A probationary essay on the causes and treatment of lateral curvature of the human spine : submitted by authority of the President and his Council, to the examination of the Royal College of Surgeons of Edinburgh when candidate for admission to their boby / by Robert Knox.

A

PROBATIONARY ESSAY,

ON THE

CAUSES AND TREATMENT

OF

LATERAL CURVATURE

OF THE

HUMAN SPINE;

SUBMITTED,

BY AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,

TO THE EXAMINATION OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR BODY,

IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE ADMISSION OF ORDINARY FELLOWS.

BY

ROBERT KNOX, M.D. F.R.S.E.

LECTURER ON ANATOMY, PHYSIOLOGY, AND PATHOLOGY; CONSERVATOR OF THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS; MEMBER OF THE MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH; OF THE WERNERIAN NATURAL HISTORY SOCIETY, *&c. &c.*

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MDCCCXXV.

TO

JOHN HENRY WISHART, Esq. F.R.S.E.

SIR,

BY Dedicating to you this Essay, I am desirous of thus expressing the high estimation in which I hold your character, both as a professional man and as a Gentleman.

Warmly attached to the Surgical and Medical Art, which you have never ceased to prosecute and advance as a Science, and observing undeviatingly an upright, candid, and liberal line of conduct towards your professional Brethren, you have thereby deservedly elevated yourself to the highest rank in the Profession, and have at all times formed a striking contrast with the unmanly, dishonourable, but too prevalent feeling, which causes its possessor to sicken at the mention of another's success, and stimulates him to calumniate and detract from that reputation he cannot hope to obtain.

The sentiments of esteem I have here expressed, may perhaps prove the more acceptable, that they are (as you know) in no shape influenced by private friendship, but are grounded exclusively on the remarkable liberality, integrity and candour, which have ever marked your conduct as well towards the Public as the Profession;—I feel assured that I have but feebly ex-

pressed a feeling much more prevalent than you will at any time allow yourself to imagine.

I have the honour to be,

SIR,

With the sincerest regard,

Your very obedient servant,

R. KNOX.

4. Newington Place,
11*th April* 1825.

REMARKS

ON THE

LATERAL CURVATURE

OF THE

SPINE.

CHAPTER I.

IS CONTORTION OF THE SPINE A NEW DISEASE?

LATERAL Curvature of the human spine is a form of distortion of so frequent occurrence, that, with the exception of certain extreme cases, its cure seldom becomes an object of regular surgical treatment. What is known to be so general, is supposed irremediable; and as it neither incapacitates the patient from any of the ordinary duties of life, nor affects the probable duration of the period of his existence, the form of distortion I speak of is almost universally neglected, or, it is hoped, that, by a slight artifice in dress, the distortion of the spine may easily be concealed.

It is indeed true, that, in numerous cases of lateral curvature, the eye of the common observer may readily be deceived by the forms of modern dress, and by the various mechanical contrivances applied to the human frame; but these deformities never escape the observation of the anatomist or of the artist. He perceives them, however masked, by the unequal elevation of the shoulders,—by the shuffling unsteady gait,—by the awkward and ungraceful motions of the feet; in a word, no art can conceal from him a deviation from the natural perpendicularity of the human spine.

Lateral curvatures of the spine are the direct results of civilization: they flow from an abuse of sedentary employments, an excessive manufacturing population, and a total neglect of the physical education of youth. From the slight projection of the right shoulder and clavicle, to the absolute distortion of the whole trunk, every possible variety may be found amidst the crowded population of large European cities, and in such numbers, that of twenty persons, male or female, we shall not find one whose spine is perfectly erect, or formed on that model which Nature originally bestowed on man, and Grecian art transmitted to admiring posterity.

This deviation from the naturally erect form was very early observed and treated of, more particu-

larly during the last century, by those whose writings have done honour to the profession. HIPPOCRATES, though practising amongst a race devoted to gymnastics, which they cultivated both as a civil and religious duty imposed on them, and who must have been generally free from such deformities, yet mentions them frequently in his works, describing them with that masterly brevity peculiar to himself. He treats first of curvatures generally, without any distinct reference to their true cause, a mode which the advanced state of anatomical and pathological knowledge renders unnecessary for us to adopt. His method, though deduced from simple observation, unaided by dissection, is clear and precise. He briefly mentions those cases of curvature of the spine, originating in disease and bad habits *, and next speaks more in detail of those displacements of the vertebræ occasioned by a fall or blow, or other accident: he promises to treat specially of lateral curvatures, and of those arising from disease, in a future part of his writings; but it would seem that this treatise, if it ever existed, has perished †.

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* Quosdam etiam in id vitium compellit una cum morbo habitus ille quo jacere consueverunt.—HIPP. *De Artic. Part.*

† See his works generally, and more particularly the Book entitled "De Artic. Part."

GALEN, an accurate anatomist and observer, expressly states, that nurses alter much the form of the chest in children *, by tight bandaging. We observe this, he continues, in young girls, " to whom their nurses are anxious to give a greater development to the hips and loins, so that they shall exceed the chest in bulk, by encircling the latter with tight bandages, and compressing and straitening the parts about the scapulæ and thorax, by which it happens, that, as the bandages are not all equally tight, the breast either projects, or the parts toward the spine protrude, and become gibbous †." Such was the opinion of GALEN; and although we cannot doubt for a moment the inaccuracy of his views as to the real causes of the lateral deformity, we may feel assured, that tight swathing of the thorax, such as described by him, is calculated to injure its contents, and to do irreparable mischief to the constitution.

As lateral curvatures are intimately connected

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* In prima Educatione.

† Most mechanics who exercise sedentary trades, and all those confined to the desk from their earliest years, are more or less deformed by lateral curvature. The male chest is never, so far as I know, exposed in childhood to be swathed with bandages, this folly being reserved in the present age for the adult.

with the civilised state of society (for they are never to be seen in savage nations), and, as shall be afterwards shewn, depend for their production on the extreme neglect of the physical education of youth, and on the excessive and injurious attention given to the education of the mind; and, in the working classes of society, on the vast prevalence of manufactures, and other sedentary employments,—so it is reasonable to presume, that it is a deformity which must daily become more frequent in society, unless checked, in so far as regards the wealthy classes, by the timely interposition of the profession. Yet it appears to me evident, that, at all times, the female portion of society, more especially those inhabiting cities, must have been greatly subject to the lateral distortion of the spine. PINÆUS, who wrote in 1579 *, says, that, whilst he resided at Paris, he observed curvatures of the spine to be exceedingly frequent, and that this was the case in every part of the kingdom; that they affected chiefly females, and did not spare the noblest and richest families. The accuracy of the observation of PINÆUS is very remarkable, and does him infinite credit. Continuing to investigate the causes of such deformities, and the bad effects flowing from them, he remarks,

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* Opusc. Physiol. et Anatom.

