COULSON
ON THE
CHEST & SPINE

2ND EDITION.

Arthur William English.

William English
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ON

DEFORMITIES OF THE CHEST AND SPINE.

ON

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OF

THE CHEST AND SPINE.

ILLUSTRATED BY PLATES.

BY WILLIAM COULSON,

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TO THE

FIRST EDITION.

The deformities of the chest, owing to their universality, are of vast public interest, and afford an extensive field for pathological investigation; for, by whatever cause the natural dimensions of that cavity become altered, whether from mechanical compression, the deformities which form the subject of this little work, disease of the spine, or other causes, the natural action of the organs contained within it must be more or less deranged, and the health of the individual ultimately affected.

My present observations do not relate to those deformities of the chest which are consequent on affections of the lungs, or of the spinal column, but to those primary derangements, which are so deeply interesting, especially in early life, and by which the spine and the contents of the chest are secondarily affected. My object has been to treat the subject as simply and briefly as possible.

In a paper which was published some time ago in one of the Medical Journals, and which was afterwards printed in a separate form, I described the deformities which form the subject of the following pages. The confirmation which my views have received from those practitioners who have attended to the subject, as well as from my own subsequent experience, have induced me to lay my observations before the profession in their present form.

William Coulson.

2, Frederick Place, Old Jewry;
June, 1836.

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TO THE

SECOND EDITION.

By the sale of the first impression, I am enabled to lay before the public a second and greatly enlarged edition of this work. The additional matter regards the structure of the chest and spine, their deformities, the exercises and even the dress best calculated to prevent these. Camper, the celebrated Dutch anatomist, wrote a masterly essay on the best formation of a shoe; Soemmering has given in his work a chapter on the construction of corsets; and it would have been an unpardonable affectation, if, in such a treatise as this, pointing out the evils arising from the abuse of stays, I had hesitated to consider the proper construction of this article of dress as intimately connected with the prevention of deformity or the cure of disease. A chapter is also added on lateral curvature of the spine.

I here beg to make the general acknowledgment that I have endeavoured to profit by whatever I could find elsewhere on the subject of the work. I have also, in its progress, sufficiently distinguished whatever observations I have deemed originally my own; and the latter, I hope, will not be found to bear, in number or value, a smaller proportion to the former than might have been expected in a work in which it is the writer's object to point out a more natural, simple and effectual method of treating the deformities which have long attracted the attention of surgical writers.

W. C.

January, 1837.

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SECTION XVII.

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DEFORMITIES OF THE CHEST.

This subject has always been one of great interest, and that interest has increased of late years owing to the prevalent modes of dress—the pressure of stays, busks, &c., by which some of these deformities are caused or increased.

With the *prevention* of deformity, every enlightened reader should in some degree be acquainted; and, in the present case, there is nothing to prevent this. With this view, I have drawn up the Sections which immediately follow, on the Structure and Functions of the parts forming the chest.

SECTION I.

STRUCTURE OF THE CHEST.

All who have seen a skeleton know that the chest forms a cavity protected by a frame-work of bones. These are, first, the back-bone (consisting of vertebræ, or short bones jointed to one another), which sustains the whole upper part of the trunk, as well as the head; secondly, the breast-bone, about seven or eight inches long, and composed of three pieces; and, thirdly, the ribs, of which there are generally twenty-four.

The bones of the spine which enter into the formation of the chest, and to which the ribs are attached behind, are twelve in number; between each, there is an elastic substance called intervertebral cartilage; and the whole are firmly joined together by means of strong ligaments.

As to general form, each bone increases in depth, breadth, thickness and convexity, as they descend, as does also the substance placed between them: hence the column is of a conical shape.

As to direction, the column they form is somewhat bent; its chief convexity projecting behind, and its greatest concavity being almost opposite to the lower portion of the breast-bone.

The sternum, composed of three distinct portions, forms the anterior boundary of the chest. Its position is oblique; the upper part being nearest the spine, and the lower part being more distant from it. It is slightly convex in front, and concave towards the chest. Its margins are thick, and marked by depressions for the reception of the cartilages of the ribs.

The twelve ribs on each side are all fixed to the back-bone behind, by a double connexion; first to the bodies of two adjoining vertebræ, and then to a lateral process or projection from the lower of each pair, thus effecting a very steady joint, and yet having the necessary freedom of motion.

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Seven of the ribs, the seven uppermost, are also attached to the breast-bone before, and are therefore called true ribs; the eighth rib has its end turned up and rests on the seventh; the ninth rests in the same way on the eighth; but the tenth, eleventh, and twelfth, are not connected with one another in front.

The fore extremity of each rib consists not of bone, but of an elastic substance, called cartilage. The elasticity of this substance, combined with the oblique position of the ribs, constitutes a beautiful provision, in consequence of which the chest enlarges and contracts in volume to afford free play to the lungs; thus constituting, as has been observed, a structure which solves, in the most perfect manner, the difficult mechanical problem of forming a cavity with solid exterior, which shall yet be capable of dilating and contracting itself.

Each pair of corresponding ribs may accordingly be considered as forming a hoop, which hangs obliquely down from the place of attachment behind, so that when the fore part of all the hoops is lifted by the muscles, the cavity of the chest is enlarged.

To the nature of the substance between the bodies of the vertebræ, it is principally owing that the cavity of the chest, as well as the remainder of the spine, is shortened by long standing, and is, on the contrary, lengthened by long lying on the back.

This intevertebral substance is lessened, either by the weight of the body which presses on the vertebræ in the erect position, or by its moisture being absorbed: hence the height of the spine altogether is remarkably shortened, particularly in young persons. In the horizontal posture, on the contrary, this substance regains its elasticity, and the natural length of the spine is restored. Thus in youth the body is evidently smaller of an evening and longer of a morning.

To the nature of this substance it is owing that the vertebræ are bent most forwards and backwards, and less sidewards (that is, right and left) and in every possible intermediate direction.

Often must the spine deviate from its straight direction in order to bring the body into a perpendicular line: for instance, if one rests more on one foot than the other, and the weight of the body above is carried to one side, the vertebræ must bend, and the curve take place in the opposite direction. At the same time, the ribs will be pressed together on the side which has the foot on the ground; while on the other side they are removed from one another: consequently the chest is contracted on the side where the ribs are brought closer to one another, and widened on the side where they are separated.

Further, the change of the chest is remarkable in turning, bending forwards, backwards, to the right or to the left, in so far as it is dependent upon the substance between the vertebræ, the direction of the spinous processes, and the situation of the ribs.

Throughout, the change is greater below than above; and, in bending forwards and backwards, to the right and to the left, this change is there most remarkable on account of the increasing thickness of the intervertebral substance.

SECTION II.

CAVITY OF THE CHEST.

Owing to the arrangement of the bones which have just been described, the chest assumes a conical shape, with the narrowest part above and the widest portion below. It is flat before and behind, and considerably convex on its sides.

On a horizontal section of this cone, the largest portion would fall in the region of the seventh or eighth rib. Consequently, in the compression or expansion of this part, the most remarkable change must follow in relation to the increase or decrease of its contents.

This change in the size of the cavity of the chest, occurs when the ribs are drawn upwards in inspiration: so that the first ascends only a little; the second follows it; the third, on account of its greater mobility, is drawn much easier against the second than the second is against the first; and so on to the last rib. At the same time, the breast-bone is pushed upwards, and removed from the spine. This alternate widening and narrowing of the chest may, in some degree, be compared to the opening and closing of a bellows.

Both, however, in the expansion and compression of the chest, the change in the cavity is much less considerable behind than before, because the ribs are only slightly moveable at their posterior connection, whilst their anterior extremities, together with the breast-bone, are at once considerably elevated and removed from the spine.

On the whole, the cavity of the chest appears tolerably symmetrical, and consequently the right half corresponds with the left; but this must not always be understood too strictly, as we often find one half stronger and more capacious than the other without any disease or malformation having occurred: in fact, a strictly symmetrical chest is perhaps never seen.

SECTION III.

CONNECTION OF THE CHEST WITH THE ARMS.

The arms are so applied to the chest, that the angle between the collar-bone and the shoulder blade (below which the arm hangs down) completes the upper part of that portion of the body.

The collar-bones come so near to each other, that they are connected with one another by a short firm ligament, and, at the same time, are joined to the upper portion of the breast-bone.

The shoulder blades, covered with muscles, move with their hollow surfaces on the convexity of the chest, and play freely and easily between the first and ninth ribs, upwards and downwards, and also between the processes of the vertebræ and the convexity of the ribs, inwards and outwards, and in every intermediate direction. Hence it happens that no change in the form can take place where these bones lie, without, at the same time, their being brought out of their situation: for instance, if the fourth and fifth ribs are pushed upwards at this spot, and the second, third, fourth, fifth, and sixth ribs are pushed backwards, the shoulder blades must naturally follow; and, on the contrary, a sufficient pressure on the shoulder blades ultimately changes the form of the ribs, and with it the cavity of the chest.

The muscles which lie between the ribs, the collar bone, shoulder blades and arm, by turns move the upper arm against the chest, and the chest against the upper arm. Hence an expansion or compression of the chest draws the upper part of the arm out of its place; and, on the other hand, the shoulder, if often and powerfully moved, gradually draws the upper part of the chest; and we accordingly find that hair-dressers who use their comb only with one hand, and keep the other quiet against the hair, raise in time the chest by the continued action of the muscles of the shoulder, so that one of the shoulder blades must lie higher: this is termed in common life a high shoulder.

It is well known that one arm is longer, thicker, heavier, and stronger than the other. Hence the action of this arm, on one side of the chest, is stronger than the action of the weak arm on the other side.

SECTION IV.

CONTENTS OF THE CHEST.

THE lungs, which beyond comparison occupy the greatest space, the heart, the origins of the vessels, the veins, the absorbents with their glands, numerous nerves, the windpipe and the gullet, the thymus gland, besides a good deal of fat which acts as a cushion to the ribs, or lies over the heart, constitute these.

Of the action of the greater of these organs, and those most concerned in this discussion, Paley very well observes:—

"The reciprocal enlargement and contraction of the chest, to allow for the play of the lungs, depends upon a simple yet beautiful mechanical contrivance, referable to the structure of the bones which enclose it. The ribs are articulated to the back-bone, or rather to its side projections, obliquely: that is, in their natural position they bend or slope from the place of articulation downwards. But the basis upon which they rest at this end being fixed, the consequence of the obliquity, or the inclination downwards, is, that when they come to move, whatever pulls the ribs upwards, necessarily, at the same time, draws them out; and that, whilst the ribs are brought to a right angle with the spine behind, the sternum, or part of the chest, to which they are attached in front, is thrust forward. The simple action, therefore, of the elevating muscles does the business; whereas, if the ribs had been articulated with the bodies of the vertebræ at right angles, the cavity of the thorax would never have been further enlarged by a change of their position. If each rib had been a rigid bone, articulated at both ends to fixed bases, the whole chest had been immoveable.

" Keil has observed that the breast-bone, in an easy inspiration, is thrust out one-tenth of an inch; and he calculates that this, added to what is gained to the space within the chest by the flattening or descent of the diaphragm, leaves room for forty-two cubic inches of air to enter at every drawing-in of the breath. When there is a necessity for a deeper and more laborious inspiration, the enlargement of the capacity of the chest may be so increased by effort, as that the lungs may be distended with seventy or a hundred such cubic inches.* 'The thorax,' says Schelhammer, 'forms a kind of bellows, such as never have been, nor probably will be, made by any artificer.' "

To this Paley's recent commentators add:—" We have another proof in the natural body of the necessity for elasticity. We before observed that a child, rash and unsteady, is liable to a thousand accidents to which those of maturer years are not exposed. Now, during all the active years of life, the whole textures of the frame, and especially of the thorax, both bone and cartilage, possess elasticity corresponding with

* Anat., p. 229.

the hazards to which youth is subject: in short, the child falls and suffers no injury, when an old man striking his ribs upon the corner of the table has them fractured.

"But let us observe the effect of elasticity in the act of inspiration. The ribs do not move to accommodate themselves to the motions of the lungs, but by moving draw the lungs after them, and cause their expansion. The interstices of the ribs being filled up, and a septum closing the thorax below, the enlargement of the cavity permits the lungs to be expanded by the weight of the atmosphere, the air entering them through the windpipe. We at once see the importance of the motions of the ribs, for the expansion of the chest and the play of the lungs.

"Paley has shown that the oblique position of the ribs is necessary to inspiration, and that, by the rising of the anterior part of the rib, the breast bone is thrust forward, and the cavity enlarged. But the rib has a double motion. It has a motion on its own axis.

Suppose a line drawn through the two extremities of a rib, which would represent the string of a bow; that string is stationary, while the bow representing the rib revolves; thus the rib, by having its anterior extremity depressed and revolving as it is raised, enlarges the transverse diameter of the thorax as well as the anterior diameter. In this action the cartilage in front is twisted; and the torsion of this elastic matter affects the muscular action in the manner following:—

"We have understood the act of respiration to be essential to life, and that the expansion of the chest dilates the lungs, gives freedom of circulation through them, and decarbonises the blood. It is interesting, therefore, to see how a property of dead matter, elasticity, becomes a guard upon life. Every one must feel that it is easier to expire the air than to inspire it: and if we can imagine a person fainting, or in any mode in danger of death (the very word expiring, in its common sense, implies that the last act of life is the expulsion of the breath), if the elasticity tends to enlarge the chest, it must tend to the preservation of life, by restoring the circulation through the lungs.

"This is exactly what happens from the elastic structure of the whole compages of the chest. The elastic property preserves the chest in a middle state. The muscles of inspiration act against the elasticity: the muscles of expiration also act against it: the elasticity tends, therefore, to maintain an intermediate state of dilatation of the thorax, and accordingly the lungs are preserved in a condition to perform their functions for a certain period at least, after the vital actions would have ceased through the muscles, had there been no such structure."

It is clear that no change can take place in the size of the chest, without, at the same time, the size of the belly and pelvis being altered; and, on the other hand, it is equally clear that no change can take place in the size of the belly and pelvis, without, at the same time, affecting that of the chest.

Lastly, as the arteries and veins of the chest and abdomen stand in evident connexion with those of the head, so also can no considerable change in the size of these cavities take place, without the head being at the same time affected.

SECTION V.

DIFFERENCE BETWEEN THE MALE AND FEMALE CHEST.

I HAVE hitherto considered the properties of the chest so far as they are common to both sexes. All the bones of the female body, however, and consequently the bones of the chest, when compared with those of the male, are smaller, weaker, smoother, of later development, and of finer texture.

The female vertebræ follow more readily than the male the change in the capacity of the chest, on account of their greater curves in their whole length, the stronger projection of their processes backwards, and their larger openings for the spinal marrow.

The female ribs yield on less pressure than the male on account of their thinness, their smaller arch, their thinner edges, their stronger projection, their greater twist, but especially on account of their longer and weaker cartilages, their greater elasticity, their striking gradual decrease in size, and their greater mobility.

The female sternum suffers more readily than the male considerable change, as it is shorter and lies higher.

On the whole, the female chest appears more of a barrel-shape than the male; the spinous processes do not project so far behind; the sternum is shorter; its under portion is more cartilaginous; the triangular space between the cartilages of the ribs is more pointed; the whole chest is longer, rounder, or slenderer, and lies higher above the hanch bones than that of the male, while its upper part is also more roomy *.

From all this it follows, that the female chest is less capable of resisting force than the male, which being

* The opening for the spinal marrow is also larger, and the lateral portions of the vertebræ are more hollowed.

nearer to the haunch bones, and having long, strong and less yielding ribs, vertebræ with long projecting processes, and a longer, stronger and firmer sternum, is almost safe from any force of expansion or compression, which indeed is never in the common course of nature so considerable as in the female during pregnancy, for the chest must then widen, and again collapse after the birth of the child.

The chest in females admits, then, with ease, of change during pregnancy; the bony and cartilaginous structure yields to the pressure of the viscera, which are pushed up by the expanding uterus with great facility, as the ribs are weaker, flatter, provided with longer cartilages and more moveable, as the false ribs become gradually shorter, as the vertebræ are higher and narrow, and as consequently the whole column is more slender.

SECTION VI.

MORE DETAILED AND MINUTE DESCRIPTION OF THE CHEST.

(*Addressed to those readers who desire thoroughly to understand its organisation.*)

I HAVE now to acknowledge the great favour conferred upon me by Dr. Southwood Smith, as the author of the "Philosophy of Health," and by Mr. Knight, as the publisher of that excellent work, in permitting me, in this section, to use such of its woodcuts and descriptions as are necessary to the view I am now desirous of laying before the reader.

The chest or thorax extends above from the first bone or vertebra of the neck, by which it is connected with the head, to the midriff or diaphragm below, by which it is divided from the cavity of the belly or abdomen (fig. I. and XIV.). It consists partly of bones and partly of muscles; the osseous and the muscular portions being in nearly equal proportions. Both together form the walls of the cavity, in which are placed the central organs of circulation and respiration (fig. XIII. 2, 5).

The chief boundaries of the cavity of the thorax before, behind, and at the sides, are osseous (fig. I.); being formed before, by the breast-bone or sternum (fig. I. 6); behind, by the back-bone or spinal column (fig. I. 2. 4); and at the sides, by the ribs (fig. I. 7). Below, the boundary is muscular, being formed by the diaphragm (fig. XIV. 2); while above, the thorax is so much contracted (fig. 1.), that there is merely a space left for the passage of certain parts which will be noticed immediately.

The figure of the thorax is that of a cone, the apex being above (fig. I.); and through the aperture which is there left, pass the tubes that lead to the lungs and stomach, as well as the great blood-vessels that go to and from the heart (fig. XIII.). The base of the cone is slanting, being considerably shorter before than behind, like an oblique section of the cone (fig. I.).

The osseous portion of the walls of the thorax is formed behind by the spinal column, a range of bones common indeed to all the divisions of the trunk; for it constitutes alike the posterior boundary of the thorax, abdomen, and pelvis (fig. I. 2, 4, 6). It is composed of thirty-six bones, twenty-four of which are separate, and movable on one another, and on this account are called true vertebræ (fig. I. 2, 4); but the other five, though separate at an early period of life, are subsequently united into a single solid piece, forming the posterior bone of the pelvis, and called the sacrum (fig. I. 5).

From above downwards, that is, from the first bone of the neck to the first bone of the sacrum, the separate bones forming the spinal column progressively increase in size; for this column is the chief support of the head and trunk, and their weight progressively augments to this point (fig. I. 2, 4).

It presents three curvatures (fig. I. 2, 4); the convexity of that of the neck being forwards, that of the back backwards, and that of the loins again forwards (fig. I. 2, 4).

