformity, there is always a sinking in or hollow above the right hip, but when there is a considerable degree of distortion, the large muscles (the sacro lumbalis and longissimus dorsi,) form such a distinct line between the pelvis and ribs, as to be sometimes mistaken for a part of the spine. It is also important to observe, that both these muscles and those of the lateral part of the abdomen, are actually shortened in such cases. This I do not conceive to be the effect of *contraction*, but of an accommodation of the muscles

to the condition of the skeleton. A similar state of some of the muscles of the neck is often observed.*

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* In the preceding volumes, I have examined several of the opinions which have been offered on the condition of the muscles of the spine in cases of distortion, and by reference to facts, both of natural and morbid anatomy, have shown that many of them are unfounded: I shall here offer a few observations on an opinion pervading the works of all who have lately written on this subject, which from being often acted upon, becomes of importance.

It is conceived that distortion takes place in consequence of the muscles on the concave side of the curve, being increased in strength, while the power of those on the convex side is diminished. The shortening of the muscular fibres on the concave side is taken as the proof of their being increased in power, and also of their having been spasmodically or morbidly contracted.

"Any deviation to one side gives to the muscles fixed to the transverse and spinous processes of the concave side of the curve, increased contraction, whilst a corresponding state of relaxation or extension takesplace in those of the opposite side; the muscles on the concave side acquire comparatively increased power, whilst those on the convex become proportionately debilitated, and the balance by which the spine is preserved in its erect form is necessarily destroyed." — Observations on Distortions of the Spine, by W. T. Ward, p. 25.

I have, on the contrary, shown that the muscles on

During every period of the disease, it is important to attend to the state of the

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the concave side are not the strongest. (See p. 68. in the octavo volume.) The idea that the muscles on the concave side are more powerful, and more contractile, than those on the convex part of the curve, seems to have arisen from the *consequences* of distortion having been mistaken for the *cause*. If the two ends of a muscle are approximated, the muscle gradually becomes shorter; a variety of proofs of this might be offered. A case in point, and in illustration of Mr. Hunter's views on the subject of contractility of muscles, is related in the Philosophical Transactions. A man broke his arm, the bones were not reduced, so that when the man recovered, the bone was diminished to almost half its natural length. "Some years after this accident, the person died. The biceps muscle of both arms was carefully dissected out, and being measured, the one was found to be eleven inches long, the other only five, so that the muscle of the fractured arm had lost six inches, which is more than the half of its original length." Similar effects are produced on the muscles of the fore part of the neck after burns, which pucker the skin so as to draw the chin towards the breast; and exactly the same thing takes place, not only in the small, but also in the large muscles of the back, and even in those of the lateral part of the abdomen, when their attachments are approximated by the yielding of the lower part of the vertebral column to the superincumbent weight.

This shortened state of the muscles has been called a disposition to contraction, a kind of spasm which

shoulders and breasts, because their form alters very much, according to the degree

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pulls the bones towards each other. But we have no proof that the muscles of the back are ever affected in this way, in cases of distortion. It is perhaps incorrect to call it a *growth*, as there is actual diminution in bulk. But the examples that are offered may entitle us to conclude, that the shortening of the muscle is the natural result of the approximation of its true extremities.

This is not to be viewed as only a curious question in physiology, but as one of much importance in the treatment of distortions of the spine and contractions of the limbs; for it will be found that if the bones can be kept at a certain distance from each other, the shortened muscles will be lengthened. It is owing to their ignorance of this fact, that rubbers and shampooers are not so successful in remedying contracted limbs as they might be.

After a description which is given of the curves of the spine, in the next page of the work from which I have quoted, it is stated, "The *intertransversales muscles* of the concave side of each curve respectively would become contracted; those of the convex side of the curve, on the contrary, being in their extended state, would become smaller in size, and consequently weaker, so that if the weight were suddenly abstracted, they would no longer have the power of replacing or preserving the bones in their natural position so as to bear the superincumbent weight; and as every increased deviation from the perpendicular line would render the muscular parts still less capable of acting, the alteration of form, unless some means were used to counteract it, would become perpetuated."

I shall not deny the existence of the *intertransversales*,

of distortion, or to the plan of treatment which has been pursued.

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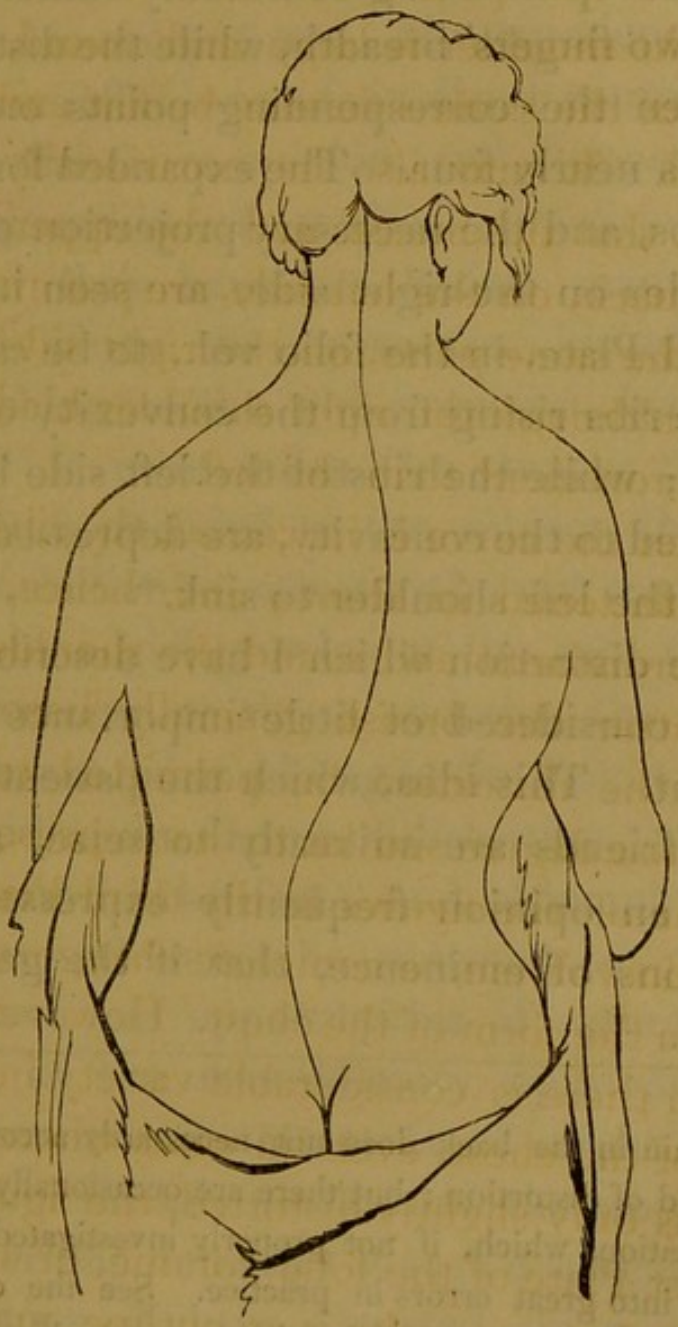
as they are in the list of the muscles of the back; but as on actual dissection we find them to be little more than mere membranous shreds covering the membrana intertransversalis (particularly between the dorsal vertebræ); and when we consider, that one sacro lumbalis muscle is some hundred times more powerful than all the intertransversales that are enumerated, we cannot believe that three or four of these small muscles have any effect either in producing distortion or in preventing its cure. That the effect of distortion on the fibres of the intertransversales has been mistaken for its *cause*, may be exemplified by the state of the œsophagus in cases of complete serpentine curvature, or of hump back; for as the œsophagus in these cases does not follow the curves but passes directly across, it is so contracted, that we might as well say that it is by an irregular action of the muscular coat of the œsophagus (which is at least as strong as the fibres of the intertransversales,) that the head is pulled towards the stomach, as that the spine is pulled from side to side by these small muscles; both opinions would be equally supported: the fibres of the intertransversales are found shortened, so are those of the œsophagus.

I shall here repeat what I have attempted to prove in the preceding volumes — that, (notwithstanding the doctrines generally received), in the *common lateral or serpentine curvature*, the muscles do *not produce* the distortion, but become altered in form *in consequence* of the distortion.

When the spine is not much distorted, the right shoulder and breast are larger and more prominent than the left; but if the curve of the spine be increased, although the right shoulder is large and round, the breast of the same side may be flat and depressed. It may also be occasionally observed, that the breast and the upper part of the neck, on the left side, are prominent, while the same parts, on the right side, are lower, although the right shoulder-blade is more prominent than the left.

When the curve is increased, the ribs become flattened in front; and hence, the more prominent and round the shoulder is, the flatter the breast generally becomes. But if the distortion be permitted to increase to a degree similar to that represented in some of the figures in the third Plate of the folio volume, a complete change takes place in the form of the chest. However, although there is considerable variety in the form of the chest, even in cases where the spine is only slightly distorted, the figure in the first Plate of the folio volume, of which the wood-cut opposite is an outline, may be

considered as nearly a correct representation of the shape in the greater number of instances.



The right shoulder is generally broader than the representation here given would imply, the space between the left shoulder blade and the spine being commonly rather less than two fingers' breadth, while the distance between the corresponding points on the right is nearly four. The expanded form of the ribs, and the necessary projection of the shoulder on the right side, are seen in the second Plate, in the folio vol., to be caused by the ribs rising from the convexity of the curve; while the ribs of the left side being attached to the concavity, are depressed, and allow the left shoulder to sink.*

The distortion which I have described is often considered of little importance to a patient. This idea, which the patients and their friends are so ready to seize, arises from an opinion frequently expressed by surgeons of eminence, that if the general

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* Pain in the back does not necessarily accompany this kind of distortion; but there are occasionally painful sensations which, if not properly investigated, may lead us into great errors in practice. See the observations on this question, in the chapter on the Uses of the Inclined Plane.

state of the health be attended to, a girl may outgrow such a degree of distortion; but there cannot be a greater mistake, nor one which may lead to more serious consequences to the patient. My experience in such cases affords proofs in direct contradiction to the above opinion, and I appeal to the generality of medical practitioners, whether they have not known many instances where the curvature, instead of diminishing as the girl grew up, became worse? It must indeed be obvious to all who have attended to the subject, that if the disposition to curvature be not counteracted, in a girl growing at the rate of an inch in two or three months, the new growth, instead of adding to the height, will only add to the degree of distortion. Such I affirm to be the fact; and although this positive style may be objected to, those who have had opportunities of seeing the effects of the contradictory opinions on the nature and treatment of slight curvatures of the spine, will admit the propriety and even the necessity of such a statement.

A spine slightly distorted, in a growing girl, may be made straight; but if it

be neglected, (however great may be the attention to the state of the health,) the curve will become rapidly worse; and if it be permitted to increase to such a degree as to render the ribs angular, it is very doubtful whether a perfect restoration of the form can ever be effected.*

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* It is often said that we may discover whether a person has distortion of the spine by the character of the face:—This opinion is to a certain degree correctly founded, as in a person affected with rickets, there is generally a peculiar form of the forehead, nose, and lower jaw, but in cases similar to those described here, there is seldom any alteration in the countenance. It is very necessary to make a distinction between the cases where the curvature of the spine is combined with rickets, and those where it is independent of this disease. This subject is discussed at some length in the preceding volumes.

ON THE CAUSES WHICH PRODUCE THE LATERAL OR SERPENTINE CURVATURE OF THE SPINE.

The enquiry into the causes of lateral distortion is highly interesting and important; for we cannot expect to treat curvatures of the spine with success, or even with safety to the patient, unless the causes on which they depend are previously ascertained.

It is natural to suppose that all the distortions which nearly resemble each other should depend on the operation of similar causes, and that the gradations in the alteration of the form should always proceed in the same order. But experience has shown, that the latter idea is incorrect, and with regard to the former there is a great variety of opinion; indeed, some have alleged, that the lateral or serpentine curvature depends on disease of the bones, while others maintain that it proceeds from disease of the muscles.

These and other opinions, on the supposed correctness of which the different modes of treatment have been founded, are canvassed, at some length, in the preceding volumes. I shall now endeavour to point out the effects which the habit of sitting or lying in a particular manner have on on the figure of a young person. The reason why children so frequently stand on one leg, and the effect of this position on the form have been fully discussed in the folio volume, where it is shown by diagrams that standing on one leg is a natural position of ease, and that it gradually produces a slight curve at the loins.

We shall probably find that children who have acquired the habit of standing on one leg, generally sit in a twisted position while writing, the right shoulder being more elevated than the left. This manner of sitting is supposed to be injurious to the shape; and it is so because sitting awry throws the ribs and shoulders nearly into the same position as when the spine is actually distorted. A comparison of the sketch of the girl writing, with the

figures in the first and second plates, in the folio volume, will afford almost a positive proof, that sitting in the manner represented in the sketch must tend to increase a lateral curvature, and even to produce it, if the lumbar part of the spine yields at the same time.

The habit of sitting awry may, perhaps, be broken by putting a book or board under the left arm, so as to prevent the girl from leaning to one side while writing or drawing. But such simple means are neither sufficient nor likely to be attended to. It is necessary to use something more effectual and more complicated in appearance. I have seen much benefit derived from the use of an apparatus which I have described in the chapter on stooping. The head is kept erect by it, while the muscles of the back are at the same time brought into a state of exertion. This question is further discussed in *the Chapter on Stooping*.

The slight distortion proceeding from these causes will be much increased if the child sleeps on a soft featherbed and with a high pillow; for she will naturally lie on the right side. The manner in which the right shoulder is then raised above the

left is exhibited in Plate B in the folio volume.

The consequences of a long continuance in this position must have been observed by those who attend an hospital, as there is scarcely a patient who suffers from the common disease of the hip, whose spine is not more or less curved. Indeed, in some instances of this disease, the part of the spine between the neck and the pelvis is bent nearly in the form of an arch, from the patient being not only obliged to lie on the side, but to approximate the pelvis and ribs, in order to relax the muscles of the loins, and in this way to take off a certain degree of the pressure from the inflamed hip joint.

I lately attended a lady who was an extraordinary instance of the effects of certain positions on the spine when long continued. She had been confined to her couch for nearly two years, and during this time, the only position in which she felt easy was that represented by the figure in Plate B. When she recovered from the attack of inflammation, the spine was found to be crooked, but not in a manner similar to the common serpentine

twist of the lateral curvature : it was more in the form of an arch. She consulted a surgeon in Bath, who tried the plan of treatment which I have recommended in the preceding volume for the cure of *Lateral Curvature* ; she afterwards came up to town, and put herself under my care, and although she was near thirty years of age, she found herself in the course of a few months much improved.

As the position represented in the Plate affects the figure, even in grown-up persons, it will be admitted that a child naturally of the finest form, may become distorted by habitually lying so. However, although the posture be obviously bad, I do not believe that it will *produce* curvature of the spine, if there be no other cause operating, and if the child take active exercise during the day. But if there be a disposition to curvature, and especially if there be already such a degree of distortion of the lumbar part of the spine, as to raise the right shoulder, the position must *increase* the curve, since it expands and separates the ribs of the right side from each other, while those of the left are compressed together, and brought nearer

to the pelvis. Indeed on comparing the sketch in Plate B, with the skeleton in the second Plate, in the folio volume, it will be found that, with the exception of the curvature of the lumbar vertebræ, the spine and ribs, and more particularly the shoulders, are brought exactly into the same condition by lying on the side and with a high pillow, as that in which they are when distortion of the spine has actually taken place.

The position in which a girl sits, while playing part of a duet on the piano, has been alleged to be one of the sources of distortion. It may certainly assist in increasing a curve, which has already taken place, and therefore should be guarded against. For the same reason a girl who is slightly distorted should not be allowed to play the harp. Plate D, in the folio volume, will show how much danger there is that a distortion which has already commenced may be increased by it; the sketch was taken from the figure of a fashionable music-mistress, and it shows that the most approved manner of sitting, while playing the harp, tends to produce the same effects on the spine, and

consequently on the shoulders and ribs, as standing, sitting, or lying in the manner already described.

But as a girl seldom begins to play the harp, until her bones are pretty well knit together, and as there is a considerable degree of exertion requisite while she is playing, the *origin* of curvature of the spine can seldom be referred to this posture.

The effects of certain positions on the form of those who follow different trades are so remarkable, and the varieties of distortion of the spine from rheumatism or diseased hip are so numerous, that we cannot doubt that a long continuance in such positions, as have been described, may alter the shape; but still it may be a question whether they will produce the true lateral or serpentine curvature. Sitting with one shoulder up, or lying on a high pillow, will gradually bend the upper part of the spine; but as this part is often curved in consequence of a scrophulous disease of the vertebræ, or of *wry-neck* without corresponding curvatures at the other parts, I suspect that too much importance has been attached to the position of the shoulders as a cause of

lateral distortion. The more I see of this serpentine curvature of the spine, the more I am convinced, that although the distortion will be always much increased, and occasionally produced by certain positions, it is generally caused in the first instance by the yielding of the lumbar portion of the spine to the superincumbent weight.

But a very important question still remains: — What is it that causes this portion of the spine to yield? This I shall now endeavour to investigate; but as the inquiry is very difficult, I must beg for more than usual indulgence from my reader.

Is Distortion caused by Bad Health?

It is a common opinion, that distortion depends on bad health, or on a peculiarity of constitution: —There is no doubt that some kinds of deformity are produced by disease; but many circumstances might

be offered to show that the *lateral curvature** of the spine seldom proceeds from this cause. Its frequent occurrence among girls who scarcely ever had a day's illness, is strong evidence of this. We may also adduce the fact, that although the poor in large towns are subject to various diseases of the spine, yet in that class, the description of lateral distortion which is so frequent among young ladies is rarely seen ; and when it does occur among the poor, it is generally accompanied with some acute disease of the vertebræ, or is, to a great extent, combined with rickets, or a distinct scrophulous affection of one of the limbs. I have had many opportunities of observing this combination of symptoms among the out-patients of the Middlesex Hospital, and I believe that this opinion is corroborated by the condition of the children in manufactories.

When there are many of the children in one family crooked, we must suspect that this distortion proceeds from a peculiarity of constitution, and may even be hereditary like certain other symptoms. But it more

* I have, in conformity with the received opinions, used the term *lateral curvature*, in describing the condition

frequently happens, that instead of lateral curvature being a *family* disease, there is among six or ten children only one of the daughters who is crooked. This fact is so common, and the occurrence of curvature of the spine without any accompanying symptom of bad health, is so frequent as to convince us, that what is commonly called lateral curvature is seldom produced by disease, although those who are of a delicate constitution may be more liable to it.* One of the most important and difficult questions in practice, is to distinguish between the cases where a scrophulous taint in the constitution is the predisposing cause of distortion, and those in which the curvature of the spine is solely owing to fortuitous circumstances. I

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of the spine alluded to; but the term is objectionable, since it leads not only to erroneous ideas on the nature of distortion, but also on the method of cure. The term *serpentine* is more applicable; for in all the cases which are generally described as lateral distortion, the curvature is more or less of this character. Even where the degree of distortion is very slight, the curve is serpentine.

* It is incorrect to say that a girl is of a scrophulous constitution merely because she is crooked. A child of parents with the best constitution may become distorted, if she be under the influence of certain causes.

hope to be able to show that much good may be done in both description of cases; but if the distinction between them is not made we shall be frequently mistaken in our prognosis.*

Why are the females in warm climates seldom affected with Lateral Curvature?