" Should the body remain erect, and the spine be not vitiated, yet the chest will become narrower, and hence will arise pulmonic disease, obstinate constipation, &c. But of all these evils, a *scoliosis*, or lateral curvature, is the most frequent, and that more to the right than to the left; so that of fifty persons, you shall scarcely find two who have not the right shoulder higher and more projecting than the left."

The spirit of observation which led PINÆUS to remark on the excessive frequency of deformed spine, stimulated him also to inquire into its causes. It seems scarcely credible that so remarkable a part of the phenomenon, as the constancy with which the lateral curvature affects the right side, should have been viewed by writers of the present day as a circumstance of no moment, and so little worth mentioning, that they continue to talk of lateral curvatures arising " from indolence and bad habits," as if all mechanics inclined during work towards the right side,—all literary men had adopted the same bad habit during the hours of study,—all females assumed the same position whilst engaged at needlework,—all school-boys, whilst repeating their lessons, or during the tedious and unnaturally prolonged school hours;—or is it because these writers, finding themselves unable to explain so remarkable

an appearance, have been forced to maintain so ridiculous a proposition? *Nothing which maintains a constant and uniform character, can have for its cause a series of accidental and unconnected circumstances.* Such was the opinion of PINÆUS, and the older authors: they fancied that this constancy of curvature towards the right side might arise from the more frequent use of the right shoulder, or from the liver and lungs being placed more towards the right side, or from both. It was even obstinately maintained, that it depended on the position of the arch of the aorta; and this absurd hypothesis maintained its ground till expunged from the literature of medicine by a living anatomist of great merit *.

It would seem, then, that, as early as 1550, distortions of the human spine, occasioned by a lateral curvature, were extremely common in some highly civilised capitals; and that the members of our profession had carefully observed its progress in society,—had noted some of its causes, with an accuracy far excelling all modern writers,—and had strenuously recommended the discontinuance of corsets and other bandages, calculated to disfigure the human frame: to be brief, it is evident that their know-

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* Dr BECLARD.

ledge of this species of deformity was much more minute than what some very late writers possess. It would seem, however, that the voice of the profession was not listened to; and that, in proportion as sedentary employments became more general,—as literary studies extended to all ranks,—as prolonged school hours were enforced on children, and severe restraints put on the exercises of the youth of either sex,—so did distortions of the spine become more general, and, with certain classes (the wealthy and the manufacturing), almost universal. The subject was resumed by a host of writers during the last century; and it may readily be imagined, that, when such anatomists as MORGAGNI, BONETUS, MERY, and LUDWIG *, entered the field of controversy, little would be left for the exercise of modern wit or ingenuity. The various and difficult questions relative to the nature of distortion were then discussed with the highest display of learning and acumen; and not unfrequently, I fear, with no other result than obscuring the truths, which a simple appeal to correct anatomical and physiological principles would have always disclosed.

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* In LUDWIG's works will be found by far the best and minutest account of deformed spines ever given to the public.

CHAPTER II.

BRIEF VIEW OF THE FUNCTIONS OF THE SPINAL COLUMN, AND ITS APPEARANCES IN A HEALTHY STATE.

FROM the lowermost lumbar vertebra, or that resting on the sacrum, the spinal column gradually diminishes in size, and there is a proportional diminution of the central canal, containing the *medulla spinalis*. This decrease in the size of the vertebræ, continues to about the middle of the back, where the column again expands (and with it the central canal) in proceeding upwards towards the cervical vertebræ *.

The muscles intended to sustain the trunk *in æquilibrio*, and to raise and support it in the erect position, are situated on its dorsal or posterior aspect. They are attached to powerful processes, or osseous projections, which contribute to give a greater extent for the origin of muscular fibres, and a more extended sphere of action. The greatest variety in the bulk and extent of these muscles may be observed in different individuals, from the al-

* In the fœtus, the spine is evidently thicker at the neck than at the loins.

most fleshless spine of the enfeebled inhabitant of modern cities, to the athletic frame of the English peasant, bearing no small resemblance to the inimitable Torso of Hercules.

It is by means of two cushions of long muscles and others, which, though broad, are very powerful, that the trunk and head are maintained in the erect position, whether the person be seated or in a standing attitude. Now, it ought always to be remembered, that the mere act of sitting down does not relieve the muscles which support the trunk and head: to relieve these a horizontal position is indispensable. A very simple experiment will, I apprehend, render this intelligible to the weakest capacity. The extreme difficulty of keeping the arm extended, even for a few minutes, is well known, and how painful the continued action of any particular set of muscles becomes, unless relieved by rest, or by the employment of their antagonists; yet it is no unusual occurrence for the extensor muscles of the spine to be kept in action during fourteen successive hours, either at the desk or at mechanical employments. The effects of such habits in producing deformity of the spine, and the manner in which such deformity is more immediately produced, will form the subject of the following section.

The three superior regions of the spine, equal, in general, about a third of the total height of the body; and the most ordinary dimensions for the length of its regions are, 5.9056 inches for the cervical, 11.810 for the dorsal, and 6.2993 for the lumbar. Common observation shews, that the proportions of the spine to the total height of the body vary exceedingly; in some the lower extremities and neck are disproportioned to the trunk, and this may happen to a great extent short of actual deformity; in others the spine is of great length, and such persons are remarked as sitting much higher than others, who in total height may yet greatly exceed them. I am inclined to think, that these differences depend on the vast admixture of nations and races which European society presents; for it does not prevail to the same extent amongst pure and unmixed savage tribes. Historians, if my memory fail not, describe the savage hordes which overthrew the Roman Empire, and plunged Europe into profound barbarism for so many centuries, as being composed of a race whose chief peculiarity, next to a hideous Tartaric physiognomy, was a disproportionate length of the spine to the extremities, so that "what the limbs were deficient in as to length, was made up by that of the body."

Some * have thought, that these disproportions in the length of the spine to the extremities, depend on a premature ossification of the vertebræ; but this idea is quite conjectural. Women, generally speaking, have the lower extremities much shorter than men; nor is this unseemly in the sex, or to be reckoned a deformity. Yet, in all ages, a greatly disproportioned shortness of the limbs has been considered injurious to the comely proportions of the female form.