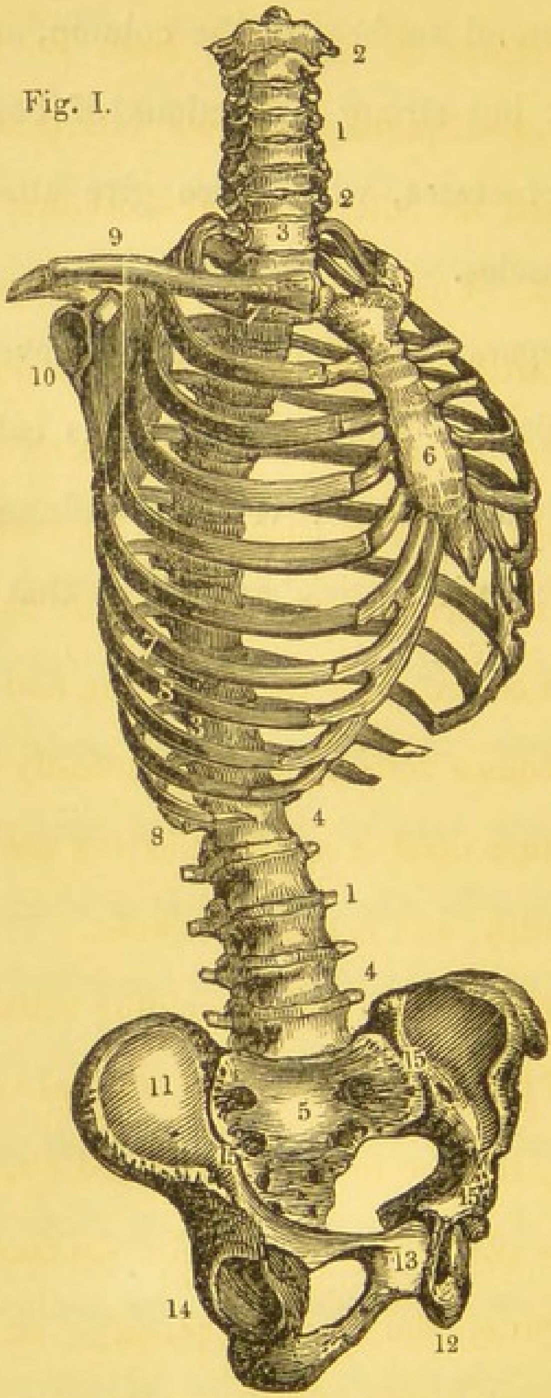
From the posterior surface of the column, which is everywhere irregular and rough, are found, along the median line, in regular series, strong and pointed projections of bone, which from their resemblance to elongated spines, are called spinous processes, and have given name to the whole chain of bones. These processes afford fixed points for the action of powerful muscles.

Extending the whole length of the column, from the base of the skull to the sacrum, on each side of the spinous processes, are deep excavations, which are filled up with the powerful muscles that maintain the trunk of the body erect.

On the lateral surfaces of the column, are likewise found short but strong projections of bone, termed transverse processes, which also give attachment to powerful muscles.

As the separate bones of the series have a kind of turning motion on each other, each is called a vertebra, and the name of vertebral column is often given to the entire series, as well as that of spinal column.

Fig. I.

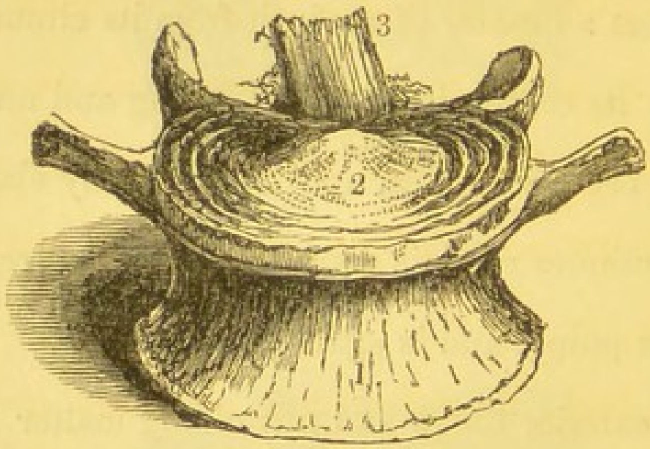


Bones of the trunk :—1, spinal column ; 2, the seven cervical vertebræ ; 3, the twelve dorsal vertebræ ; 4, the five lumbar vertebræ ; 5, the sacrum ; 6, the sternum ; 7, the true ribs ; 8, the false ribs ; 9, the clavicle ; 10, the scapula ; 11, the ileum ; 12, the ischium ; 13, the pubes ; 14, the acetabulum ; 15, the brim of the pelvis.

Each vertebra is separated from its fellow by a substance of a peculiar nature interposed between them, termed the intervertebral substance (figs. II. 2, and III. 2). This substance partakes partly of the nature of cartilage, and partly of that of ligament. It is composed of concentric plates, formed of oblique fibres, which intersect each other in every direction. For about a quarter of an inch from its circumference, towards its centre, it is tough, strong and unyielding; it then becomes softer, and is manifestly elastic; and so it continues until it approaches the centre, when it becomes pulpy, and is again inelastic.

The exterior tough and unyielding matter is for the firmness of the connexion of the several vertebræ with each other, and the interior softer and elastic matter is for the easy play of the vertebræ upon each other; the one for security, the other for pliancy; and the adjustment of the one to the other is such as to combine these properties in a perfect manner. The quantity of the unyielding substance is not so great as to produce rigidity; the quantity of the elastic substance is not so great as to occasion insecurity. The firm union of its solid matter renders the entire column strong; the aggregate elasticity of its softer substance renders it springy.

Fig. II.



1, One of the lumbar vertebræ; 2, intervertebral substance; 3, a portion of the spinal cord in its canal.

The column is not constructed in such a manner as to admit of an equal degree of motion in every part of it. Every thing is contrived to give to that portion which belongs to the neck freedom of motion, and, on the contrary, to render that portion which belongs to the back comparatively fixed.

In the neck, the mechanism of the articulating processes is such as to admit of an equal degree of sliding motion forwards, backwards, and from side to side, together with a turning motion of one bone upon another; and the intervertebral substance between the several vertebræ is thick. In consequence of this mechanism, we can touch the breast with the chin, the back with the hind head, and the shoulders with the ear, while we can make the head describe more than a semicircle.

In the back, the articulating processes are so connected as to prevent the possibility of any motion, either forwards or backwards, or any turning of one vertebra upon another; while the intervertebral substance is comparatively thin (fig. I. 2, 4). That portion of the column which belongs to the back is intended to afford a fixed support for the ribs, a support which is indispensable to their action in the function of respiration.

In the loins, the articulating processes are so connected as to admit of a considerable degree of motion in the horizontal direction, and from side to side, and the intervertebral substance here progressively increases in thickness to the point at which the upper portion of the column is united to the sacrum (fig. I. 2, 4), where the degree of motion is extensive.

The spinal column performs several different, and apparently incompatible, offices.

First, it affords a support and buttress to other bones. It sustains the head; it is a buttress to the ribs (fig. I. 7); through the sternum and the ribs it is also a buttress to the superior, and through the pelvis, to the lower, extremities.

Secondly, it affords a support to powerful muscles, partly to those that maintain the trunk in the erect posture against the force of gravitation, and partly to those that act upon the superior and inferior extremities in the varied, energetic, and sometimes long-continued, movements they execute.

Thirdly, it forms one of the boundaries of the great cavities that contain the chief organs of life. To the support and protection of those organs it is especially adapted: hence the surface in immediate contact with them is even and smooth; hence its different curvatures, convexities and concavities, have all reference to their accommodation. In the neck, it is convex (fig. I. 2), in order to afford a firm support to the œsophagus, the wind-pipe, the aorta, and the great trunks of the venous system (fig. XIII. 3, 4). In the back, it is concave, in order to enlarge the space for the dilatation of the lungs in the act of inspiration (figs. I. 3, and XIII. 5). In the loins, it is convex, in order to sustain and fix the loose and floating viscera of the abdomen (figs. I. 4, and XIII. 6, 7, 8, 9). In the pelvis, it is concave, in order to enlarge the space for lodging the numerous, delicate and highly important, organs contained in that cavity (fig. I. 5).

Fourthly, it forms the osseous walls of a canal (fig. II. 3) for the lodgment and protection of the soft and tender substance of the spinal cord, one of the great central masses of the nervous system, the seat of the *animal* * life.

Fifthly, it affords, in its osseous walls, secure apertures for the passage of the spinal nerves, by which impressions are transmitted from the organs to the spinal cord and brain, in the functions of sensation; and from the spinal cord and brain to the organs, in the function of volition.

For the due performance of these offices, it is indispensable that this column should be firm, rigid, strong, and yet, to a certain extent, readily flexible in every direction.—By means of the ring of compact bone, which forms so large a part of its body, its strength is effected; and by means of its numerous separate

* According to the improper phraseology of Bichat.

pieces, exactly adjusted to each other, and dove-tailed into one another, an increase of strength is gained, such as it would not have been possible to communicate to a single solid piece. By the same mechanism, some degree of flexibility is also obtained; each separate bone yielding to some extent; which, though slight in a single bone, becomes considerable in the twenty-four.

The flexibility required, however, is much greater than could be obtained by this expedient alone. A rigid and immoveable pile of bones, in the position of the spinal column, on which all the other parts of the body rest, and to which they are directly or indirectly attached, would necessarily have rendered all its movements stiff and mechanical; and movement of every kind impossible, but in a given direction.

That the movements of the body may be easy, free and varied; that it may be possible to bring into play new and complex combinations of motion at any instant, with the rapidity of the changes of thought, at the command of the impulses of feeling, it is indispensable that the spinal column be flexible in every direction, forwards, backwards, and at the sides: it is equally indispensable that it be thus capable of yielding, without injuring the spinal cord, the spinal nerves, the thoracic and abdominal viscera, and the muscles of the trunk and extremities.

The degree in which it actually does possess this power of flexibility, and the extent to which, by the cultivation of it, it is sometimes actually brought, is exemplified in the positions and contortions of the posture-master and the tumbler.

This power is acquired by means of the intervertebral substance, the compressible and elastic matter interposed between the several vertebræ. So compressible is this substance, that the human body is half an inch shorter in the evening than in the morning, having lost by the exertions of the day so much of its stature; yet, so elastic is this matter, that the stature lost during the day is regained by the repose of the night.

The weight of the body pressing in all directions upon the spinal column—muscles, bones, cartilages, ligaments, membranes, with all their vessels and all the fluids contained in them—the weight of all these component parts of the head, trunk, and extremities, pressing, without the cessation of an instant, during all the hours of vigilance, upon the intervertebral substance, compresses it; but this weight, being taken off during the night by the recumbent posture of the body, the intervertebral substance, in consequence of its elasticity, regains its original bulk, and of course the spinal column its original length.

The flexibility acquired through the combined properties of compressibility and elasticity, is greatly increased by the action of the pulpy and inelastic matter in the centre of the intervertebral substance, this matter serving as a pivot to the vertebræ, and facilitating their motion on each other.

Its effect has been compared to that of a bladder partly filled with water, placed between two trenchers:

in this case, the approximation of the circumference of the two trenchers on one side, would instantly displace a portion of the water on that side, which would occupy the increasing space on the other, with the effect of facilitating, in every possible direction, the change of the position of the two trenchers in relation to each other. To this effect, however, it is indispensable that the matter immediately around this central pivot should be, not like itself, rigid and unyielding, but compressible and elastic.

It is an interesting fact, that since this illustration was suggested, it has been discovered that this very arrangement is actually adopted in the animal body. In certain animals, in the very centre of their intervertebral substance, there has been actually found a bag of water, with a substance immediately surrounding the bag, so exceedingly elastic, that when the bag is cut, the fluid contained in it is projected to the height of several feet, in a perpendicular stream.

But, besides securing freedom and extent of motion, the intervertebral substance serves still another purpose, which well deserves attention.

Firmness and strength are indispensable to the fundamental offices performed by the column; and, to endow it with these properties, we have seen that the external concentric layers of the intervertebral substance are very tough, and that they are attached to the bodies of the vertebræ, which are composed of dense and compact bone. But, than dense and compact bone, nothing can be conceived better calculated to receive and transmit a shock or jar, on the application of any degree of force to the column. Yet such force must necessarily be applied to it in every direction, from many points of the body, during almost every moment of the day; and, did it actually produce a corresponding shock, the consequence would be fatal: the spinal cord and brain would be inevitably killed; for the death of these tender and delicate substances may be produced by a violent jar, although not a particle of the substances themselves be touched. A blow on the head may destroy life instantaneously, by what is termed concussion; that is, by the communication of a shock to the brain through the bones of the cranium. The brain is then killed; but on careful examination of the cerebral substance after death, not the slightest morbid appearance can be detected: death is occasioned merely by the jar.

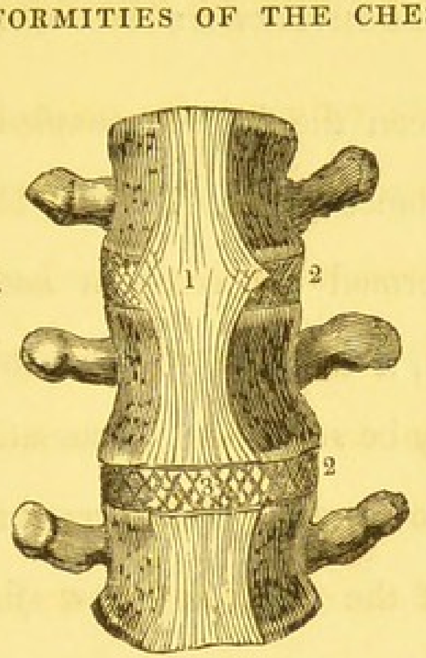
A special provision is made against this evil, in the the structure of the bones of the cranium, by the interposition between its two compact plates of the spongy substance called diploë; and this is sufficient to prevent mischief in ordinary cases.

A great degree of violence applied directly to the head is not common: when it occurs, it is accidental: thousands of people pass through life without ever having suffered from it on a single occasion: but every hour, in the ordinary movements of the body, and much more in the violent movements which it occasionally makes, a degree of force is applied to the spinal column, and through it transmitted to the head, such as, did it produce a proportionate shock, would inevitably and instantly destroy both spinal cord and brain.

The evil is obviated partly by the elastic, and partly by the non-elastic, properties of the matter interposed between the several layers of compact bone. By means of the elastic property of this matter, the head rests upon the summit of the column as upon a pliant spring, while the canal of the spinal cord remains secure and uninvaded. By means of the soft and pulpy portion of this matter, the vibrations excited in the compact bone are absorbed, point by point, as they are produced: as many layers of this soft and pulpy substance, so many points of absorption of the tremors excited in the compact bone—so many barriers against the possibility of the transmission of a shock to the delicate nervous substance.

Alike admirable is the mechanism by which the separate pieces of the column are joined together. If one of the bones were to slip off its corresponding bone, or to be displaced in any degree, incurable paralysis, followed ultimately by death, or instantaneous death, would happen; for pressure on the spinal cord, in a certain part of its course, is incompatible with the power of voluntary motion, and with the continuance of life for any protracted term; and, in another part of its course, with the maintenance of life beyond a few moments. To prevent such consequences, so great is the strength, so perfect the attachment, so unconquerable the resistance of that portion of the intervertebral substance which surrounds the edge of the bodies of the vertebræ, that it will allow the bone itself to give way rather than yield.

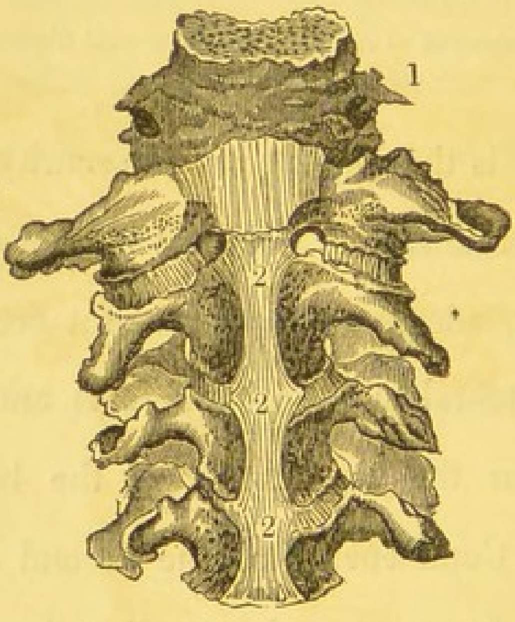
Fig. III.



1, Common anterior ligament; 2, intervertebral substance. The anterior ligament is removed to exhibit (3,) the crucial fibres passing over it.

Yet such is the importance of security to this portion of the frame, that it is not trusted to one expedient alone, adequate as that might seem. Besides the intervertebral substance, there is another distinct provision for the articulation of the bodies of the vertebræ. Commencing at the second cervical vertebra, in its fore part, and extending the whole length of the column to the sacrum, is a powerful ligament, composed of numerous distinct longitudinal fibres (fig. III.), which are particularly expanded over the intervals between the bones occupied by the inter-vertebral substance (fig. III. 1, and IV. 2, 2). This ligament is termed the common anterior vertebral, beneath which, if it be raised from the intervertebral substance, may be seen small decussating fibres, passing from the lower edge of the vertebra above, to the upper edge of the vertebra below (fig. III. 3), from which circumstance these fibres are termed crucial.

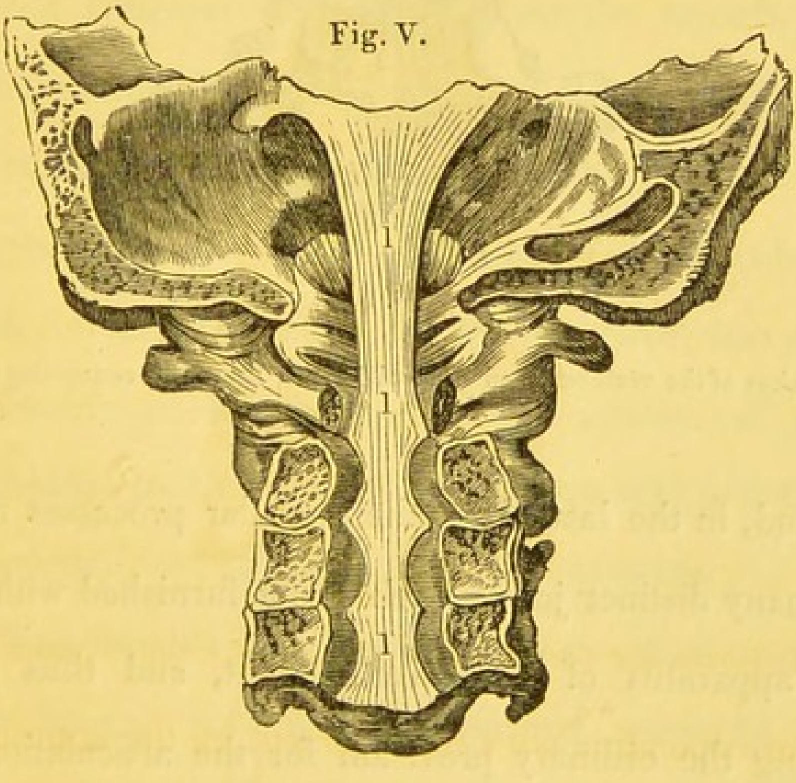
Fig. IV.



1, Portion of the occipital bone; 2, common anterior ligament.

Corresponding with the ligament on the anterior, is another on the posterior, part of the spine (fig. V. 1) which takes its origin from the great hole in the base of the skull, or foramen magnum (fig. V. 1); descends thence, within the vertebral canal, on the posterior surface of the bodies of the vertebræ (fig. V. 1), and extends to the sacrum. This ligament is termed the common posterior vertebral, which, besides adding to the strength of the union of the bodies of the vertebræ, prevents the column itself from being bent too much forward.

Fig. V.

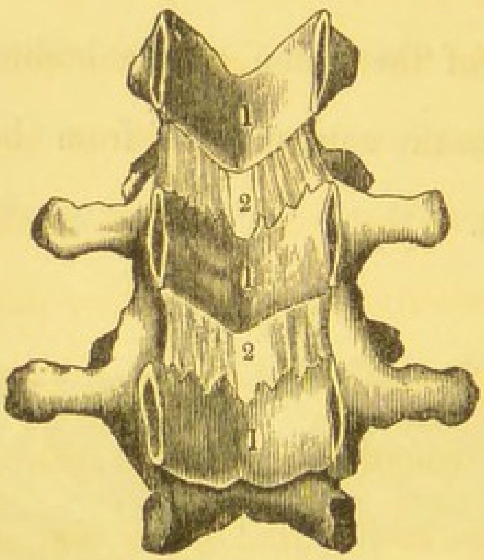


1, Posterior vertebral ligament.

Moreover, the bony arches of the vertebræ (fig. VI.

1) are connected by means of a substance partly ligamentous, and partly cartilaginous (fig. VI. 2), which, while it is extremely elastic, is capable of resisting an extraordinary degree of force.

Fig. VI.