As we are informed by travellers, that lateral distortion of the spine is rarely seen

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* A gentleman who has lately written on diseases of the spine, says, that although it has been remarked, that in lateral curvature, the distortion of the dorsal part of the spine takes place more frequently towards the right side than the left, his experience is the reverse of this statement. On referring to my notes, I find that the proportion of cases, where the convexity of the curvature between the shoulders is towards the *left* side, is not more than one in eight to those where it is in the opposite direction. From certain circumstances connected with the instances where the distortion has been towards the left side, and appearing at an early age, I have been induced to consider them as very unfavourable, excepting where the patient was left-handed. The history of the symptoms of lateral curvature, which are given in the work referred to,

among the women in warm climates, it may be useful to enquire into the causes of their exemption from this complaint. It might at first be imagined that it proceeded from the temperature being warmer, but as the females of the colder climates enjoy a similar exemption, we are led to believe that a climate so changeable as our own produces a tendency to curvature in the spine. But this explanation is not satisfactory, for although girls coming to this country from the East or West Indies seem to be more liable than others to become crooked, there are few examples of lateral curvature among the poor in towns, or among the peasantry who are so much exposed to the vicissitudes of our climate. Since it is a common opinion that the female form may be improved by art, it might be supposed that modelling the shape is better understood, and more frequently practised,

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would lead us to suppose, that the greater number of the cases described there, are very different from those I allude to: they seem to have been all more or less affected with scrophula, and of the same class as those who present themselves occasionally as out-patients at hospitals and dispensaries.

in those countries than here. But the loose clothing of the women in warm climates, shows that they are not indebted to stays or similar contrivances for their fine figures; indeed such restraints would be unsufferable in a warm climate. Nor can we believe that their exemption from deformity is traceable to the practice of those feats of strength which are now so much in fashion here, for their indolence is proverbial. Indeed the indolent and luxurious life which they indulge in, is so unlike that led by females here, that in trying to assign a reason for the difference in the tendency of the women in the two countries to become distorted, we might suppose that a life of activity was prejudicial to the figure. But this idea is at once disproved by the fine and elegant form of a healthy boy or girl brought up in the country, and allowed to indulge in the active amusements natural to the youth of both sexes; who from morning till night are scarcely five minutes at rest, and while in bed not only lie in the most extraordinary positions, but even when sound asleep seldom remain long in the same. This involves the question of *appropriate exercises*, which will be fully inquired into

presently. Now, it may be assumed that the exercises natural to the age and to the constitution of the individual cannot be hurtful, but, on the contrary, must be beneficial. Indeed that an active life is not prejudicial to the figure, is proved by the rare occurrence of deformity among the inhabitants of the colder climates, where active exercise is necessary to the existence of man. We are thus led to suspect that there is something in the education and manner of rearing young ladies in this country that is not conformable to the dictates of nature, and under which some are more liable to sink than others. If it be so, it is very important to inquire into the nature of the error.

The inhabitants of warm climates are not subjected to the same restraints and discipline, as far as their corporeal motions are concerned, as the females in this country. They are permitted to indulge more in the recumbent posture, they spend less time in sitting and standing, and while young are not obliged to act so much in opposition to the feelings natural to the age, as the youth of this country are in the

acquirement of a variety of accomplishments. It seems just to assign their exemption from deformity principally to these causes, and thence to conclude, that the habits of life which prevent the occurrence of distortion in one climate would be beneficial in another; but a system of indolence is unnatural to the inhabitants of this country, and it is very doubtful whether it would be attended with the same effects as in warmer countries, for the nature of our climate not only admits, but even requires active exercise; and as every climate has its own peculiar customs, we may be satisfied that those habits which we can clearly refer to nature will be found to be most conducive to the perfection of the form.

The question is now narrowed, and we are at liberty to enquire whether young ladies in this country have the advantages which nature dictates; if it can be shown that they have not, it will be no longer surprising that they should lose their natural form.

It will probably appear that, owing to the prevalence of erroneous opinions on the question of exercise and rest, there is sel-

dom a proper balance kept up between them. It is, perhaps, correct to say, that the less exercise a child takes, the more does it require general muscular relaxation in the recumbent position, and that the lighter and more sedentary the pursuits are, the more necessity will there be either for active exercise or general relaxation. Thus in warm climates, where active exercises cannot be taken, the due relation of parts, or balance of the system, is preserved by great indulgence in the recumbent position.

If we consider the manner in which young ladies are brought up, from the age of ten to sixteen, and keep this principle in view, we shall perhaps be able to discover the cause why they are more frequently deformed in a particular manner than those of any other climate, or even than the poorer classes in their own country.

As long as a child continues in a state of nature, that is, while it is permitted to run freely about, and before it arrives at that age when the parent is induced to pay particular attention to its figure, the form is fine and perfect; but about the age of nine or ten, what may often be truly called its

miseries commence. Education is seriously begun, and the girl is no longer permitted to indulge in that playfulness which is not objected to in boys; indeed, it often happens that the first lesson a young lady receives, is an admonition that she is not a boy: when she walks, or when she sits, particular attention is paid to her manner, and the point most generally insisted on is, that she shall keep herself quite erect. For this purpose, or to give the chest a certain form, she is incased in a pair of stiff stays. Girls are thus early put under restraints not natural to their age. This, in some degree, renders them artificial, which is increased by the restrictions which are unavoidable in the acquirement of certain necessary accomplishments.

If such habits be unnatural to the time of life, we cannot wonder that there should be a deviation from the natural growth of parts. It is not extraordinary that a child has its bowels disordered when its natural diet is changed; but we are apt to think it strange that the figure should not continue to grow as well *when we take great care of it*, as when the child was romping, and when no

attention whatever was paid to its form. To set the bowels right, a variety of family recipes are often given, while the diet is neglected; but they are as ineffectual in restoring the natural tone of the digestive organs, as the staymaker's contrivances are in mending the shape. * In both instances we endeavour to overcome nature, or to set it right, by artifices, and often by artifices that are ill calculated for the purpose.

Perhaps the reader is now prepared to admit the following view of the causes of the common slight curvature, when it occurs in a girl who, although not of a bad constitution, is listless, easily fatigued, and un-

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* "If one shoulder projects rather more than the other, or if one side seems a little larger than the other, a pair of stiff stays and a collar to brace the shoulders back are immediately applied; and this plan is persevered in, for every person in the family is delighted to see how much the child's figure is improved. But although the evil may be concealed for a while, its cause is increased by wearing stays or a collar; for the child can no longer take that sort of exercise which is necessary to keep the muscles of the spine in such a state of activity, as to fit them for their several uses." — See the preceding vol. p. 191.

willing to take active exercise. The first cause which I would assign is the want of sufficient general exercise, and especially of that which acts more immediately on the muscles of the back; the second, on the almost necessary yielding of the lumbar portion * of the spine to the weight of the upper part of the body, if the girl be allowed to sit at work, or practise at the piano-forte for hours without any artificial support; the third cause I would name is the habit of lounging or balancing the body on one leg; the fourth, the habit of sitting awry while writing or drawing; the fifth, the habit of sleeping on a soft bed and with a high pillow; the sixth, the more frequent use of the right than of the left arm; and, lastly, I would assign as a cause of curvature

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* This is the most moveable part of the spine, and although it supports the weight of the chest, head, and arms, it is not strengthened by the locking of its processes, nor by the attachments of the ribs, as the dorsal part is. As it is thus so dependant on its muscles, it must yield more readily than any other part when a girl is in a slightly debilitated state, either after recovering from fever or measles, or from the bad health that often accompanies a change in the constitution.

most of the attempts that are made to correct the figure or to model it into a certain form. As so many of the means employed for this purpose, and for counteracting what are considered the disposing causes to distortion, frequently increase and even produce the curvature, it may be useful to endeavour to exhibit these effects. I am therefore confident, that to those who are interested in this enquiry, no apology is necessary for going, at some length, into the consideration of the USE OF THE INCLINED PLANE; of the UTILITY OF STAYS AND SIMILAR CONTRIVANCES; of the MANNER OF SITTING; of the MEANS GENERALLY EMPLOYED WITH THE INTENTION OF PREVENTING OR CURING A STOOP; and of THE EFFECTS WHICH CERTAIN EXERCISES PRODUCE ON THE FORM.

ON THE USE OF THE INCLINED PLANE.

Lying on the inclined plane has of late years been considered so sure a method of curing all distortions, and also of preventing children from becoming crooked, that a plane is now considered a necessary appendage to the furniture of the nursery or school-room; and so much reliance has been placed on its good effects, that it is not unusual to hear a mother express surprise that her daughter should have become crooked, when she had been in the habit of lying every day for a certain time on the board.

The opinion generally entertained seems to be, that as the plane is used for the cure of girls whose spines are a little twisted, lying upon it must prevent those who are straight from becoming crooked. But this is a mistaken view, and there is little doubt that from parents supposing that a child's figure will be preserved by lying for a certain time

daily on the board, many circumstances of more importance are neglected.

The question may be put in this way. If a distortion could be remedied or prevented by a girl lying on her back for half an hour or an hour daily, would not lying in the same position for eight or ten hours during the night have the same or even a better effect? A moment's consideration must convince us, that the effect of lying a short time on the board can be little compared to that of lying in the same position during the whole night; and from this we may conclude that if good is to be derived from lying in a certain manner, it is more important to regulate the mode in which a child lies in bed, than to insist that she should lie on the board in the best position possible for twenty minutes or half an hour twice or three times a day. What is expected to be the consequence of a girl's lying for a short time on the plane? Is there any thing specific in the board, or is it more than the medium of affording rest; or is there any difference between the manner of lying on a board and that of lying on a mattress? Lying on a board is certainly more uncom-

fortable; and perhaps this is the reason why it is considered useful; for it seems to be an axiom, that if any thing connected with surgery is agreeable, it cannot be salutary.

The inclined plane, as it is commonly made, is good only so far as it gives rest and support to the body. Viewing it in this light, I see no reason why it should not be made comparatively comfortable (by cushions), that a girl may, by reclining on it, really be at rest, after a long and weary music lesson, or a fatiguing walk, for then is the time that the spine of a young person requires to be carefully managed. *

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* It cannot be too often repeated, that the spine of the most delicate girl, if not already distorted, will not suffer by the erect position, as long as she is not fatigued, and continues in activity and exertion; it is during a state of lassitude and relaxation of the muscles that the horizontal position is necessary, for it is then, that the bones and ligaments are in danger of yielding. This may easily be proved. If a girl who is not very strong be placed on a seat after she has gone through certain exercises, and be allowed to sit for about five minutes without any support to her back, we shall find on examining the spine that it has become curved, and probably in two directions. The consequences of a girl, whose spine is already distorted, sitting up without some

It is generally supposed that the hard board is useful in assisting to press in the projecting shoulder; yet no opinion can be more incorrectly founded, or more likely to be the cause of injury to the patient, for it can be satisfactorily shown, by several cases, that lying on the hard board has increased the distortion. But, even setting aside the question of its being hurtful, and the absurd prejudice that because a board is uncomfortable it must be useful, and that if agreeable it must be injurious, we may assume, that it is unnatural for any person, and more particularly a delicate girl, to lie on a hard board. Even animals make some sort of bed to rest upon.

I will not here enter into a description of the manner in which a girl who is a little distorted may be constrained to lie in a certain position while in bed, (which is of more importance than the question how she lies during the time she may be on the board,) as it is given in the chapter in the

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artificial support must be obvious. — See further on the question of curing Distortions, by certain exercises.

preceding volume, "On the Mode of treating the confirmed Lateral Curvature;" I shall at present only say, that a girl who has the slightest tendency to become distorted, should sleep on a firm mattress, and with little or no pillow. The bad effects of a child habitually lying on a featherbed and with a high pillow, may be understood by the sketch given in illustration of one of the causes of distortion. (See page 21., and plate B in the folio volume.)

The practice of laying a patient on the back and in an inclined or horizontal position for months, and even for years, which has of late prevailed, as a method of cure for all kinds of curvature of the spine, and more particularly the lateral, has been founded on the idea, that the distortion depends on an undue contraction of certain muscles of the spine, and on a diseased state of the vertebræ. Taking this view of the cause of distortion, it was imagined that by keeping a patient constantly at rest on an inclined or horizontal plane, the irritation proceeding from the supposed disease of the bones would be relieved; and the muscles of both sides being kept in a state of quietude,

would be gradually reduced to the same standard of strength, so that in a certain time the equilibrium in their actions would be restored.* But the ideas on which this mode of treatment has been founded are completely erroneous, and there are numerous facts to prove that when put into practice it has completely failed. Is it not surprising that keeping the body in one position should have been proposed as the best method of curing a defect in the spine after the admission that the distortion is frequently consequent on weakness, and that if any part of the body be allowed to lie unexercised, that it becomes deteriorated? for this plan is, of all others, the most effectual in rendering the body weak, and in preventing those muscles on which the support of the spine depends from performing their natural functions. The bad effects of such a method of treatment are gradually becoming evident, and the use of the inclined plane is quickly falling

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* See page 10., and the chapter on the question, "Whether distortion depends on an irregularity in the action of the muscles," in the preceding volume.

into disrepute; for even where it at first seems to be useful (as in cases of slight distortion attended with great debility), it is found that although the girl may, perhaps, become straighter after having been confined to the horizontal position for months, she does not after a time gain strength, but on the contrary becomes so weak as to be scarcely able to walk or stand; and when she attempts to sit up without some artificial support, she sinks almost double, or, at least, into a state worse than she was in, when she first lay down.

So many instances of the complete failure of this mode of treatment in lateral curvature have come under my own observation, that the mere enumeration of them might be considered by many sufficient to prove the inefficacy of the system; but I suspect that even the detail of the cases would not convince others, as I know from experience that it is as difficult to alter the opinions of those who have taken a different view of this question, as to remove the prejudices of parents. I have little doubt that

the good effects of the inclined plane, in *other* diseases of the spine, will be brought forward to show that the system has been successful. However, as the question is not whether it has been useful in *some* affections of the spine, but whether it has been useful in cases of *common lateral* or *serpentine curvature*, I shall give a few examples of the consequences that I have found to proceed from it. These examples, and the arguments that may be deduced from an observation of the natural and diseased functions of the parts connected with the spine, will perhaps be considered by those who are unprejudiced, as sufficient proof that the plan will invariably fail in cases of common lateral curvature.

In this discussion, I shall be obliged to question the accuracy of opinions which have been given in cases of distortion by several eminent practitioners; but I trust that the cases I shall now bring forward, and the numerous and indisputable facts that are offered in this and the preceding volumes, to prove that there is a much greater variety in the affections of the spine than was supposed to exist, or, at least,

than had been described, will save me from the imputation of presumption.

I shall now select only four instances to exemplify the failure of the system of treatment by the inclined plane in lateral curvature, and the bad effects that have resulted from the supposition that the principles on which the practice was pursued are correctly founded. It may, perhaps, not be irrelevant to mention, that the rank in society of each individual whose case is stated, was such as to render it improbable that they should have continued long and seriously ill without having the best advice the country afforded; from which it is fair to conclude that the system they were put upon had met with the approbation of men who stand high in the profession.

The first instance I offer was the daughter of a gentleman, who was in the habit of spending the winter in town with his family, and who had consequently the opportunity (of which I know he availed himself) of having advice from the leading men in the profession.

I found the young lady, who was about

15 years of age, reduced to such a state of weakness, that when she attempted to rise, that I might examine her spine, she fainted; she was then unable to walk, or even to stand without support. As far as I could judge from her history, this debility was owing solely to long confinement in one position—(she had lain on her back for two years). In this case, the system of restraint, and of preventing all action of the muscles of the back, had been carried to a degree scarcely credible; for when she went to bed, or from that to her couch, she had always either been carried or rolled off from the one to the other. Instead of the curvature of the spine having been removed by this system of treatment, it had been increased; indeed it was scarcely possible for any one to be in a worse condition. The ribs were distorted to an extraordinary degree; and this, I have no doubt, was caused by the constant pressure of the shoulder against the board, which I have in the preceding volumes shown to be as hurtful as the pressure made by machinery. It appeared that her debility was the effect of confinement, not of disease; for having put her on

an entirely different plan of treatment, she became, *in the course of a few weeks*, as robust and active as any girl of her age.

The second instance was the daughter of a gentleman in a neighbouring county. From the history given by her mother, I learned that she had at first merely the slight lateral curvature, which should not have confined her to her couch for a day. When I saw her she had lain on her back on the plane for eighteen months; she could with some difficulty walk across the room, but could not stand without being supported. The spine appeared only a little distorted while she lay on her face, but it became completely curved when she stood up, and the ribs were more compressed than we find them in cases where this practice has not been pursued, so that I have no hesitation in asserting, that the distortion in this instance was also much increased by the confinement to the plane.

This young lady had all the appearance of full health and of being strong, but the appearance was deceptive, for it was produced by fat, not by healthy and vigorous muscle, as might be proved by taking hold

of her arms, and still more by the tottering manner in which she moved when raised from her couch.

That this debility was, as in the last case, the effect of the confinement and not of any disease, may be inferred from the following circumstance: —

After a consultation on the state of her spine, her father went into another room to hear the opinions of the surgeons. On coming back he found his daughter skipping about the room, dancing the steps of a quadrille. "O, papa," says she, "I know I am to be laid on my back for two years, so I am taking my last quadrille." This shows that there was not at first any disease, nor even any tenderness of the vertebræ, which should have required rest; and yet this fine girl was not only condemned to lie on the plane for a year and a half, but her spine was even repeatedly blistered to remove a supposed disease of the vertebræ. I need not enter into a description of the plan of treatment which was followed by this young lady, as it was nearly the same as that described in the chapter on the mode of treating con-

firmed lateral curvature. By pursuing the system steadily, she quickly acquired strength, and her figure was in a few months so much improved, that her father, on coming to town to see her, could scarcely discover any distortion.

The subject of the third case was a gentleman, who was more than twenty years of age, and had been suffering from distortion for nearly twelve years. From the advice he had received, he had so completely confined himself to his couch, that he had scarcely left it five minutes, at any one time, during several months preceding my visit, (he even slept on it,) and for several years he had never risen from it, unless he was at the same time supported by one of the collars that are used by Mr. Chesher. When I first saw him, he could not raise himself to receive me, and on begging him to show me how long he could support himself in the sitting posture, he made the attempt, but could not continue in it above half a minute, without suffering from a dreadful sense of suffocation. While he lay on his face, the lumbar part of his spine appeared straight, but it became

twisted the moment he attempted to sit up. I immediately changed the plan of treatment, during the course of which some very curious phenomena with regard to the action of certain muscles occurred: these I have endeavoured to explain in the chapter on the means of remedying stooping. The system pursued was so successful in restoring strength that, in the course of a few months, this gentleman, who had been confined to his couch or encased in iron instruments for nearly half his life, was enabled to rise, to throw aside all his artificial supports, and to partake of the amusements both of town and country.

The fourth instance is particularly interesting and important, as illustrating the danger of erroneous theories when they are supported by the authority of eminent men. The patient was the daughter of a country banker, and nearly related to some of the highest medical authorities in England. From the history given to me by her mother, I concluded that her spine had been at first affected nearly in the same manner as those of some delicate children, and which by proper management may almost always be

remedied. But, unfortunately for this young lady, as soon as it was discovered that her spine was distorted she was laid on her back; and, notwithstanding a confinement to the plane for years, or, I should rather say, in consequence of this confinement, the curvature of the spine became gradually worse, and, when I saw it, was almost irremediable.

Although her parents had observed an obvious difference for the worse, when the spine was examined from time to time, they were induced to persevere, on finding that the plan was approved of by some of the most eminent men in the profession, and on being flattered by repeated assurances held out to them, as I have known held out to others, that their daughter would get up in a few months quite recovered. But often as this promise has been made, I believe it was never yet fulfilled in a case of common lateral curvature; and in support of this assertion I have the authority of one whose opportunities of seeing such cases have certainly been greater than those of any other man. I allude to Sir Astley Cooper, who told me, while in consultation on

the case of this young lady, that he did not know a single instance of a girl being cured by that mode of treatment. *

There is a common opinion, but a very erroneous one, and for which there is no foundation in fact, that the spine becomes fixed when a girl arrives at a certain age. It is this deceptive hope which has induced many a poor girl to confine herself to the plane for years. Every one must have met with instances where the distortion of the spine has increased after the age of twenty-one.

The above plan of treatment is to be reprobated in cases of lateral curvature, as it tends to increase rather than diminish the curvature and the original causes of distortion. But it is also objectionable in other respects, which are more important than the condition of the figure. It almost invariably injures the health. Girls who have been long con-

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* It is to be recollected that I admit that many cases of *spinal disease* may have been cured by rest. The question at issue is, — Were any of those which have been cured cases of lateral curvature?

fined to the reclining board are delicate, and liable to all the worst symptoms of hysteria. Indeed, I have known a young lady have so many of the symptoms of disease of the heart that she was treated accordingly, although there was little doubt, from the history of their accession, and of the manner in which they were relieved, that they altogether proceeded from the weakness caused by the long confinement to one position. It is scarcely necessary to make any remarks on the danger of the internal organs suffering from the neglect or unwillingness of the patient to attend to the regular performance of their natural functions. An instance of a most serious organic disease in one of the pelvic viscera from this cause is given on the best authority.