The admirable structure of the spine,—the incredible perfection of form it displays,—its comple adaptation to the various functions required of it, leaving nothing for the most captious mind to cavil at or cenusre,—all argue it the work of infinite and unmeasurable wisdom. To dilate on this point would lead from the object of this essay; but I cannot refrain from quoting a beautiful passage in the works of GALEN, wherein that great man sums up, with inimitable brevity, the various uses of the spinal column: "Porro quatuor jam has spinæ utilitates numeres licet; primam quidem velut sedis cujusdam, et fundamenti instrumentorum ad vitam necessariorum: secundam, autem, velut viæ cujusdam spinali medullæ: tertiam, tuti præsidii; quar-

* FRANK, Opera, xi. 1792.

tam motus instrumenti quem dorso ac spina animalia obeunt; quibus quinta ex abundanti accidit, viscerum ab anteriori parte spinæ incumbentium munimentum."

In the healthy state, the vertebral column ought to incline neither to the right nor left, so that a vertical line would divide it into two equal parts. The head placed on its summit, is, by reason of the horizontality of its condyles, almost in æquilibrio, and requires of the muscles charged with sustaining it but a slight effort. As might be expected, it is quite the reverse with other animals, which, from their prone, and more or less quadruped form, have the head suspended, as it were, to the anterior extremity of the column. In man who is naturally erect, the weight of the head, arms, chest, and many of the abdominal viscera, is supported by the spine in a line perpendicular with the ground, and with a pressure increasing from the atlas downwards to the sacrum and pelvis: in quadrupeds, for a very obvious reason, nothing of all this takes place. Hence it happens, that, whilst in man the spine may be distorted, and even twisted by its own weight, and by that of the head and thorax, and forced to deviate from its naturally straight and upright form, either laterally, posteriorly, or anteriorly, other animals are subject only to a curvature of the spine

inwards, and the stooping head and rounded shoulders do not more certainly characterize advanced age in man, than does the hollowness of the spine in quadrupeds. Thus, we already perceive in the anatomical structure of man, as compared with other animals, that, to his erect form may be traced the tendency to certain deformities and diseases to which he is especially liable *, and from which they, by reason of the horizontality of the spine, are entirely exempt. But, in ascribing to the naturally erect form of man a tendency to produce deformity, I must not be understood as supposing that real deformities can ever be produced merely by this, as some contemporary writers have done. Man, in a savage state, is never deformed. For the real causes of the lateral curvature of the spine we must look to the customs of civilized society, to the ill-judged neglect of the physical education of youth, to the restraints imposed on all classes, and particularly to those acquired sedentary habits, alike destructive to the health, and injurious to the natural form of the body.

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* Hernia and Distorted Spine.

CHAPTER III.

ON THE CAUSES OF THE LATERAL CURVATURE OF THE SPINE.

PARENTS the most careless seldom entirely overlook in their children the coming on of a distorted spine. They observe that the shoulder begins to grow out, that the young person walks awkwardly, that, if a boy, his clothes do not fit him, and are uniformly drawn away to the right side; and that, if a girl, in addition to these symptoms of deformity, there exists more obviously in her a remarkable fulness of the right breast, and a proportionate elevation of the right clavicle. These appearances are generally first observable about the ages of eight or nine, that is, some time after the young person has been sent to school, or to some other sedentary employment: in other words, shortly after he has been exposed to the exciting causes of the complaint. For, who are the persons most subject to a lateral curvature, and consequent distortion of the spine? Is it not those who are condemned to maintain the erect position of the trunk during the whole day, generally without the smallest intermis-

sion, and that from their earliest years. He must have observed, with a careless and an inaccurate eye, who has not remarked, and readily distinguished the various classes of mankind subject to this species of deformity. Who has not remarked, that those prone to lateral curvatures of the spine, are, 1*mo*, The female in civilized life, who, excluded from active and robust exercise, is condemned to sedentary domestic habits, and who, from the very commencement of her education, can seldom relieve, as nature intended, the muscles of the spine: 2*do*, The industrious student and literary character, devoted to study, or to the desk: 3*tio*, The mechanic, employed from his infancy in certain sedentary employments.

Who ever saw the idle or the habitual truant affected with curvature of the spine? When was the peasant or the soldier from his youth, observed to be distorted in the spine? We may sum up these interrogatories by an appeal to what Nature forcibly points out, and what history and observation confirm.

When a child is allowed to grow up to manhood, as nature intended, neither badly nursed nor limited in exercise and amusements, nor stinted in food, when he is permitted to roam about unfettered by the customs of society, the restraints of dress,

and imprisonment imposed by education. His adult form will be found perfect and erect; in such an individual the spinal column never deviates from a straight line, perpendicular with the ground when the body is erect, nor does he at any time know disease in that organ, but from the effects of accident, of wounds, or of distressing compulsatory labour. This is the precise condition of the form in all savage nations, and with many, who, though not deemed savage by mankind, may, from the nature of their institutions, and their total ignorance of the arts and sciences, be fairly deemed uncivilized: the peasants of most countries present this perfection of the frame, when not oppressed by severe labour, but it is chiefly to be observed amongst those nations who do not cultivate the soil, but trust to their cattle or to the chase for their support. In ancient times, when so much attention was paid to the physical education of youth, this beauty and perfection of frame must have been exceedingly common. We observe it in the antique statues of Greece, nor can we be surprised, that, in that extraordinary country, the human frame should have reached its maximum of perfection, when we reflect on the honours bestowed on the conquerors at the Olympic Games *.

* "Palmaque nobilis, terrarum dominos
"Evehit ad deos." Hor.

We may imagine, for reasons known to those acquainted with the history of Greece, that this admirable form prevailed most in Sparta and Bœotia; whilst we cannot doubt, that, during the long course of ages through which Rome gradually rose to fame and splendour, when her sons, accustomed to the exercises of the field, were taught to view war as the sole object worthy their ambition, that, in such a state of society, the human frame must necessarily have attained its highest degree of perfection.

But the system of education is changed: corporeal exercises are no longer viewed by the better classes of society as much deserving cultivation: to the education of the mind every other consideration is sacrificed; and to talk to parents of the physical education of their children, would be to address them on a subject altogether unintelligible. They imagine (very falsely indeed) that a child may grow up symmetrical in form, healthy, vigorous, and active in his spirits, though imprisoned eight or ten hours daily at school, and compelled, for the remainder of the day, to sit upright on a chair or bench. When fatigued, he must *not* be allowed to throw himself on the ground, in order to relieve the muscles of the back. This would be the teaching him awkward, slovenly habits. If a girl, other additional torturing contrivances are resorted to, to

compel her to retain the trunk bolt-upright, and to maintain the absolutely erect position, in despite of nature and common sense. We shall endeavour to shew, in the course of the following pages, that the true causes of the lateral distortion of the spine are to be sought for in this total neglect of the physical education of youth.