1, Arches of the vertebræ seen from within; 2, ligaments connecting them.

And, in the last place, the articular processes form so many distinct joints, each being furnished with all the apparatus of a moveable joint, and thus possessing the ordinary provision for the articulation of bones, in addition to the whole of the foregoing securities.

"In the most extensive motion of which the spinal column is capable, that of flexion, the common anterior ligament is relaxed; the fore part of the intervertebral substance is compressed, and its back part stretched; while the common posterior ligament is in a state of extension. In the extension of the column, the state of the ligaments is reversed; those which were extended being in their turn relaxed, while the common anterior vertebral is now put upon the stretch. In the lateral inclination of the column, the intervertebral substance is compressed on that side to which the body is bent. In the rotatory motion of the column, which is very limited in all the vertebræ, but more particularly in the dorsal, in consequence of their attachment to the ribs, the intervertebral substance is contorted, as are likewise all the ligaments.

"The number and breadth of the attachments of these bones," says an accomplished anatomist and surgeon *, "their firm union by ligament, the strength

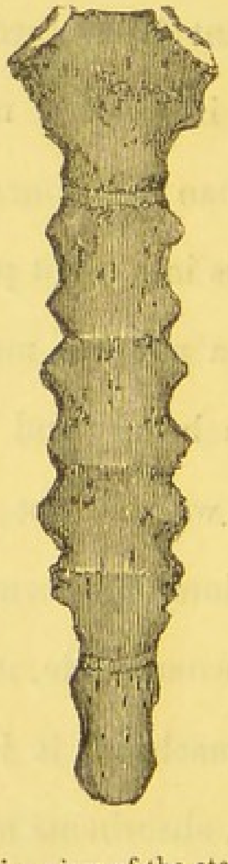
* Treatise on Ligaments, by Bransby B. Cooper, Esq.

of their muscles, the very inconsiderable degree of motion which exists between any two of them, and, lastly, the obliquity of their articular processes, especially in the dorsal and lumbar vertebræ, render dislocation of them, at least in these regions, impossible without fracture; and I much doubt whether dislocation, even of the cervical vertebræ, ever occurs without fracture, either through their bodies or their articular processes. The effects of each of these accidents would produce precisely the same injury to the spinal marrow, and symptoms of greater or less importance, according to the part of the spinal column that is injured. Death is the immediate consequence, if the injury be above the third cervical vertebra; the necessary paralysis of the parts to which the phrenic and intercostal nerves are distributed causing respiration instantly to cease. If the injury be sustained below the fourth cervical vertebra, the diaphragm is still capable of action, and dissolution is protracted. The symptoms, in fact, are less violent in proportion as the injury to the spinal marrow is further removed from the brain; but death is the inevitable consequence, and that, in every case, at no very distant period."

Thus the object of the construction of the spinal column being to combine extent and freedom of motion with strength, and it being necessary to the accomplishment of this object to build up the column of separate pieces of bone, the connecting substances by which the different bones are united are constituted and disposed in such a manner as to prove absolutely stronger than the bones themselves. Such is the structure of this important portion of the human body, considered as a piece of mere mechanism; but our conception of its beauty and perfection would be most inadequate, if we did not bear in mind that, while the spinal column performs offices so varied, and apparently so incompatible, it forms an integrant portion of a living machine; it is itself alive; every instant blood-vessels, absorbents and nerves, are nourishing, removing, renewing, and animating every part and particle of it.

The anterior boundary of the thorax is formed by the bone called the sternum, or the breast-bone, which is broad and thick at its upper, and thin and elongated at its lower, extremity (figs. I, 6, and VII), where it gives attachment to a cartilaginous appendix, which, being pointed and somewhat like a broad-sword, is called the ensiform cartilage.

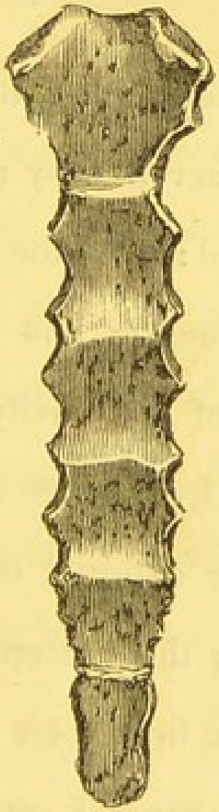
Fig. VII.



Anterior view of the sternum.

Its position is oblique, being near the vertebral column at the top, and distant from it at the bottom (fig. I, 6). Its margins are thick, and marked by seven depressions, for the reception of the cartilages of the seven true ribs (fig. VII). Its anterior surface is immediately subjacent to the skin, and gives attachment to powerful muscles which act on the superior extremities; its posterior surface is slightly hollowed, in order to enlarge the cavity of the thorax (fig. VIII).

Fig. VIII.



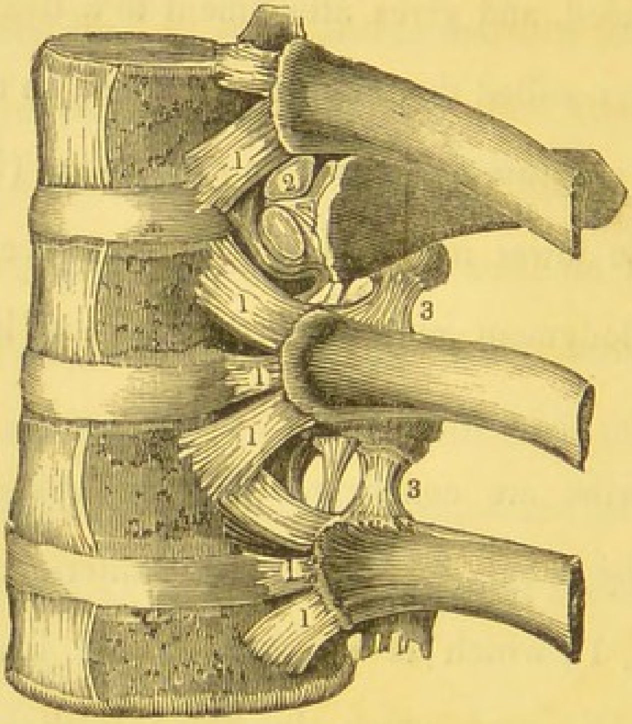
Posterior view of the sternum.

The thorax is bounded at the sides by the ribs, which extend like so many arches between the spinal column and the sternum (fig. I, 7, 8). They are in number twenty-four, twelve on each side, of which the seven upper are united to the sternum by cartilages, and are called true ribs (fig. I, 7): the cartilages of the remaining five are united with each other, and are not attached to the sternum; these are called false ribs (fig. I, 8): all of them are connected behind to the spinal column.

The ribs successively and considerably increase in length as far as the seventh, by which the cavity they encompass is enlarged: from the seventh they successively diminish in length, and the capacity of the corresponding part of the cavity is lessened. The direction of the ribs from above downwards is oblique (fig. I, 7, 8). Their external or anterior surface is convex (fig. I, 7, 8); their internal or posterior surface, concave: by the first, their strength is increased; by the second, the general cavity of the thorax is enlarged (fig. I, 7, 8). Their upper margin is smooth and rounded, and gives attachment to a double layer of muscles, called the intercostal, placed in the intervals that separate the ribs from each other (fig. XII). Along the lower margin is excavated a deep groove, for the lodgment and protection of the intercostal vessels.

The ribs are connected with the spinal column chiefly by what is termed the anterior ligament (fig. IX, 1), which is attached to the head of the rib (fig. IX), and which, dividing into three portions (fig. IX, 1), firmly unites every rib to two of the vertebræ, and to the intervertebral substance (fig. IX, 1). This articulation is fortified by a second ligament (fig. IX, 2), also attached to a head of the rib, termed the interarticular (fig. IX, 2), and by three others, one of which is attached on the fore part, and the two others on the back part, to the neck of the rib (fig. X, 1).

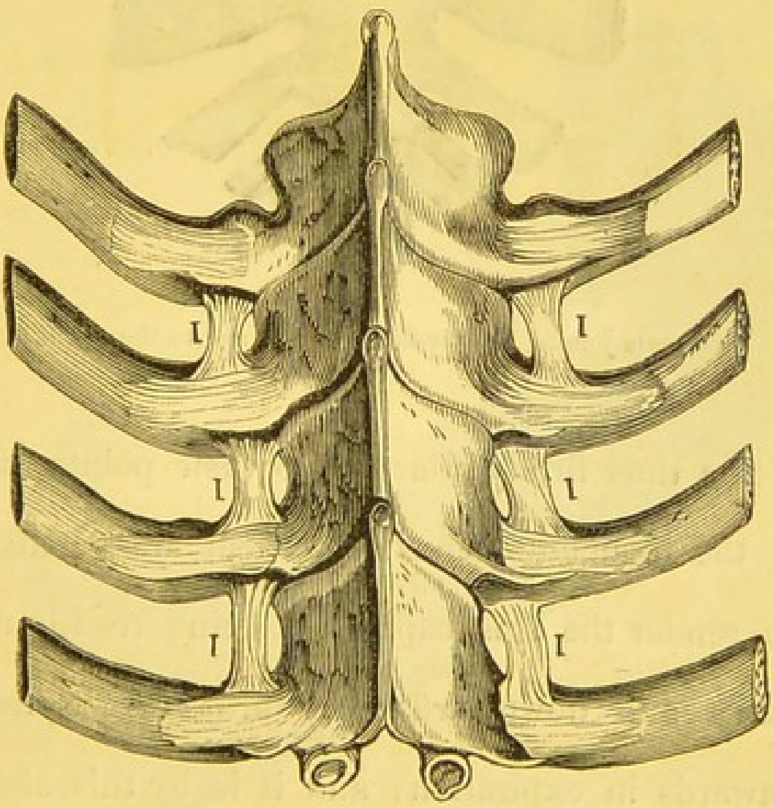
Fig. IX.



Ligaments connecting the ribs to the spinal column. 1, anterior ligaments; 2, interarticular ligaments; 3, ligaments of the necks of the ribs.

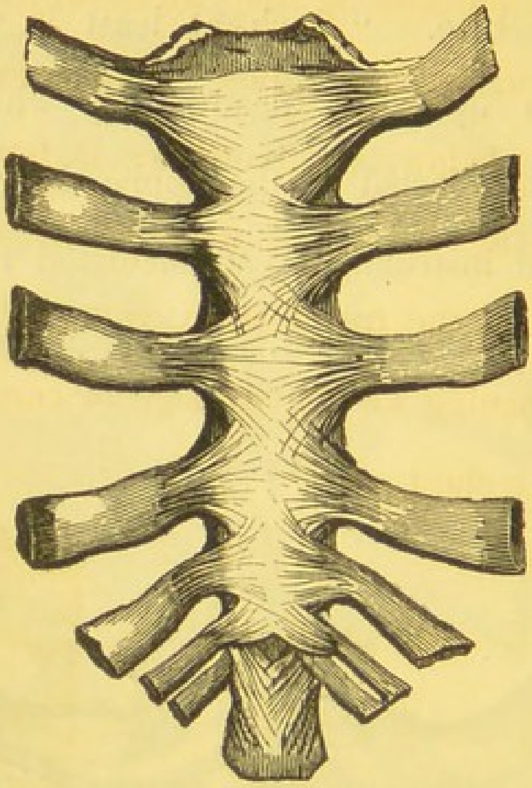
The cartilages of the seven superior ribs are attached to the sternum by a double layer of ligamentous fibres, termed the anterior and the posterior ligaments of the sternum (fig. XI). So strong are the bands which thus attach the ribs to the spinal column and the sternum, that the ribs cannot be dislocated without fracture. "Such at least is the case in experiments upon the dead body, where, though the rib be subjected to the application of force by means of an instrument best calculated to detach its head from the articulation, yet it is always broken."

Fig. X.



1, &c. Ligaments connecting the ribs to the vertebræ behind.

Fig. XI.

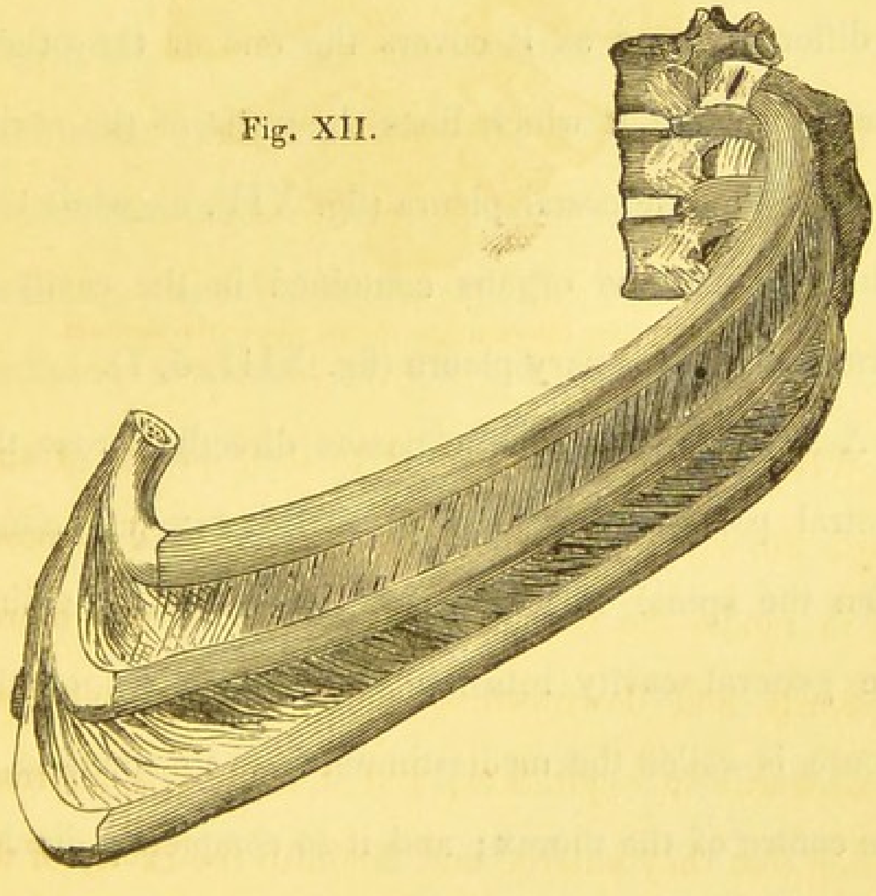


Ligaments joining the cartilages of the ribs to the sternum.

While thus firmly attached to their points of support, the ligaments which fix them are so disposed as to render the ribs capable of being readily moved upwards and downwards; upwards in inspiration; downwards in expiration; and it is by this alternate action that they enlarge and diminish the cavity of the thorax in the function of respiration.

Such are the boundaries of the cavity of the thorax, as far as its walls are solid. The interspaces between these solid portions at the sides are filled up by muscles, principally by those termed the intercostal (fig. XII); below, the boundary is formed by the diaphragm (fig. XIV, 2); while above, as has been already stated, the cavity is so contracted as only to leave an opening for the passage of certain parts to and from the chest.

Fig. XII.



A view of the muscles called intercostals, filling up the spaces between the ribs.

The inner surface of the walls of the thorax, in its whole extent, is lined by a serous membrane, very thin and delicate, but still firm, called the pleura. The same membrane is reflected over the organs of respiration contained in the cavity, so as to give them an external coat. The membrane itself is everywhere continuous, and everywhere the same, whether it line the containing or the contained parts; but it receives a different name as it covers the one or the other; that portion of it which lines the walls of the cavity being called the costal pleura (fig. XIV, *a*), while that which covers the organs contained in the cavity is termed the pulmonary pleura (fig. XIII, *5*, 1).

A fold of each pleura passes directly across the central part of the cavity of the thorax, extending from the spinal column to the sternum, and dividing the general cavity into two. This portion of the pleura is called the mediastinum, from its situation in the centre of the thorax; and it so completely divides the thoracic cavity into two, that the organs on one side of the chest have no communication with those of the other; and thus there may be extensive disease in one cavity (for example, a large accumulation of water), while the other may be perfectly sound.

The main organs contained in the cavity of the thorax are, the lungs with their air tube; the heart with its great vessels; and the tube passing from the mouth to the stomach (fig. XIII).

The two lungs occupy the sides of the chest (fig. XIII, *5*). They are completely separated from each other by the membranous partition just described, the mediastinum. Between the two folds of the mediastinum,—namely, in the middle of the chest, but inclining somewhat to the left side,—is placed the heart, enveloped in another serous membrane, the pericardium (fig. XIII, *2*, 1).

The lungs are moulded to the cavities they fill; whence their figure is conical, the base of the cone being downwards, resting on the diaphragm (fig. XIII, *5*, *b*), and the apex upwards, towards the neck (fig. XIII, *5*).

That surface of each lung which corresponds to the walls of the chest is convex in its whole extent (fig. XIII, *5*); on the contrary, that surface which corresponds to the mediastinum is flattened (fig. XIII, 5). The basis of the lung is concave, adapted to the convexity of the diaphragm, on which it rests (fig. XIII, *5*).

The air-vessel of the lungs, termed the bronchus, together with the blood-vessels and nerves, enter the organ at its flattened side, not exactly in the middle, but rather toward the upper and back part. This portion is termed the root of the lung.

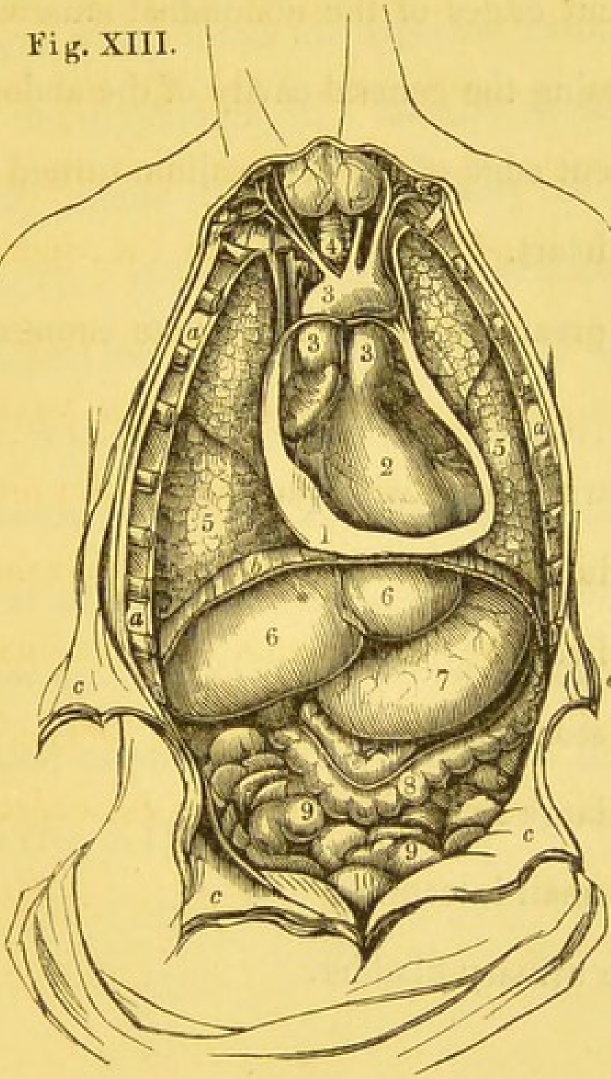
The lungs are attached to the neck by the trachea (fig. XIII, 4), the continuation of which forms the bronchus; to the spinal column by the pleura; and to the heart by the pulmonary vessels (fig. XIII, 3, *d*): their remaining portion is free and unattached.

In the living body, the lungs on each side completely fill the cavity of the chest, following passively the movements of its walls, and accurately adapting themselves to its size, whether its capacity enlarge in inspiration, or diminish in expiration; so that the external surface of the lung (the pulmonary pleura) is always in immediate contact with the lining membrane of the walls of the cavity (the costal pleura); consequently, during life, there is no cavity, the chest being always completely full.