In opposition to this reasoning, the outline of which was given in the preceding volume, it has been stated that girls who have been long confined to the plane look fat and plump. They certainly sometimes appear so, but they are in fact in a relaxed state, and their muscles, when examined, are found to be soft and doughy, without any of that

vigorous tone which always accompanies good health. We need seek no better proof of this than the inability of patients in this condition to keep the spine in an erect position, or to walk without support. Girls are often in such a state of weakness from the same causes which produce the distortion, that they may be relieved by the recumbent position. But if this mode of relief be continued for any time, even in those cases where it has removed the pain in the chest and back, all the bad effects which have been already described will take place. The cases in which the health and strength are improved by lying on the inclined plane for weeks or months are quite different from those at present under consideration.

I now proceed to make some observations on a subject which is, in my opinion, of the first importance in considering the mode of practice to be followed in affections of the spine;—Does the pain which is usually felt in some parts of the spine, in cases of lateral curvature, depend on a disease of the bones, or inflammation of the ligaments; or is it

merely the consequence of certain causes which may speedily be removed? Since writing the chapter in the preceding volume, "On the Enquiry into the Opinion that Lateral Distortion is caused by Disease of the Vertebræ," I have seen several patients who had suffered severely from the nature and cause of the pain having been mistaken. A young lady was confined to the horizontal position nearly a year, and repeatedly blistered, because a weary and dull pain in the lumbar part of the spine had been considered symptomatic of a commencing disease of the bones: how long she might have been kept in that position is scarcely possible to imagine, for as, at the end of four months, she felt the same pain when she attempted to walk, it was supposed that the inflammation was not subdued, and she was accordingly ordered to submit six months longer; and even at the expiration of that time, matters being still in the same state, she was laid a third time on the board. Soon after this I saw her, and having learned the history of her case, and made

a careful examination of her spine, I was so much satisfied of there never having been any disease of the vertebræ, that although the same pain was felt when she sat up, I put her on a plan of treatment very different from what had been pursued. In the course of a short time the pain ceased, and she became rapidly strong, and improved in appearance. But, notwithstanding the issue of this case, it would be a more serious error to mistake the pain consequent on inflammation of the bones for that which is usually attendant on lateral distortion. When the vertebræ are actually diseased there is generally a train of symptoms, in addition to the pain, which will assist us in discovering the nature of the case. It is, however, sometimes difficult to determine whether the pain is merely the effect of weakness, or of a slight inflammation; and this difficulty I have found principally to present itself in cases of distortion in boys; for as they are so little exposed to the causes which produce distortion in girls, we are led to suspect that those who become crooked have a peculiar weakness in

their osseous system, and therefore that their vertebræ may be more than usually liable to the scrophulous inflammation.

But painful sensations in the back may depend on a variety of causes. The pain may arise from pressure on some of the viscera: an instance of this is related at page 200. in the preceding volume, but in that case the distortion was to a great degree; when the distortion is slight, it may depend on some of the nerves being compressed in their passage from the spinal canal: I have little doubt that this was the cause of an almost indescribable pain which a young gentleman, who was for some time under my care, felt when he sat in a particular position, for the pain always ceased while his shoulders were supported, and gradually left him as the spine became straight.

There is one cause of these painful sensations to which we should particularly attend. A young lady from the neighbourhood of Dublin had a displacement, or rather a malformation, of the spinous processes of two of the vertebræ, such as I have de-

scribed at page 90. in the preceding volume. When one of these vertebræ was pressed upon in a particular manner, a pain darted through her shoulder. As she was of rather a delicate constitution, and as some of her relations had been great sufferers from disease of the spine, her mother became alarmed, and brought her to London. The cause of the apparent distortion was easily explained, but I could not discover the source of the pain. However, it happened that about the same time I was consulted on the case of a young lady, who suffered nearly in a similar manner, when a particular part of the spine was touched. On comparing the symptoms in the two cases, I was led to suspect that the pain was occasioned by a branch of a nerve being pressed against one of the processes of the vertebræ. I examined the course of the nerves at this part more carefully than I had previously done, and found branches of the dorsal nerves passing very near the same processes as those which, when pressed upon, had given the sensation of pain; it is therefore probable that the process may occasionally pass un-

der the nerve, and thus subject the nerve to pressure. But even although the nerve be not entangled with the process, the same pain may be felt during an examination of the back; for as the nerves (and particularly that between the fifth and sixth dorsal vertebræ) lie between the spinous processes and the angles of the ribs, they will be thrown so much forward on the convexity of the curve when the spine is distorted, as to be directly exposed to the touch. Indeed I now find, that by pressing in a particular manner, a pain, similar to that described above, may be produced in almost every case of lateral curvature of the spine.

The nature of the pain caused in this way is so similar to that described by some authors as occasioned by disease of the vertebræ, that it may have sometimes been considered an unequivocal symptom of disease of the vertebræ, and the patient treated accordingly. We cannot help suspecting that this has happened, when we reflect on the many instances where patients have been confined to the horizontal position, and blisters or issues have been applied on each side of the spine, merely be-

cause there has been a little irregularity in the shape of the column, and a certain degree of pain felt upon pressure.*

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* When I was first led to remark that the irregularity in the shape of the spinous processes might be mistaken for curvature of the spine, I was not aware of how much importance this might be in practice. Within these few days I was consulted on the case of a gentleman who for several years suffered from occasional violent pain in the back, and probably (from the description given) resembling that affection of the nerves in other parts of the body, which is called Tic Doloreux. The difficulty of managing such cases is well known; and as several eminent practitioners in one of the largest towns in England were foiled, the patient was induced to consult the persons who are well known as the Whitworth doctors. They immediately, in their imposing, oracular manner, pronounced his disease "to be a growing out of the back." He continued with them for more than twelve months, wearing a machine which weighed 24 pounds, to press in the bones that grew out. He got better for a time, and it was natural for him to suppose that his relief from pain was owing to the operations of these quacks; but he was probably mistaken, as the pain in tic doloreux is often relieved by a change of system; and will return after a time. The medical friend of this gentleman tells me that his patient is now worse than ever, and that the appearance of distortion is still the same. I was unable to offer any satisfactory explana-

The examples given in the Appendix to the preceding volume make it unnecessary to show that I attach due importance to a tenderness in the course of the spine, when it is combined with certain other symptoms.*

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tion of the cause of the pain; but from the description given of the distortion I believed that there never had been any displacement of the vertebræ, but that the appearance proceeded from an irregularity in the form of the spinous processes. I showed the surgeon the cast described at p. 90. in the preceding volume: finding it to be exactly similar to the state of his friend's spine, he acknowledged that we could no longer regard the symptoms as dependant on distortion. The patient had been repeatedly subjected to the treatment by caustic issues.

* The importance of attending to the symptoms of inflammation, in the early stages of the disease commonly called caries of the vertebræ, is well illustrated in the elaborate and learned work of Wenzel of Bamberg, which has just been published in Germany. This work, which contains 500 folio pages, abounds with important observations on the difficulty of distinguishing the several maladies of the spine that originate in inflammation; but, being written in German, will probably be little read in this country. The profession are much indebted to a friend of mine, who has given, in the Medical and Physical Journal, a faithful sketch of the conclusions to which

It is scarcely requisite, I trust, for me to state, that, in my strictures on the inclined plane, I have not intended more than to object, first, to its being considered as the only thing necessary towards the cure of distortion ; and, secondly, to the use of it without remission, for months. In the chapters in the preceding volume, that are descriptive of what I believe to be the best means of treating distortions, it will be found that the use of the inclined plane is considered essential to the cure of lateral curvature. And there cannot be a doubt that a young and delicate girl may be much the better of occasionally lying down ; when she is growing quickly, and is at the same time

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Wenzel has come on the nature and treatment of caries of the vertebræ. As far as I can judge from a very cursory review of this work, the author has not entered into many of the questions which are canvassed in the present volume. His observations are confined principally to *disease* of the vertebræ: where he has alluded to the *high shoulder* (the name given by him to the common case of lateral curvature) he advocates the theory that it is caused by an *alteration* in the state of the muscles of the back, which I have endeavoured, at p. 13. and in the preceding volume, to prove is not the *cause* but the *consequence* of distortion.

delicate, the weight of the upper part of the body is obviously so much more than the lumbar vertebræ can support beyond a certain time, that common sense dictates the necessity of giving occasional ease and rest to the muscles of the spine, and this cannot be more effectually or more easily done than by lying down either on the inclined plane, or, on a couch, where she may have room, while in the horizontal position, to shift her body as she pleases.*

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* The bad effects of lying constantly in one position on the inclined plane, are so much obviated by friction over the muscles of the back, that a slight curvature may be cured in this way. But why do those who lay a patient on a board for months, with the view of subduing an inflammation of the bones, and restoring the equilibrium of the actions of the muscles, recommend the spine and adjacent parts to be rubbed and shampooed for two hours during the day? Is it not contrary to their theory of the causes of distortion, and to their views of the mode of curing curvatures? But, so far am I from objecting to the combination of friction with rest, that I consider it as the only means of saving patients, who are laid on the plane, from falling into the most miserable state of debility. Since friction and shampooing are only a form of exercise, why not carry the system of combining exercises

It may, in conclusion, be affirmed that, beneficial as the use of the inclined plane is in many instances, it has, like other valuable remedies, been very improperly employed, from erroneous notions having been entertained of its effects, and more especially from practitioners not having been aware of the great variety of affections to which the spine is liable.

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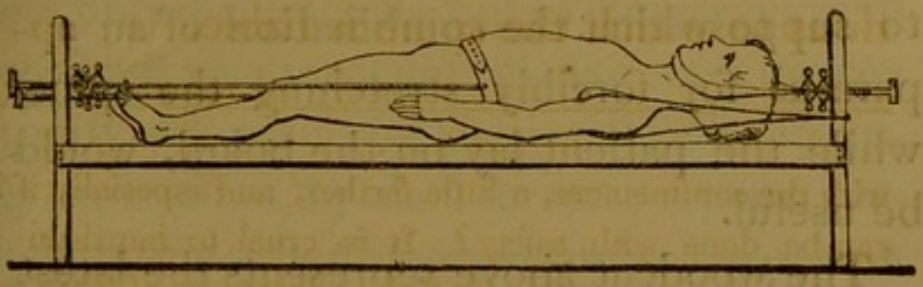
with the confinement, a little farther, and especially if it can be done with safety? It is cruel to imprison a young lady for months, if all the advantages of lying on the plane may be attained, and the disadvantages avoided, without making her undergo such severe discipline as the constant confinement to one position must be.

On the Plane, as a Means of Stretching the Spine.



Many machines, and some of them very ingenious, have been invented for the purpose of stretching the spine; these instruments have been used in the idea, that if the vertebræ could be kept separated from each other, the distortion would be removed. But being commonly made of iron, and attached to the body, they were often injurious. It was therefore imagined that any contrivance by which the spine might be kept constantly stretched without much pressure being made on particular parts, would be a great

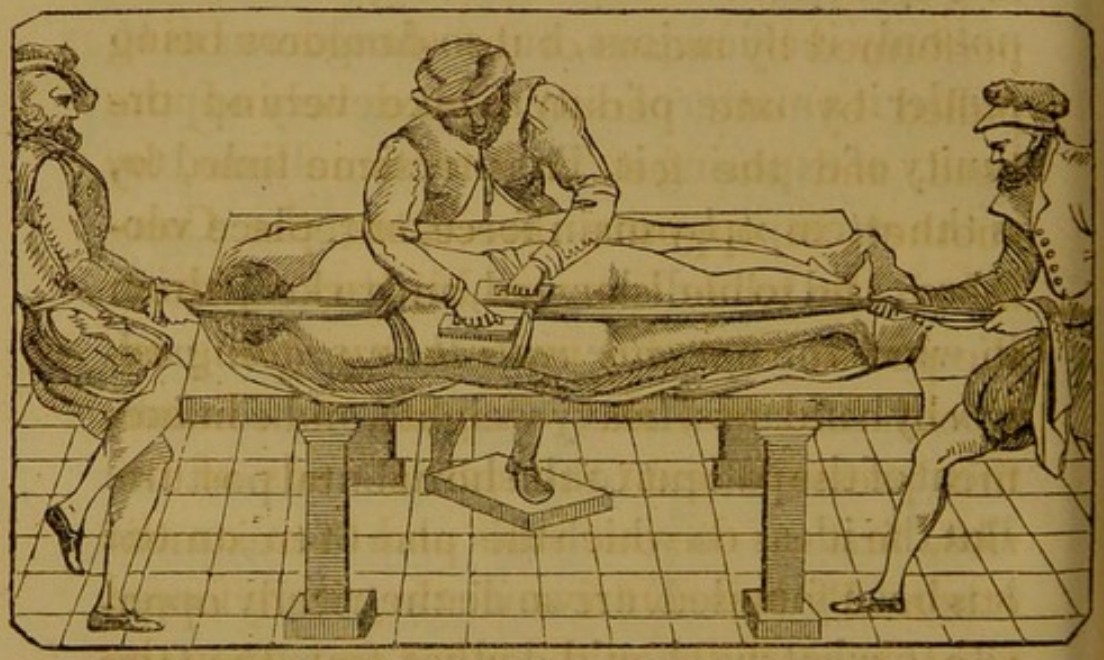
improvement. Accordingly the plan of swinging the body by straps attached to the head came into fashion, but this system was soon given up, as it was found to be of little permanent benefit; and then confinement to the inclined plane was said to be the only means of curing distortions. But as this also generally failed, it was natural to suppose that the combination of an apparatus for forcibly stretching the spine while the patient lay on the board, would be useful.

The woodcut above represents the latest invention of this kind. It is used in Paris in an institution called the *Orthopedique*. The consequences of keeping the spine stretched, without at the same time exercising the muscles, have been so fully discussed in the preceding volumes, as to render it almost unnecessary to dwell on the effect of this contrivance, for it is evident that it must be even more injurious than the collars which have been used to support the spine. By this French invention, patients are debarred from taking the exercise which to a certain degree obviated the bad effects of the collar. I have already had an oppor-

tunity of knowing that the plan has failed even under the superintendance of the inventors; and it will not now be denied, that the confinement must be injurious.

A most untenable theory still prevails in this country; that distortion is produced by dislocation of the vertebræ; and upon this theory, a practice has been founded which is not only inefficacious, but so dangerous as to render it a matter of duty to take every opportunity of exposing it. The practice alluded to, is the attempt, by main force, to replace vertebræ, said to be dislocated, and to keep them in what the *operator calls their proper position* by bandages, heavy weights, and confinement of the patient to the horizontal posture. But the ideas on which this plan of treatment has been founded, are so diametrically opposite to what we should deduce from the facts of anatomy, as to be scarcely worthy of a serious refutation. We have only to compare the sketch below, with the description given of this mode of practice, to learn that the idea of reducing dislocated vertebræ to cure distortion, is not new, but adopted from the suggestion of ancient authors, who, although worthy of credit in many respects, must be

admitted by all who are conversant with anatomy, to have occasionally dealt in the fabulous.* The danger to which the spinal marrow would be subjected, by any forcible attempt to shift one of the bones of the spine, must be obvious to the merest tyro in anatomy.



This is copied from the chapter in Am-

* In Hildanus, under the head of Dangerous Ignorance of a Barber Surgeon, "Perniciosa Tonsoris insciitia," a case is given where the operator attempted to replace two projecting vertebræ, by laying the patient on his face, and then pressing on the bones with both his knees. The horrible effects produced are well described: but in the next page, a case is given where Hildanus says the vertebræ were dislocated by the devil!

brose Paree, on the cure of the projecting vertebræ.

The modern operator thus describes the method: —

"I caused the spine to be stretched daily, for an hour at a time, in order to draw out, and, in some degree, to separate the vertebræ from each other. This operation was performed by means of the shoulders being pulled by one person placed behind the head, and the feet, at the same time, by another, in opposite directions, the Colonel all the while lying on his back. During the period that this process was going on, I continued to make, with my own hands, firm pressure upon the sternal ends of the ribs, first on the one side and then on the other. By this contrivance they were forced to act powerfully, at the other end, upon the depressed vertebræ. This was done to drive them outwards, and towards their proper situation in the column."—Medical and Physical Journal, vol. 44.

It may appear almost incredible, that such an attempt was ever made in this country; but we have the best evidence of its having been done, that of the

operator himself, and I can state that a mode nearly similar, although even more frightful, has been practised in London by the same operator within these twelve months. I have been consulted by several patients who had not only been rigidly confined to the horizontal position for two years, but had submitted almost daily, during that time, to be laid for an hour on their face, to have the feet fastened to one end of a bed frame, while a cord that was attached to a strap round the back of the head was wound up by a windlass that was fixed to the other, and which, from its appearance, seemed to be of sufficient power to raise half a ton. I was told that while the spine was thus stretched, the physician tried, with a small wooden instrument, to *push in the dislocated bones !* Cases, detailed by this operator, to show the *wonderful* effects of this plan of practice, may be found in the 44th and 45th vol. of the London Medical Journal.

ON THE EFFECTS OF ARTIFICIAL SUPPORTS WHEN APPLIED FOR THE PURPOSE OF PREVENTING OR CURING DISTORTIONS OF THE SPINE.

The attempt to cure distortions by machinery fixed to the body is a very important subject, and has been fully entered into in the preceding volumes. I shall here offer a few remarks on the application of stays or other artificial supports. The various opinions regarding their effects, show the difficulty of deciding whether or no, such applications are advisable. The general impression is, that stays are hurtful; some persons, however, insist that they are useful and necessary, perhaps swayed by observing how much more common deformity is now, than when it was the custom to put children into stiff French stays, almost as soon as they were born.

This question will not appear simplified

by asserting that stiff stays may produce distortion, and yet that those which are generally worn are not stiff enough. This opinion suggests an explanation which will, perhaps, put the question in a new point of view.

The sketch above is copied from the "*Orthopedie* of Andry." The cross stick was used to lengthen and

It is not surprising that men acquainted with the natural form of the chest should object to children being put into such a state of bondage as they were, when stays similar to those represented in the sketch were worn. All anatomists who have touched on the subject have agreed, that the effect of the support and restraint caused by such stays is to weaken the muscles by which the spinal column and the parts attached to it are naturally sustained. They have also expressed their opinion, that when such a support has been used for some time, it becomes absolutely necessary.

We have almost daily opportunities of proving the correctness of the opinion, that

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flatten the collar bones ! ! " Quand les enfans sont en robe, on doit, pour la même raison, leur donner des corps dont l'ouverture des manches puisse jetter suffisamment les bras en dehors, et lorsqu'ils sont un peu grands, leur présenter un bâton suffisamment long qu'on leur fasse tenir horizontalement par les deux extrémités, les bras étendus. Le petit effort qu'ils feront alors, pourvu qu'on recommence souvent, obligera les clavicules à s'allonger et à s'aplatir."

if any part of the body be not used, it wastes and loses its natural character. Now, as the spine cannot of itself support its own weight, and still less that of the upper part of the body, it must have the assistance of the several muscles; and as these, to be of any avail, must be kept constantly in play, it follows that if stays be worn of such a form and substance as to prevent the action of these muscles in supporting the spine, the muscles must waste and become nearly useless. (See the Chapter on Appropriate Exercises.)

This appears so obvious as scarcely to require the support of names; but to impress it more strongly, I shall quote the opinions given by some of those writers, who are deservedly considered authorities in every question relating to medical science.