Let us first inquire minutely into the causes of lateral curvature of the spine, which have been assigned by various writers, and admit or reject these causes, as they fully or otherwise explain the whole of the phenomena accompanying lateral curvatures.

I.—*Of the supposed dependence of Lateral Curvature on a disease of the Ligaments, Vertebral Cartilages, or Osseous Structure of the Spine.*

It seems to me an inaccuracy to apply the term Pathological (as some late writers have done), to that species of distortion which forms the subject of this Essay. In no case is it necessarily dependent on disease of the vertebræ, or on any portion of the

column. It is true, that simple caries of the bone may be superadded, or even precede, lateral curvature, and that the lateral curvature may, in some sufficiently rare cases *, be actually occasioned by the *scrofulous decomposition of the bones*, generally known by the name of the *Vertebral Disease of Pott*. But lateral curvature is not necessarily connected with a diseased condition of the spinal column ; and to speak of it, therefore, as a pathological condition of the spine, is, in some measure, to mislead the public and the profession †.

The dependence of lateral curvature on scrofula, or a predisposition to scrofula, is a widely extended opinion ; and some have even maintained the extremely erroneous proposition, that lateral curvatures may be considered as a sequel of rickets. So extensive is this feeling with all classes (I mean the dependence of lateral distortion on a scrofulous predisposition), that I shall detain my readers for a short time, whilst examining the influence of cer-

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† The assertion that lateral curvatures of the spine arise out of the dislocation of one or other of the vertebræ, does not merit the smallest notice.

* I shall endeavour shortly to publish a case, in which this occurrence would have happened, had the patient survived for a short period.

tain external agents on the growth and consolidation of bone.

There exists, in infancy, a softness of the bones composing the spine, corresponding with the general pliability and delicacy of all the textures of the body. This comparative softness of the bones to the hardness afterwards acquired, continues, more or less, to manhood; or, at least, till some time after puberty. It would seem to be slightly increased by a bad regimen, unwholesome food, impure and moist air, and other unhappy circumstances, which the condition of civilized society so often presents; but its most remarkable development, when it constitutes the disease called *Rickets*, is owing to causes as yet but imperfectly understood. Certain hereditary evils, such as scrofula, have, in like manner, been supposed calculated to prolong this comparatively soft condition of the bones; but numerous facts occur to me, which render it more than probable that these hereditary evils have no marked influence in prolonging the soft condition of bones beyond its usual period, however much they may contribute towards the production of actual disease.

The vast prevalence of scrofula, and of other hereditary diseases, together with the very obvious effects of unwholesome food over the general health of infants, may seem to some sufficient proofs of the

efficiency of these causes in retarding the progress of ossification to a later period than in the healthy state; but I have not met with any author of credit, who offers a strict analysis of this opinion; and my own observations, drawn from pathological anatomy, by no means confirm such conjectures. The children of the scrofulous have ever seemed to me as erect and well made as others; and I have even remarked, in young persons decidedly scrofulous, a beautiful symmetry of form, in which the usual projection of the right shoulder was scarcely apparent, and yet the physical education of these persons had been singularly neglected.

Low, damp situations have been supposed to prolong, to a comparatively late period in life, the softness and pliability of the osseous texture, which, in a healthy and natural state, ought to be limited to early years; but the accuracy of this observation may also be fairly questioned. It has not been observed by any one, that the inhabitants of the fenny counties of England are remarkable for distorted spines; and I can myself assert, from personal observation, that, in the low and damp districts of Hampshire, distorted spines are not common. If, in the swampy provinces of Holland, travellers have observed curvatures of the spine to prevail, this is, without doubt, attributable to the remarkably se-

dentary habits of the race, and not to any influence the moist air may exert, in retarding the progress of ossification *.

There is still another very obvious condition of the osseous system, somewhat connected with this subject. I allude to the brittleness of the bones, combined occasionally with softness in very young children. The only case I have met with of this disease, was one sufficiently remarkable: the patient, a little girl, about ten months old, was supposed to have fallen from the arms of a careless nurse, and injured her arm. The medical attendants could not agree as to the nature of the accident which had happened, and the mother of the child becoming alarmed, I was sent for in the middle of the night. It was sufficiently evident, on a careful examination, that the *os humeri* and *radius* were broken; the bones of this child seemed to give way under trifling external injuries, *i. e.* they were extremely brittle; the child died some time afterwards of diseased mesenteric glands. We shall not stop to inquire into the pathology of these cases; the dissections of

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* It may indeed be objected to this, that the same race, when transplanted to the dry and healthy climate of Southern Africa, acquire a perfection of size and strength of frame, quite unparalleled in the world; but it ought also to be remembered, that their habits have undergone important changes.

thousands of scrofulous bodies, disprove the idea that the bones of such persons are naturally softer than others. We know nothing, therefore, of any modification or change produced in the osseous system, by the presence of a scrofulous habit, short of disease in the bones themselves.

Even in the healthy adult state, the bones composing the vertebral column, may be acted on by external causes, so as to produce inequalities in the depth or thickness of their bodies, and thus throw the spine out of its natural direction. The effects, however, of these changes, as shall be shewn afterwards, are confined chiefly to the intervertebral cartilages, though, ultimately, by their continuing to operate, they may affect the bones themselves. It is not, therefore, to any diseased habit, that we are to look for the causes of lateral curvature, but to those great errors in the physical education of youth, by which the muscles of the spine are kept in a constant state of exertion, under circumstances the most disadvantageous.

II. *Does lateral curvature of the spine, depend on a contracted or enfeebled state of the muscles connected with it?*

The opinion which maintains, that lateral distortions of the spine originate in a contracted state of the dorsal muscles, or in an irregular action of these muscles, is of very ancient date*. It has undergone a variety of modifications. Sometimes it was stated to be mere feebleness of those muscles which are employed in maintaining the body erect; at other times, the nerves supplying these muscles, were supposed to be compressed, and hence arose irregular action in the latter, and a want of due balancing in the muscles of the spine. *Lastly*, it has been asserted, that lateral curvatures do not exist! that there is no such deformity,—that it is merely a *rotation* of the spine, originating in a violent contracted state of the muscles, which state is somehow or other, connected with, or dependent on, their constant wasting; and, as these waste and decay, so the contraction becomes daily more and more violent, till at last, when the muscular cushions of the

* Mery, Memoires de l'Acad. des Sciences.

back have almost disappeared, the contraction of the fibres, now reduced to mere threads, can no longer be overcome, and the patient remains distorted for life!