The anterior surface of the pericardium, the bag which envelopes the heart, lies immediately behind the sternum, and the cartilages of the second, third, fourth, and fifth ribs, covered at its sides by the pleura, and firmly attached below to the diaphragm (fig. XIII, 1).

Surrounded by its pericardium, within the mediastinum, the heart is placed nearly in the centre of the chest, but its direction is somewhat oblique, its apex being directly opposite to the interval between the fifth and sixth ribs on the left side (fig. XIII, 2); while its basis is directed upwards, backwards, and towards the right (fig. XIII, 2). That portion of its surface which is presented to view on opening the pericardium is convex (fig. XIII, 2); but its opposite surface, namely, that which rests upon the part of the pericardium which is attached to the diaphragm, is flattened (fig. XIII, 1). It is fixed in its situation partly by the pericardium, and partly by the great vessels that go to and from it. But under the different states of expiration and inspiration, it accompanies, in some degree, the movements of the diaphragm; and in the varied postures of the body, the heart deviates to a certain extent from the exact position here described.

Fig. XIII.



a. The cut edges of the ribs, forming the lateral boundaries of the cavity of the thorax.

b. The diaphragm forming the inferior boundary of the thorax, and the division between the thorax and the abdomen.

c. The cut edges of the abdominal muscles, turned aside, exposing the general cavity of the abdomen.

1. The cut edge of the pericardium turned aside.

2. The heart.

3. The great vessels in immediate connexion with the heart.

4. The trachea, or wind pipe.

5. The lungs.

6. The liver.

7. The stomach.

8. The large intestine.

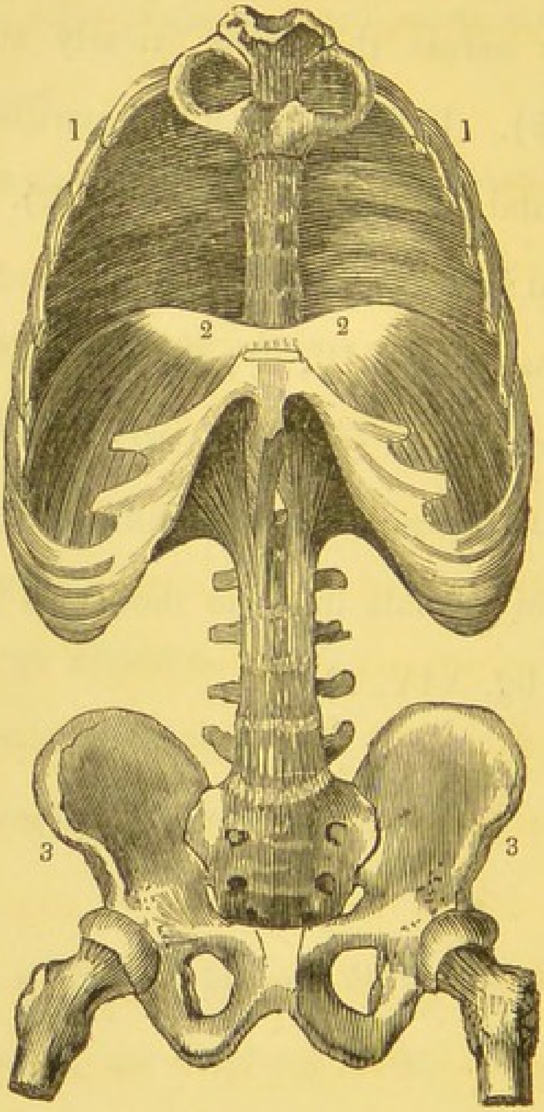
9. The small intestines.

10. The urinary bladder.

The second division of the trunk, the abdomen, is bounded above by the diaphragm (fig. XIV, 2), below by the pelvis (fig. XIV, 3), behind and at the sides by the vertebræ and muscles of the loins (fig. XVI), and before by the abdominal muscles (fig. XVI, 9).

The organ which forms the superior boundary of the abdomen, the diaphragm, is a circular muscle, placed transversely across the trunk, nearly at its centre (fig. XIV, 2). It forms a vaulted partition between the thorax and the abdomen (fig. XIV, 2). All around its border, it is fleshy (fig. XIV, 2); towards its centre, it is tendinous (fig. XIV, 2); the surface towards the abdomen is concave (fig. XIV, 2); that towards the thorax, convex (fig. XIV, 2); while its middle tendinous portion ascends into the thorax as high as the fourth rib (fig. XIV, 2).

Fig. XIV.

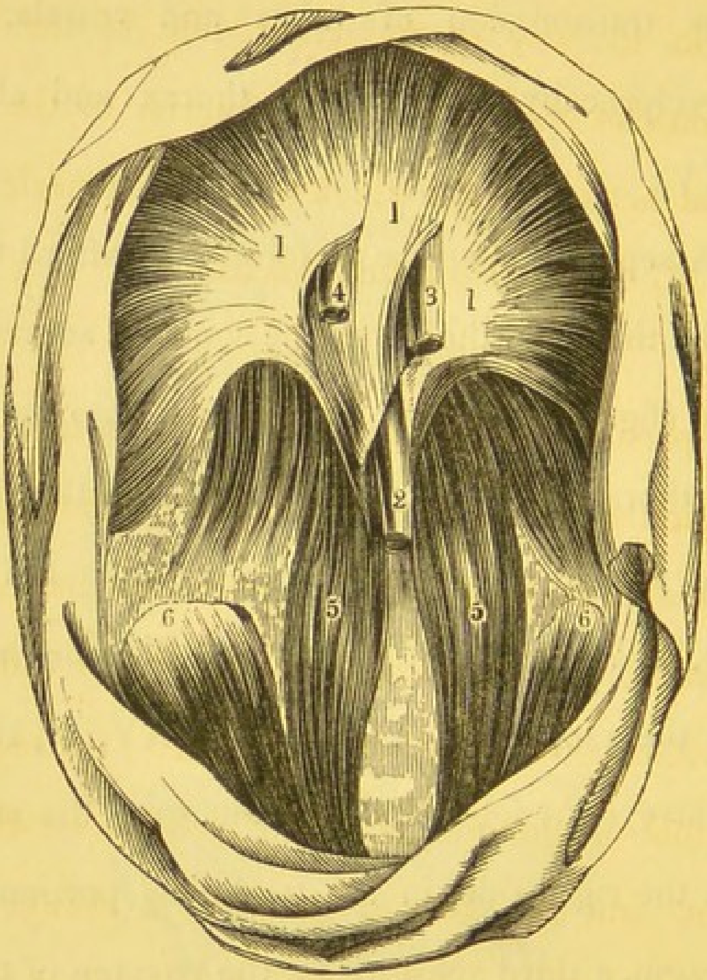


View of the diaphragm.—1, cavity of the thorax; 2, diaphragm separating the cavity of the thorax from that of the abdomen; 3, cavity of the pelvis.

The diaphragm is perforated by several apertures, for the transmission of tubes and vessels, which pass reciprocally between the thorax and abdomen (fig. XV).

1. A separate aperture is formed to afford the exit from the thorax of the aorta, the common source of the arteries (fig. XV, 2), and the entrance into the thorax of the thoracic duct, the tube that bears the digested aliment to the heart. 2. A little to the left of the former, there is another aperture, through which passes the esophagus or gullet (fig. XV, 3), the tube that conveys the food from the mouth to the stomach. 3. On the right side, in the tendinous portion of the diaphragm, a third aperture for the passage of the vena cava (fig. XV, 4), the great vessel that returns the blood to the heart from the lower parts of the body.

Fig. XV.



View of the diaphragm with the tubes that pass through it.—1, arch of the diaphragm; 2, the trunk of the aorta passing from the chest into the abdomen; 3, the esophagus passing from the chest through the diaphragm to the stomach; 4, the vena cava, the great vein that returns the blood to the heart from the lower parts of the body, passing from the abdomen into the chest, in its way to the right side of the heart; 5, 6, muscles that arise in the interior of the trunk, and that act upon the thigh; 5, the muscle called psoas; 6, the muscle called iliacus.

The partition formed by the diaphragm between the thorax and abdomen, though complete, is moveable; for as the diaphragm descends in inspiration and ascends in expiration, it proportionally enlarges or diminishes the cavities between which it is placed; consequently, the actual magnitude of these cavities varies every moment, and the size of the one is always in the inverse ratio of that of the other.

Between the abdomen and the pelvis there is no separation; one cavity is directly continuous with the other (fig. XIV, 3); but along the inner surface of the expanded bones, which form a part of the lateral boundary of the abdomen, there is a prominent line, termed the brim of the pelvis (fig. I, 15), marking the point at which the abdomen is supposed to terminate and the pelvis to commence.

Behind, and at the sides, the walls of the abdomen are completed partly by the lumbar portion of the spinal column and partly by the lumbar muscles (fig. I, 4), and before by the abdominal muscles (fig. XVI, 9).

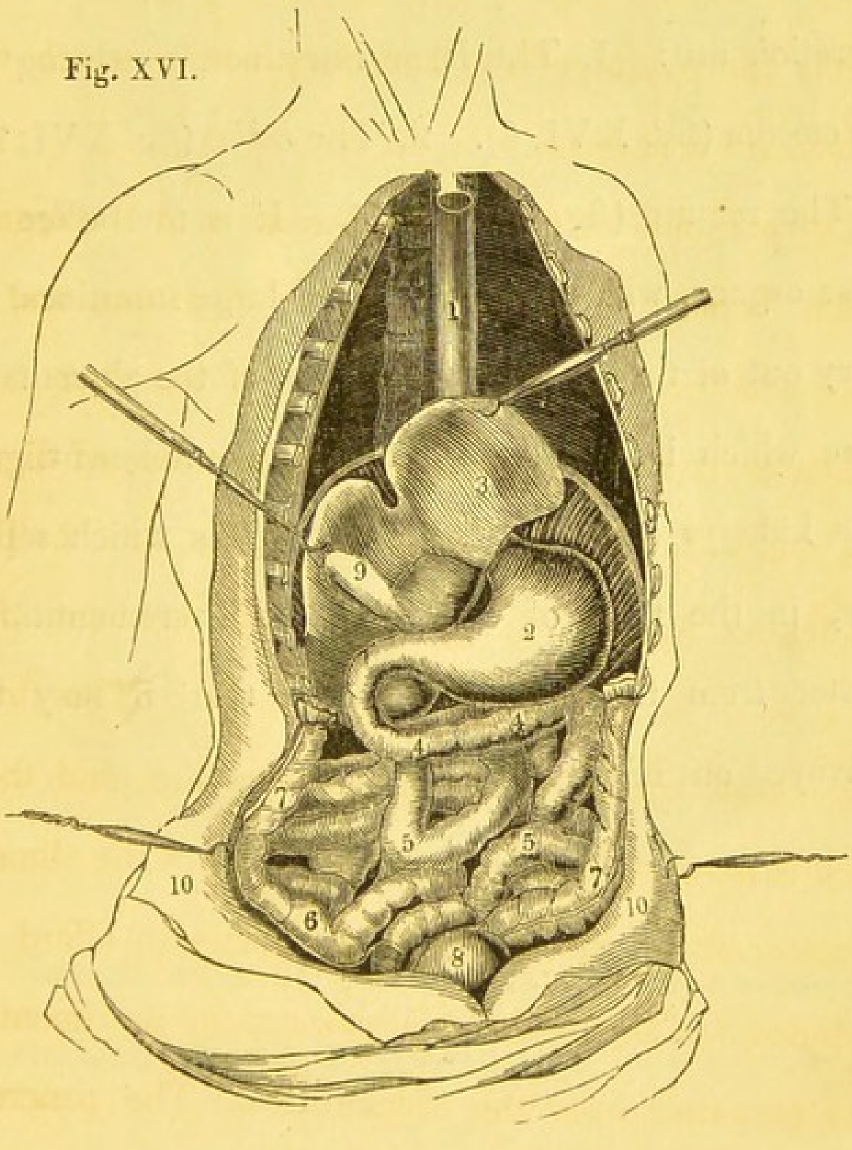
The inner surface of the walls of the abdomen is lined throughout by a serous membrane, termed the peritoneum (fig. XVI). From the walls of the abdomen, the peritoneum is reflected upon the organs contained in the cavity, and is continued over them so as to form their external coat. The peritoneum also descends between the several organs, connecting them together, and holding them firmly in their situation ; and it likewise forms numerous folds, in which are embedded the vessels and nerves that supply the organs. It secretes a serous fluid, by which its own surface and that of the organs it covers are rendered moist, polished and glistening, and by means of which the organs glide smoothly over it, and over one another in the various movements of the body, and are in constant contact without growing together. In structure, distribution and function, the peritoneum is thus perfectly analogous to the pleura.

Like the thorax, the abdomen is always completely full. When the diaphragm is in action, it contracts. When the diaphragm is in the state of contraction, the abdominal and lumbar muscles are in the state of relaxation. By the contraction of the diaphragm, the organs contained in the abdomen are pushed downwards, and the anterior and lateral walls of the cavity being at this moment in a state of relaxation, they readily yield, and, consequently, the viscera are protruded forwards and at the sides. But the abdominal and lumbar muscles in their turn contract, the diaphragm relaxing; and, consequently, the viscera, forced from the front and sides of the abdomen, are pushed upwards, together with the diaphragm, into the cavity of the thorax. A firm and uniform pressure is thus at all times maintained upon the whole contents of the abdomen: there is an exact adaptation of the containing to the contained parts, and of one organ to another. No space intervenes either between the walls of the abdomen and the organs they enclose, or between one organ and another: so that the term cavity does not denote a void or empty space, but merely the extent of the boundary within which the viscera are contained.

The contents of the abdomen consist of the organs which belong to the apparatus of digestion, and of those which belong to the apparatus of excretion.

The organs which belong to the apparatus of digestion are:—1. The stomach (fig. XVI, 2). 2. The duodenum (fig. XVI, 4). 3. The jejunum (fig. XVI, 5). 4. The ilium (fig. XVI, 5). The three last organs are called the small intestines, and their office is partly to carry on the digestion of the aliment commenced in the stomach, and partly to afford an extended surface for the absorption of the nutriment as it is prepared from the aliment. 5. The pancreas (fig. XVII, 5). 6. The liver (fig. XVII, 2). 7. The spleen (fig. XVII, 4). The three last organs truly belong to the apparatus of digestion, and their office is to co-operate with the stomach and the small intestines in the conversion of the aliment into nutriment.

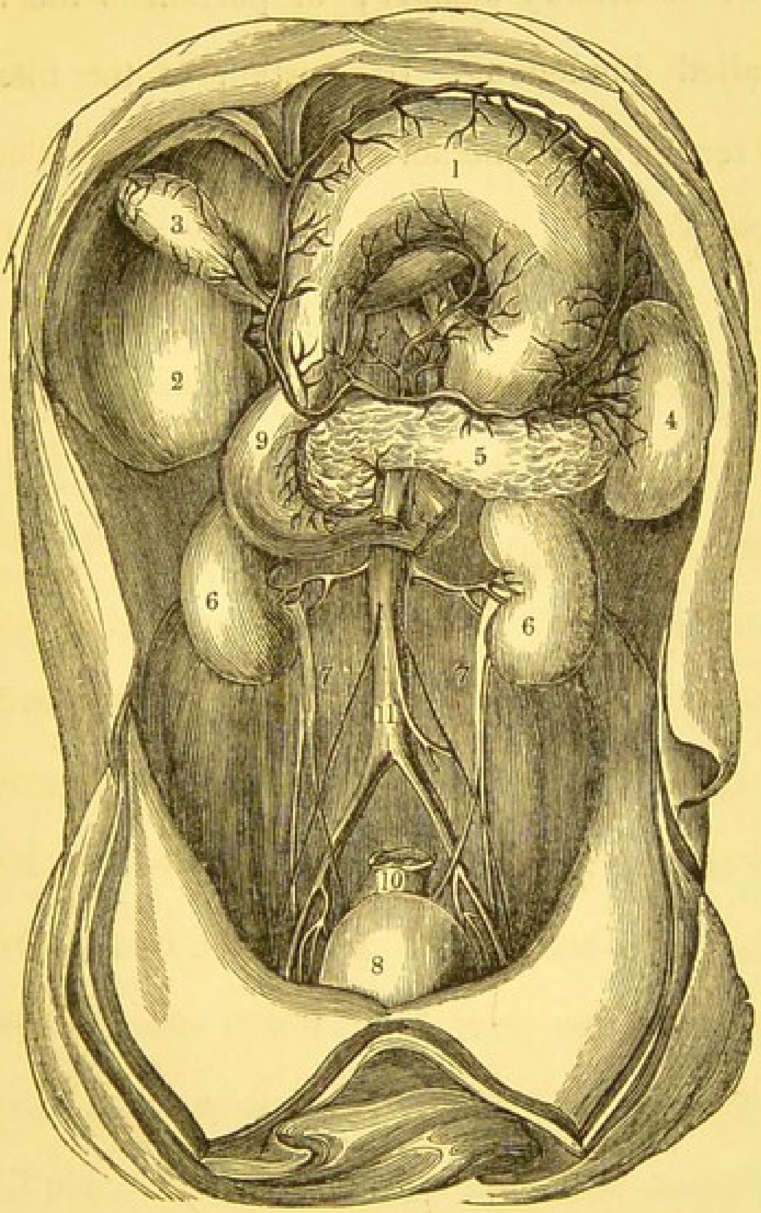
Fig. XVI.



1. Æsophagus; 2. stomach; 3. liver raised, showing its under surface; 4. duodenum; 5. small intestines; 6. cæcum; 7. colon; 8. urinary bladder; 9. gall bladder; 10. abdominal muscles divided and reflected.

The organs which belong to the apparatus of excretion are:—1. The large intestines, consisting of the cæcum (fig. XVI, 6). 2. The colon (fig. XVI, 7). 3. The rectum (fig. XVII, 10). It is the office of these organs, which are called the large intestines, to carry out of the system that portion of the alimentary mass which is not converted into nourishment. 4. The kidneys (fig. XVII, 6), the organs which separate, in the form of the urine, an excrementitious matter from the blood, in order that it may be conveyed out of the system.

Fig. XVII.



General view of the viscera of the abdomen.—1. stomach raised; 2. under surface of liver; 3. gall bladder; 4. spleen; 5. pancreas; 6. kidneys; 7. ureters; 8. urinary bladder; 9. portion of the intestine called duodenum; 10. portion of the intestine called rectum; 11. the aorta.

SECTION VIII.

LATERAL COMPRESSION.

My attention was directed to this deformity by the valuable paper of Baron Dupuytren *; and I almost daily meet with cases of the kind in my own practice.

In most instances, the subjects of this deformity are of a weak constitution; and sometimes, as Dupuytren observes, the offspring of lymphatic, scrofulous, or rachitic people, dwelling in low, damp, and cold places, ill clothed, and brought up on unsubstantial food.

The deformity is sometimes congenital. At others, however, it occurs during childhood, or later. Indeed, Dr. Copland † says that his experience leads him to state, that it generally comes on gradually after birth,

* Répertoire d'Anatomie, tom. v. p. 198.

† Dictionary of Practical Medicine, Part I, Art. Chest.

owing to deficient inflation and development of the lungs, arising from the weakness of the muscles of inspiration, and the flexibility of the ribs at the time of birth; that in cases of this description the vital energy of the lungs is insufficient for their healthy actions, and the respiratory mechanism unable to accomplish their full expansion, or sustain the continued pressure of the atmosphere, before which the soft and imperfectly-formed thoracic parietes gradually yield; and that it has appeared to him very frequently to be greatly increased, if not altogether occasioned, subsequently to birth, by the very common practice, among nurses, of lifting the child by pressing the palms of the hand on the sides of the chest, immediately under the armpits. In these views, I am inclined to concur, though not disposed to lay great stress on the incidental cause mentioned in the conclusion.