The following remarks are made by Portal, a very eminent French physician, on the strong and stiff stays in fashion at the time when he wrote, which was soon after the publication of the work from which the sketch in the preceding page was

taken. " Those who use them are sure to become distorted, for the muscles of the spine have been so weakened by want of use, that when the artificial props are removed, they are no longer capable of supporting the body." *

Van Swieten, the Dutch physician, whose name is illustrious in the annals of

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* " Il est très-important d'observer, que les personnes qui n'ont fait aucun usage des corps ont les muscles du dos plus fort et plus volumineux que les autres. On peut même dire qu'on a peine à démontrer les muscles du dos dans les femmes qui se sont distinguées à porter des corps étroits; cependant, les dames moins jalouses pour l'ordinaire de leur taille, lorsqu'elles sont parvenues à un certain age, abandonnent l'usage des corps ou en prennent de plus grandes, et de plus laches, et comme alors les muscles du dos sont prodigieusement affaiblis elles se voutent ou elles s'inclinent sur les côtes. Plusieurs qui sont devenues bossues vers leur temps critique, rapportent la cause de leur distorsion à la cessation du flux périodique, tandis que ce n'est qu'à la cessation de l'usage des corps, ce qui prouve qu'il est pernicieux d'en faire contracter l'habitude aux enfans. Les muscles sont chez eux assez forts pour maintenir et pour mouvoir l'épine; les bains froids, l'exercise même, et les frictions sur le dos, pourroient suffire à la redresser; mais dans un age avancé, les muscles du dos, à force d'avoir été comprimés et d'être restés dans l'inaction, sont devenus incapables de maintenir le tronc en equilibre."

medicine, gives even a more distressing picture of the condition into which women may fall, who have been accustomed from their infancy to wear stiff stays. But the name *Lorica* (coat of mail,) by which he designates them, and his observations, would lead us to believe that the stays worn in his day were peculiarly stiff and strong. "Those who have been long accustomed to wear *Loricæ* can never lay them aside, for fear of the chest falling forwards in consequence of the weakened state of those muscles, which, when properly exercised, are not only capable of supporting the weight of the upper part of the body, but even of heavy burdens. Indeed I could not view but with pity, those who were so wretchedlyreduced as not to dare to take off the stays even to go to sleep, much less to raise themselves, or to keep the body erect if brought into that position."*

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* Vidi non sine commiseratione miseras tales feminas, quæ nequidem somni tempore deponere audebant loricas expertæ jam sæpius quod vix se vertere in lecto possunt, multo minus corpus in lecto erigere vel erectum sustinere.

We can conceive the bad effects that must have ensued from wearing such machines; indeed the consequences are well described by an eminent author who wrote about sixty years ago. His observations are so just and so applicable to the present question, that they are worthy of being quoted: — "* Some nations have fancied that nature did not give a good shape to the head, and thought it would be better to mould it into the form of a sugar-loaf. The Chinese think a woman's foot much handsomer, if squeezed into a third part of its natural size. Some African nations have a like quarrel with the shape of the nose, which they think ought to be laid as flat as possible with the face. We laugh at the folly, and are shocked with the cruelty of these barbarians, but think it a very clear case that the natural shape of a woman's chest is not so elegant as we can make it, by the confinement of stays. The common effect of this practice is obstruction in the lungs,

* See a "Comparative View of the State and Faculties of Man with those of the animal World." London, 1772.

from their not having sufficient room to play, which, besides tainting the breath, cuts off numbers of young women in the very bloom of life. But Nature has shown her resentment of this practice in a very striking manner, by rendering above half the women of fashion deformed, in some degree or other. Deformity is peculiar to the civilized part of mankind, and is almost always the work of our own hands. The superior strength, just proportion, and agility of savages, are entirely the effects of their hardy education, of their living mostly in the open air, and their limbs never having suffered any confinement."

But the deformity alluded to was not similar to that which is now prevalent; it consisted in a contracted form of the chest, accompanied by a degree of weakness that produced great distress. This condition of the chest, however afterwards aggravated, probably owed its origin to the custom of wrapping children in tight bandages almost as soon as they were born, for swaddling bands were formerly so common, that there are even directions given in books of surgery how they should be applied. The

observations of the author quoted above, are as forcible and just on this subject as those which he has made on the use of stays: — "The evident tokens of delight which the little creature shows in recovering the free use of its limbs, and the strong reluctance it discovers to be again remitted to its bondage, one should think would strike conviction of the cruelty and absurdity of the custom into the most stupid of mankind."

Such arguments have had an influence, and children are now left in comparative freedom; but notwithstanding the consequences of depriving any part of the body of the power of performing its natural functions, parents do not hesitate to swathe and put into the most complete bondage, children of a more advanced age; for what are stays but bandages? However, as all the arguments that have been employed against the use of stays, and the proofs that have been given of their bad effects, will not prevent their being worn, our efforts must be directed towards rendering them as harmless as possible.

As even fashion does not require that a child should look otherwise than nature

made it, there can be no necessity for putting a girl into stays before she is ten or twelve years of age; when stays *must* be put on, they should be loosely laced, for the tighter they are, the more do they act as compressing bandages, which not only prevent the natural play of the muscles, and thus weaken them, but even waste and lessen their size. That such may be the effect of pressure is often seen in the wasted leg of the mendicant, which, through tight bandaging alone, can be reduced to that condition which excites our commiseration.

If stays are put loosely on, and only worn occasionally; and if the girl takes sufficient active exercise, and rests in a proper manner when fatigued, there is little danger of the form suffering even from strong stays. But, although, by this method, stays may be rendered almost harmless, there will be some difficulty in pursuing it, as the girl will feel the occasional bondage very uncomfortable. The annoyance produced by it, is marked by the flushing of the face from impeded respiration, and by a stiff and constrained manner of walking. The remedy generally

proposed is, that *she should wear the stays until she gets used to them ;* this advice will probably be followed ; and then it is likely that the bad effects, already described, will ensue.

But, on the other hand, it has still to be shown that stays may often be necessary, and that those generally used may, under certain circumstances, not be stiff enough.

Almost every step in the education of a young lady tends to make her artificial, at least as far as her body is concerned. Stays tightly laced are applied at an early age, and she is debarred from taking the exercises natural to youth ; yet, notwithstanding the tendency of such a system to weaken all the muscles of the back, she is expected to be able to keep her spine as upright as if she had the strength of a porter. She may appear to sit erect, when she is, in fact, crooked ; the cause of this is explained in the next chapter. But to return to the question ; a mistake seems to exist with regard to the effects produced by stays, which are not stiffened with bones. Mothers

are led to believe that their children are in no danger of becoming distorted by wearing such stays ; but they forget, or do not know that the tight bandaging of the chest, when continued, is more injurious than the effect produced by stays which support the figure, even to such a degree as to obviate the necessity of the action of the muscles. It is true that a bandage, occasionally applied, gives support and strength; but if constantly worn, it produces a wasting of the part. Proceeding on this view, it may be stated that if tight stays *must* be worn, they should be made sufficiently stiff and strong to sustain the weight which the muscles that have become deteriorated by want of action are unable to support. If the stays are not made so, (the muscles or natural means of support being already weakened) there is danger of certain ligaments of the spine yielding, and hence, of the vertebræ falling out of their natural line, and thus producing curvature of the whole column. But so prevalent is the persuasion that stays are injurious, and so little does the principle, on which they are useful or hurtful, seem to be understood, that the first thing

generally recommended in a case of weakness, or yielding of the spine, is that the stays should be thrown aside, or at least that all the bones should be taken out. If a determined plan of practice, combining appropriate exercises with rest and proper support, is to be pursued, this may be all very well; but when a girl is weak, to deprive her of her artificial supports, and to leave her at once to her own physical resources, seems to be acting in a manner very much at variance with the dictates of common sense. I have seen so many instances of the bad effects of this plan, that I cannot help expressing myself strongly.

Although a girl may be absolutely tortured when she begins to wear tight stays, she soon becomes so dependant on them as to feel very uncomfortable without them. If she should have a fit of illness, her dependance on this artificial support is more distinctly marked, for when she recovers, and is expected to sit up, the muscles of her back are so feeble and relaxed, that she is not able, even during the short period of dressing, to keep herself erect, unless she binds the waist with a towel or handkerchief. A mother naturally takes alarm at this, espe-

cially when she recollects that, before the stays were worn, her daughter could not bear any thing tight round her, and was strong and active. She, however, hopes that the late illness is the sole cause of the weakness, and she waits in expectation that her daughter will become stronger; but the girl continues in the same dependant state, and probably complains of lassitude and a weary pain in the back. Her spine is now examined, perhaps a slight curvature is discovered, and pain when certain vertebræ are touched. She may now be condemned to lie for two years on the inclined plane; at all events, the bones are ordered to be taken out of her stays, under the idea that as they have produced the distortion, all danger of the curve increasing will be removed by this measure.

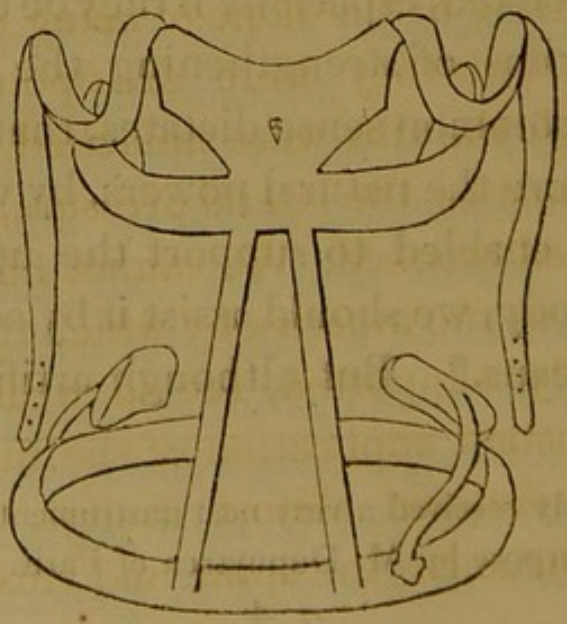
But this only adds to the evil, for the girl has, from the weakness consequent on her illness, and the previous disuse of the muscles fallen into such a condition as to require support. Although the supervention of distortion affords a good argument against the previous use of stays, they may nevertheless be necessary to a person in this state.

Tight stays have been worn, the muscles have been weakened, distortion has taken place, in short the mischief is already done, and the question now, is not whether the stays produced the distortion, but what is to be done to counteract their previous effects. Surely we ought rather to add to the means of support for a time, than to take from them; and therefore, when the spine yields, instead of throwing aside the stays, we should make them stronger, and, if possible, in such a manner as to take off the weight of the shoulders and head, from the lower part of the spine.

Although such stays will not cure a distorted spine, yet, if judiciously managed, they may tend to prevent the spine becoming more crooked, especially if they be combined with means of strengthening the muscles; indeed common sense dictates, that until we can restore the natural powers, by which the spine is enabled to support the upper part of the body, we should assist it by some artificial means.* But although artificial sup-

* I lately received a very neat instrument, contrived for this purpose by M. Dupuytren of Paris.

ports are here recommended, they are to be considered as only assisting in the cure of distortion, and as the means of preserving what is gained in another way. In the preceding volumes, the question of the propriety of attempting to cure distortion by such machines is discussed at some length. And so far am I from swerving from the opinions expressed there, that I am more convinced than before of many of these machines being injurious in a variety of ways, and I would now object even more than I formerly did to that proposed by Mr. Chesher, for it is very lately that I became aware of its effect on the muscles of the fore part of the neck. (See the observations in the next chapter.)



The instrument sketched above, may be sometimes an useful adjunct to other means: but it has been recommended on high authority, as the only thing necessary to cure distortion, and as it for a time conceals the deformity, it will probably always be used, although (perhaps from the superintendance of its application and its effects being entrusted to a mere mechanic) it generally injures both the figure and health. Indeed, I have not known one instance, among a considerable number of patients who had worn this instrument, where it had not been in some degree hurtful. Some of these patients, notwithstanding the pain produced by the ulceration under the arms, wore it for a long time in the hope of being eventually cured; but they were disappointed, for, although the ribs were modelled into a certain shape by the lateral pressure, the spine remained crooked. We cannot be surprised at this, as the muscles by which the spine is naturally supported, are so weakened by the constant application of the machine, as to be rendered almost useless, indeed in some instances the spine and ribs have ap-

peared as if covered only by skin, so much have the muscles been wasted. I do not know whether a cure has ever been effected where patients have worn the machine the time prescribed by the maker (nine years ! that is, until the spine becomes fixed !) It has probably been seldom persevered in so long, for in the course of two or three years the patients become so weary of the constant pain and restraint, and the friends so tired of the frequent expensive repairs, that it is thrown aside, and then the mechanic's excuse is that it has not had a fair trial. I have in the preceding volumes mentioned several of the evils attending the use of this instrument ; were it necessary I could offer several striking examples of its inefficacy and bad effects.

ON THE MEANS GENERALLY USED WITH THE INTENTION OF CURING A STOOP.

As a stoop frequently accompanies a slight distortion, and as the means commonly used to counteract it are not only ineffectual, but even tend to increase the bend, it will not be out of place here to enquire into the methods of treating it, especially as one which I have to propose assists in removing a slight degree of lateral distortion.

When the chest and the head fall forward, the most common method of trying to correct the stoop, is to put on some instrument by which the shoulders and the head are held back. To operate upon the shoulders, the common back collar is applied, and to hold back the head, a riband is brought over the forehead and fastened to the collar.

While these instruments are kept on, the figure looks straight, though stiff and constrained; but the moment they are taken

off, both the head and the shoulders fall more forward, than before their application. Many examples of the bad effect of artificially supporting the head might be offered. The following example, although it is to be observed in the figure of a horse, is very demonstrative. When the rein (called the bearing-rein), by which the head of a carriage-horse is reared up, with the intention of giving him a showy figure, is loosened, the head immediately falls forward, and the neck, instead of having the fine arch that is so much admired, droops between the shoulders. Looking to this effect, we should at first be inclined to condemn the practice followed by horse-dealers, of reining up the head of a young horse in the stable, by means of the apparatus called a dumb-jockey. But on examining into this mode of fixing the head, it will be found to operate on a very different principle from the bearing-rein. Instead of a simple bit, such as the horse in harness can lean his head upon, without suffering any pain, a bit, calculated to teaze and fret, is put into the young horse's mouth. To relieve himself from the irritation produced by this, and which is increased by the constant pull

of the elastic piece of iron to which the rein is fastened, he curls up his neck, and thus brings all the muscles of the back of the neck into strong action, instead of allowing their power to be superseded by the artificial support afforded by the bearing-rein to the horse in harness.*

Many different contrivances, but all acting nearly on the same principle as the *bearing-rein*, have been proposed as means for obliging a girl to keep her head erect.

There is one mode which, to a person ignorant of anatomy, seems to be particularly well adapted for this purpose, but it is in fact more objectionable than the plan of tying the head back with a riband. A piece of lead of some pounds weight is slung over the back in such a way that it must be supported by a riband put around the head.

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* When the Russians wish to give a horse high action in trotting, they accustom him while young to wear very heavy shoes on the fore feet. We can now perhaps understand how this produces the desired effect; the resistance to be overcome necessarily increases the strength of certain muscles, and hence when shoes of the common size are put on, the horse will lift his feet higher than one which has not been subjected to this discipline. Since writing this, I have been told that opera dancers practise with lead weights on their shoes.

Although this contrivance prevents the head for a time from falling forwards, its bad effects may be demonstrated. When the weight is on, the muscles of the back of the spine are passive, while those on the fore-part of the neck are necessarily brought into action to prevent the head from being pulled too far back, and this is easily proved; if we put the fingers on the sternal portions of the sterno cleido muscle, which, with the small muscles on the fore-part of the throat, pull the head forwards,

we shall feel them tense and in action; and to show still further the increased activity of the muscles on the fore part, and the passive condition of those of the back, we have only to raise the weight when the girl is not aware of our doing so; the head will then be immediately poked forwards.

I lately saw an ingenious piece of mechanism intended to hold the head back, by producing the same effect as the weight suspended by the riband; it is recommended by Mr. Bampfield.* But it is

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* "Mr. Moginie (a watchmaker) has also constructed a back board, to which is fitted a very ingenious contrivance to keep the head and spine erect. It consists of a common back-board; the scapular bar and axillary supports already described; of a box, spring, pulley, and cord, and a head-piece or band.

The scapular bar is screwed to the back-board. The head piece is made of a padded elastic spring, covered with leather, which grasps the head in a line with the forehead, around which a strap is passed from one side, that is buckled to the other, and secures it. The box-spring is secured to the bottom of the back-board, and is of the same materials, and made on the same principle, as a watch spring.

From the spring a silk cord is led through two pulleys, to be hooked to the head piece. The spring can be ad-

scarcely necessary to add that the objections made to the use of the weight, on the ground of the anterior muscles being excited by it, while those of the back of the neck are passive, are equally applicable to this contrivance.

We have many opportunities of observing the incorrectness of the principle on which all similar plans for the cure of a stoop have been founded. For instance; porters who carry burthens on the back, by the assistance of a band round the forehead, always stoop; while those who carry baskets

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justed to any required power, as by winding it up it can be increased, and *vice versa*.

When the head is erect, the cord does not draw it back. But as the head is bent forwards, the spring resists more and more, as every inch of the cord is extended, until it arrives at a given extent, beyond which the spring will not yield, and then the tight cord occasions the head to be pulled backwards so forcibly, that the patient is soon weary, and raises the head erect. This bending and raising the head and upper part of the spine, may be performed as an exercise. The whole of this instrument may be concealed, except the head-piece, and this may be covered with vellum, or a riband, so as to appear like a lady's fillet; and in a young lady, would be regarded as an ornamental part of her head-dress."

before them suspended by a band round the back of the neck, are peculiarly erect. But the most remarkable example of the effect from the head being pulled back by a weight hung behind, is the condition of the women who carry salt in the streets of Edinburgh, for they may be recognised as much by their miserable sardonic grin, which is caused by the constant excitement of the platysma myoides muscle, as by their stoop.

Such results may, perhaps, be thought scarcely worthy of notice; but the very worst consequences may ensue from any system of treatment where a constant resistance to the muscles of the fore-part of the neck is kept up. — A gentleman had for many years worn one of the collars invented by Mr. Chesher. By using this machine two very bad effects were produced; the muscles of the back were so weakened as to be rendered incapable of supporting the column, while those on the fore-part of the neck were so disproportionately increased in strength, by the constant resistance opposed to them by the strap passing from

the suspending rod under the chin, that whenever the strap was loosened, the chin was forcibly drawn towards the chest. As the muscles of the back part of the neck did not offer any counteracting resistance, the windpipe was now pressed down or almost doubled on itself. As soon as this took place, (and it was almost immediate on the attempt to sit up without the collar,) the patient was seized with such a sense of suffocation as to be obliged to throw himself on his back. As he was able to breathe with ease while he lay on his back, his advisers were led farther into error, and believed that it was the weight of the head which pressed down the windpipe. To counteract this pressure, various contrivances had been proposed to support the head. Indeed the patient himself was so convinced, from what he had heard, that it was the weight of the head which pressed down the windpipe, and so alarmed had he become from the certainty of having a fit of suffocation when the head was left unsupported, that I had much difficulty in persuading him to believe that if the head could be made *heavier* the

sense of suffocation would be relieved. I at length induced him, although he submitted with great dread of the consequence, to allow me to place about fourteen pounds of shot on the top of his head. He was very much alarmed, but it was highly gratifying to witness his surprise and pleasure in finding, that instead of his head being weighed down, he could support it, and could breathe with ease while in the upright posture. The principle on which I proceeded was this: — The muscles of the back part of the neck had been brought into such a state, that their ordinary stimulus was not sufficient to excite them to the action necessary to counteract the efforts of those on the fore-part of the neck, which had been evidently increased in strength. The placing a weight on a certain spot on the head formed an additional stimulus to the muscles of the back part of the neck, a fact which the reader may prove by an experiment on himself.

By proceeding on this principle, by combining a variety of exercises, and by gradually diminishing the weight carried on the head, I had very soon the pleasure of seeing my

patient walking and sitting in a state of great comfort, without being obliged to use any artificial support.

I have since used nearly the same means, and with considerable success, in the case of a patient who was suffering from a paralytic affection of some of the muscles of the back part of the neck. I wish I had thought of it while attending a lady, who had a very peculiar nervous affection, which gave her the feeling of being about to shake her head off.

It is well known, that instruments similar to that represented in the wood-cut, support almost the whole weight of the head and shoulders by the strap which passes under the chin. It must also have been observed, that the wearer very frequently pushes down the head against the chin strap. In this way, the muscles on the fore-part necessarily become stronger, while those of the back, being deprived of their natural stimulus to action in consequence of the rod superseding their office, become diminished in power. Even were there no change in the degree of strength in the muscles on the fore-part, the head would naturally fall, if the support afforded by the chin strap were removed; but as these muscles are increased in power, while those of the back are diminished, the head must not only fall, but even be pulled down.