To those who argue, that a feebleness of the muscles of the trunk is the true cause of the lateral curvature of the spine, I reply, that, from such a cause, the spine may be bent into the form of an arch, as we find in old age, and in youth, whose growth exceeds their years, and in convalescents from severe disease; but a lateral curvature can have no such origin. It is true that a lateral curvature of the spine will occur the more readily, that there exists originally a want of development of those muscles which erect the spine; but I am well inclined to think, that such feebleness is occasioned in most instances, rather by the undue exercise given those muscles,—an exercise unaccompanied by any relaxation, and which consists merely in maintaining the erect position of the body during sixteen hours of every day, from the age of seven, upwards to puberty. It seems to have been altogether forgotten, that, by sitting down, not one muscle of the spine is relieved; that, on the contrary, they must continue their exertions to maintain the trunk erect, and *in æquilibrio;* and that when this position is maintained in children, (agreeable to the modern system of education, and the ha-

bits of civilised life) for many hours daily, and that the weight of the head, shoulders and chest, with its contained organs, are allowed to press upon the spinal column *, whilst the muscles, for want of that due relaxation and vicissitude of action, (which, properly attended to, give that admirable development of the muscles so much admired by all,) become daily weaker, and, perhaps, even lose a portion of their bulk; the result will generally prove to be a lateral curvature of the spine.

But why should the distortion be lateral? Can we suppose, with GALEN, PINÆUS, and others, that it originates in the use of corsets? But the youth of either sex are equally subject to this form of distortion. Can we suppose for a moment that it owes its origin to bad habits acquired at school? Such, for example, as always carrying the school-books under the left or the right arm † (it matters not which). But thousands, who have never carried books to school, are subject to this deformity. Or

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* The effects of the great weight which the column has to support in the erect position of the body may be judged of, by reflecting on the fact, that the height of a moderately tall person will be found, after the day's exercise, to be diminished by about an inch.

† LUDWIG, and many others.

from playing on the harp or pianoforte* ? Or does it arise from an attempt made, when the person has been long confined to the sitting posture, to transfer the weight pressing on the spinal column from one tuberosity of the *ischion* to the other, and whilst standing from one foot to the other? I think not. For why does the curvature happen so uniformly towards the right side? School-boys do not always stand on the left leg whilst repeating their lessons; nor can we entertain for a moment the idea that a number of fortuitous and accidental circumstances can give rise to a phenomenon so uniform, so constant, as curvature of the spine towards the right side. Were the active and moving agents placed on either side of the spine, viz. the muscles, perfectly symmetrical, and of equal energy, strength, and bulk, a lateral curvature of the spine could never happen. It would bend into the form of an arch, or, could the head and trunk be supported perpendicularly, its intervertebral substances would become generally shortened, and would disappear by reason of the incumbent weight of the head and chest, &c.;

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* Shaw. How frequent is lateral curvature of the spine, and how few can boast of their having become deformed by playing on the harp!

the bones themselves might become thinner, and ultimately suffer; but still a lateral curvature of the spine could not take place. That this distortion, or rather that the cause of the spine deviating from its true and straight form towards either side, originates in a want of perfect symmetry in the two halves of the body, will, I trust, be immediately proved, by an appeal to an anatomical discovery, which seems to have been altogether overlooked by my contemporaries.

PINÆUS, whom I have already had occasion to quote, expresses his doubts whether the lateral curvature towards the right arises from the more frequent use of the right shoulder, or from the liver and lungs being placed more towards the right side, or from both. In order to prove that the curvatures towards the right side do not arise from either of the causes assigned by PINÆUS, and succeeding anatomists, we shall consider the question at some length.

III. *On the causes which give rise to the lateral curvatures of the spine, and which more particularly determine the curvature to the right or left.*

When a frame naturally delicate is exposed to the full influence of a modern education, when the muscles of the spine are exerted during the whole day, and that for a continuance of many years, without any of that relaxation and employment of the antagonist muscles, or flexors, so essential to the continuance of muscular action, and to the growth of the muscular fibre;—when, in order to aid this highly unnatural mode of education, it becomes necessary further to support the trunk and head with corsets and machines (the muscles of the spine being no longer able to do so), instead of allowing that repose in a horizontal position, or even a vicissitude of action and relaxation, which would give rest and immediate relief, as well to the muscles as to the ligaments and bones of the spine *;—when this has

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* The muscles of the spine are best relieved by a horizontal position. In cases, however, of over-fatigue, we naturally employ the antagonist muscles to those used during the upright position of the body, and we therefore bend the whole trunk very much forward.

continued for a longer or shorter period, symptoms of a curvature of the spine appear, which will be found to be in an amazingly large proportion towards the right side: this is owing to the want of symmetry in the corresponding halves of the body.

The instances in which the two sides of the body are strictly symmetrical are rare. This is proved, 1*st*, By simple inspection, which shews, that in the right-handed, the right arm and the right side of the body generally are stronger, and more powerfully developed, than the left: in the left-handed, it is precisely the reverse. Should it be said, that this greater energy and development in the right arm, arise from its constant use, it may be objected that such explanation is not applicable to the right lower extremities, which partake of the same superiority with the upper. *2dly*, Individuals of all nations, and of all ranks of society, use, in preference, one or other arm, and this is owing to an internal consciousness of strength in the extremity used, and not to any education; to suppose which, amongst savage nations, and amongst the lower classes of mankind, is absolutely ridiculous. *3dly*, This want of symmetry in the two sides of the body is observable in the mechanic, whatever almost be his employment; in the labouring poor, who often use both arms equally; and in those born to ample fortunes, who

scarcely use their hands at all. In all these there is a want of symmetry, and an unequal development, in the two sides of the body (extending frequently even to the organs of vision); and the curvature of the spine, when it exists, will be found in the stronger side, whether right or left. Hence it is that few but the professed dancer, can execute those elegant and graceful movements, which depend on the individual possessing the most perfect command over both lower extremities. It is incorrect, then, to talk of "predominance of action of the right arm *," as being the cause of its physical superiority over the left: in running, walking, leaping, &c. we employ both lower extremities equally; there can be no predominance of action as applied to them, and yet the left lower extremity seldom acquires the full strength of the right. *4thly*, The disproportion of the two halves of the body is not confined to mere inferiority in point of strength, and a slight, though visible, inequality as to development; there is often an absolute shortening of the foot or limb, and a corresponding feebleness of the muscles. The shortening of the limb, however trifling it may be, proves a cause of spinal deformity, by altering the direction of the pelvis, and it gives rise to a very peculiar mode of

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* Beclard.

walking. Persons so affected, in walking, even very gently, make a sudden spring each time they rise on the left foot, as if simply to propel the body forwards. But this very peculiar movement is, in fact, made, not to accelerate progression, but to compensate for the actual shortness of the left leg, and thereby conceal the rising and falling of that side, which, without this little artifice, would be very apparent.