A similar cause is assigned by Dr. Barlow*, in the Cyclopædia of Practical Medicine.—" There is one

* Article, Education.

very common mode of exercising infants, which, we think, deserves particular notice—we mean the practice of hoisting or raising them aloft in the air. This practice is of such venerable antiquity, and so universal, that it would be vain to impugn it. The pleasure, too, which most children evince under it, seems to show that it cannot be so objectionable as a cursory observer would be disposed to consider it. Still there are hazards which ought not to be wholly overlooked. The risk of accident is one of some amount: children have slipped from the hands, and sustained serious injury. Some people are so energetic as to throw up children and catch them in descending. This rashness there can be no hesitation in reprobating, for however confident the person may be of not missing hold, there must ever be risk of injury from the concussion suffered in the descent, and even from the firmness of grasp necessary for recovering and maintaining the hold. The motion of the body, too, has a direct tendency to induce vertigo; and when the liability of the infant brain to congestion and its consequences is considered, when the frequency of hydrocephalus in infants is borne in mind, an exercise which impels blood to the brain will not be regarded as wholly insignificant. There is one more objection which seems not to have attracted attention. The hold taken of a child in the act of hoisting it, is by the hand grasping the chest. The fingers and thumb placed on each side of the sternum, compress the ribs, and any one with the hand so placed will at once perceive that if the pressure were strong, and the resistance from the elasticity of the ribs weak, the impression on the chest resulting would correspond exactly with the deformity named chicken-breast. That any force is ever used, capable of inducing speedily such a change, is in the highest degree improbable; but that reiterated pressure of this kind, however slight, would, in a weakly child, have power to impress and distort the chest, few, we imagine, will doubt."

In this deformity, the sides of the chest are very much flattened, one side being sometimes more depressed than the other; the ribs occasionally appear even as if driven inward, or as if pressed from one side to the other; and, in some children, this compression exists to such an extent, that the two sides of the chest can be grasped with the fingers of one hand.

In consequence of this, the sternum projects in a carinated form, or like the breast of a pigeon, whence persons with this deformity are called *pigeon-breasted.* The sternum, however, is not always so prominent as it at first sight appears to be, the projection being formed by the sternal extremities of the ribs, and the sternum itself being either flat, or a little concave at its lower, and projecting at its upper, part.

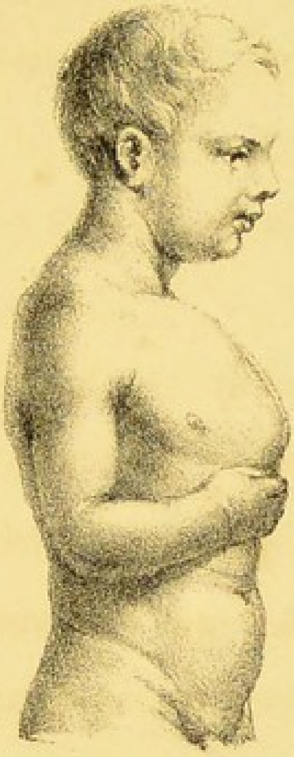
There is always some alteration in the natural direction of the spinal column; either a lateral curvature, which I believe to be common, or a projection of the spine backwards.

While the transverse diameter of the chest is of course considerably lessened, the antero-posterior and vertical ones are increased; so that while the former loses a fourth, a third, and sometimes half of its extent, the others receive a proportionate increase. See Plate I.

When it is considered how very unfavourable this contracted state of the chest is to the proper development and exercise of the organs contained within it, it is but natural to expect that their functions should be deranged. The extent of this derangement depends in a great degree on the extent of the deformity.

From the depression of the sides of the chest, the action of the heart is embarrassed, and it may be seen strongly pulsating against the ribs; the lungs are compressed from the same cause; the circulation is hurried; the breathing is quick, and often difficult, being generally performed through the mouth; wheezing and short dry cough occur; the nostrils appear as

PLATE. I.



PROMINENT STERNUM.

if stopped up; the tonsils are generally enlarged; and confirmed phthisis often puts a period to this struggle for life.

"It is a remarkable circumstance," says Dupuytren, "that this vicious conformation is almost constantly attended by a considerable swelling of the tonsils—a swelling, the union of which with the depression of chest, depends upon a cause as yet unknown to us *." But there is surely nothing wonderful in this, that, when the organ of respiration is so severely affected, all the aërial passages, and the parts which lubricate them, should be correspondingly affected.

The enlargement of the tonsils in some of the cases which fell under Dupuytren's observation, was so great as to compel him to remove a portion of them. "It is easy," he says, "to conceive how much the swelling must increase the difficulty which patients find in

* "Une chose remarquable est, que ce vice de conformation est presque constamment accompagné d'un gonflement considérable des amygdales, gonflement dont la liaison avec la depression de la poitrine tient à une cause qui nous est encore inconnue."

breathing, in consequence of the lateral depression of the sides of the chest. In some individuals, this swelling has been so great, that I have been compelled to remove a portion of the glands, an operation which, though it does not put an end to the difficulty of breathing, has nevertheless constantly relieved the patient." In several of my own patients, the tonsils have been so much enlarged as to prevent me seeing any part of the back of the pharynx.

It is a consequence of the preceding conditions, that the voice is not strong, and that persons with this deformity cannot speak for any length of time continuously. It is another consequence of the same causes, that the breathing is very loud in sleep. Indeed a peculiar symptom in this deformity is the noise which children make during sleep. Respiration is then always performed with open mouth and great noise, in consequence of being embarrassed by the malformation of the chest, the swelling of the tonsils, and the diminished aperture of the nostrils.

The mother of one of the children with this deformity told me that the screams and noise of her child, when sleeping, were such as to disturb the whole family. Certain it is, that the children frequently start up in bed, and have unpleasant dreams, which not improbably are relative to the state of the respiration.

Owing probably to the state of the fauces, hearing is slightly affected.

Dupuytren observes that catarrh is frequently a complication of this depression of the sides of the chest; and that, especially when the tonsils are swollen, it always constitutes a very serious complication. There is then indeed a triple cause of oppression; malformation of the sides of the chest, swelling of the tonsils, and catarrh.

But, he observes, that, of all the maladies that may accompany this malformation, there is none more dangerous than the hooping-cough. No disease, he says, ever presented to him a more painful spectacle than that of a wretched infant who had the parietes of the chest pressed in laterally, swollen tonsils, and violent hooping-cough. "At each crisis of the cough, he suffered such oppression that instant death seemed to be threatened: he died indeed in one of the paroxysms."

In infants, who have this deformity, there is great difficulty in taking the breast, danger of suffocation if the nipple be retained long in the mouth, a necessity of quitting it in a few seconds with loud cries, and afterwards the voice is short, broken and abrupt.

The preceding symptoms, particularly difficulty of respiration and circulation, may extend so far as to prevent the development of the vital functions, and cause death in the first moments of existence. When they do not cause immediate death, they may produce it in a more advanced stage, by preventing suckling, or even by impeding nutrition, and opposing the development of strength. Even when they do not cause death either primitively or consecutively, they keep the children who suffer under them in a state of meagreness, weakness and incapacity of action, that deprives them of the greater portion of their faculties.

Dr. Copland says, that in many cases which have come before him, rapid emaciation, great debility, defective assimilation and sanguefaction, an atrophied and flaccid state of the muscles, softening of the bones, frequently asthenic, or chronic bronchitis, and swelling of the glands, have followed the deformity, and terminated the life of the patient.

All observers agree that, as the infant advances in age, the disorder of respiration and circulation is still more remarkable, particularly when the patient takes any exercise, goes up or down stairs, or attempts to speak with eagerness; and that the pulse then becomes quick, irregular, or intermittent, being accelerated upon the slightest cause, whether physical or mental, nearly in the same way as in persons affected with diseases of the heart.

The disorder in the movements of this organ, it is observed, and the irregularity of the pulse, which is alternately slow and rapid, might induce us to believe it a disease of the heart, did not attentive observation of the phenomena prove that these disorders and irregularities are in relation with the movements of respiration only, and are a result of the constraint it labours under.

If no attempt be made to remedy the deformity at an age when the bones are in a pliant state, the patient, sooner or later, falls a sacrifice to some disease of the lungs, or heart, produced or excited by the constant functional derangement to which these organs have been subject. In fact, where the transverse diameter of the chest is lessened, patients are, more or less, predisposed to phthisis; whilst affections of the stomach and heart prevail where the hollow sternum exists.

I opened the body of a person about twenty-four years of age, who was pigeon-breasted. He had, from his early youth, been subject to affections of the chest, and died at last from hæmoptysis. The lungs, on examination, were found extensively diseased.

M. Breschet*, who has examined the bodies of several persons with this deformity, has observed a delay in the development of the skeleton, the bones of the skull still separated at a period when they should have been united, the continuance of distinct epiphyses, swelling of the extremities of the long bones, various torsions of their substance, little consistence in their tissue, (so that in this respect they might be compared to bones softened by immersion for some time in weak nitric acid, and were sometimes cut more easily than broken), that tissue of a deep, and, as it were, venous red, and dentition backward, the teeth of the first or second set being affected, the crown decayed, partly destroyed, and furrowed anteriorly. The voluntary muscles are described as being atrophied, soft, pale and exhibiting a fish-like structure.

* Répertoire d'Anatomie, tom. v. p. 204.

In regard to the vascular system, the substance of the heart is commonly observed to be pale and flaccid, the foramen ovale to be quite open in young infants, and but imperfectly closed in older children, the lungs externally to be depressed towards the spinal column, to present towards the point corresponding to the depression of the thorax an analogous depression, and to bear behind the impress of the ribs in such a manner as to be furrowed by these bones, while lines in relief correspond to the intercostal spaces, the same organ internally to be often studded with tubercles of various sizes, portions of it to be frequently inflamed or hepatised, and, in some cases, attended with bronchitis, the bronchia to be more or less loaded with mucus, or muco-purulent matter.

Of the secreting organs, the mucous follicles of the intestinal canal are observed to be often tumefied, but rarely ulcerated, excepting when a chronic diarrhœa has attended the latter stages of the thoracic compression: and the mesenteric glands are occasionally observed to be much enlarged.

Thus there is a vicious condition of the whole vital system. Is this a cause or a consequence of the malformation of the chest? The best treatment must remain undecided till the ultimate cause is determined.

As to modifications of this deformity, I should observe that, in some cases, there is a projection of the chest anteriorly, with a projection of the ribs and spine posteriorly; the cavity of the chest being greatly lessened in size and capacity from side to side.—The following remarkable case of this kind was sent to me by Mr. Smith, of Trinity Square:—

Master M. R. W., æt. 18, applied to me, August 19th, 1836, on account of a deformity of the chest.—When about four years old, he fell down stairs and injured the spine; posterior curvature of the spine took place; and deformity of the chest ensued.

At present, there is posterior curvature of the spine and pigeon state of the breast. He complains of fulness in the region of the stomach, a choking sensation in the throat, and great oppression, at times, in breathing.—See Plate II.

I have ordered him to try the Indian exercises; but the deformity is too great to permit me to expect much benefit from any mode of treatment.

Since the publication of my former edition, I have met with another modification of this deformity of the chest which I had not before noticed, and which I will now term semilateral compression of the chest. In this case, one side of the chest, throughout its whole extent, is very elevated, whilst the other is in its natural condition, or but slightly depressed.—The following is an instance of this kind of deformity:—

August 16, 1836.—James Bowie, of a weak and delicate constitution, æt. 19, residing at No. 155, Bishopsgate Street Without (apprentice to a printer), applied to go down to the infirmary at Margate, as an

PLATE. II.

PROMINENT STERNUM & SPINE.

out-patient, on account of a deformity of the chest. He states that, for some time past, he has felt great weakness and giving way of the spinal column, and an inability of keeping himself quite straight, but that these symptoms have increased very much during the last ten weeks.

At present, there is considerable elevation of the left side of the chest, with depression, or apparent depression, of the right side, elevation of the sternal ends of the ribs, and a groove in the sternum. He has experienced, of late, great pain in the region of the heart, and palpitation. There is considerable curvature of the spine. He attributes the deformity to the working of the press. I have since seen three cases of this kind of deformity: one was an in-patient last season (1836), at the infirmary at Margate ; the other, a printer, who applied to me at my own residence, and the third, a gentleman in Messrs. Leaf's establishment, of Old Change.

In persons affected with rickets, this state of the chest is not uncommon. Dr. Weatherhead * truly observes that, in this disease, the ribs yield at the parts least able to resist; the cartilages project; the ribs become flattened on the sides; and this throws the sternum forwards, forming an irregular ridge. The sternum is likewise affected by the disease, and becomes unequal and knotty, owing to the irregular manner of its ossification.

I recently saw a case of diseased hip in the third stage, in a child labouring under lateral compression of the chest †, and the state of the chest was much aggravated by the local and constitutional disease from which the child suffered.

I defer speaking of the treatment and causes of this deformity until I have considered the next kind of deformity.

* A Treatise on Rickets, second edition.

† See Coulson on the Disease of the Hip-joint, 4to, with plain and coloured plates, p. 50.

SECTION IX.

ANTERIOR COMPRESSION.

Dr. Copland, after observing that the anterior depression of the chest has been much overlooked by authors, and doing me the honour to add that I had "lately noticed it in an instructive article on deformities of the chest," says "It is by no means uncommon both in young and grown up subjects, although not so frequent as the lateral depression." It certainly is not so often congenital as the former kind; but it does frequently occur in persons of a weak habit, who are narrow-chested, and who stoop a good deal.

The cause of this deformity is generally pressure upon the chest.

With regard to those which arise from the useful pursuits of life, they are well illustrated by the invaluable work of Mr. Thackrah, on "Arts, Trades, and Professions, as Affecting Health and Longevity;" for although their effect in producing the hollow sternum is not always alluded to by him, it is evidently their surest result. In proof of this, I quote and abridge two or three striking examples.

"Tailors," says Mr. Thackrah, "are very unfortunately situated. Sitting all day in a confined atmosphere, and often in a room too crowded, with the legs crossed and *the spine bowed*, they cannot have respiration, circulation, or digestion well performed. Disorders of the stomach and bowels are general, and often obstinate. Pulmonary consumption is also frequent. Some of the men state their liability to pains of the chest. It is apparent, even from observing only the expression of countenance, the complexion, and the gait, that the functions of the stomach and the heart are greatly impaired, even in those who consider themselves well. The reduction in the circumference of the chest is not so much as we might expect. The average of our measurements presented thirty-three to thirty-four inches, while that of other artisans is about thirty-six. The capacity of the lungs, as evinced by measuring the air thrown out at an expiration, is not less than common. The average of six individuals was 221 cubic inches. The prejudicial influence of their employ is more insidious than urgent—it undermines rather than destroys life. Apprenticed at an early age, tailors have their constitution modified to their employment; but its native vigour, drawn off in youth by this adaptation of organs to external circumstances, gradually declines, and finally ceases before the natural termination of life. Of twenty-two of the workmen employed in Leeds, not one had attained the age of sixty; two had passed fifty; and, of the rest, not more than two had reached forty. We heard of an instance or two of great age, but the individuals had lived chiefly in the country. In London, Stultz and Co. employ 334 men. Of these, six are above sixty years of age; fourteen about fifty; and the greater number of the remainder about forty. Three men of the above six, about sixty, have curvature of the spine. They are so subject to anal fistula, that they have a 'fistula club.' Their most common affections are dyspepsia, diarrhœa, and dull headach, with giddiness, especially during summer. *They attribute their complaints to two causes; one of which is the posture—the body bent for thirteen hours a day;* the other, the heat of the shop. A large proportion of tailors die annually of phthisis. The evils attendant on the employment are, in many cases, greatly aggravated by bad habits. Like other men physically or morally depressed, the tailor often seeks the baneful comfort of ale and ardent spirit. The time of relief from work is generally spent, not in invigorating the animal frame, but in aggravating his complaints, and converting functional into organic disease. The position of the tailor might be amended. He now sits cross-legged on a board, because, in the ordinary sitting posture, he could not hold a heavy piece of cloth high enough for his eyes to direct his needle. Let a hole be made in the board, of the circumference of his body, and let his seat be placed below it. The eyes and hands will then be sufficiently near his work; his *spine will not be unnaturally bent;* and his chest and abdomen will be free. I am aware that old workmen will be unwilling to regard this or similar suggestions; so much are men formed to their habits. But, if masters and medical men would urge an alteration, and if, especially, boys apprenticed to the trade were taught to work in the posture recommended, tailors would assuredly become much more healthy. The practice of drinking might also be easily reduced, if masters discharged from their employ every man who absented himself a day without proper cause.

"Milliners, dressmakers, and straw-bonnet makers, are often crowded in apartments of disproportionate size, and kept at work for an improper length of time. Their ordinary hours are ten or twelve in the day, but they are confined not unfrequently from five or six in the morning till twelve at night. *The bent posture* in which they sit tends to injure the digestive organs, as well as the circulation and the breathing. Their diet consists too much of slops, and too little of solid and nutritive food. From these causes collectively, we find that girls from the country, fresh-looking and robust, soon become pale and thin. *Pains in the chest*, palpitation, affections of the spinal and gangli-onic nerves, and defect of action in the abdominal viscera, are very general. The constant direction of the eyes also to minute work affects these organs. Sometimes it induces slight ophthalmia, and some-times, at length, a much more serious disease, palsy of the optic nerve. The remedies are obvious—venti-lation, reduction of the hours of work, and brisk exercise in the open air. The great cause of the ill-health of females who make ladies' dresses is the lowness of their wages. To obtain a livelihood, they are obliged to work in excess *.

" Shoemakers, it is well known, are placed in a *very bad posture*—a posture second only to that of tailors. The abdominal viscera, and especially the stomach and liver, are compressed. Lads put to this employ often suffer so much from headache and general indisposition, that they are obliged to leave it; and men who have been able to bear it for years, lose appetite and strength. Digestion and circulation are so much impaired, that the countenance would mark a shoemaker almost as well as a tailor. The secretion of bile is generally unhealthy, and bowel-complaiuts are

* " Two very respectable dressmakers, who charge more than the generality, state that they can earn but 12*s*. each per week, though they sew, on the average, fifteen hours per day. The sempstress who goes out to her work rarely receives more than a shilling a day, in addition to her board. Can ladies, humane in disposition, and prompt in their support of charitable institutions, reflect on the miserable hire they afford to the persons they employ—persons of their own sex—persons often reduced, by the faults or misfortunes of others, from a comfortable situation in life, and sometimes even from apparent independence, to work for daily bread ?"

frequent. The capacity of the lungs, in the individuals examined, we found to average 182 cubic inches, and the circumference of the chest thirty-five inches. In the few shoemakers who live to old age, there is often a *remarkable hollow at the base of the breast-bone*, occasioned by the pressure of the last *. Much as posture injures shoemakers, bad habits injure more. No wonder we find poverty and filth marked on their families and houses. Exercise in the open air is urgently required for the relief of this as well as other employments."

These are mere specimens of the injury from bad postures in trades.—Let us now look to a still greater evil †.

"The employment of young children in any labour

* "In Edinburgh, the makers of balls for the game of golf are stated to suffer from pressure on the pit of the stomach, which induces subacute inflammation of the mucous membrane, obstinate gastrodynia, &c."

† I quote this at greater length to spread, as far as I can, a knowledge of this evil.

is wrong. The term of physical growth ought not to be a term of physical exertion. Light and varied motions should be the only effort—motions excited by the will, not by the task-master—the run and the leap of a buoyant and unshackled spirit. How different the scene in a manufacturing district! No man of humanity can reflect without distress on the state of thousands of children, many from six to seven years of age, roused from their beds at an early hour, hurried to the mills, and kept there, with the interval of only forty minutes, till a late hour at night; kept, moreover, in an atmosphere impure, not only as the air of a town, not only as defective in ventilation, but as loaded also with noxious dust. Health! cleanliness! mental improvement! how are they regarded? Recreation is out of the question. There is scarcely time for meals. The very period of sleep, so necessary for the young, is too often abridged; nay, children are sometimes worked even in the night.—The time of labour in the flax-mills is generally excessive.