However*, although the collars and the

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* The substance of a few of the following pages has been already published in the preceding volume, but it is so connected with the present enquiry, that I have been induced to reprint it with very little alteration.

lead weight, as they are generally used, are not only inefficacious, but even hurtful, they may occasionally be useful in keeping the head in a certain position, after it has been brought to it by such exercises as tend to strengthen those muscles of the back which support the shoulders and head. But so completely do I differ from the opinions commonly entertained, as to the means of counteracting an habitual stoop, that I would almost recommend the position of a tailor sitting on his shop-board, as more advantageous than the systems generally followed. This at first appears ridiculous; but the manner in which a tailor holds his body when he walks, proves that there is something in his habits which tends to the correction of a stoop; for he is quite a caricature of a strutting erect figure, especially in the way he bends in his loins and carries his head.

The peculiarity of the tailor's gait proceeds in a certain degree from the bent position in which he sits: but this explanation is not at first satisfactory, since it may be observed that other tradesmen, who also stoop while at work, generally have their head inclined forwards, and have also a dis-

tinct and habitual bend in the neck; such, especially, is the condition of persons who sit at a table and stoop forwards, as watch-makers, engravers, &c. It is not difficult to explain the cause of the difference, and the enquiry will assist in directing us to the principles which we ought to recollect in our operations upon the spine.

In the sitting position of the tailor, the head hangs so low, and so complete an arch is formed between it and the pelvis, that the muscles of the spine are called into strong action to support the head; the necessary consequence of this is, that these muscles become even unnaturally strong, or at least so strong as to predominate over those by which the spine is pulled forward. But the bent position is not the only cause of increase in the strength of the muscles, for it depends also on the exercise given by frequently jerking the head backwards. In those who stoop from the middle of the body, as in writing or working at a table, the muscles of the spine are not called into action; for while the head is in this position, it rests or is supported by the ligament of the neck. The ligament being

thus kept constantly on the stretch, becomes lengthened, instead of being made more contractile as muscles would be; and hence the stoop is increased. When this is combined with the consequences of the want of muscular action, the deeper ligaments which bind the upper vertebræ gradually yield; if the operation of these causes continues for a certain time, the bones and cartilages themselves become altered in shape, and consequently an almost irremediable stoop is produced.*

This view derives confirmation from what may be observed in the shape of the tailors in some parts of Germany, who, instead of having the erect figures of London tailors, are quite bent. On enquiring into the cause, we find, that instead of sitting as tailors do in this country, a hole is cut in the table, and a seat is placed within it; so that their position, while working, becomes nearly the same as that of persons who sit at a table.

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* Elderly persons may recollect how often the girls who worked at *tambouring* were crooked: the present fashionable amusement of embroidering seems to have, in some instances, the same effect.

It may, perhaps, be objected, that labourers, and especially the vine-dressers in France, are remarkable for the complete arch which their body forms, although they bend while at work as much as the tailor does. This may also be explained, for in the labourer, the bend is produced by the pelvis rolling on the head of the thigh bones, while in a person sitting as a tailor, the pelvis continues nearly fixed, and the bend is in the vertebræ on the pelvis.

The erect figure of the Turk perhaps comes from the manner of sitting which is common among Eastern nations; but the heavy turban, and the spice box slung from the back of the neck, may account in a great measure for the fine figures of the Turkish Jews who frequent the streets of London.

We may even take the shoemaker as an example of the effect of a particular manner of sitting, and of frequently using the muscles of the shoulders. He is also a little in caricature, but he carries himself better than the tailor, and the cause is obvious. The tailor's figure is very erect, but the right shoulder is generally a little

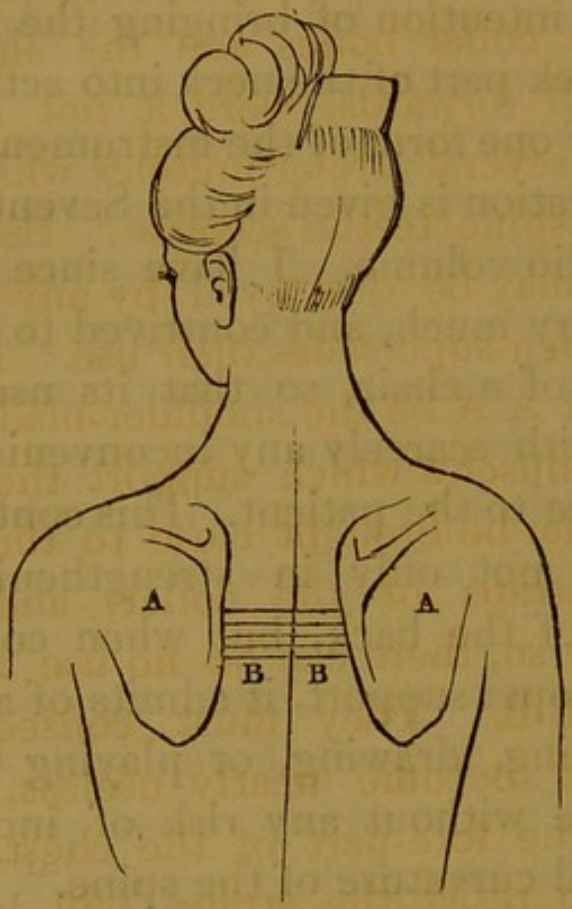
higher or larger than the left ; from the constant exercise given to the right arm, while the left rests upon the knee : this inequality of the shoulders is not observed in the shoemaker, because he not only uses both arms equally, but the muscles by which the scapulæ are supported, become so strong by the habit of jerking back his elbows while he works, that his shoulders always appear more braced back than those of any other class of persons : indeed so characteristic are the figures of tailors and shoemakers, that they may be easily distinguished in a crowd.

I have mentioned these circumstances, because they afford familiar examples of the principles on which we ought to proceed, in endeavouring to correct deformities; but it would be ridiculous to propose the position either of the tailor or of the shoemaker, as the best adapted to correct a stoop or falling forward of the shoulders; though, in very young patients, I have found it expedient to put all their playthings on the ground, and to recommend such games as will induce them, while sitting, to bend the body and raise the head

alternately. In patients farther advanced, much benefit has been derived from the use of an instrument which was planned with the intention of bringing the muscles of the back part of the neck into action. A sketch of one form of the instrument and of its application is given in the Seventh Plate of the folio volume. I have since simplified it very much, and contrived to fix it to the back of a chair, so that its use is attended with scarcely any inconvenience or annoyance to the patient. This contrivance is useful not only in strengthening the muscles of the back, but when combined with a proper support, it admits of a young lady writing, drawing, or playing on the pianoforte without any risk of increasing the lateral curvature of the spine.

The preceding observations apply also to the contrivances usually employed to keep the shoulders back, and particularly to the question of the propriety of using the common back collar. The effect which this instrument produces in ordinary cases

may be easily comprehended by the following diagram.



The part of the back formed by the ribs is not a flat, but rather a round surface; and as the shoulder-blades rest on this, they would fall either forwards or towards the spine, were there not some means of keeping them in a certain position. They are most disposed to fall forwards, for although the clavicles appear to hold them back, these bones are

united to the sternum by a moveable joint; and as the weight of the arms operates principally on the anterior angles of the scapulæ, both the collar bones and the shoulders would fall forwards, were it not for the action of several strong muscles which pass from the spine to the scapulæ. But these muscles may be destroyed by any contrivance which supersedes their use. For example, let A A be the shoulder-blades, and B B the muscles which support them. If the scapulæ be brought close to the spine by the straps of the collar, and kept constantly so, there can be no use for the muscles B B. They must consequently waste and become nearly useless, while those on the fore-part of the chest, being excited to resist the straps, will become increased in power; and hence, when the collar is taken off, not only will the shoulders fall forward as in a delicate person, but the muscles on the fore-part of the chest will predominate over those by which the scapulæ should be held back, and *pull* the shoulders forwards.

The spine and the ribs are occasionally bent so as to have some resemblance to the

back of a spoon. In such cases, the shoulders not only appear round, but the lower angles of the scapulæ project in an extraordinary manner, because the upper and anterior angle is not only unsupported by the ribs, but is dragged forwards by the clavicles which are carried in the same direction with the sternum. When this is to a considerable extent, it constitutes the *contracted chest* or the *chicken breast*. This, in a slight degree, is common in London, and especially among young lads; it may be discovered by the coat having the appearance of being more worn opposite the lower angle of the scapula than at any other part. Such a condition of the chest can only be completely remedied by appropriate exercises; but a collar is here necessary for a time, to keep the bones in the improved condition into which they are brought by the exercises.

These arguments will probably appear sufficiently well founded to prove that a girl, under ordinary circumstances, cannot hold her head or shoulders back, unless the muscles by which they are naturally supported are in a proper condition; various

contrivances have been proposed to strengthen these muscles. Dumb bells, if managed in a particular manner, are good; skipping, when the arms are thrown backwards and over the head are still better; the exercises, called Spanish exercises, performed with two long poles, are also useful, but to each of these there may be objections, as they all operate more or less on the spine or ribs, which, in cases of a bad stoop, are generally affected.

The following anecdote, for which I am indebted to a very eminent surgeon, will set the question of the propriety of wearing the back collar in a correct point of view. He was consulted by a gentleman, who is now one of our first tragedians, as to the best mode of correcting a stoop which he had acquired. My friend told him that neither stays nor straps would do him any essential good, and that the only method of succeeding was to recollect to keep his shoulders braced back by a voluntary effort. But the tragedian replied, that this he could not do, as his mind was otherwise occupied. The surgeon then told him that he could give him no farther assistance. Shortly after

this conversation, the actor ordered his tailor to make a coat of the finest kerseymere, so as to fit him very tightly, when his shoulders were thrown back. Whenever his shoulders fell forward he was reminded by a pinch under the arms, that his coat cost him six guineas, and that it was made of very fragile materials ; being thus forced, for the sake of his fine coat, to keep his shoulders back, he soon cured himself of the stoop. My friend was much obliged to him for the hint, and afterwards, when consulted whether young ladies should wear shoulder straps, permitted them, on condition that they were made of fine muslin, or valuable silk, for tearing which, there should be a forfeit.

An enquiry into the manner a girl should sit, may appear trifling to those who have not been in the habit of seeing many cases of distortion of the spine, but it is intimately connected with the present subject, and is really of considerable importance. The question has been disputed ; one party insisting that girls should always sit erect,

while others are advocates for a lounging position. It is not difficult to show that both are wrong; — when a delicately formed girl is supposed to be sitting erect, she is generally sitting crooked; to a superficial observer she may appear quite straight; but any one who will sit on a music stool, and endeavour to keep his body in a perpendicular line for ten minutes, will be convinced that it is difficult for even a strong man to sit as long as a delicate girl is expected to do, without allowing the spine to sink to one side or to fall forwards.

The attempt to sit erect beyond a certain time is injurious, for although bending the spine occasionally, is useful rather than hurtful, yet when it is done involuntarily, and when it is attempted to conceal the bend by an endeavour to keep the head straight, there is danger of the spine becoming twisted. A double curve is generally the consequence of the attempt; there is first, a bend forward, or to one side, to give ease to the fatigued muscles; and then, to conceal this, there is a second curve that is

necessarily accompanied by a slight twist in the vertical line of the whole column.

The proposal to allow children to sit in a crooked or lounging position seems to have been founded on the idea, that all the muscles are more relaxed in this way than even when the child lies at full length on its back. This notion is certainly incorrect, and such a mode of sitting is injurious; for even were the muscles more relaxed by it, the bones and ligaments acquire such a shape as necessarily produces distortion. See page 23, and 104.

It may naturally be asked how a girl should sit, since it would appear, that whether she is in an erect or stooping posture, she is equally in danger of becoming crooked. As sitting, in the manner generally recommended, affords little or no support to one who is weak, the safest answer would be, that a delicate girl should not sit for even more than five or ten minutes without having some support to her back and when she is fatigued, that she should lie down or recline on a couch. But as it would be very annoying to a girl not to be allowed to sit up except for so

short a time, and as a couch is not always at hand, we must endeavour to show how a delicate girl may remain in an upright posture for a reasonable time without incurring any risk of becoming crooked. This leads to an enquiry into the merits of the chairs which are at present generally used by children.

Young ladies are often obliged, while at their music lessons, to sit upon those chairs, which have high backs, long legs, and small seats. Such curiously formed chairs are said to have been invented by a very eminent surgeon, and are intended, either to prevent distortion, by some supposed operation on the spine, or as the most effectual means of supporting the body. I cannot imagine how a chair of this description can effect the first purpose; and to discover how far it is calculated for the second, I beg my reader to make the experiment on a chair of the same proportion to his figure, as the chair in question is to that of a little girl.

I think he will find that if the seat or surface on which he rests, is small in proportion to his body, the chest will, after a time,

either fall forward or to one side, unless he exert himself to a degree that is very fatiguing. Indeed, if the seat be at the same time so high, that the feet do not rest fairly on the ground, but dangle under the chair, a forward position of the head is almost necessary to preserve the balance of the figure.*

My objections to such chairs have been met with the assertion, that girls feel remarkably comfortable in them. This is no argument in favour of their use, for it is not uncommon for a girl who has seven or eight pounds of iron strapped upon her body and next to her skin, to say the machine annoys her so little, that she does not care how long she wears it.

But whether this chair is agreeable or not, it is easy to show that it is not calculated to give much proper support to the body, and that it is almost impossible for a delicate girl to sit long in a natural or easy position upon it.

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* It must be almost unnecessary to remind my reader, that if the knees are bent in standing or walking, there is a curve in the spine at the same time.

It may be allowed, that the chair which we consider the most comfortable, that is, the chair which affords most support to the body, should, if made in proper proportions, be the best for a delicate girl. In such a chair, the *seat* should be scarcely higher than the knees (thus permitting the whole of the foot to rest on the floor), and of such a size, that on sitting back, the upper part of the calves nearly touch it. This form of *seat* is very different from that of the chair I have alluded to, the *back* of which is also equally objectionable, for, instead of being in some degree shaped to the natural curves of the spine, it is made nearly straight, and projects so as to push the head forwards. A delicate girl should always sit so as to rest against the back of the chair, and, if the lower part of her spine is weak, a small cushion will afford great relief. As it is quite a mistake to suppose that the shoulders, if raised, in any other way than by the action of the muscles, will continue high, I do not object to a girl who is delicate being supported by an arm chair; for, by occasionally resting on the elbows, a considerable weight is taken off from that part

of the spine which is the most likely to yield.

These observations refer only to the manner in which delicate girls, whose spines are still straight, should sit : when the spine is actually distorted, it will be necessary to combine certain artificial supports with the contrivance described at p. 107.

ON THE EFFECTS WHICH CERTAIN EXERCISES PRODUCE ON THE FORM, AND ESPECIALLY ON THEIR INFLUENCE IN PREVENTING OR CURING DISTORTIONS OF THE SPINE.

As one object of this volume is to show the effects which result from the various means that have been employed to cure distortions of the spine, and particularly those proposed by persons who have not made the anatomy and pathology of the spine a subject of study, I shall add a few observations on a question which has of late excited considerable attention, viz. — *The effects produced by exercise.*

The desire to go to the extreme of every fashion, extends its influence even tothe education of children. A few years ago, young ladies at school were kept in a

very inactive state, but now they are often called upon to use such violent exertions, as to render it almost as necessary to point out the danger of excessive activity as it formerly was to recommend exercises as conducive to the health and form. Many of the feats of strength which young ladies now perform, are fitted only for athletics, and as they are seldom proportioned either to their age, strength, or constitution, the shape may be injured, while the health can receive no benefit from them. Whoever may have witnessed the feats alluded to, will not consider this an exaggerated opinion, and will perhaps also admit, that even were there no risk that a girl should fall from the rope or pole, there is considerable danger. during the violent efforts she must make to support herself, of seriously injuring the abdominal muscles, or at least some of the joints. The state of violent action which all the muscles of the body, and particularly those of the abdomen,* are thrown into by attempting to

* Some of the observations contained in a Memoir, entitled "*Sur l'Influence des Efforts sur les Organes ren-*

raise the body on a cross pole may be imagined, by an examination of the sketch

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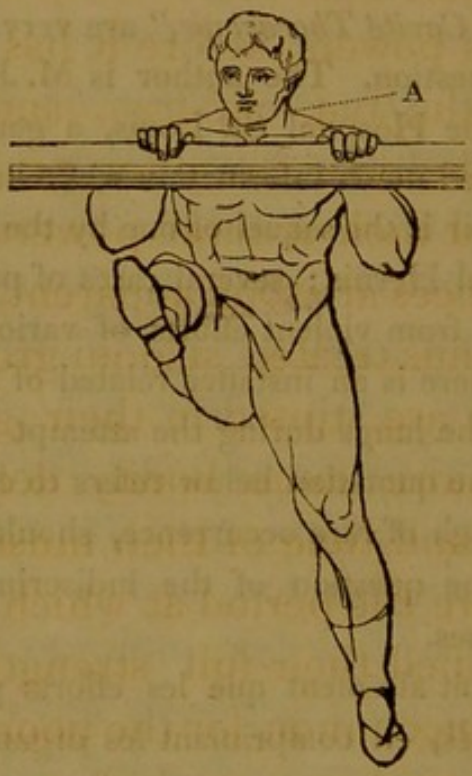
fermés dans la Cavité Thoracique," are very applicable to the present question. The author is M. Jules Cloquet, Surgeon of the Hospital St. Louis, a gentleman from whom I derived much information while in Paris.

The Memoir is the sequel of one by the same author on Abdominal Hernia; several cases of partial rupture of the lungs, from violent efforts of various kinds, are given; and there is an instance related of protrusion of a portion of the lungs during the attempt to lift a sack of barley. The quotation below refers to certain effects, which, although of rare occurrence, should be noted in considering the question of the indiscriminate use of violent exercises.

" On conçoit aisément que les efforts prolongés, ou souvent répétés, en comprimant les organes pectoraux, 1° produisent un engorgement, une sorte de stase dans le systême veineux, par l'obstacle qu'ils apportent à la rentrée du sang dans le cœur et les gros troncs veineux, ainsi qu'au passage de ce liquide à travers les poumons, effet augmenté dans ces circonstances par l'activité que les muscles extérieurs en contraction impriment à la circulation veineuse; 2° que par les mêmes raisons, les efforts occasionnent une légère déplétion dans le systême artériel, et cependant une projection plus forte, quoique moins abondante, du sang dans les artères: 3° enfin, qu'ils s'opposent au changement chimique que doit éprouver le sang dans le poumon, en empêchant le renouvellement de l'air dans l'intérieur de cet organe.

below, which is taken from one of the late works on gymnastics.



Les changemens physiques qui arrivent pendant les resserremens du thorax dans les organes centraux de la respiration et de la circulation, nous rendent raison du gonflement, de la rougeur violacée de la face et du cou, chez les personnes qui, comme les bateleurs, exécutent de violens efforts; des divers accidens qu'on a eu occasion d'observer dans ces circonstances, tels que la rupture du cœur, celle des gros vaisseaux thoraciques, des tumeurs anéurysmales, etc.; des épanchemens de sang

The bad effects of working a young horse too early, and so as to call for occasional violent exertion, are so generally known, that a valuable animal is seldom put to the trial of its powers, before it has attained its full growth; but children, and especially those of the poor, are often put upon tasks far beyond their natural powers. The bad consequences are soon apparent, as children who are thus treated seldom grow up vigorously, but are stinted in their growth, and often acquire some bodily defect, or the elasticity and tone of their muscles are lost, long before the period at which they would have attained their full strength. Indeed, it is not uncommon for the poor to be worn out at an early age, and often may the face

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dans le cerveau, dans le tissu des poumons; de l'oppression, des étouffemens et des palpitations qu'éprouvent les individus attaqués de maladies organiques du cœur, lorsqu'ils montent un escalier, genre de mouvement qui demande des efforts continuels pour élever à-la-fois tout le poids du corps d'un plan inférieur sur un plan plus élevé. Pendant ces efforts, les parties malades sont douloureusement comprimées, le cœur se dilate péniblement, mais se contracte avec plus de force sur le sang qui remplit et distend ses cavités, etc."

of twenty be seen on the shoulders of thirteen.

It may, perhaps, be argued, that such children have not only been over-worked, but have been badly fed and clothed. There is no doubt that the latter causes will have the worst effects; but even good and nourishing food is not sufficient to avert the consequences of premature over-exertion, especially if it be sudden, and entered upon without previous training.*

In considering this question as connected with those who are not likely to be put to hard labour, we have particularly to fear that a child of high spirit, while climbing a rope, or mounting a cross-bar placed high above its head, may over-exert itself. Even were the attempt to excel in such feats not dangerous, the feats themselves are ill calculated to produce the effects intended. They will probably increase the bodily strength, although at the hazard of some

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* The miserable appearance of some of the farmers' boys proves, that even fresh air and plenty of good food will not counteract the bad effects of early and hard labour.

serious injury; but as they are proposed for the improvement of the form, it is a fair subject of enquiry whether those exercises, at present in fashion, can really have that effect.