In the greatly disproportionate number of persons in whom the superiority of the right arm over the left in energy and actual development was observed to exist, some of the earlier anatomists founded their explanation of the constancy with which lateral curvatures affect also the right side of the dorsal region, whilst others conjectured and maintained, that the lateral curvature of the spine towards the right side, is owing to the direction given to the spine by the arch of the aorta, and that this accounted also for its so great frequency *. But Dr

* This almost uniform superiority of the right over the left sides, pervades apparently the whole animal kingdom ; yet the great narwhal, or sea-unicorn, presents a most remarkable instance to the contrary. In this animal, improperly named Unicorn, the left tooth, vulgarly called the Horn, is always larger than the right ; sometimes the disproportion is remarkable.

Beclard says *, that he once saw a total and regular transposition of the viscera, thoracic and abdominal; the point of the heart was to the right also, and yet the curvature of the spine was as usual; the convexity was to the right. He farther observes, that " he once dissected a left-handed person, whose internal organs were placed as usual, and who, notwithstanding, had the curvature in the spine in the opposite direction. He has known several left-handed individuals, well formed, and who all have the left shoulder, and the whole of the extremity connected with it, a little stronger than that of the opposite side, and at the same time a little more elevated. All men (he continues) who use constantly the right hand, have the inverse disposition. It is above all remarkable in persons whose professions require an almost exclusive use of the right arm; these have the shoulder evidently more elevated. The greater number of those whose bones have slowly acquired the natural consistence, and particularly those whose muscles have little contractile energy, have also the right shoulder a little more elevated, or, what comes to the same, have, in the dorsal region of the spine, a curvature whose concavity is to the left. Finally, most rachitic and crooked-back persons, have the right shoulder high-

* Bulletin de la Faculté, &c. 1812.

er than the left."—" From these different considerations, we may conclude (he continues) that the lateral curvature of the spine does not depend on the presence and pressure of the aorta, but on the predominance of action of the right arm, which being stronger, and acting oftener, forces the vertebral column to incline to the left, to establish the equilibrium, and to offer to its muscles a fixed solid point."

When, in consequence of the cause I have pointed out, and of others which shall be presently explained, a lateral curvature has been established in the dorsal part of the spine, and the equilibrium and perpendicularity of the trunk been thus affected, there arises, in consequence of the efforts made to maintain the equilibrium, and by an obvious mechanical law, another curvature of the spine somewhat lower down, and uniformly towards the opposite side.

We may, I presume, now conclude, that the causes of the frequency and prevalence of lateral curvatures of the human spine, depend neither on any peculiar softened condition of the bones, connected with scrofula or hereditary disease*, nor on any connate feebleness of the muscles which elevate and

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* Macartney.

maintain the trunk erect *, nor on bad habits, and awkward positions of the body, acquired at school and at the desk †, nor on any actual disease of the vertebæ, or intervertebral cartilages, which give rise to lateral curvature but seldom; that, instead of these circumstances being causes of lateral curvature, many of them are merely the effects of a spine already become deformed; but that, by an erroneous system of education, demanding of children efforts beyond their strength, the muscles supporting the spine daily lose their energy, for want of relaxation, and a correct system of exercise; that, by degrees, the column bends, under the continued weight of the head and thorax, and, like a pillar placed between two unequal powers acting upon it, (for the body is very seldom strictly symmetrical), it will obviously yield and bend towards the stronger

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* A numerous list of authors; but there exists a comparative weakness of the muscles, to the duties required of them during the education of youth, and this was exceedingly well understood by Morgagni and Bonetus. Mr Mery (*Mem. de l'Acad. Royale des Sciences*, 1706, p. 624.) though he indulges much in hypothesis, observes, when treating of this subject, that the contractions of the muscles must be stronger on one side than on the other, to bend the bones themselves, because, when the antagonist muscles of a part act with equal force, they maintain the bones in their natural figure, in spite of their softness, and the weight of the body.

† Ludwig, Shaw, Haller, &c.

force, which, in the right-handed, is the right side, and in the left-handed the left. As soon as the column has deviated from a right line, the scapula towards which the spine is incurvated, projects, and the whole form of the thorax becomes greatly altered. It would be tedious to dwell on details, which every one the least acquainted with the anatomy of the human body may so readily understand, should he chuse to adopt the principles I have endeavoured to establish.

IV. *On the Influence of Corsets in altering the Female form.*

Having explained sufficiently, I trust, the real cause of the lateral distortion of the human spine, and shewn it to consist partly in a certain original tendency to malformation, but which, unless aided by a vicious system of education, enfeebling the muscles of the trunk, destroying their energy, and even wasting their substance, and demanding of the youth of either sex exertions beyond their years, would, in no instance, be productive of any bad effects to the frame; we shall now, though very briefly, inquire into the effects of one of the most ancient modes of bandaging which exists, I mean the application of a firm unyielding bandage, applied with

different degrees of pressure around the female thorax, in all civilised countries, a practice still resorted into very early years, and continued to the latest period of life. We learn from ancient authors, that corsets have been used occasionally for other purposes than merely giving a delicacy of form to the waist. GALEN expressly says, that nurses alter much the form of the thorax, by tight bandaging, and that the practice originated "in an anxiety, on the part of the parents, so to compress and reduce the thorax and shoulders in children, that, compared with the hips and loins, they shall appear delicate and feminine." The bed of PROCRASTES is here literally applied to the human form! How vain must the attempt be to reduce the comparative bulk of the female thorax in all cases, to that inimitable delicacy which nature has bestowed on a few favoured individuals, and which Grecian art has pourtrayed in her imperishable monuments*; as well might we hope to shorten or lengthen the human form at pleasure.

The application of tight corsets to the whole chest and shoulders, (a practice the most destructive

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* The statue of the Venus Genetrix, now in the Louvre, displays this admirable beauty in the female form in the highest degree.

to health which can be well devised), seems to have been in use even amongst the Romans, at a much earlier period than that of GALEN. TERENCE † describes admirably both the intention and results of such applications:

" Haud similis virgo est virginum nostrarum quas matres
student;
Demissis humeris esse vincto pectore ut graciles sient;
Si qua est habitior paulo, pugilem esse aiunt; deducunt cibum.
Tametsi bona est natura, reddunt curatura junceas; itaque ergo
amantur."