When the former edition of this work was published, the people were working from half-past six in the morning till eight at night, and were allowed an interval of but forty minutes in all that time. The engine was stopped only at noon; and the operatives consequently were obliged to take breakfast and 'drinking' (afternoon meal) while they pursued their labour,—one tending the other's machinery while the latter took his hurried meal. Children sometimes have not had the opportunity of eating till nine or ten A. M., though they had been at the mill from half-past five, and must have risen from their beds half or three quarters of an hour before. At the present time, the work commences at six and ends at half-past seven; the intervals for meals are fifteen minutes, forty, and fifteen, and the children and overlookers are allowed to leave the mill only for dinner. Whatever improvement may be effected without a legislative enactment, restricting the period of labour, this improvement will be but temporary. Masters, however enlightened and humane, are seldom aware, never fully aware, of the injury to health and life which mills occasion. Acquainted far less with physiology, than with political economy, their better feelings will be overcome by the opportunity of increasing profit, and they will reason themselves into the belief that the employment is by no means so unhealthy as some persons pretend, and that the children will be nothing the worse for two or three half-hours a day more labour, and a little less time for meals. That this is no improbable prognostic, is proved by the past. The diminution of the intervals of work has been a gradual encroachment. Formerly an hour was allowed for dinner; but one great manufacturer, pressed by his engagements, wished his work-people to return five minutes sooner. This abridgment was promptly adopted at other mills. Five minutes led to ten. It was found also that breakfast and 'drinking' might be taken while the people were at work. Time was thus saved; more work was done; and the manufactured article consequently could be offered at a less price. If one house offered it at a lower rate, all other houses, to compete in the market, were obliged to use similar means. Thus, what was at first partial and temporary, has become the established period: and the unfortunate artisans working before in excess, have since had to carry labour to a still greater and more destructive extent. The sound of the steam-engine anticipates, often, the cock-crowing of the morning. While the engine works the people must work. Men, women, and children, are thus yokefellows with iron and steam; the animal machine —fragile at best, subject to a thousand sources of suffering, and doomed by nature, in its best state, to a short-lived existence, changing every moment, and hastening to decay— is matched with an iron machine insensible to suffering and fatigue: all this, moreover, in an atmosphere of flax-dust, for twelve or thirteen hours a day, and for six days in a week."

In schools, "children, and very young children too, are kept for many hours daily, in a state as nearly motionless, as it is possible for the masters to produce. The time devoted to amusement is much too little. Instead of two or three hours a day being allowed for play, only two or three hours a day should be devoted to confinement and labour. To fix a child in a *particular posture* for hours, is vile tyranny, and a cruel restraint on nature.—To girls' schools, in particular, should attention be paid. The exercise is much too limited. Young ladies walk out, it is true, but scarcely at a rate to warm the feet. Their time for amusement is too little; and full romping exercise, exercise which brings all the muscles into play, is discouraged. It is vulgar to use the limbs as nature designed; it is vulgar to take the food which nature requires; and young ladies must not do any thing that is vulgar. Sitting, moreover, for hours at needlework, or in learning what are called accomplishments, they leave a numerous class of muscles wasting for want of exercise. The muscles of the back are especially enfeebled; and the spinal column, in youth comparatively soft and flexible, bends under the weight of the head and arms. *The spine yields,* because the muscles, which closely connect the bones, and should by their action keep them in a proper line, become too weak. We are often asked, why are spinal complaints so common? We answer, that a principal cause is the want of full exercise; we say that young persons are obliged to acquire what is of little or no use in after-life, while they neglect what is necessary to the establishment of the body in health and vigour; in short, we have daily to lament that muscular exercise is sacrificed to accomplishments and to learning. If it be asked, why are girls more subject to distortion than boys? we reply, because they do not romp like boys. The amusements of boys are far more active than sedentary; those of girls are more sedentary than active.—When girls leave school, the same system of muscular quietism is enforced. They must keep up their accomplishments by practice. Several hours a day they must devote to music, and frequently a considerable time to the more injurious occupation of drawing; most of the remaining day, they spend in finger occupations. *Little time is devoted to exercise in the open air,* and the exercise they do take is such as to chill, rather than invigorate the circulation."

In fact, students, clerks, and all those whose occupations require them to stoop, and who do not counteract the effect of this habit by proper exercise, are subject more or less to the hollow sternum.

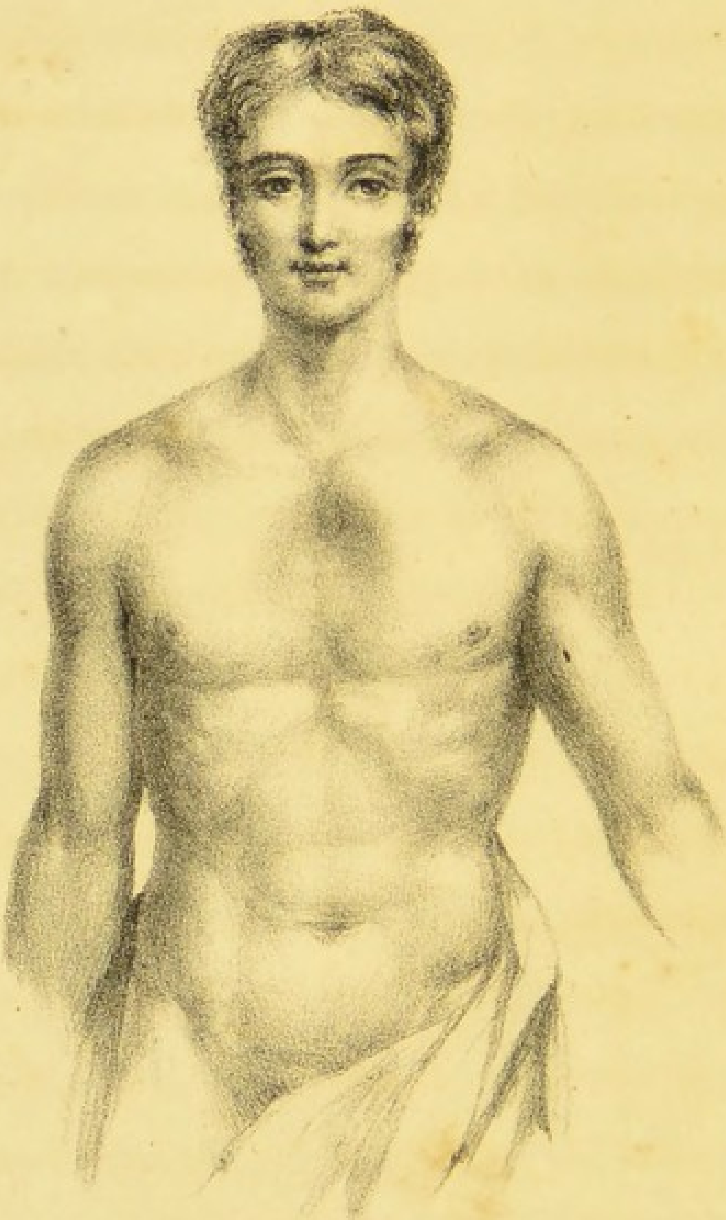
Accident also produces this deformity. I have known it caused by a kick from a horse, and very recently the following case came under my notice, where the hollow sternum was produced by a fall:—

Elizabeth Meadows, æt. nine years, residing at No. 26, Plummer's Row, Whitechapel, applied to me, August the 27th, 1836, on account of a hollowness of the sternum. The mother says that the chest was well-formed and natural until three years ago, when she was pushed down and fell with the chest against the pavement. The integuments of the chest and abdomen were swollen from the effect of the accident, and an attack of fever supervened, which confined her three weeks, and left her very weak. From this time the hollowness of the sternum came on, and at present the lower part of the sternum is sufficiently hollow to contain an egg. She has become of late very thin. By the employment of the Indian Exercises, strengthening medicine, and the avoidance of stooping, the child is now (October 17th) much improved.

The pressure of busks, added to the general pressure of stays, appears to be a great cause of the occurrence of this deformity among women.—It is much more common than is usually supposed.

The external appearances of the chest in this kind of deformity are directly the reverse of those which we last considered. The sternum is hollow or concave anteriorly, being pressed inwards, either at its middle, at its lower part, or along its whole

PLATE. III.



DEPRESSED STERNUM.

extent; the sides of the chest are prominent; the shoulders are high; and the spine is either straight, or but little altered from its natural shape. See Plate III.

Internally, the lungs and heart are of course compressed anteriorly; their functions are correspondingly altered; and their stucture ultimately suffers.

The constitutional symptoms which attend this kind of deformity are not so severe as those which attend the other. The circulation is hurried; the breathing is generally short and quick; and the patient is generally subject to cough or chronic catarrh.

My friend and late colleague, Dr. Lambe, told me that a patient of his, in whom this depression or hollow state of the sternum existed, died of a pulmonary affection. The sinking in of the sternum in this case was the consequence of the affection of the lungs, or rather of the weakened state of the circulation, because, for upwards of fifteen years, he had been subject to these attacks, and the sinking in of the sternum had come on only during the last three years.

Still, as I before observed, affections of the stomach are more prevalent in this deformity than those of the chest. Uneasiness after meals, pain in the region of the stomach, flatulency, irregularity of the bowels, and general weakness, are the concomitants of this deformity.

SECTION X.

TREATMENT OF THE DEFORMITIES OF THE CHEST.

In my first paper * on this subject, I observed that the occurrence of both these deformities appeared to me to depend, in most cases, on a weak and languid state of the circulation; and the constitutions of those in whom they are met with, as well as the state of the osseous system, as demonstrated by dissection, strengthened this opinion.

I am now disposed, in some measure, to qualify this opinion. It is the good fortune of surgery to treat of obvious and indisputable facts; and it is less conformable to the philosophic spirit of that art to assign, as the cause of disease, a certain state of the circulation, or other functions, than that structural condition,

* London Medical Gazette, vol. v.

or, as in this case, that palpable malformation, by which it would appear that such state of function must inevitably be produced. This view seems to be confirmed, in the present case, by the fact that the removal of the deformity by exercise, &c., at once rectifies all functional derangement.

It is, moreover, more reasonable to suppose that a great cause like this, oppressing the centre and source of the circulating and respiratory systems, should produce an infinity of functional derangements, than that these (themselves uncaused, or without assigned cause) should produce so great a deformity.

But whatever may be the ultimate cause of these deformities, both local and constitutional means are expedient in the treatment of them.

The constitutional remedies for both deformities are the same. We must order nutritious diet; regulate the digestive function; and employ the artificial salt-water bath, with a very large proportion of salt, at a temperature suited to the peculiarities of the case (or preferably sea bathing),—in short, we must make use of all those means by which the system can be duly kept up.

After having evacuated morbid secretions and fœcal accumulations from the bowels, by means of the usual purgatives, of which rhubarb, or senna combined with a tonic bitter, is among the most suitable, Dr. Copland recommends Brandish's alkaline solution, or the solution of potash, or other preparations of this substance, either in some gruel or mutton broth, or in a tonic infusion, or combined with preparations of iron. The following powders may also be taken once, twice, or thrice daily:—

℞. Ferri sulp. exsic. gr. ii—vj.
Potas. sulp. . gr. xij—xx.
Pulv. cascarillæ ʒj—ʒiss.

Misce bene, et divide in cartulas xij æquales, quarum capiat unam bis terve quotidie.

℞. Potas. subcarb. . gr. i—iv.
Ferri subcarb. . gr. iij.
Pulv. Rhæi . . gr. iv—ix.
Pulv. cascar. (cum
calumbæ) . gr. v—xij.
Misce; fiat pulvis.

℞. Ferri tartarizati . gr. iij—xvj.
Pulv. calumbæ . gr. vj—xij.
Pulv. zingib. . gr. ij.
Misce; fiat pulvis.

Instead of these, the tincture of ammoniated iron, mixtures containing sulphate quinine, or the tincture of iodine, in doses of one to three drops, twice or thrice daily, may be employed advantageously. In every other respect, the treatment is the same as that recommended for rickets.

I concur, however, with Dupuytren, in thinking that a strengthening regimen, and the use of tonics, should be used with all the moderation required by the embarrassment of respiration and the disorder of the circulation, which might be increased, and even rendered dangerous, by a regimen and remedies of too tonic a nature, or given in too great a quantity.

Whatever mode of treatment be adopted, there can be no doubt that a pure air is requisite to its success. My trust, however, is in other than constitutional remedies.

All the practitioners who have considered the subject are agreed that, to these general remedies, we must join local ones.

"Of all those which I have used," says Dupuytren, "I have found none more efficacious than exercises adapted to strengthen the muscles which extend from the arms and shoulders to the chest, and especially than frequent pressure upon the sternum from before backwards."

For the lateral depression of the chest and prominent sternum, I have indeed tried the plan recommended by Dupuytren with success. But knowing *the longer continuity that can be given to exercises, and the brief duration that can be given to pressure;* impressed also with *the very different efficacy of voluntary effort in well directed exercise,* compared with *the passive submission to pressure;* I infinitely prefer the former to the latter wherever it is possible.—But let me lay this method of pressure fairly before the reader.

"Pressure," says Dupuytren, preliminarily, "if exercised on the chest from before backward, by means of a machine supported on the back, and which by means of a spring, a screw, or any other method, would tend to flatten, or rather press in the sternum, would have the disadvantage of all continued mechanical pressure: it would cause insupportable pain, irritate the skin, inflame it, and produce abscesses, or at least scars."

This is a very narrow view of the influence of continued pressure. It would do much more than this: it would destroy the power of the voluntary muscles, and render probably the disease irremediable, by the destruction of one of the best means of cure. If physiology teaches not this, it teaches nothing.

"The pressure," he continues, "which I recommend, has none of these disadvantages. [But how does mechanical pressure differ from the temporary application of a machine?] It consists, after the child has been placed sideways, in placing the hand or knee against his back, or still better, his back against the wall, and placing the palm of the other hand upon the most projecting part of the sternum, and in pressing or pushing the anterior part of the chest towards the posterior part, by alternate movements, which, after some days' practice, accord so well with the movements of respiration, that the little patients, and those who exercise the pressure, soon learn to exercise it during the time of expiration, and to suspend it, so as to allow the breast to develop itself, during the moment of inspiration. During these movements, a sound is heard similar to that made by the air in alternately entering and escaping from a bellows.

" I have often attentively observed the immediate effects of this exercise : these effects are a flattening of the projection of the sternum, a greater or less bending outwards of the ribs, the momentary return of the chest to a more natural shape, respiration much more strong and perfect than in general, [but what does he add?] and, when the pressure is removed, the *immediate return* of the parts to their ordinary state, accompanied with a strong inspiration.

" These pressures should be repeated ten times—a hundred times a-day if it were possible, and continued for several minutes each time: their efficacy will be in proportion to their frequency and duration."

The reader will observe, that I give this method with great qualification. But I proceed to complete the statement of it.

The chief difficulty which the practitioner has to struggle with in the treatment of this deformity, is that of impressing on the minds of parents the absolute necessity of perseverance in the use of pressure, and of disposing them to continue, with sufficient assiduity, a process of which the results cannot for some time be visible. When we must trust to hired nurses, the difficulty, I fear, would be almost insuperable. Dupuytren accordingly says, "The practising of these pressures must not be indifferently consigned to any one. A mother's affection alone is capable of the perseverance requisite for success: with this ally, there is scarcely any malformation of the kind we have described that cannot be remedied; and I have seen children who were dreadfully afflicted, become eventually strong and well constituted."

In the second kind of deformity, local pressure may also be made, but in a different direction from that in the former case. In the first kind of deformity, it must be made from before backwards; in this, from side to side. The child or patient must be placed with one side against the wall, and pressure be made either with the hand or the knee against the prominent part of the opposite side, from below upwards. By pressing the ribs upwards, we tilt the sternum forwards, and in some degree imitate the natural action of the parts. The pressure should be made during expiration, and suspended during inspiration, as in the former case. Parents are frequently astonished to see the degree of pressure which can be kept up without producing any inconvenience.

Dr. Copland suggests that "its benefits will be considerably promoted by applying a liniment, night and morning, along the spine, or even upon both the sternum and spine." But he adds, that "this latter deformity is very seldom met with so early in life as to admit of any expectation of advantage from the use of pressure."

With regard, however, even to that kind of deformity, to the cure of which this mode of treatment is most applicable, that of the ELEVATED STERNUM, *I think* *pressure expedient only where infancy renders guidance unintelligible, and voluntary exercise impossible.* Its less efficiency may be illustrated by a case related by the Baron himself.

The deformity, he says, "could not be immediately remedied; but it was necessary to preserve the child, and for this it was necessary to suckle it. This was effected by keeping the entrance of the nostrils clean and free, by removing from them the breast, and every thing that might impede the passage of the air; by offering the breast to the child, and removing it alternately, so as to leave time for respiration to take place, and especially by gradually substituting, for sucking, which obliges children to breathe only through the nostrils as long as they have the nipple in their mouths, the introduction of food by a spoon, which does not prevent, or but for a very short time prevents, their breathing through the nose and mouth at the same time. By these attentions, the child reached three years of age."

As it is in this stage that Dupuytren proposes the removal of the tonsils when necessary, I may here quote his statement on that subject, without much suspending his narration of the case.

"I have said, that depression of the sides of the chest was often attended by swelling of the tonsils, and that I had been several times obliged to remove a portion of them in infants at the breast. Is it better, then, to attack this cause of the disease, or to wait for it? I have as frequently, perhaps more frequently than others, experienced the difficulty of this operation at a period of life when reason is unable to master the efforts of instinct, which revolts against every thing that causes pain, and strives to free itself even from that which is merely embarrassing. Nothing less, accordingly, than the imminent danger which menaces life, has determined me to act in these cases. So serious is this danger, that I have seen children suffering under depression of the sides of the chest and swelling of the tonsils at the same time, fall, after violent but useless efforts to breathe, and after the most cruel suffering, into the most alarming state of convulsion, or into a state of suffocation, amounting to asphyxia, from which state they recovered only to fall again into the same danger at the end of a few minutes. We must therefore act, if we do not wish to see these wretched children die in the midst of the most frightful torments, owing to the necessity, joined to the impossibility, of breathing."

" An invention," he adds, " as simple as it is ingenious and useful, seems likely in future to render the extirpation of the tonsils more prompt and easy, less painful, and in particular much less dangerous. I mean the speculum invented by one of my pupils, Doctor J. Lemaitre. By means of this instrument, which is as valuable for the diagnosis of the diseases of the mouth, as for the operations they require, we may keep the mouth open, the tongue down and immoveable, and may extirpate the tonsils with perfect safety."

To return to the case,—he says, " I then proposed repeated pressure of the chest from before backward, according to the method before described. The child, at that time between three and four years of age, had at first some difficulty in performing it, but soon became accustomed to it; and the relatives and friends of the child, encouraged by the good effects of the practice, engaged in it with such zeal that these pressures were repeated as often as a hundred times a day, and the child passed from the hands of one to another to be again subjected to the same pressure. This perseverance was attended with the best results. In less than six months, indeed, the projection of the sternum diminished; the back became straight; the lateral depression of the chest ceased almost entirely; the belly diminished in size; respiration was performed more slowly, easily and regularly; exercise was performed with much more ease; the size of the tonsils diminished, as well as the noise made by the air passing through the throat during the night."

Still the Baron acknowledges that this was insufficient.