We have frequent opportunities of observing the actual deformity which arises from the disproportionate development of any particular class of muscles. For example the legs of those opera dancers, who pride themselves on their powers of making extraordinary leaps and pirouettes, are almost herculean, while their arms are comparatively diminutive. Similar effects are produced on the orm of those who practice horsemanship and tumbling, although these persons are sometimes better proportioned than the dancers, from their muscular system being more generally exercised; still their muscles are so unnaturally increased, by the violent exertions necessary to their feats of strength, that their appearance may also be considered as approaching to deformity.

But there is a more important circumstance to be considered in regard to the propriety of making children use occasional

violent exertion ; — the changes which may be thus produced in the condition of the ligaments of the joints. When muscles are gradually increased in strength, the ligaments become strong in proportion ; but the ligaments are as likely to be hurt from the muscles being suddenly called into violent action and at an early age as by any accidental twist or strain. They are in this way liable to become spongy and relaxed, so as to produce weakness, or a condition similar to that of the joints of a young horse which has been galloped hard, or obliged to take great leaps before he has acquired his full strength ; indeed, there is much resemblance in the condition of a joint with the ligaments strained, to that of a horse which is broken down or wind-galled.*

Such consequences may be guarded against by gradually increasing the degree of exertion ; but, however great the care in

* Small bunyons or ganglions, which are similar to what the farrier calls wind-galls, are sometimes found about the ankle joints of delicate girls, who have over-exerted themselves in dancing.

this respect, the joints may be injured in another way, which it is highly important to understand.

If any exercise, however good, be continued for a long time, and regularly repeated while a young person is growing, certain ligaments may become unnaturally lengthened and elastic. As, for example, we may observe, that in the bolero dance, upon the sta e, some of the performers nearly touch the floor with the inner ankle, which is a feat that no person with a fine and strongly formed ankle is capable of.

We find, on examining the foot of an opera dancer who can do this, that all the ligaments of the foot, and especially the lateral ligaments of the ankle, are so unnaturally long, that the foot can be turned in every direction as easily as the hand. The bad consequences resulting from this looseness of the joints, do not appear when the performer is dancing or strutting along the stage, as the muscles of the leg are then in an artificial state of exertion, and for a time preserve the bones in a proper relation to each other; but the effect is quite obvious when the dancers are walking in the streets,

for then, while attempting to walk naturally, they have distinctly a shuffling gait. This is particularly observable in old dancers, who have retired from the stage, for the muscles having by disuse lost their tone, the bad effects of lengthening and straining the ligaments are then distinctly marked. Indeed these evils are not confined to a peculiarity of gait, for the feet of almost every opera dancer, excepting those called the *pantomimes*, are deformed, and even some of the dancers, while in full vigour and most admired, are actually lame. This may appear a bold assertion, but if a high instep be important to a well-formed foot, these dancers' feet are deformed, for, with few exceptions, they are quite flat; and that they are lame cannot be denied, as they have, almost all, a halt in their gait. If we consider the manner in which they are taught, we shall not be surprised at this. They commence their discipline at a very early age, and their sole endeavour, for six or eight hours daily for many years, is to stretch the ligaments of the feet and ankles. This is done in various ways, but chiefly by standing for hours on the tips of their toes, their only respite

being occasional attempts to push the ankle bones towards the floor. In this way the power of the muscles is soon exhausted, and the whole weight of the body being then sustained by the ligaments, they must yield, and hence those which bind the bones of the foot together become unnaturally lengthened. As a necessary consequence of the stretching and elongation of these ligaments, the bones are separated from each other, and the feet are thus rendered nearly as flat as those of a monkey.* Although the shuffling gait and

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* The feet of those who wear strong shoes are also frequently deformed, but in a different manner. The bones are pressed together, and the ligaments and small muscles, instead of being unduly developed, are nearly destroyed; this results from the shoes almost entirely preventing the natural actions of the muscles. The effect of encasing the feet in the manner practised in China, is generally known; last autumn there was an opportunity of proving, by examination of the feet of the Chinese woman, who died in Pall Mall, that the stucco models, brought from China, give a very correct idea of their form.

In connection with this subject, the curious difference between the foot and leg of an Irish haymaker and that

the lameness apparent in walking depend principally on the condition of the ligaments and of the muscles forming the calf of the leg, they may, in some degree, result from the dancer being so much accustomed to move on the tips of his toes, that it has become almost unnatural for him to bring his heel to the ground. Indeed the gait of an opera-dancer in walking may be said to resemble, in some respects, that of a bear dancing; for this animal, which, like all other quadrupeds, *walks* on the tips of his toes, when obliged to *dance*, must bring his heel, or os calcis, to the ground.

I shall not enter farther into this subject; the above remarks may, perhaps, furnish some hints for remedying a defect of

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of an English peasant may be noted. The effects produced by the heavy unyielding shoe, and the tight leather gaiters, which the Englishman wears, are very evident in the shape of his leg, for he has scarcely any calf, and when he runs, he drags his leg after him as if it were a lifeless mass attached to his thigh; while the Irishman, or a Scotch shepherd, being seldom encumbered with shoes, has strong and well-formed feet and legs, and, in running, bounds or springs from the toes.

the inner ligaments of the ankle, which seems to be more common now than formerly.

The utility of properly-regulated exercises is so generally admitted, that it cannot be supposed the preceding observations have any other object than to show the danger of exciting young and delicate girls to exert themselves beyond their natural powers, and of allowing them to perform violent exercises when not superintended by persons acquainted with the laws which regulate the several motor powers. However, these remarks render it almost necessary to show that the benefits to be derived from exercise are justly estimated.

By exercise, the several parts of the body are fully developed, and it is only by its regular performance, that they are perfected and preserved from falling into decay. In this climate, we cannot even enjoy the fresh air unless we at the same time keep our bodies in active exercise; and every one knows how much

regular exercise conduces to the general activity of the frame, and assists in the operations of the digestive organs. It must also be admitted that exercise is the most effectual remedy for that morbid excess of nervous irritability which is sometimes observed even at an early age.

The works of Locke, of Addison, indeed of all the most eminent writers on education, contain admirable examples of the influence which activity of the body has over the operations of the mind. Even Hippocrates, who wrote a philippic against violent exercises, says, moderate exertion gives firmness and strength to the body, and vigor to the mind: there is also an observation of Pliny to the same effect. "Mirum est ut animus agitatione motuque corporis excitetur." But the most forcible remark is made by Rousseau in his Emilius; "The weaker the body, the more it commands; the stronger it is, the more it obeys; the body must possess vigor to be obedient to the mind; a good servant should be robust."

These views have not always been admitted; for although it has been allowed,

that the mental energies of the Eastern nations correspond to the inactive and indolent life which they lead, it has been argued that the savage, who possesses bodily strength, agility, health, and all the animal faculties in greater perfection than man in the more advanced state of society, is but little removed above the brutes in regard to intellectual faculties. But this question has been so often and so well met, that it would be almost presuming, and certainly unnecessary, to enter upon it. In truth, it is universally admitted that a vigorous and healthy constitution, with all the bodily and animal powers in full perfection, which can only be acquired and preserved by properly-regulated exercise, are quite compatible with the nobler and more distinguishing faculties of human nature.

The question of the necessity of exercise to the preservation of the form may be considered in a point of view which bears directly on the subject of distortion.

It may be stated as a law of the animal economy, "that the exercise of an organ is necessary not only to its perfection but

even to its preservation." This is often exemplified by parts which are not kept in due activity; for if they are not exercised, they degenerate so as even to lose their peculiar characters. For example, as long as a joint is kept in activity, the apparatus continues perfect; but when the motion of the joint has ceased for some time, all its complex parts degenerate; their peculiar characters and structure disappear. When we examine a joint which has become stiff or anchylosed, we see that the character of every part is changed;— the bone is no longer hard, but softened and cellular; and the bursæ, the capsules, and the ligaments, form one indistinct mass of cellular membrane.

The converse of the above proposition holds. That, by exercise, the organs may be renovated, or even new ones may be formed, out of the cellular membrane, which may be considered the common matrix. If a bone be dislocated, new cartilages, capsules, bursæ, sheaths, ligaments, all may be formed; and if these parts, constituting a new joint, be kept in activity, although they may not have the

regularity of the apparatus of the original joint, they assume all the characters of the several parts.

A variety of facts, illustrating this law of the animal œconomy, are given in the preceding volume, to show that not only the muscles and ligaments, but the bones, arteries, and nerves, all degenerate if they are not duly exercised; and that it is even possible to distinguish between the bones of a person who has died in full vigor, and those of one who has been long bedridden.*

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* The following is from a review of the preceding volume: — "We find a very striking proof of the correctness of the opinion advanced by Mr. Shaw, in an extract from the travels of a German author, cited by Dr. Beddoes, in his work on Consumption. This gentleman was struck with the strong and athletic forms of the skeletons still exposed on the field of battle at Murten, where Charles the Bold, with his Burgundians, fell a sacrifice to the patriotic valour of the Swiss. His expressions are these: 'The three hundred years during which they have been exposed, in great measure, to the open air, have little affected their prodigious firmness of structure. Such bones, and parts of bones, as now moulder down in a few years of exposure, were evidently firmer than in the recent subject. From rubbing together in my box, they acquired here and there the polish of the enamel of

But in no part of the system is this law better exemplified than in the history of the affections of the SPINE. The muscles of the spine, which, with the exception of those of the heart, are most constantly in action, and whose office is to support the vertebræ, may be so weakened by want of exercise as to become incapable of per-

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the teeth. Out of the charnel-house at Murten, I selected skulls that attested the strength of the stroke by which, as appeared from the marks, the helmet was cleft, and which, being pierced in the orbits by the point of the spear, probably belonged to knights, since the spear would be directed against this as the most vulnerable part. I still possess these specimens, and I consider them as an incontrovertible answer to the question, how these knights could wear armour insupportable by the present race? They were more hardy and athletic than we are.' — *Ebell uber die Bleyglafw*, Hanover, 1793.

" This is a more rational account of the prowess of our ancestors than the incredible histories which would make us believe that we had degenerated from their outward appearance and gigantic stature. The truth is, as Mr. Shaw has stated, that, the bones become closer in their texture, the whole frame of the body is more intimately knitted, and greatly strengthened, by that life of exertion and fatigue which our forefathers led."—*London Medical and Physical Journal*, No. 299.

forming their functions.* When they are reduced to this state the ligaments which bind the vertebræ together yield to the superincumbent weight; for the ligaments are affected in a secondary manner by the same causes which produced debility in the muscles; weakness of the muscles is therefore one of the most frequent forerunners of distortion.†

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* I have great pleasure in quoting the following passage from a paper by my friend Professor Macartney, of Trinity College, Dublin, as it is not only very important in itself, but affords a satisfactory answer to a sort of jocular criticism made lately on my remarks on this subject in the volumes already published: — "Muscles lose power and bulk by disuse; but what would be disuse in one case would not constitute it in another, or in different words, in proportion to the frequency with which a muscle is intended to act, the necessity for its action exists in order to prevent its degeneracy. There are some muscles in the human body which are rarely put into full action. In animals we have examples of muscles which are only intended to be employed on particular occasions that may never occur. Such muscles do not decline from disuse, whilst those that are provided for constant employment cannot remain at rest without sustaining great diminution of their bulk and power."

† This sentence must not be construed to imply

We may now return to the question of what are appropriate exercises. It is almost needless to point out any particular exercises for children who are in full health, andwh ose form is perfect. Although I was at one time partial to the present fashion of gymnastic exercises for boys, I must now confess, that for a boy who is naturally of an active disposition, they may be considered almost ridiculous ; but when certain exercises are judiciously managed (and I hope the preceding observations will show what is to be guarded against), they are highly useful to those who are naturally indolent.

But as much has been said lately of the possibility of curing all distortions of the figure by means of particular exercises, it is necessary to make a few remarks on this question.

I have had frequent opportunities of observing the remarkably good effects that are

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that one set of muscles becomes weak, and the other so strong as to pull the spine to one side. When the muscles of the back have not been exercised, they become equally weak on both sides ; the spine, being consequently not supported, must sink.

produced by a variety of exercises on young ladies who are in that state of listlessness and muscular inactivity which causes the chest to appear contracted, and even gives the appearance of curvature of the spine. The chest soon becomes expanded, and instead of continuing to walk in a stiff awkward manner, as if the spine was distorted, the girl carries herself erect and with an elasticity and pliancy of the whole figure. But what is, perhaps, of more importance, a complete change takes place in her constitution; as, for example, if she had an habitual cough it will most probably have ceased.* Indeed, a change for the better

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* The following curious remark is made by Fuller in his Medicina Gymnastica: — "And so I think it is no less obvious if exercise be as efficacious as I assert, that it is in our choice whether a cough shall run on to a consumption." The good effects which I have seen ensue from exercises would almost induce me to give entire credit to Fuller's views; and I should be almost inclined to treat a girl who has a cough nearly in the same manner as if her spine was distorted; for it has been frequently remarked to me by a mother, that her daughter has not had her winter-cough, since she began the system of treatment to remedy the curve of the spine.

may be observed in every organ, and particularly in the state of the skin, which being

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In the preceding volume, I have endeavoured to show the connection between the state of the lungs and the form of the chest, and that distortion may be consequent on disease of the lungs. (See p. 145.) — I have lately had several cases of this kind, which were interesting, not only as instances of recovery from disease of the lungs, but as cases where there was much difficulty in treating the distortion. In one instance the distortion was to such a degree, in consequence of abscess in the lungs (which was opened by the operation of paracentesis thoracis), as to be irremediable. When I first saw this patient there was great difficulty of respiration, but the breathing was improved in a remarkable manner through perseverance in the use of certain exercises. In a young lady who had suffered for several successive winters from cough, the area of the side in which she used to have the greatest pain was so much smaller than the other, that although the twist of the spine became, after a time, so slight as to be scarcely perceptible, I was unable to develope the diminished side. But although we may meet with instances where it is almost impossible to enlarge the small side, we should be slow in pronouncing any case irremediable. I know, at present, two young ladies who are remarkable instances of the good effect of perseverance in attempting to increase the area of the chest. In both, the left side was less, by two inches, than the right; there was

of the first importance in the animal œconomy, should always attract our attention in such cases.

But although the most beneficial effects are produced by exercises, we shall be disappointed if we trust entirely to them in cases where the spine is actually distorted, and even when the curvature is slight.

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consequently great deformity, but now they are nearly equal in size. In these cases there probably never was any affection of the lungs; but if one side continue flat, and as it were compressed, after the spine has been made nearly straight, we may suspect that the lung of that side has suffered at an early age. A young lady who was lately under my care is nearly in this condition. Her spine was much distorted; it is now nearly straight; and the right side of the chest appears natural, but the left scapula lies flat upon the ribs. When she left town she was in excellent health; but she had had cough with spitting of blood, and pain in the left side, for two successive winters. I suspect that one lung is sometimes originally smaller than the other; this would necessarily cause a difference in the size of the two sides. We have similar examples in other organs. It is such instances as these which occasionally render the treatment, of what may appear to be a case of common lateral curvature, very difficult.

I am often told of extraordinary cures effected merely by exercises; but I have not been able to see any such instances; and on making enquiry have found them to be cases similar to that just described.

Those who are ignorant of the variety in the diseases of the spine, are very liable to be deceived with regard to the effects produced by exercises. They may be led to believe that the distorted appearance of a girl proceeds from an alteration in the form of the bones, while it may be owing only to a degree of relaxation and weakness. * When

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* It must have occurred to almost every practitioner to be asked why a girl appears crooked at one time and straight at another. The suspicion that the girl is twisted, is generally considered as the mere fancy of an anxious mother; but it is not altogether ideal, and the cause of the change in the form may, perhaps, be explained. Young persons are subject to a peculiar squint, which is generally removed by attention to the state of the bowels. Now, as the muscles, for the support of the spine are as dependent on the bowels for the proper performance of their functions as those of the eye, why may they not occasionally be in a state to twist the body as those of the orbit are to twist the eye? I have known several

they see a girl in such a condition get rapidly better, merely by going through certain exercises, they naturally suppose that the same means will be successful in every case. This opinion is strengthened by the circumstance, that even when the distortion depends on a change having taken place in the form of the vertebræ, this system of

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such instances, and some where the parents had been led to believe that the spine was actually distorted, and the patient consequently subjected to very severe modes of treatment. In these cases the practitioner was probably also deceived, and really imagined that the figure was restored by some particular and direct effect which exercises or confinement to the inclined plane had upon the spine, when in fact the removal of the curves depended almost solely on the improvement in the state of the bowels. By enquiring into some cases, where certain exercises or confinement to the inclined plane seemed to have acted like a charm, I have been led to suspect that the deformity depended on derangement of the general health. I trust these remarks will not lead to the belief, that certain medicines which act on the bowels will be sufficient to remove the deformity. Appropriate exercises and rest have nearly as much effect on the bowels as the best medicines; but as both plans of treatment are good, the most rational mode of proceeding is to combine them.

treatment improves the health and vigour of the patient so much, that she is soon able to carry herself better than before, and the deformity is consequently not nearly so apparent. This induces the friends to persevere in the system, and it is natural for them to imagine that if so much benefit accrues from a short trial of exercise, a curvature, however bad, may be completely cured by perseverance. But for reasons which will be given presently, they are generally disappointed. I have seen several instances of the failure of this plan in some of the large boarding schools in and near town. Indeed, if distortion depends on a change in the form of the individual vertebræ, exercises, although absolutely necessary, must be combined with other plans of treatment, or the curves will not be remedied.

To prove that exercises *alone* can be successful only in cases of distortion where the bones are not yet mis-shapen, it will be necessary to enter a little into the history of this plan of treating curvatures of the spine: —

This method of treatment has been considered a modern discovery; but the older authors were acquainted with it, and in their writings we find a variety of exercises described, as suitable to different diseases.

Portal, the French physician, in his work upon rickets, after some observations on the condition of the muscular power and shape of men who follow different trades, says, "Do not these afford so many lessons which should be remembered when we endeavour to restore the shape of children, whose figure or limbs have become distorted? We ought to consider the effects caused by using particular classes of muscles, as examples in favour of such exercises as will strengthen those muscles which are weakest."

In pursuance of these principles, he recommends a variety of exercises; some in the form of games, and such especially as are calculated to act upon certain muscles, as pulling weights over wheels fixed in particular situations, &c. But, although Portal has given us many useful hints, as he has taken erroneous views of the pathology

of distortion, and has not made correct distinctions between the different cases, his advice, if followed in every instance, might not only be useless but even hurtful.

If all the distortions, to which the spine and bones of the chest are liable, depended on the same cause, and were in every respect exactly similar, the treatment which was found beneficial in one case might be reasonably expected to be good in all. But there is great variety in the cases of distortion; the whole figure may be in the relaxed condition I have alluded to, or the spine may be already twisted in consequence of a sponginess and lengthening of the ligaments, while the muscles are at the same time in a debilitated state. In either of these cases, appropriate exercises would quickly restore the figure; but in another instance, although the distortion might be apparently similar, the shape of the bones may be already altered. Exercises would be also beneficial here, but unless a variety of means were at the same time used to preserve the bones during the intervals of exercise in a favorable position, the vertebræ

could not regain their natural forms, on the restoration of which the ultimate cure depends. What, for example, can be more obviously hurtful than to allow a girl to sit up for some time, or to ride or walk a mile or two after she has been fatigued by an hour's hard exercise? The muscles which should support the spine are wearied, and their vigour expended, while the ligaments by which the bones should be held together, are relaxed and lengthened. Indeed no good effects, but the reverse may result from such treatment, for the apparatus which holds the different parts of the column together, being relaxed and weakened, and the muscles which should support it being exhausted, the spine must yield to the superincumbent weight, and hence the individual vertebræ necessarily fall still farther out of their right line.* From a conviction that

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* There is much similarity between the curves of a tree and of the spine. In both, the first bend is at the lower part, and in each, the upper part *strives* to become perpendicular to the base by a series of curves. These

the muscles are the natural supports of the spine, I never permit patients to go through fatiguing exercises unless they can take complete rest immediately afterwards, and in such positions as would facilitate the growth of the bones and ligaments in the manner desired.