But TERENCE is well known to have borrowed freely from the Greek dramatists, and chiefly to have followed and imitated MENANDER, some of whose comedies he translated literally: it is possible, therefore, that the observation in the text may not have been meant to be applied to the Romans but to the Greeks.

It is evident, however, that a part of the deleterious and injurious effects arising from the use of corsets, has been done away with, for I presume that they are not now worn by infants, nor applied, so far as I know, with the same views as in ancient times; the object which is now most aimed at, seems to be the tightening the waist, and the giving to it a small, delicate, and roundish form. In no way, however,

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* EUN. Act 2. scen. 3.

can compression by means of corsets be applied to the frame, without more or less injuring the general health.* A question which is of some moment to be here discussed, is, Whether or not the moderate use of corsets could be discontinued without an increase in the number of cases of distorted spine? For however paradoxical it may seem, and contrary to the received notions of the profession, and of others, I am well convinced, that, until the education of females be thoroughly altered,—until a greater latitude of exercise and amusement be permitted them, —until they are allowed the unrestrained exercise of the muscles of the whole body, and be no longer compelled to sit erect six, eight, or even ten hours daily, we can never hope for a diminution in number of cases of distortion, nor can the discontinuance of corsets be recommended. They give a degree of support to the body during the tedious sedentary hours to which females in civilized life are condemned. But if, instead of resorting to them in early years, the parent, when he perceives that his child can no longer retain the body erect during ten or twelve successive hours daily, (passed either at school, or in equally sedentary employments at home), will put an immediate stop to so erroneous a system of education,

* Every anatomist must have seen some of the effects of tight corsets on the ribs, and even on the surface of the liver.

and, instead of employing the mechanical supports of corsets and machinery, will permit the sufferer to take that healthy active exercise and amusement, alternating with repose, which nature intended, he will then have traced the causes of deformity to their source, and no longer impute to Nature that which is due only to the prejudices and errors of man; he will no longer entertain the false and dangerous hypothesis, that Nature had given to the human race a form it cannot maintain, unless aided by the wretched machinery of clumsy mechanics. *

In thus discussing the subject of the application of corsets to the female form, I trust I have not met it with that declamation which often, proceeding on unsound principles, may be immediately refuted by an appeal to some well known facts. I firmly believe, that the employment of corsets, moderately tight, during school hours, and other sedentary employments, is beneficial, and tends greatly to relieve the muscles of their load; at all other times it must be extremely hurtful, by compressing these muscles and causing them to waste, and thus, though very

* Corsets are so universal that they have almost become an essential part of the female dress; nevertheless, they are a species of machinery, and I fear, that, very generally, the materials of which they are made, render them little inferior in all their good or bad qualities to the "machines for distorted spines."

indirectly, contributing to distort the body *. Bnt they have no direct influence of this sort; and all the declamation of the profession merely tends to its discredit, as being contrary to well known matter of fact. For example, when it is said, that "females who do not use corsets are generally the most upright in form," an effect is mistaken for a cause; the corsets were not required, and therefore, were not used.

The really injurious effects of corsets over the female form, are best exemplified by the wasting and destruction of the muscles of the arms or limbs from the application of tight bandages. It requires but little reflection to apply such cases to those of compression of the chest by tight corsets; the results must be in a great degree analogous.

CHAPTER IV.

ON THE TREATMENT OF THE LATERAL CURVATURE.

PALFIN, an author of little fame, but of great good sense, says, "when, from an internal or external cause,

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* The most casual observer must have remarked, that the muscles of the spine in females who use tight corsets, are never

the spine is incurvated forwards or backwards, or to either side, there arises a hump quite incurable, *when perfectly established*, and all the efforts of *quacks* can only augment the evil, or give origin to others still worse." Now, the assertion of PALFIN is undeniably true, and hence the necessity of early attending to the physical education of youth; a part of education which we may safely venture to assert, is never thought of by the parent.

Scarcely has the infantile age passed, when the child is forced to sit upright on a chair, or what is still worse, on a bench; soon the education of the mind becomes more important; the school-hours are therefore prolonged, and the studies often become oppressive, and, at all times, though overcome with fatigue, and with the harassing exertion of maintaining the trunk erect during twelve or fourteen hours daily, he is denied the indulgence of reclining during any part of the day, so as to give a few minutes rest to the muscles of the spine. The education of the female is, generally speaking, worse; the confinement at school-hours and needle-work more prolonged; the restraints on a free exercise of the muscles more se-

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for a moment relaxed by bending the body forwards, which, with them, is a movement that cannot be performed; a female using stiff corsets *can never stoop*.

vere. It would be tedious to dwell on details which must suggest themselves to every reflecting mind.

It seems reasonable that an infant should not be carried too long in his nurse's arms, and that, for some time after he has commenced walking, he should be permitted to run about perfectly unrestrained. When at school, if a boy, he should be encouraged to every exercise suited to his years. School-hours must not be prolonged ; because, whilst sitting on a bench, the back is totally without support, and the muscles of the spine are undergoing perpetual exertion in maintaining the trunk erect and equally balanced. It seems to me difficult to explain why prolonged hours of study should be enforced on children, when the attention of the adult can scarcely, under circumstances the most interesting, be fixed for so long a period as an hour, the usual duration of most academical lectures. Finally, with regard to the more active exercises, I presume that they ought to be left altogether to the inclination of the youths themselves, and no restraint whatever be put on them. I am, indeed, well aware that, in a few of the great schools of Germany and Prussia, regular gymnastic exercises form, or were wont to form, an essential part of the education of boys, and that the utmost attention is paid to the physical education of youth. But I object to this being carried so

far, because the exercises have too much the resemblance of a task; we cannot doubt that they would be considered as such by most boys. Now, pleasure itself becomes irksome, on its assuming the form of labour. These exercises, moreover, resemble rather a system of training for some great feat, than a healthy daily exercise, intended to relax the mind and invigorate the body; and, by being extended to all, weakly children might, in emulation, be urged to efforts beyond their strength and years.