"*Six or seven years passed in this way!* during which the child grew, and acquired strength remarkably. *Still the child was not perfectly formed, nor the spine perfectly straight, nor respiration perfectly free; the chest was round and cylindrical; the vertebral column projected a little; and respiration was disturbed after any fatiguing exercise.* I then recommended the exercise of moving a weight suspended to a rope passed over two pulleys by means of the superior extremities. This *exercise* [*voluntary and active exercise, not passive pressure*] *was continued during two years* with the same exactness as pressure had been exercised on the sternum. Two or three hours were thus spent every day, and *the good effects of it were speedily manifested!* The muscles of the superior members acquired strength; those especially which are attached to the chest, the great pectoral, the great dorsal, &c. &c. received a great development; the thorax, the sides of which were constantly raised by these muscles, received great increase in size; the spine, the muscles of which were equally exercised by the continual movements of flexion and extension of the body,—*the spine became perfectly straight, and acquired its natural curvature; respiration became full, deep and of the ordinary slowness; in fine, this young female is now one of the tallest and best made of her sex,* and no one in seeing her would even imagine that during her infancy she had been labouring under malformation."

The most instructive passages in this relation, I have marked by italics, and I need not make further comment. It verifies my previous statement, that "pressure is expedient only where infancy renders guidance unintelligible, and voluntary exercise impossible." And "the good effects" of voluntary exercise so "speedily manifested," show that it should have been much earlier commenced, and that thereby the cure might have been much earlier accomplished.

Donald Walker's theory of deformity, and its cure by exercise, shall be given in a subsequent section, from his "Exercises for Ladies," as necessary to demonstrate the Principle on which exercise is so applied, and to obviate some very ill-founded objections.

Under the partial impression of these truths, now vastly strengthened, I observed, when I first published my views on the subject, that "if the child be sufficiently old or strong, all those exercises should be used which have a tendency to expand the chest. The muscles, by the action of which we endeavour to effect this, are the two large serrated and pectoral muscles."

Dr. Copland has subsequently observed, that "in this deformity, the various exercises resorted to with the view of imparting strength and agility to the frame, will be useful, if judiciously directed:" and that "as soon as children affected by this depression of the walls of the chest can be brought to employ the muscles of the upper part of the body in a determinate manner, this mode of treatment should also be employed."

Let us now examine the exercises prescribed by these authorities.

"The object and result of the exercises I recommend," says Dupuytren, "is to raise up the sides of the chest, to separate them, to make them turn outward, and finally to restore them to their natural conformation. There is no exercise better adapted for this purpose than that which obliges persons labouring under this malformation, to raise a weight suspended to a cord passed through two pulleys, by the aid of their arms and hands, during several hours daily. The end of the cord to be grasped should be fastened to the middle of a lever, to be taken hold of by the two hands, the other extremity supporting a weight proportioned to the strength of the individual. The individual standing upright, or even rising on tiptoe, to reach the lever placed at the extremity of the cord, seizes it with both his hands; and, employing the power of the muscles of the fore-arm, arm, neck and chest, to bend the head, chest and body downwards at the same time, must raise the weight at the other extremity of the cord, and alternately employ the flexor muscles to raise the weight, and the extensors to straighten the body. If it be true—and there is no doubt of it—that there exist between the bones and muscles relations of conformation and action, so that the latter always tend to act upon the former, in such a manner as to bring them to their first and fixed shape; it is certain that the exercise we have just described, will, by directing the efforts of the muscles upon the bones of the chest, gradually bring the sides of this cavity to an improved form."

Perhaps the best mode of overcoming the depression by developing muscular action and power, similarly observes Dr. Copland, "is to cause the child to raise weights, by means of ropes and pulleys placed at a considerable height over its head; so that, by taking hold of the rope with both hands raised above the head, and pulling it downwards, the muscles may be brought into action, and the parietes of the chest thereby dilated."

Participating in these views, I observed in my former paper, in speaking of the treatment of the ELEVATED STERNUM, that "the child should stand erect, and *carry the arms as far backwards as it can;*" and, to the latter injunction, I still attach much importance. With a vague impression, however, that the exercise prescribed by Dupuytren was not the best devised, since in it the weight of the body and the contraction of the abdominal muscles must depress the ribs, I observed, that "the use of the dumb-bells is a good exercise," and added, that "any exercise, indeed, is good, by which the scapulæ are approximated towards each other, and the arms carried backwards."

I am now satisfied that carrying the arms backward and approximating the scapulæ, without at the same time depressing the ribs by the weight of the body and the action of the abdominal muscles, is all that is requisite. I object, however, to the employment of dumb-bells for that purpose, on account of the jerk which they produce, the involuntary action (that is, beyond a certain extent) which that implies, and even the danger which it produces; and I deem the Indian Exercises, first described in Europe by Donald Walker, in his "Exercises for Ladies," as greatly preferable to all others, both in these and in every other deformity of the chest. They raise up the ribs and sternum, without the slightest counteracting tendency to depress them, and they give the fullest expansion to the chest.

By these various means, if properly persevered in, the chest returns to its natural shape, and the whole system becomes invigorated.

In the treatment of the DEPRESSED STERNUM, I strongly advise my patients to carry the arms back, at right angles to the body, or as far as they can; and to desist, as much as possible, from stooping. And here also I think the Indian Exercises the most efficacious; for it is evident that whatever both raises and expands, or naturally rounds, the chest, at once elevates the depressed sternum, and depresses the elevated one. As the hollow sternum not unfrequently occurs in adults who stoop a good deal, I recommended an instrument to be worn for the purpose of constantly keeping the body erect; but I beg now to state my conviction of the injurious tendency of all instruments or bandages which impede the natural and voluntary action of muscles, as always tending to their destruction and to the increase of deformity.

I subjoin, from Mr. Walker's book, a plate which represents some part of those exercises, and which will give the reader an idea of the expanding effect which they have on the chest.

No. IV

INDIAN SCEPTRE EXERCISE

The sceptres or clubs consist of two pieces of plain and smooth wood about two feet long (including the narrow portion for a handle to terminate in a nob), and loaded with lead at their lower and larger extremity, so as to furnish any convenient weight, as one pound, one pound and a half, or two pounds.

The mode of using them is exemplified by one of his exercises, thus:—

" Beginning from either first position *, the body being turned laterally,—for example, to the left,—the sceptre in the right hand is thrown upward in that direction at the full extent of the arm, (see Plate IV. fig. 1), making a large circle in front of the body—a circle in which it sweeps downward by the feet and upward over the head, (see Plate IV. fig. 2 and 3), while the sceptre in the left hand at the same time performs the first exercise, (making a smaller circle round the head and behind the shoulders), (see Plate

* In which the sceptres are held upright in front of the body, the elbows being near the hanches and the fore-arms horizontal.

IV. fig. 1, 2 and 3), until, crossing each other, before the head, (rather on the right side), their movements are exactly reversed, the sceptre in the right hand performing the small circle round the head, while that in the left performs the large one ;—and these continue to be repeated to each side alternately."

But it is essential that every reader interested in this subject should possess the important work now quoted, and practise the exercises which precede this one.

I have tried the plan of throwing back the shoulders, in some milder cases, with success ; and I think there are but few cases in which we need despair of doing good. The treatment, however, must be continued for a long time after the chest has been restored to its natural shape, else the deformity is likely to recur.

I entertain, however a somewhat different opinion respecting the pigeon-breast in adults; and fear that in them we shall always experience greater difficulty in restoring the breast to its natural shape. In this deformity, the osseous portion of the rib is the part to be acted upon; in the other, it is more the cartilaginous part.

Having shown, from Mr. Thackrah's excellent and valuable work, in what way students and literary men suffer from a sedentary and bending position, I here quote his observations on the treatment which is necessary:—

" The evils attendant on literary and scientific pursuits, may be greatly diminished by measures of a very simple, though decided, character.

" 1st. The quantity of study should be reduced. It should engage but a moderate and definite proportion of the day. Three or four hours, I think enough for close reflection—others, perhaps, would allow a longer period; but six hours certainly ought not to be exceeded; for more cannot be employed with effect. We hear, indeed, of men reading or writing twelve or fourteen hours a day. They may be at their books during this time, but I doubt their being engaged in study. The faculties cannot support such exertion. The mind and body require relief and alternation. Change is the character of the universe. Every thing has its rise, acmé and decline; and man is subjected to this law, alike in his physical and intellectual character. The mind, long applied, loses its power. As Milton feelingly remarks, 'The spirit of man cannot demean itself lively in this body without some repeating inter-missions of labour, and serious things.' Constant application renders the ideas confused, and stops inven-tion. The brain may then be said to be strained, rather than exerted, and its work is aptly said to smell of the lamp. Let the student bear in mind that, even without reference to health, long continued application of the mind is unwise. He defeats his object by the earnestness with which he pursues it. Let him remember the remark of Pope Ganganelli, 'There is scarcely any book which does not savour of painful composition in some part of it; because the author has written when he should have rested.' Nor is temporary failure all. I have before adverted to the serious effects on the brain and its membranes, which result from excessive application of mind. Let me again urge the student to remember that exhaustion is the result of great exertion, that the finest intellect and powers which mock difficulty, and ridicule opposition, are often broken by their own intensity of action. Nothing surely is more melancholy than the view of high-wrought talents sinking into torpor, and night-shade encircling the brow, which should have worn the chaplet of laurel. Alternation of pursuits affords some relief. But this principle cannot be a substitute for rest, still less can it be a substitute for that muscular exercise in the open air, which is the

"2nd measure.—This remedy, indeed, is as obvious as the first, and yet quite as much neglected. By muscular exercise, I do not mean a walk at the rate of a funeral procession; or a ride on horseback, at the pace of a market woman: I mean such exercise as healthy boys take when liberated from the school-room, or as sportsmen take when in pursuit of game—exercise which produces full circulation, and a free state of skin. The gymnastic practice is highly to be commended *. Gardening is also a valuable recreation, and one which may be used when the age for more strenuous exertion is past.

"A third remedy, to which I have more than once adverted in other classes, and which, from its importance, I would enforce, though at the risk of repetition, is attention to the state of the digestive organs, and especially to the time and mode of eating. When food is taken at irregular times, and in a hasty manner, the stomach must suffer. The gastric juice is not constantly secreted; and the period of its abundance is determined by the habits of the individual. If a man, accustomed to dine or lunch at two, defer the meal till

* "He who vehemently applies himself to the mathematics, or to any other dianöetic exercise, should also employ the motion of the body, and be familiar with the gymnastic."—*Taylor's Plato.* Hippocrates, though delicate in constitution, acquired health by the practice of the gymnastics, and attained the age of 100.

five, he finds his appetite and power of digestion to be less. In fact, the stomach secreted gastric juice at its usual period; but, receiving nothing for this solvent to act on, was obliged to absorb it, and was not able to effect a fresh production equal in quality and quantity to the former. The meals, then, should be taken at regular and accustomed hours. We are far from approving of frequent meals; they do not allow sufficient rest for the stomach. Still less should food and study be so mixed together, as to leave no time for digestion. The quantity of food should be considerably less than usually taken. This rule is of more importance than a reference to quality. Some literary men have been in the habit of taking vinous or spirituous liquors; but this practice is decidedly injurious. The intellectual excitement it produces at the time, is more than counterbalanced by the subsequent depression; and ruin of health, and the abbreviation of life, are the ultimate results. Tea and coffee are much better and safer stimulants; they have been highly prized by Harvey, Pope, Voltaire, Napoleon, and others. Their moderate use may be commended; but the student should be informed, at the same time, that their abuse—the drinking, I mean, of tea and coffee of great strength, or several times a day—decidedly impairs the tone of the stomach. Fermented liquors are injurious. The state of the intestines is important. When these are neglected, the digestive functions are impaired, and a train of bodily evils necessarily succeed. The mental faculties are, in many persons, affected even immediately by the state of the bowels.

"As pure air is important to the student, the country is of course preferable to towns. I may repeat also the general recommendation of morning, as the best time for mental application. When there is much excitement and continued labour, the frequent washing of the head with cold water affords great relief, and tends to prevent that irregularity in the circulation, on which is founded disease of the brain."

I will now give some cases of these deformities.

Case I.—William Powell, æt. six years, of a weak and delicate constitution, applied at the General Dispensary, May 7th, 1828, for a complaint of his chest.

His mother states, that the child had a fine natural breast when born, but, when seven months old, she perceived the form of the chest begin to alter, and, from that time to this, it has been gradually attaining its present shape. The sternum appears, at first view, very prominent; but on a careful examination, the sternal extremities of the ribs project most, the sternum not being so much altered in direction. The sides of the chest are very much depressed, particularly the right side. There is slight lateral curvature of the spine. The child's breathing is not very quick or difficult when awake; but it breathes through the mouth, and the nose appears as if it were stopped up. The tonsils are very much enlarged. During sleep, the breathing is very laborious, and the child is constantly making a dreadful noise. (Unwilling to trust to the assertions of the parents, I convinced myself of the fact by being present when he was asleep. The noise was very peculiar: the breathing appeared for a moment to be suspended, and then to be resumed with a rattling noise.) He frequently starts up in his sleep, and makes various exclamations. He has a cough, and is a little deaf. The mother gives the child a decoction of rue and savine, of sufficient strength to keep the bowels open, by which he appears to be benefited.

I advised the pressure, and the exercises which I have first described: they were partially tried; but the parents being inattentive, or too indolent to persevere with the treatment, the child derived little or no benefit.

Case II.—Master William N——, æt. five years, of a weak and delicate habit, brought to me, May 5th, 1828, for tinea capitis.

Perceiving that the child breathed with difficulty, I inquired the reason, and desired to look at the chest. On examination, I found both sides of the chest very much depressed; the sternum prominent, particularly at its upper part; the lower portion slightly concave. The child was born with a broad chest, but, after the first year, it began to assume its present shape. The breathing is quick and short; the nostrils appear as if they were stopped up; and the child breathes through the mouth. During sleep, he struggles a good deal, rises up in the bed, and, after making a great noise, recovers himself. The noise is so loud and distressing to the mother, as frequently to prevent her sleeping. The tonsils are enlarged; and the child has a frequent running at the nose.

I pointed out to the parents, who are intelligent persons, the cause of the difficulty of breathing, and the other symptoms; and I assured them that, if they would apply pressure to the chest, and induce the child to take certain kinds of exercise, which I enumerated, the chest would resume its natural shape, and the symptoms disappear. They immediately consented: the child was laid on the floor or table, and pressed by the mother for five minutes, or more, repeatedly during the day. The dumb-bells were employed a good deal; and exercise with the pulleys and rope was tried. The constitutional remedies which I have enumerated, were also employed. These means were steadily persevered in for several months. The state of the breathing soon mended, as well as the health of the child; and the chest began to resume its natural shape. The chest is now well-formed.

Case III.—John William Rivers, æt. 16, thin and emaciated, applied at the General Dispensary, June 9th, 1828, for an affection of his chest.

He states that he has great difficulty in breathing, particularly on making any exertion, palpitation of the heart, sensation of choking, and very unpleasant dreams. He starts up in his sleep, and makes a very curious noise, the respiration being, as in the former case, for a moment suspended, and then resumed with a rattling noise. The tonsils are enlarged; he is slightly deaf; and he has a cough. On examination, I found both sides of the chest very much depressed, and the sternum very prominent at its upper, but a little concave at its lower part. The pulsations of the heart were to be seen very strong against the side of the chest. There was a lateral curvature of the spine. The mother told me that her son was born with a flat chest; and was strong and healthy up to his fourteenth year, at which time he was apprenticed to a tailor. Soon afterwards, the complaint began to make it appearance.

It was so evident that great confinement had destroyed the boy's health, and produced this state of constitution, that I ordered him to quit the business, without which no mode of treatment would be availing. After reference of the case, by the master, to a magistrate, the boy was released from his apprenticeship. I then advised pressure, dumb-bells, and the other exercises, and gave quinine internally. My directions were attended to. In the space of a month, the shape of the chest began to improve; the breathing was easier; and, at the end of four months, he was cured. He is now robust, and in good health; and the chest is as flat as natural. I have recently seen this person, and find his chest continues flat.

Case IV.—Charles Clitherow, æt. 4 years and a half, of a delicate constitution, was brought to me June 29th, 1829, with an affection of the chest.

The mother states that her child was born with a flat chest, and that its shape did not begin to alter until a year and a half ago, when it was taken with shortness of breathing, slight cough, and wasting of the body. The mother, at this time, perceived an alteration in the shape of the chest. All these symptoms had latterly increased. The child starts up in his sleep, and makes various exclamations; and the nostrils are always as if they were stopped up. The tonsils are enlarged; and he grates his teeth in his sleep.

The same means were ordered in this case as in the preceding, and the shape of the chest was, after eighteen months, very much improved.

Case V.—Elizabeth Morphew, æt. 8 years, residing at No. 10, York-street, Whitechapel, applied to me, in May this year, on account of a hollow sternum.

The mother says, that her daughter has had this depression of the chest from her infancy; that she was always very delicate; that latterly, however, she has had a good deal of cough and shortness of breath, and that she frequently complains of pains and weight across the chest, which compel her to bend forward for the purpose of relief. She is very thin and pallid, has bad appetite, and is slightly deaf. The lower half of the sternum is considerably depressed; the edges of the ribs are convex; and there is also slight lateral curvature of the spine.

I ordered her, Liquor. Calcis ℥iiss; R. Humuli et

R. Calumbæ, ana ℥iv; Extract. Sarsæ ℥j: a dessert-spoonful of this mixture to be taken twice a-day, and an aperient powder occasionally. Above all, I strongly impressed on the mother's mind the necessity of exercises, which have been adopted with great regularity.

By the use of the Indian Exercises, the form of the chest is already much improved. I have also directed the child to lie down on a hard board whenever she feels fatigued.

There are two other children in the same family, who have a tendency to the same affection: a third died of a disease of the chest. The mother is of a delicate constitution, but the father is strong and healthy.

Case VI.—A gentleman from the neighbourhood of Croydon consulted me in August, on account of a depression of the sternum. For several years, he had been accustomed to stoop a great deal at a desk.

I strongly advised my patient to take the Indian Exercises, under the superintendence of Mr. Goadly, of No. 97 B, Quadrant, Regent Street, which he has done with considerable relief to his deformity.

The following case was sent me, in September last, by an intelligent lady from Ipswich.

Case VII.—Emma Burman, aged 8 years, was a fine baby, and in good health till about three years old. She then became unwell, and has been gradually becoming worse, especially during the last two years. The child's chest considerably projects, the ends of the ribs being as prominent as the knuckles appear when one's hand is clenched. The quick and laboured pulsation of the heart is visible against the side. She has a cough, and expectorates considerably. Her breathing is short, and she makes a frightful noise when asleep—so much so, that her mother often fears she will be suffocated. Her appetite is bad.

The child has regularly taken the medicine prescribed at page 44 of your work, and used the skipping-rope several times a-day, lying down on the floor when fatigued. Her mother says that she breathes with much less difficulty, especially in sleeping; that her cough is better; and that her appetite is improved. The child says she feels better, and is very much pleased with the exercise prescribed.

October 8th.—During the last month, the child has been taking the Indian Exercises, by the use of which the state of her chest, as well as that of her general health, are very much improved.

Case VIII.—R. Snelling, æt. 23, of a delicate constitution, living at No. 3, Montague Street, Russell Square, footman, applied to me, Sept. 16th, 1836, on account of a deformity of the chest. He says, that as long as he recollects, he has been subject to a deformity of the chest; that his breathing is short, with a sense of oppression at the lower part of the sternum; that, in the winter months, he is subject to coughs; and that he is told he constantly makes a disagreeable noise in his sleep. The uvula is always relaxed. The sides of the chest are depressed; there is a slight groove along the sternum; and there is lateral curvature of the spine. I recommended the Indian Exercise—cold sponging—going out in the open air—and avoidance of all causes that tend to lower or depress the system.

Case IX.—William Grelly, æt. 20, book-binder, No. 2, Knowles' Court, Little Carter Lane, applied to me, August 31st, 1836, for an affection of the chest. He says, that, for some time past, he has suffered pains in the breast-bone, towards its lower part, and felt his breathing not so free as before these pains came on. On examination of the sternum, the lower third is very much depressed; and this he attributes to pressure against this part of the sternum in his occupation. In other respects, his health is very good.

I strongly advised him to avoid pressing against this part of the sternum, to trust to the strength of his arms only, to sponge the chest with cold water, to take the

Indian Exercise, and to go out in the open air whenever he could.