The necessity of paying minute attention to the mode of managing exercise and rest, even in a case of common distortion, must be obvious*; but there are

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curves of the tree will increase if some artificial support be not given, and so it is with those of the spine; we should therefore imitate the operations of the gardener so far as to prop up the spine, and particularly after the power of the ligaments and muscles which are the natural supports has been expended by exercises. But we should not carry this analogy too far, for were we constantly to support the curved spine, the muscles would be rendered useless, see p. 74. It would be an interesting experiment to try whether the wood of a tree, which had been some time incased in props, was equally dense and strong as one which had been left to support itself. It would probably be found in a state analogous to that of a bone which had not been used.

* About two years ago I was consulted on the case of a young lady who had the common lateral curvature of the spine; I did not see her again until lately, when I was not a little surprised to find her still persevering in

many complicated cases of distortion which it is even more necessary to attend to, and especially at present, when posture-masters are supposed to be capable of curing all the varieties of distortion.

The curve of the spine may appear exactly the same as in the last instance described, and yet a very important change may have taken place in the condition of the bones, which a superficial observer may not discover. Some of the vertebræ may have become anchylosed or firmly united by bone. In such a case (which is not an uncommon one), violent exertions would not only be of no avail in restoring the figure, but they would be actually dangerous. This is a fact which I am anxious to impress on my reader, because exercises have been

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the plan which I had proposed, for I naturally imagined that her mother had taken other advice. The curvature had been remedied at one part; but from the same method having been continued without any reference to the changes that almost daily take place in the spine of a young person under treatment, a curve nearly as bad as the first, but of an entirely different character, had been produced.

prescribed in cases where the surgeon was aware that anchylosis had taken place, and he has prescribed them under the idea that where the spine is consolidated by bone it is stronger than in any other part, and is therefore in no danger of being broken even by the most violent exertion. But the opinion, that the spine is strongest where it is anchylosed, is founded in ignorance of its structure; for it has been proved, by various experiments, that the strength of the spine mainly depends on the elasticity of the peculiar matter by which the vertebræ are united.

To demonstrate that the spinal column is not strengthened but weakened by anchylosis, we have only to try the comparative degree of strength in the several parts of a spine where some of the vertebræ are united together by bone. In such an experiment we shall find that the anchylosed part is so weak and brittle, as to be fractured by the slightest jerk, while it is very difficult to break the column at any part where the intervertebral cartilages are entire. In further proof of this fact, there are several fatal

instances of fracture recorded, where the spine was broken at an anchylosed part, by a comparatively slight degree of force.

In cases of lateral curvature where the patient has a bad constitution, it is not unusual for the bones to unite, by anchylosis; but it is in another set of affections of the spine that we have chiefly to dread the misapplication of exercises. When the spine is attacked by the scrophulous inflammation, which often destroys the bodies of two or more of the vertebræ, the condition of the patient at the commencement of the disease is such that the slightest exertion produces great pain and an attack of fever; of course there can be no exercise used at this period. But if the patient should recover so far as to be able to walk, there is danger of particular exercises being recommended to cure the deformity consequent upon this disease, because they have been found beneficial in other cases of distorted spine. It can scarcely be believed that any person acquainted with the changes which take place in the bones in such cases, would venture to recommend the trial of violent exertions to remove the curves, yet

I have known patients, whose spines had been distorted by disease of the vertebræ, not only obliged to mount ladders and climb ropes, but even to be suspended and swung by the head for half an hour, three times a day, under the direction of regular practitioners. The gentlemen who advise such means cannot be aware of the nature of the distortion that produces the *hump back*, for they would not intentionally allow a patient to run the risk of being killed by the slightest slip or accidental jerk.*

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* The following instance of the fatal issue of a case where the distortion was of that kind called hump back is given by a late author. — "On the 21st of October, she was lifted out of bed, and by some accident fell from the arms of the servant to the ground on her back; after screaming she died in five minutes."

While upon this subject I may state, that anchylosis of the vertebræ, producing different degrees of hump back, without the patient's ever having suffered from any symptoms denoting disease of the bones, or even inflammation of the ligaments, seems to be more common than is imagined. I have lately seen seven cases of this kind; four of these patients were children living in London, three were from the country, one from Dunstable, the other from Brighton, and the third from Twickenham. There

There is a set of cases very common in London, in which certain exercises may be detrimental instead of useful. — When the distortion proceeds from rickets or is accompanied by a ricketty affection of the limbs. Although the general character of the spine in such cases is very similar to

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is such a variety of diseases of the bones among the poor in London, that we cease to wonder at such cases, and even at some more extraordinary, among the out-patients of an hospital. But as the instances I have alluded to occurred among a class of persons who could give their children every comfort, (indeed one of the patients was the child of parents in the first society in London,) they are more interesting, as affording a proof that there is a condition of the system (independent of that produced by cold, bad air, and bad food), under the influence of which, the bones will become united together, without any obvious symptom denoting the change that is taking place. Such a state of the spine is by many called scrophulous: it may be so, but the more we see of the affections of the spine, the more are we convinced of the evils that have resulted from their being all classed under this general term. The question of the propriety of exercises in such cases is very difficult, — if not performed with discretion, they may be fatal to the patient, while on the other hand there can be no doubt, that, if judiciously used, they may be of the greatest service.

that of the common lateral curvature, there is a very important difference between them; and unless exercises be carefully performed, and in a particular manner, the general distortion may be increased, and especially that of the bones of the pelvis, from which the most serious consequences may ensue.

There can be little doubt that to the cases of distortion from rickets having been confounded by all who have written on this subject, with those which are independent of this specific disease of the osseous system, is to be attributed the discrepancy of opinion which has prevailed on the propriety of exercise in cases of lateral curvature of the spine; for as long as no proper distinctions were made between the different causes of distortion, the question of exercise must have been perplexing. In some instances, certain exercises were evidently beneficial, while in others, apparently similar, they increased the distortion.

Many cases in support of these opinions might be offered, but perhaps they may be admitted to be sufficiently well founded

to show the necessity of each case being fully understood before violent exercises are proposed, and also that although various exercises may be very beneficial in almost every stage of lateral curvature when judiciously managed, they will be of little avail in restoring the figure, unless the bones are kept in proper relation to each other during the intervals of rest; nor should it be forgotten that the changes which take place in the form of the individual bones of the trunk are so gradual and so imperceptible, that an indiscriminate use of different kinds of exercise may be injurious even in the most simple case. (See note to page 148.)

Under all these difficulties it may be affirmed, that unless the exercises are in every instance superintended by a person thoroughly acquainted, not only with the natural actions of the several classes of muscles, but also with the causes of certain changes in the form, they may be more detrimental than useful. When there is only a degree of lassitude, and before distortion has actually taken place, a variety of exercises are safe and useful; but when

the spine has become in the slightest degree distorted, it is necessary to pay strict attention to the effects produced by each kind of exercise.

As it is unnecessary to offer further arguments to show that *exercises alone* are not sufficient for the cure of every case of distortion, we may now enquire how far certain exercises are calculated to improve the figure.

The exercises on which I shall chiefly comment are those at present in fashion — as climbing a pole or rope ladder, or suspending the body for some time by one or both hands.

Few feats are so difficult to perform as climbing a rope ladder when it is not fixed at the bottom. Great exertion is required, for although the ladder hangs perpendicularly, it is pliable in every part, so that the steps on which the feet rest, are pushed forwards, and the upper part of the body falls backwards.

The weight would then be sustained principally by the hands, if the climber did not attempt to keep the body in an extended line and nearly perpendicular. By these combined efforts, the exertion both to the muscles of the arms and of the loins is very great; this necessarily tends to strengthen

these muscles, but there are several objections to this form of exercise, and the principal one is, that it requires more effort than a young person, and particularly a girl, should be allowed to make.

In performing this exercise, and in climbing a rope or a pole, as a sailor does, a set of muscles are brought into action, the increased developement of which instead of improving, tends to destroy the elegance of the figure. Is it, for example, desirable that a young lady should have the strong and short neck of a sailor boy? for such will inevitably be her condition if she should ever attain any expertness in such exercises. When she attempts to raise herself on the ladder, or the pole, the head must, in some degree, be made a fixed point; and this is done by the action of the muscles between the head and the shoulders.* These

* In cases where the distortion has become irremediable from mistaken modes of treatment, the grand object is to restore the patient's health and strength; for this purpose I have recommended climbing the rope ladder, although I would not advise this exercise for the improvement of the shape in a case of distortion where there is

muscles being then called into violent action to raise the body, are necessarily increased in power, and gradually become so much enlarged, as to give a peculiar roundness to the shoulders and back of the neck. This may be exemplified by the accompanying figure.

a hope of a cure. This kind of exercise gives great strength to the loins, and increases the power of the

The jaws are also firmly clenched by their muscles, which, when increased in size, give the stringiness and harshness to the expression, that may be observed in porters, or more particularly in the women who carry burdens suspended by a strap

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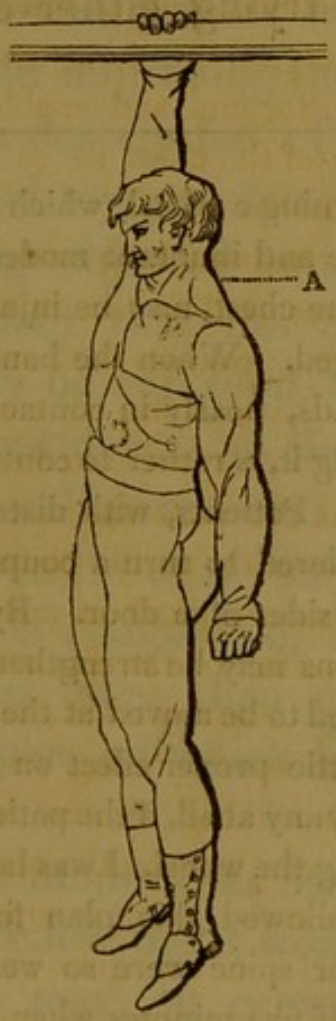
muscles of the chest and spine so much, that it tends to remove the difficulty of breathing which generally accompanies a bad distortion, and enables the patient to support the weight of the chest so as even to improve her general appearance.

But if a patient has been long under an irksome plan of treatment, and received no benefit from it, (notwithstanding the flattering promises held out to her,) she very naturally suspects that nothing we can propose will do her good. I have been often asked of what avail these exercises can be, as the patient, since she gave up the system of lying constantly on the plane, has been in the habit of walking about as much as most people, and this exercise has had no effect on the distortion nor on the difficulty of breathing. But as patients in this condition are generally obliged to wear a strong steel support to prevent the chest from sinking, we may ask what effect the exercise of walking can have on the muscles of the spine, if the necessity for their action is superseded. Indeed, as long as the muscles of the spine and chest, on which the freedom of respiration depends, are rendered useless by artificial supports, the difficulty of breathing will continue.

round the forehead; but the stringiness of the neck is from another cause, which has been already explained in the observations on stooping.

The same objections apply to the plan of making those, who are slightly deformed, accustom themselves to hang by one or both arms.



The spine may, in this way, appear more straight for the time; but the exer-

tion to support the whole body is so much in the muscles of the shoulders and neck, that the effect is similar to that produced by climbing a rope or ladder. The muscles of the neck, marked A, are much increased in size; this is more evident in the sketches of climbing the ladder or the single rope. Indeed any one may be satisfied of this being the effect, by trying either of those exercises.*

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* Even the turning a wheel, which is considered one of the most simple and innocent modes of strengthening the muscles of the chest, may be injurious, unless it be judiciously managed. When the handle of the wheel is held by both hands, nearly in contact with each other, the effect of turning it, is rather to contract than dilate the area of the chest. Patients, with distortion of the spine, are sometimes ordered to turn a couple of winches that are fixed to the sides of a door. By this exercise the muscles of the arms may be strengthened; but, although the legs are ordered to be moved at the same time, the exercise can have little proper effect on the muscles of the spine, and scarcely any at all, if the patient wears steel supports while turning the wheel. I was lately consulted by a lady, who had followed this plan for some time, but the muscles of her spine were so weak that she could not support herself five minutes when her steel supports were taken off.

We may therefore conclude, that although gymnastic feats are sometimes useful for boys, they may be injurious to girls; indeed it is ridiculous to expect that feats of strength, similar to those performed by the ancient athletæ, should improve the female form. There are, however, many amusing exercises to which there can be no objections, and which are most effectual in improving the figure; but to enter into a description of them, would be going beyond my province.

After having objected to almost every plan of treatment that has been hitherto pursued, it may be expected that I should state what I consider to be the best mode of treating lateral curvatures; but such is the variety, even in these affections of the spine, that it is impossible, in a work of this kind, to do more than point out the general principles on which I should proceed.

Of the many modes that have been proposed, there are few that I would altogether reject, as each may, at certain stages, be applicable, although probably not one of

them, if used singly, would be successful. To succeed in curing distortions, we must combine, and in a judicious manner, nearly all the different modes, or, at least, such as are likely to effect the following objects: —

First, to act upon the spine so as to alter the false position of the vertebræ, and consequently of the ribs and shoulders.

Secondly, to keep the vertebræ in their new and improved position.

The third and most essential object is, to bring the muscles of the back into such a condition, that they will, after a certain time, be capable of retaining the spine in its natural position, without the aid of any artificial support.

In the preceding volumes, the manner of effecting these several objects is detailed; and although (in the desire to be explicit) the system may appear more complicated than it is in reality, the results have been such, that I can, with great confidence, recommend it to the profession; as there has been scarcely a case where the plane has not been of considerable benefit

in improving the figure, and not one where the general health has not been most materially improved by it.* But before undertaking the charge of a case where some of the vertebræ are already mis-

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* Every day's experience proves the importance of discriminating between the different cases even of lateral distortion. There are two varieties that are very common and very difficult to cure. The first is where the distortion has commenced early, and before the girl has been under the restraints of education; if it began before the child was three years old, we may be almost certain that it arose out of a decided weakness of constitution, and consequently that the bones are become irreparably altered in form, or united together. The other case is where the curve between the shoulders is very acute: — in some instances of this kind, although I have been able to remove the curve at the loins, I have been foiled in my attempts to make the part between the shoulders quite straight. Anchylosis probably takes place more frequently in such cases than where the curve is in the form of a regular waving line. But, although it may not be possible to make the spine perfectly straight, the figure may be so far improved as to render the distortion almost imperceptible when the girl is dressed; and we may safely promise, that if the patient will attend to certain rules, the distortion will never get worse.

shapen, we ought, in justice to ourselves, to inform the friends of the patient, that the figure can be restored only by *directing the growth* of those bones; and that, therefore, our operations must be followed up for a period proportionate to the natural progress of the *growth* of bones.

When the distortion depends merely on bad habit, or on a degree of weakness of the muscles and ligaments, it may be soon removed; but if it has continued so long that the shape of the bones is altered, it would be as unreasonable to expect that the spine could be made straight by any sudden operation, as that a young tree which was bent could be made to stand erect by any other means than by directing its growth by props, &c. If the analogy of the condition of a bent tree, and of a crooked spine be just, it will be allowed that the older the patient is, the greater will be the difficulty of the cure. It may also be added, that all our attempts will be ineffectual unless the patient assists by submitting cheerfully to the rules laid down. A girl, even so young as thirteen, with a distorted spine, has no

time to lose, and if she expects to have her figure restored, she must consider the attempt to remedy it, as her sole object for many months.

There is one argument in favour of making the attempt as early as possible, which is established by every day's experience; — after a distortion has proceeded to a certain extent, it becomes rapidly worse, if neglected or mismanaged; and the longer it continues, the less susceptible it is of remedy.

In urging the necessity of attending strictly to the cure, I am happy in believing, that the means I have proposed are not only conducive to the health of the patient, but interfere very little with the principal branches of education. I trust, also, that when compared with the plans generally put into execution for remedying distortions, they will be considered as comparatively agreeable to the patient.*

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* It is unnecessary to recapitulate the observations offered in this and the preceding volumes, in proof of the variety of affections to which the spine is subject: but

I would again direct attention to the following questions, as they should be taken into consideration before a plan of treatment is decided on, or an opinion given as to the probable issue of a case of distortion.

As to the time the distortion was first observed; — Was it at a very early age, or between 9 and 15? Was it after a rheumatic fever, or after one of the exanthematous disorders, as measles or scarlet fever?

With regard to the nature of the curve of the spine; — Is it acute in some parts, or in a general waving line? Is the curvature between the shoulders to the right or left? Is the spine curved merely from side to side, or so twisted on its axis as to produce a prominence on one side of the spine and a sinking on the other? Is the distortion apparent above the first dorsal vertebra; or is the curve between the shoulders greater or less in proportion than that at the loins? Is any pain felt on pressure; and what is the nature of this pain? And, lastly, whether there be any anchylosis of the vertebræ?

With regard to the condition of the ribs; — Is there an evident difference in the size of the two sides? Does this inequality disappear when the spine is forcibly elongated? Has the patient ever had a cough attended with pain in the side that is diminished in size? Do the individual ribs appear mis-shapen? Does the sternum project; or is it flattened?

In regard to the question of the state of the constitution; — What was the condition of the health about the time of teething? Has the girl been of late listless, easily fatigued, and unwilling to take active exercise. Has the countenance that peculiar character which denotes deformity? Is the state of the skin or

glands such as to mark a weak constitution? Are there any symptoms of infantile paralysis or blight? What was the condition of the wrists, knees, and ankles, during childhood? And, lastly, are the limbs crooked or straight?

ON THE TREATMENT OF CONTRACTED JOINTS.

In the preceding volumes, it has been shown whence it happens that rubbers and shampooers are sometimes successful in the treatment of distortions and contractions of the limbs, when surgeons have failed. It is there stated that their occasional success seems to arise from pressure *,

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* *Friction* may be considered as operating immediately on the surface; unless done with considerable force, it produces only a change in the circulation of the skin, which, however, is of great use in many diseases that are dependant on weakness or torpidity of the system of the part.

Shampooing, as practised by the Indians, is more efficacious than friction, in removing deep-seated pain, or in relaxing contracted muscles; for the skin is acted upon, under very advantageous circumstances, (the use of the

thumbing, &c., calling into action parts which, from lying long dormant, have become feeble and useless. The cases where this practice is most likely to be attended with benefit, are those of stiff and contracted joints, after rheumatism, or any chronic inflammation. But to do good even in such cases, great perseverance is necessary; and a degree of boldness, which *à priori* we should almost consider dangerous. The professed rubber proceeds in a much more violent manner than those who know the structure of the parts, would venture upon,

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warm bath is preparatory to the manipulation,) and the fibres of the muscles are called into activity by the friction of the internal surfaces upon each other.

Thumbing is a more violent and a coarser mode of shampooing, and is consequently often more efficacious. Indeed, no one, unless he submits to a trial of the practice upon himself, can imagine how severe this mode of treatment is at first. Nevertheless, a delicate patient will in a short time submit with apparent pleasure to the discipline.

Pinching, *percussion*, *kneading*, may be all considered as varieties in the modes of giving exercise. The effect of each being to produce an increased action in the part operated on.

without some previous evidence of the practice being harmless, although, indeed, this violence may be one cause of the rubber's success. But such bold practitioners may occasionally do harm, as they are seldom capable of distinguishing between the contractions attending the acute inflammations of joints and those which are the consequences of chronic affections, and are also inattentive to the distinctions of constitution, and the possibility of rousing a scrophulous action. However, instances of bad effects from their mode of practice seem to be rarer than we might expect; but we may not hear of all that occur, for although every instance, where a quack is successful, is blazoned about, parents are so far ashamed of entrusting their children to the care of ignorant persons, that they always endeavour to conceal any mischief that has been done.

When a surgeon, for the first time, witnesses the operations of a professed rubber, he is a little startled at the violence of his operations, and is surprised at the manner delicate patients bear them. Such were my own impressions at first; but having, about

eight years ago, had frequent opportunities of seeing a famous rubber at work, and having witnessed the result of his treatment in several cases, I was so satisfied that, if judiciously combined with other modes, it might not only be safe, but of the greatest use, that I have since been in the habit of ordering the women, whom I employ on these occasions, to rub and shampoo with a degree of violence which, to some practitioners, might appear almost unwarrantable.