Should (notwithstanding the adoption of the mode of education I have pointed out), a lateral curvature of the spine make its appearance, other measures must be adopted, according to its nature and extent. The use of an inclined plane for him to rest on during the day time, and when not engaged in active exercise, must be immediately resorted to; the relaxation given the muscles of the spine ought to be frequent, and his bed so constructed as to prevent him deviating from the absolutely straight position during sleep. When a-foot, he must be actively exercised in running, rowing and pitching a light iron-bar, with either hand alternately; balancing himself for hours on a narrow beam, raised a little from the ground, and on which he will accustom himself by degrees to walk with freedom; and he ought also, though with more cau-

tion, to learn the balancing a light weight, such as a small basket, on his head. These exercises he will continue for several hours during the day, but it must constantly be kept in mind, that, when at rest, the only admissible position is a nearly recumbent one. Should it appear on examination, that one side of the body has a considerable predominance in the bulk of the muscles over the other, it may be found necessary to condemn the more powerful extremity to a total inactivity for many months. Thus, if the right arm and shoulder be considerably stronger than the left, it ought to be tied up for a longer or shorter period. I have known a practitioner of great eminence, direct, under such circumstances, the left arm to be tied up. Such extraordinary mistakes originate in a want of clear physiological ideas. The early physical education of females will not differ much from that of boys; their exercises will of course be of a less robust nature. The frequent use of skipping-ropes, and the very elegant game of battledore, ought perhaps to be much practised by them. The game may be played with the left hand, which will give strength and additional development to the whole left side; parents and guardians will of course adapt the exercise to the sex.

Observations on the application of Machinery to rectify Spinal deformity.

It must be allowed, that the question of applying machinery to the human frame, either with a view of rectifying or of preventing deformities, has been met by the profession rather by declamation, than by fair argument. Many exclaim in a strain of the most violent invective against every form of machine proposed to rectify a distorted spine, and yet seem altogether unable to offer real and solid objections to their use; whilst others, after having inveighed against their application for half a century, suddenly adopt their unlimited use. It seems to me much more candid and honourable to avow, (as many surgeons placed at the very head of the profession have most certainly done,) that they do not very clearly understand the nature of the lateral curvature, and unhesitatingly hand over the patient to an instrument-maker.

Machinery (of which a vast variety has been submitted to the public), has been applied, I apprehend, to the human frame, for the purpose of rectifying or preventing spinal deformity, chiefly with the following indications.

1*mo*, To enable the individual to maintain the trunk erect during the day, and so to dispense with a recumbent position.

2do, To relieve the spinal column of the weight of the head, and trunk, and arms.

3tio, By maintaining a constant pressure on those parts of the body, such as the scapulæ and ribs, which are forced out of their natural position (merely by the distortion of the spine), to reduce them to their original places.

I. I have already explained at great length, that the unnatural and forced habit of maintaining the trunk so long erect, is the great cause of most cases of lateral curvature, and hence machinery, inasmuch as it enables this pernicious system of education to be continued, is positively hurtful. When applied, it completely prevents the patient from taking the healthy exercise, which, alternating with repose in a recumbent position, can alone rectify the deformity, and secure a permanent upright form. Finally, it exercises a pressure on the muscles of the trunk, which is demonstrably injurious.

II. Were we to value machinery, according as it relieves the spinal column of the weight of the head and trunk, we should hold very cheap all modern inventions compared with those of former times. Contrast, for example, the altogether inadequate machine now in such general use, and which, though

made by a London mechanic of the first reputation, and warmly recommended by surgeons of the greatest eminence, is actually the most inefficient apparatus I have ever seen. Contrast this machine, with the Hinckly collar, the Chester collar *, or any of those tremendous applications of former days, and we shall immediately perceive the vast superiority of the latter. In these the spinal column is, at least, relieved of the weight of the head, and in the construction of them, there is, at least, some regard shewn to anatomical principles. In the construction of the modern machine, the object held in view, seems chiefly to destroy the muscles of the spine and the form of the thorax by pressure, for the machines are evidently constructed on this principle.

But if the use of machinery be merely to relieve the spinal column of the weight of the head and trunk, I suggest, as a much easier mode of doing so, the allowing the sufferer to lie down when fatigued,

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* I may remark, that the treatment of lateral curvature, described under the name of the Chester Plan, seems of very ancient date. It is distinctly described by Glisson and Mayow, in a work published as early as 1671. The "plan" is quite unparalleled, both as it regards the danger to which it exposes the patient, and its total inadequacy to effect the end proposed.

and thus relieve, in the mode Nature intended, the over-exerted muscles of the spine.

III. Of all the enormities practised in this branch of the profession, that of applying pressure to the projecting scapulæ and ribs, in order to reduce them to their original position, is the greatest. The merest tyro in anatomy knows, or ought to know, that all such projections and depressions are simply the effects of a distorted spine, and that they can in no way be rectified, but by giving to that organ its correct perpendicular form. The machine, in general use, is also provided with proper instruments of pressure, without which, indeed, the extraordinary errors displayed in its construction, would have been incomplete!

A question then arises, Shall the application of machinery be entirely discontinued?—and in all cases?—perhaps not: there seem to me cases in which the employment of machinery, constructed on physiological principles, and made under the superintendance of the surgeon, may be of service; but it is constantly to be borne in mind, that these are to be uniformly laid aside during the hours devoted to active exercise and to sleep. Machinery can be useful only when the person afflicted is a female, for when the deformity attacks the other sex, exercises

of the most robust and active nature may be resorted to, so as not only to check the progress, but actually rectify the curvature, provided this be not already established. In females, on the contrary, whose habits of life must always, to a great degree, be sedentary, no such robust exercises can be resorted to, and I doubt extremely if that of dancing be so useful as some have supposed. I feel inclined, therefore, to propose the application of machinery, at those hours when recumbent position is inadmissible, *i. e.* during school-hours, or whilst engaged at needle-work ; but above all, I strongly urge the frequent exercise of walking, rendered agreeable by the amusing pursuits of Botany, than which a more delightful recreation cannot be offered to the human mind. I need hardly add, that the use of corsets ought, if possible, to be entirely discontinued.

Such are the means I have ventured to recommend for the treatment and prevention of spinal deformity; various other methods have been proposed, some of which are harmless, others extremely injurious. Authors of the highest respectability assure us *, that they have seen cases in which caustic issues were resorted to for the cure of lateral

curvature of the spine! I fear it is but too true that such mistakes are common. I have myself witnessed a case in which the unhappy sufferer, (a middle-aged woman in respectable circumstances in life) was treated for an enlarged spleen for more than three years; the symptoms being chiefly dyspeptic, with occasional attacks of dyspnœa. The attending practitioners fancied they discovered an enormously swelled spleen, which proved on dissection to be merely a lateral curvature of the spine! The abdominal and other viscera were perfectly healthy.

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* Shaw.

FINIS.