It is scarcely necessary to state, that the nature of the case must be carefully investigated before any mode of treatment is determined upon, and that from whatever cause the motion of a joint may have been lost, we should be very cautious in our first attempts to restore it. If the bones be anchylosed, our labour will be in vain, and the attempt to move the joint may be dangerous ; but if the bones can be moved in the slightest degree, we may calculate on doing good, for the stiffness may proceed only from inflammation changing the natural secretions of the sheaths of the tendons, or from adhesions having taken place between those parts. By rubbing, and gentle attempts at

motion, the cellular membrane, by which the tendons and sheaths are united, may be loosened and extended, the contracted ligaments may be lengthened, and the muscles resume their natural structure and functions. Liniments and oils of different kinds are generally employed by rubbers with the intention of *suppling the joints.* The use of them is certainly attended with advantage, for a great deal of *friction* is necessary to cause their absorption, on which the rubber supposes the *charm* of the treatment depends. They are also useful in removing any remaining inflammatory state of the joint, or in preventing its return.

But although rubbing, shampooing, and a variety of exercises are most useful, and occasionally successful, they should be considered as only part of the plan of treatment; for the position in which a contracted joint is kept, is as important to its cure as the occasional relaxation and exercise. But so much harm has been done by instruments, that parents, and even many practitioners, seem to have a complete dread of them. They are, however, often absolutely necessary; for it will be found as

difficult to remedy a contracted and distorted limb, without the assistance of some means to support and preserve it in a certain position, as it is to cure a distortion of the spine merely by exercise. In every case of contraction, the cure will be at least much expedited by any means, however simple, by which the limb may be preserved (during the time it is not exercised) in the improved condition into which it has been brought by the shampooing, &c. Two essential points are gained by keeping the limb in a right position. The alteration in the form of the heads of the bones which is always, to a certain degree, the consequence of the contracted state of the joints, will not be so likely to increase, for the bones are no longer allowed to remain in the position which produced the change; and the muscles and ligaments that have been contracted will actually grow longer if kept extended. This fact is very important in practice, and has been already alluded to at p. 12.

Proceeding on these views, I have always insisted on the application of some means

to prevent the contraction after the limb has been shampooed, and have been particularly careful to keep the limbs in a proper position during the night. Happily there are few cases where this cannot be done, and the means of doing it, are generally so simple, that even irritable and restless children forget the restraint after one or two nights.

If the limb be kept constantly encased in a machine, and no exercise whatever permitted, its muscles will waste, so that at the expiration of the period that was promised to be sufficient to effect a cure, the limb will be found incapable of supporting the weight of the body. It may moreover be stated, that a limb, from being thus rendered dormant, seems to be more than usually liable to be hurt by pressure, and hence we often see large and galling sores produced by the iron supports.

It is from these obviously bad effects, that shampooing, &c. have been of late used so much more than instruments, and certainly if either system of treatment is to be used singly, the latter is better than the former.

But it is surprising that the two modes have not been more frequently combined, as the one assists the other very much, while either, when used singly*, is rarely attended with success.

It might be expected that I should detail the manner of treating each case, but the forms of contracted limbs are so various, and the causes from which they proceed are so many, that it is not possible to do more than point out the general principle of the treatment. Its application to the individual cases must be left to the ingenuity of the practitioner. †

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* When we attempt to put a contracted or a distorted limb into a certain position, without its having been previously rubbed and shampooed, the muscles and ligaments will be found so rigid and tense as scarcely to admit of the joint being removed.

† In the treatment of contracted limbs, the application of vapour is often of great service. There are many modes of using it, but perhaps the plan sketched below is one of the most convenient. It is an improvement on the hot air bath, which was first used in this country, at the Middlesex Hospital. I contrived it for a young lady who had contraction of the muscles of the hip and knee, and who was always much enervated

The most difficult cases we meet with are those where the contraction of the limbs is

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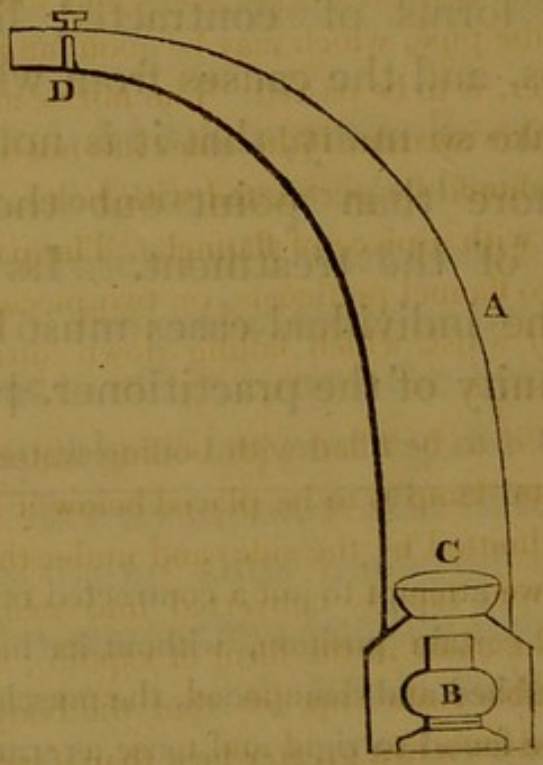
when the whole body was exposed to the vapour, as in the baths at Brighton.



A is the tube, about three feet long, that is commonly used for the hot air bath; a hole is to be cut in its side near the bottom, of sufficient size to admit a copper pot, C, about 2½ inches deep, and 3 in diameter. This pot is to be supported by wires passing across the tube; it should not touch the sides of the tube, but leave a space of three-fourths of an inch all round; the opening is

combined with a certain degree of palsy both of the body and mind. In some in-

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to be closed by a small door. B, a spirit lamp, or an Argand lamp, trimmed with cocoa-nut oil, may be used. D is a stop-cock; a piece of wood is to be nailed to the back of a chair (below the seat), and through this, the nozzle of the pipe, which may be about an inch and a half in diameter, is to be passed. The nozzle may be directed rather downwards; if the chair has not a cane bottom, the seat should be perforated with holes, which are to be covered with a piece of flannel. The patient may have either two flannel petticoats, or two pieces of calico tied round her waist, which falling down surround the chair.

The pot C is to be filled with boiling water, and the spirit or Argand lamp is to be placed below it (plenty of air must be admitted by the side and under the lamp); the water is very rapidly converted into steam, which issues under the chair in the form of vapour; a quantity of heated air also rushes up, so that the body may be quickly exposed even to a greater heat than if it were acted on merely by vapour. The degree of heat may be easily regulated either by the stop-cock at D, or by altering the flame of the lamp. If it be an Argand, it may be lowered, if a spirit-lamp it must be covered up in part, or withdrawn.

By such an apparatus (the expence of which is little more than a guinea, if the pipe be made of tin), a vapour bath sufficient for the whole body may be prepared in a bed-room in five minutes.

stances, the mind is in such a condition as to render all our attempts abortive; but unless there is absolute imbecility we ought not to give up any case as hopeless, for the mind in children often improves in the same ratio with the progress or increase in the bodily powers, and it is well known that nothing tends so much to give command over the muscles as repeated efforts to acquire it. One grand difficulty in the treatment of such cases is to excite the child to put these muscles into action which we wish particularly to exercise. To effect this we have not only to contrive such modes of performing exercises as will bring certain muscles into play, but we have to combine them with some amusement * that will induce the child to put them into action; for however useful shampooing, rubbing, &c. may be, their effect upon the muscular system is as nothing compared to that of

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* Children in this state vary so much in disposition, that the same amusement will not do for all; but I have generally found that a noisy toy, connected with the exercising pullies, was the most effectual inducement to work.

voluntary exertion. The importance of a child acquiring a voluntary power over its muscles (and which it may do by practice) is proved by the fact, that a child may be unable to walk, although all the muscles necessary to the action are sufficiently powerful, as is shown by the resistance they offer when we pull against them.*

NERVOUS CONTRACTION OF THE MUSCLES.

Within these few years, I have seen some curious instances of contraction of certain muscles which was distinctly referable to a local affection of the nervous system. Such cases are now more than usually interesting from the light that has been

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* The application of this principle will be found very useful in cases where, after a paralytic attack, one arm continues affected; the patient should take up small articles with the weak hand, and endeavour to place them in certain determined positions as in making chess-moves, &c. If she should have previously to the attack been able to play on the pianoforte, practising on it will tend very much to restore the voluntary power over the muscles of the arm.

thrown upon them by the late researches into the peculiar functions of the different nerves.*

These nervous affections take place more frequently in certain muscles of the neck and chest, than in those of the limbs; this may proceed from the great difference between the systems of nerves which supply these parts, and from those of the neck being more immediately connected with the functions of the viscera.

Although we can now often determine what particular nerve is affected, we have occasionally great difficulty in discovering the cause. However, as the contracted state of the muscles, on whatever it may depend, will have injurious effects on the joints, if a limb be affected, or on the spine if the muscles of the neck or chest be attacked, we should endeavour to counteract the consequences of the position into which the bones are brought by it. It would be injudicious not to en-

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* See the Exposition of the Natural System of the Nerves of the Human Body, by Charles Bell.

deavour to discover the causes of such spasmodic affections, and to remove them even by experimenting with medicines; but if we direct our attention solely to the discovery of the source of the evil, its *effects* may be overlooked, and in consequence of this neglect, certain parts of the body may suffer to an almost irremediable degree. A case where this had nearly happened came under my observation last spring, and under circumstances which interested me much. A young lady had for a considerable time suffered from a train of symptoms (apparently hysterical), attended with contraction of the muscles of the hip and knee. She had been under the care of several practitioners, both in town and country, who had paid great attention to her general health. But as the hip and knee seemed to get worse, a consultation was called; the symptoms appeared so extraordinary, that the senior consultant plainly said that the patient was deceiving us; but I opposed this opinion, because I considered it more likely that she might be suffering from a peculiar nervous affection which we could not comprehend, than

that she should not only deceive her friends, but submit to much inconvenience and pain. I therefore proposed, that whatever might be the cause of her present condition, whether it was a trick or not, we should do what had not yet been done,— endeavour to counteract its effects,—for her ancle was at this time turned round, so that she walked on the outside of her foot, and the knee was bent outwards to such a degree, that the external lateral ligament was nearly an inch longer than natural ; her spine was also becoming distorted.

From having expressed this opinion, the case was rather forced upon me; and as I saw that the gentlemen who were in consultation did not expect that I should succeed in making the patient better, I was naturally more anxious than usual about the result. In the course of a short time the limb was much improved by the use of the vapour bath, shampooing, rubbing, and artificial supports, and attention being, at the same time, paid to the general health, the young lady became so much better, that now (within twelve months) she can walk so that scarcely any lameness is apparent. I have no hesitation in asserting,

that if the state of the ancle and knee had not been attended to, they would soon have been irrecoverably injured.

From what I saw of the disposition and character of this young lady while I attended her, I was convinced that she had never used any deceit towards her medical advisers, nor pretended to suffer what she did not.

I know that there are many instances where deceits of the most curious kind have been practised; but when we consider the almost inexplicable intricacy of the nervous system, and its liability to be deranged from the age of ten to eighteen, we should be more disposed to think that we are mistaken, than that an amiable girl should not only deceive all her friends, but submit to much suffering from the means that are sometimes used to make her *confess.*

The knowledge that is now possessed by many men in this country, regarding the functions of the several nerves, make it difficult for a patient to imitate a nervous affection so as to deceive them; and how readily those who are yet unacquainted

with the peculiar properties of the several nerves may be led to suppose that an illness is feigned, will be also acknowledged. But there are many nervous affections which are as yet quite inexplicable; one very curious case I saw about twelve months ago, with my friend Mr. Neville of Esher; the patient not only suffered excruciating pains, but all her limbs were distorted in the most extraordinary manner; and whether this proceeded from disease in the head or spine it was impossible to determine; the whole nervous system seemed to be affected; the flexor muscles, as in tetanus, overcoming the extensors.

In such cases we may experiment either upon the nerves of the head or of the spine; but some times, although the nervous symptoms are very curious, they are so far local, that one acquainted with the functions of the nerves may at least point out the parts which are *not* affected. As an instance of this, I may refer to the case of Mr. ———, surgeon, near Colchester, who suffered dreadful misery from spasmodic contractions of the muscles of the abdomen; and I might appeal to him as an au-

thority in proof of the unnecessary severity of treatment that a patient may undergo when the functions of the nerves regulating the several muscles are not taken into consideration. A still more distressing instance of contraction of the muscles from an affection of certain nerves is that of a young Jewess who is under Mr. Bell's care, in the Middlesex Hospital; she is partly recovered; but when I first saw her, if her hand was touched for the purpose of straightening the elbow, the pain was so great that she screamed, and her face and brows became immediately bedewed with perspiration.

The marks of real suffering are so evident in the countenance and the effects on the form are so obvious in such cases, that no one could for a moment suppose any deceit was practised. But there are certain affections of the muscles, which not being attended with pain or much inconvenience to the patient, may be suspected to be feigned. For example, the person cannot (or as some would say) will not shut the eye; if the parts about the eye are examined, nothing will be discovered; but if the state of the ear be attended to, it

may, perhaps, be found inflamed, or a swelled gland will be seen between it and the jaw. Now either of these conditions, by affecting a particular nerve, may be the cause of the loss of power over the eye, and also of a twist in the mouth.* Or one shoulder may drop, and the patient may be observed to keep it sometimes in its proper position; this has also been called a trick, but as we now know that the muscles of the shoulders are supplied with two sets of nerves differing entirely in function from each other, and that one may be affected while the other is entire †, we can fully acquit the supposed impostor of this imputation. The cases of this kind which have been lately in the Middlesex Hospital are already pretty generally known; I have also seen several instances nearly similar.

Nervous affections of the muscles of the throat are more common; as for example, a

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* See Exposition of the Natural System of Nerves, by Charles Bell; and a Paper on Paralysis by me, in the Medico-Chirurgical Transactions.

† From a certain affection of one of these nerves, the head may be pulled towards the shoulder, and resemble, in some respects, the disease called wryneck.

girl may not be able to speak, although she can swallow with ease, or she may have the power of speech without that of swallowing; or she may make a constant barking noise without any accompanying symptom of cold, or of inflammation of the throat. Such cases are certainly very perplexing, and as they most frequently occur in girls who are sometimes a little fanciful, they are often suspected to be feigned. But since it has been ascertained that the several functions are regulated by separate nerves, it cannot appear extraordinary that one may be disturbed while the others continue right. Such cases have been generally called hysterical, and this name is, perhaps, as applicable as any other; but I repeat, that scarcely on any occasion when a girl has symptoms of a spasmodic affection, are we warranted in alleging that she is feigning, and certainly not unless we can show that the symptoms are incompatible with the facts already discovered regarding the functions of the several nerves.

I have now a terrier which has the same spasmodic twitching of the muscles of the side of the mouth as that which is

commonly considered a trick. Such an affection may, in some instances, be from imitation and habit, but of this we could scarcely accuse the dog; in fact, it proceeded from an operation which I performed on the nerve that regulates the motions of the lips and cheeks.*

These spasmodic affections do not often occur in the muscles of the limbs. I have, however, seen instances where the knee has continued for weeks as stiff as if an iron rod had been passed from the tibia to the centre of the femur. For this affection,

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* I have already stated that it is difficult for a patient to imitate a nervous affection, without doing things by which one acquainted with the functions of the nerves may discover the imposition. Of this, I saw several examples while attending the Russian hospitals, after the battle of Paris, in 1814. The soldiers who had recovered from slight wounds were inspected in order to ascertain their fitness for service. There were many of them who had contracted limbs and stiff joints; they were of course discharged; but some of the Cossacks desirous of going home, and not having very correct ideas of muscular motion, in trying to show that their limbs were contracted, often brought the muscles into actions that were quite incompatible with the character of their wounds.

I have repeatedly applied leeches and blisters; but this I would not do again, as such cases often get well suddenly, and do not appear to be influenced by local treatment.

The limbs are often affected in a manner which, a few years ago, was quite inexplicable; but since it has been discovered by Mr. Bell that the nerves supplying the limbs, (which were supposed to be single,) are in fact double, and endowed with two distinct functions, it does not appear surprising that the fibrils, which regulate the actions of the muscles, should be affected, while the sensibility remains in its natural degree; and on the other hand, that there may be pain or even loss of feeling in a particular part, without any apparent alteration in its structure, or in the power of moving the limb. In both instances, the source of the affection is either in a deranged state of the general health, or in some change that has taken place near the root of the nerves.

So far we may account for the symptoms, but as we are not yet acquainted with any mode of treatment by which they may certainly be removed, we should pay particular

attention to the effects they produce. If the affection be of the motor nerves, we should guard against the consequences of contraction of the muscles on the ligaments of the joints, for if it should continue long, the form of the limb may be so altered, that the patient may be left a cripple, although she may suddenly recover from the spasmodic affection.

In cases where there is a particular part pained, there is danger of our paying too much attention to the local treatment. The affected part is often repeatedly bled and blistered, which does not relieve the pain, but even sometimes aggravates the nervous affection. I object to such a plan of practice because I have seen it do harm, and because it is not founded on correct data; for although the blisters are applied on the part where the patient *feels* the pain, the probability is that the source of the pain is higher up: for instance, there are many cases now on record where a violent pain in the sole of the foot proceeded from an injury of the nerve in the ham. We should also recollect that this severe local treatment may have an effect on the whole leg. I lately attended a young lady whose limb was not

only wasted, but her spine crooked in consequence of the lameness which came from the nervous pain in the foot, and the severe treatment that had been employed; by following the plan I proposed, she gradually got better, and is now quite well; but such cases are often very perplexing; and it has not unfrequently happened that the patient has been supposed by the surgeon to have feigned the illness; while, on the other hand, the surgeon has been accused of not understanding the case.

A young lady had a pain in her knee, the muscles of which were at the same time violently contracted. She had been for some months under the care of a surgeon in town, who applied blisters, &c., but without any good effect. She went down to Brighton, used the vapour bath and was shampooed; in a few days afterwards she was seen walking on the Steyne.

In such a case as this, we cannot wonder that the patient should be accused of deceit by the surgeon, or that Mahumed, the shampooer, should be considered, by the friends of the patient, as more clever than her surgeon. But as the young lady

was about 15, it is probable that the contraction and pain in the joint was one of those nervous affections which girls of this age are liable to, and which not only ape all sorts of diseases, but are often suddenly removed by change of air.

ON THE PARALYTIC AFFECTIONS OF THE LIMBS.

As I have dwelt at some length in the preceding volumes on the causes of the paralytic affections to which children are subject, and on the consequences of such attacks on one or more of the limbs, I have little to add to the description of the mode of treating those affections.

Much good may often be done, and the deformity may be prevented from getting worse; but where the bones of the limb are shorter and smaller, we should not promise to cure the patient. The numerous instances of one limb continuing smaller than the other in men who are active, and who can even go through the fatigues of hunting, are sufficient to prove that when

the diminution is to a certain degree, it is almost impossible to promote the growth of the limb so as to bring it to a proportion with the rest of the body.

The extraordinary activity occasionally displayed by the children of the poor who are affected in this way, also affords a strong argument that artificial exercises, however well contrived, will not always restore limbs which have been blighted at an early age. But although we shall probably fail in effecting all that a mother expects, we should not discourage the attempt to remedy such affections; for if neglected, they influence other parts of the body: and the endeavour to restore the limb by shampooing and appropriate exercises is always attended with beneficial effects.

THE END.

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Mr. CHARLES BELL and Mr. SHAW.

Two Courses of Lectures are given during the winter and spring seasons: one Course beginning on the 1st day of October, and terminating on the 18th day of January; the other Course beginning on the 19th day of January, and terminating towards the middle of May. — In each Course the Structure of every part of the Human Body is explained, so as to exhibit a complete view of its Anatomy, with the Physiology and Pathology; the Operations of Surgery are likewise demonstrated.

Mr. SHAW has lately published a Third Edition of the MANUAL of ANATOMY. In this work he has endeavoured to give a short and correct description of the different parts of the body, and of the methods of exhibiting them. He has also attempted to show the manner of distinguishing between the healthy and morbid appearances presented during the examination of bodies, for the purpose of discovering the cause of death. But his chief object has been to direct the attention of the Student to the more important parts of Anatomy, and especially to their application to the sciences of Medicine and Surgery.