October 29th. He has strictly attended to my directions; the hollowness of the sternum is much improved; and his breathing is considerably better.

The following is Mr. Goadby's report of two of the cases in which I had directed him to employ the Indian Exercises.

"Case I.—Recommended to me by Mr. Coulson for the practice of the Indian Exercises.—24th August, 1836.—A gentleman aged between thirty and forty, tall and thin, with a very narrow chest, and appearing to have considerable depression at the bottom of the sternum.—Exercise with boy's clubs, each of only four pounds weight, set the whole of his frame in a state of tremulous agitation. The first simple and gentle exercise produced instant perspiration, owing to the very weak state in which he was. He nevertheless made considerable exertion for nearly an hour, and acquired three of the exercises.—A week after, on the 31st of August, having practised in the meantime, he was visibly improved in his appearance; his chest was evidently enlarged; and that debility which attended him on his first practice had left him. He now made use of the first men's sized clubs, each of five pounds weight, and performed additional exercises.—At his third visit, on the 9th of September, his strength had so much increased, and his chest expanded, that his exercises were performed with the six-pound clubs; and new exercises were added. Practising every day, he found the depression of the chest much improved, and observed that he had no occasion to see me again for a month.—His fourth and last visit was on October the 7th, when he appeared quite an altered man, exercised with the six-pound clubs with great ease, and was requested, when he came again, to bring back his clubs, and exchange them for others of still greater weight.

"Case II.—Recommended to me by Mr. Coulson.—This case was far worse than the first. The gentleman appeared to be under thirty, tall, and having, from a bad habit of stooping, or from a severe cold, contracted his chest and injured his lungs. His voice was hollow; he was labouring under severe indisposition and great debility; and he expectorated blood.—This being a case requiring the greatest caution, he took his first exercise on September the 30th, with the clubs used by children of seven years of age; viz., of two pounds weight each. The first simple exercise caused him a temporary loss of breath and much exhaustion. A second exercise only could be ventured upon. These could scarcely be practised long enough to enable him to retain them; the whole time, including rests, not lasting more than a quarter of an hour.—Taking the small clubs home with him for practice, during three or four days, his next visit was on the 4th of October, when he stated that he was much better; and he had actually gained so much strength that there was no difficulty in giving him the four-pound clubs.—On his third attendance, only two days after, viz., the 6th, he employed the six-pound clubs, his strength having wonderfully improved. He soon obtained six of the exercises, which he performed without the exhaustion attending his first attempt.—On October the 11th, his fourth visit, after a period of only eleven days, his figure was erect, his chest enlarged, he looked more cheerful, and was also quite an altered man.

SECTION XI.

EXTERNAL FORMS OF THE CHEST IN WOMAN, AS PRELIMINARY TO COMPRESSION BY STAYS.

For the views taken in this section, as necessary to understanding the supposed purpose, and the real effects, of compression by stays, I am mainly indebted to the work of Alexander Walker—"Beauty, Illustrated chiefly by an Analysis and Classification of Beauty in Woman"—a work well calculated to advance the interests both of anthropology and of the fine arts.

With the capacity of the pelvis and the consequent breadth of the hanches, all those functions which are most essentially feminine are intimately connected.

Camper, in a memoir on physical beauty, read to the Academy of Design, at Amsterdam *, showed that, in tracing the forms of the male and female within two elliptical areas of equal size, the female pelvis extended beyond the ellipsis, while the shoulders were within; and the male shoulders reached beyond their ellipsis, while the pelvis was within.—Hence, by dress, women instinctively endeavour to enlarge the region of the pelvis.

The abdominal and lumbar portion of the trunk, as already said, is longer in woman. In persons above the common stature, there is almost half a face more in the part of the body which is between the mammæ and the bifurcation of the trunk.

The abdomen placed below the chest has more projection and roundness in woman than in man: but it has little fulness in a figure capable of serving as a model; and the slightest alteration in its outlines or its polish is injurious.

The waist, which is most distinctly marked in the

* Memoire sur le Beau Physique.

back and loins, owes all its advantages to its elegance, softness and flexibility.—Hence women narrow and relatively elongate the waist.

The neck should, by the gentlest curvature, form an almost insensible transition between the body and the head. It should also present fulness sufficient to conceal the projection of the flute part of the throat in front, and of the two large muscles which descend from behind the ears toward the pit above the breast-bone.—Hence all the management of the neck in women.

Over all these parts, the predominance of the cellular tissue, and the soft and moderate plumpness which is connected with it, is a remarkable characteristic of the vital system in woman. While this facilitates the adaptation of the locomotive system to every change, it at the same time obliterates the projection of the muscles, and invests the whole figure with rounded and beautiful forms.—Hence much also of female management.

It has been well observed that the principal effect of such forms upon the observer must be referred to the faculties which they reveal; for, as remarked by Roussel, if we examine the greater part of the attributes which constitute beauty, if reason analyse that which instinct judges at a glance, we shall find that these attributes have a reference to real advantages for the species. A light shape, simple movements, whence spring brilliance and grace, are qualities which please, because they announce the good condition of the individual who possesses them, and the greater degree of aptitude for the functions that individual ought to fulfil.

Even the preparatory vital organs and functions differ somewhat in the two sexes.

Woman has frequently a smaller number of molar teeth than man; those called wisdom teeth not always appearing. Mastication is also less energetic in woman.—Hence sometimes woman's affectation of delicacy in this respect.

The stomach, in woman, is much smaller; the appetite for food is less; hunger does not appear to press her so imperiously; and her consumption of food is much less considerable *. Hence indubitable cases of long abstinence from food have generally occurred in females.

In the choice and the preference of certain aliments, woman also differs much from man. In general, women prefer light and agreeable food, which flatters the palate by its perfume and its savour. Their appetites are also much more varied.

Women, whom vicious habits have not depraved, use also beverages less abundantly than men. Fermented, vinous, and spirituous beverages are indeed used only by the monsters engendered in the corruption of towns—amidst the insane dissipation of the rich, or the wretched and pitiable suffering of the poor; and both are then brought to one humiliating

* Statistical results in relation to the supply of hospitals and prisons, carry the expense of a man much beyond that of a woman.

level, marked by the red and pimpled, or the pallid face, the swimming eye, the haggard features, the pestilential breath.

Digestion in woman is made, however, with great rapidity; and the whole canal interested in that process possesses great irritability.

The absorbent vessels in woman are much more developed, and seem to enjoy a more active vitality.

All these facts as to the subordination and the delicacy of the preparatory vital organs, originate the taste for tight stays, and insure their consequences.

Women have, in greater abundance than men, several of the liquids which enter into the composition of the body. They appear to have a greater quantity of blood; and they certainly have more frequent and more considerable hemorrhages. There is less force in the circulation and respiration; but the heart beats more rapidly. The pulse also is less full, but it is more quick and more firm.

Connected with this, in woman, the purer lily and more vivid rose of complexion depend upon various causes.

It would appear that, in women, the blood is in general carried less abundantly to the surface and to the extremities, where also the white vessels are more developed; and that, to this, as well as to the subjacent adipose substance, the skin owes its whiteness.

In youth, however, one of the constituent parts of the skin, the reticular tissue, or whatever the substance under the scarf-skin may be called, appears to be more expanded, especially in women; and it would seem that this tissue is then filled with a blood which is less dark, and which forms the colouring of youth. This, differently modified by the scarf-skin, gives the blue, the purple, and all the tints formed by these and the colour of the skin. Where the vessels are more patent, and the skin more thin, delicate and transparent, as in the cheeks, the hue of the rose is cast over that of the lily. In addition to this, the slightest emotions of surprise, of pleasure, of love, of shame, of fear, often diversify all these tints.

Lightness of complexion, however, is probably dependent more particularly on the arterial circulation, and darkness of complexion on the venous circulation; for we know that in fairer woman the arteries possess greater energy, while in darker man the veins are more developed, larger and fuller.

The branches of the great artery of the body, the aorta, supplying the abdomen and pelvis, are larger in woman than in man, as well as more habitually liable to variation in the quantity of their contents. The quantity of blood, also, which passes to the abdomen, is greater.

The relation of this to the compression by stays is obvious.

At the same time, the secretions are generally less in women. Hippocrates says, "Nam corpus muliebre minus dissipatur quam virile;" the expenditure of the body of woman is less than that of man.

It is evident, then, that the secretions, nutrition in particular, must be greater. We actually know them to be so.

But the nourishment of the organs concerned in locomotion is less active, and that of the cellular and adipose substance is generally more active, than in man. Hence the slenderer muscles of woman, and the circumstance that she affects to be even feebler than she is.

And on this, important consequences depend.

Woman is subject to crises which would destroy all her organs, if they offered too powerful a resistance. Some parts of her body are exposed to great shocks, to alternate extensions, compressions and reductions, which could not take place with impunity, but by means this predominance of the cellular and adipose structure.

The cellular expansion, the general basis of the structure, appears, then, to be more abundant in woman, more lax and yielding, more dilated and fuller of liquids; and it is by yielding gradually, by decomposing and weakening shocks by means of the general suppleness of the different organs, thus procured, that nature seems, in woman, to avoid, or to destroy, every hurtful effort.

It is thus, then, that nature gives to all the parts of woman that suppleness which renders her capable of easily yielding to the great revolutions which affect her organisation in regard to reproduction, as well as mark the different periods of her life.

How opposite, then, to the intention of nature is the constraint of tight-lacing!

Now, with the great purposes described above, beauty is naturally associated. It is principally this excess of the cellular and fatty tissues which gives to the members of woman those round and beautiful outlines, that soft and polished surface, which the body of man does not possess.

In every part, however, of the human figure, as observed by Reynolds, " when not spoiled by too great corpulency, will be found distinctness, the parts never appearing uncertain or confused, or as a musician would say, slurred; and all those smaller parts, which are comprehended in the larger compartments, are still found to be there, however marked."

Thus even the interests of beauty have been so perfectly consulted by nature, as to show how injudicious is the interference of art in opposition to it.

Now, while all this is the case, it appears that the true skin is much thinner and more delicate in woman than in man, and that it derives more or less of its clear whiteness from the quantity of fat which is below it; for meagreness inevitably tarnishes and dries it. Hence, to possess a fine, soft, white and fresh skin, it is also indispensable to possess plumpness.

In relation to this purer white, it must also be observed, that transpiration, which might soil it, appears to be much less abundant in woman; and that the liver or vein-relieving gland, is very large. The excretions of the skin in woman are indeed chiefly limited to certain parts.

While the skin is thus more white in women, it is also more transparent. The reticular tissue, or substance interposed between the true skin and scarf-skin, appears to have more clearness and turgescence, especially on the face, where, under the influence of various emotions, it easily permits a passage to the blood, as we see in blushing. It is in youth that this turgescence and clearness are most evident.

Hence the skin in woman less conceals the veins, of which the colour, only enfeebled or modified by the skin, 'gives all those shades of azure which the charmed eye follows with so much pleasure on the surface of the bosom and of all the parts where the skin has least of thickness.'

All this constitutes freshness or animation, which is nearly synonymous with health, and without which there is no beauty. 'When that quality,' as observed by Roussel, 'is wanting, all other attractions strike but feebly, because the prompt judgment, which instinct suggests, warns us that the woman whose person does not present all the characters of perfect health, is in a disposition little favourable to the plan of nature, relatively to the maintenance of the species.'

On these circumstances many of the arts of women are founded; and it will be found that few are more fatal to this kind of beauty than tight-lacing.

The whiteness and the animation of the skin, however, do not alone constitute its beauty: there is still another quality which is absolutely necessary to it. This is the softness and the polish which, as the reader has seen, is one of the first conditions of physical beauty. In woman, this is probably derived from a slight degree of oleaginous secretion. Hence she has few asperities of the skin, especially on the surface of the bosom, and elsewhere.

Brown women, who probably have more of this oleaginous secretion, are said to possess in a greater degree the polish of skin which gives impressions so agreeable to the organ of touch; and hence Winckelmann has said that persons who prefer brown women to fair ones, allow themselves to be captivated by the touch rather than the sight *. There is reason, however, to doubt the accuracy of this. Brown women appear to have greater softness, but less smoothness of skin.

Pressure and constraint, however, effectually destroy the smoothness and polish of the skin.

In woman, the bust is smaller and more rounded than in man; and it is distinguished by the volume and the elegant form of the bosom.

The external and elevated position of the mammæ is by far the most suitable for a nursling, which, no longer deriving subsistence from within the mother, nor yet able of itself to find it without, must be gently and softly borne toward her; 'an admirable posi-

* "Quegli che preferisce la bruna non mal s'oppone certamente, se più del tatto che dallo sguardo si lasci attrarre; poichè generalmente la pelle d'una mano bruna (quando tal sia naturalmente, e non per l'azilne del sole e delto' aria) è più dilicata e morbida che quella d'una mano candida."—*Storia delle Arti del Disegno.*

tion,' says a French writer, 'which, in keeping the infant under the eyes and in the arms of the mother, establishes between them an interesting exchange of tenderness, of cares, and of innocent caresses, which enables the one the better to express its wants, and the other to enjoy the sacrifices which she makes, in continually contemplating their object.'

According to Buffon, in order that the mammæ be well placed, it is necessary that the space between them should be as great as that from the mammæ to the middle of the depression between the clavicles, so that these three points form an equilateral triangle.

The two portions of the mammæ should be well detached. The whole presents, in beautiful models, more elegance than volume; and the areola, it may be observed, is red in fair women, and deeper coloured in brown ones.

Winckelmann observes that, in the antique statues, the mammæ terminate gently in a point, and that they have always virginal forms, as a consequence of the system of the ancient artists, which consists in not recalling in the ideal the wants and accidents of humanity.

All this, it will be seen, is altered by the pressure and constraint of stays.

SECTION XII.

COMPRESSION BY STAYS POPULARLY CONSIDERED.

Anxious to satisfy even the general reader in all that regards, not the *cure*, but the *prevention*, of deformity resulting from the use of stays, I, in this section, avail myself of the elegant, and to every lady the indispensable, work of Mrs. A. Walker, entitled "Female Beauty, as preserved and improved by Regimen, Cleanliness and Dress, and especially by the Arrangement, Colour and Adaptation of Dress, as variously influencing the Forms, Complexion and Expression of each Individual, and rendering Cosmetic Impositions unnecessary; all that regards Regimen and Health being furnished by Medical Friends, and revised by Sir A. Carlisle.

The eager desire of amending the defects of nature has induced the use of stays, as a mechanical means, to prevent or correct those forms which are commonly ascribed to her errors, but which we might more frequently impute to our own.

This part of our subject, I regret to say, has not always been wisely treated, even by medical writers. They generally, if not always, speak of the compression of the waist as quite unaccountable and quite unnatural.

'We know,' says even Soemmerring, 'that as often as the waist is lengthened to its natural limits, the tendency to abridge its diameter appears; and we confess we are puzzled to account for the fact; for surely it is strange that a permanent prepossession should exist in favour of a mode of dress which is at once ugly, unnatural and pernicious.'

Now, every young woman knows that one of the most conspicuous differences between the young and the old, consists in the less or the greater distension of the waist. Is it then unaccountable or unnatural that she should prefer seeming young to seeming old? Every young woman knows that one of the most conspicuous differences between the maiden and the matron consists in the same less or greater distension of the waist. Is it unnatural, then, that she should prefer seeming maidenly to seeming matronly? Men, who write so injudiciously, do not promote the interests of truth. It is the use of force and excessive compression that are alone blameable.

When, indeed, corsets are employed to render the chest as small below, and as broad above, as possible, and greatly to increase the fulness and prominence of the bosom;—when the young lady spends a quarter of an hour in lacing her stays as tight as possible, and is sometimes seen by her female friends pulling hard for some minutes, next pausing to breathe, then resuming the task with might and main, till, after perhaps a third effort, she at last succeeds, and sits down covered with perspiration; then it is that the effect of stays is not only injurious to the shape, but is calculated to produce the most serious inconveniences.

And what is the effect of this compression upon the eye and mind of the observer? It excites an instantaneous conviction of artifice, and a very natural suspicion of its necessity: notions equally at variance with beauty and purity are called up; and the object of these dark thoughts may excite much more contempt than admiration. When, indeed, a lady is tightly laced, she loses the character at once of beauty, of grace, and of innocence.

If the ancients, who have left us the most perfect models of human beauty, obtained it by simple means, by supporting the shape without compressing it, we must necessarily obtain the opposite result by our folly, in attempting to form the shape by means of whalebone bodies and corsets.

The human form has been moulded by nature, and the best shape is undoubtedly that which she has given it. To endeavour to render it more elegant by such means, is to change it: to make it much smaller below, and much larger above, is to destroy its beauty: to keep it cased up in a kind of domestic cuirass, is not only to deform it, but to expose the internal parts to numerous and frightful accidents.

Under this compression, the development of the bones, which are still tender, does not take place conformably with the intentions of nature, because nutrition is stopped, and they consequently become twisted and deformed.

Women who wear very tight stays complain that they cannot sit upright without them, nay, are compelled to wear *night stays* when in bed; and this strikingly proves to what an extent tight stays weaken the muscles of the trunk. It is this which predisposes to lateral curvature of the spine.

From these facts, as well as many others, it is evident, that tight stays, far from preventing the deformities, more or less considerable, which an experienced eye might remark among ninety out of every hundred young girls, are, on the contrary, the cause of these deviations. Stays, therefore, should never be worn, under any circumstances, till the organs have acquired a certain development, and they should never at any period be tight.

A well-known effect of the use of stays is, that the right shoulder frequently becomes larger than the left, because the former, being stronger, and more frequently in motion, somewhat frees itself, and acquires by this means an increase, of which the left side is deprived, by being feebler and subjected to continued compression.

'The injury,' says a correspondent of the Scotsman, 'does not fall merely on the structure of the body, but also on its beauty, and on the temper and feelings with which that beauty is associated. Beauty is in reality but another name for that expression of countenance which is the index of sound heath, intelligence, good feelings, and peace of mind. All are aware that uneasy feelings, existing habitually in the breast, speedily exhibit their signature on the countenance, and that bitter thoughts, or a bad temper, spoil the human face divine of its grace. But it is not so generally known that irksome or painful sensations, though merely of a physical nature, by a law equally certain, rob the temper of its sweetness, and, as a consequence, the countenance of the more ethereal and better part of its beauty *.'

In many persons, tight stays displace the breast, and produce an ineffaceable and frightful wrinkle between it and the shoulder. And in others, whom nature has not gifted with the plumpness necessary to beauty, such stays make the breasts still flatter and smaller.

Generally speaking, tight stays destroy also the firmness of the breast, sometimes prevent the full

* 'It may not be amiss to inform the ladies, according to our medical instructor, that the red-pointed nose which glows, rather inauspiciously, on some female faces, is in many cases the consequence of tight lacing.'

development of the nipples, and give rise to those indurations of the mammary glands, the cause of which is frequently not well understood, and which are followed by such dreadful consequences.

They also cause a reddish tinge of the skin, swelling of the neck, &c.

A delicate and slender figure is full of beauty, in a young person; but suppleness and ease confer an additional charm. Yet most women, eager to be in the extreme of fashion, lace themselves in their stays as tight as possible, undergoing innumerable tortures, appear stiff, ungraceful and ill-tempered. Elegance of shape, dignity of movement, grace of manner, and softness of demeanour are all sacrificed to foolish caprice.

Stays tend to transform into a point the base of the cone which the osseous frame of the chest represents, and to maintain in a state of immobility two cavities whose dimensions should vary without ceasing. By this compression, stays are prejudicial to the free execution of several important functions, muscular motion, circulation, respiration, digestion.

The muscles or organs of motion are enlarged by free exercise, and are destroyed by compression. Every degree of this, as exercised by stiff stays, diminishes and enfeebles the muscles of the chest: a great degree of it absolutely annihilates them. Long before that is accomplished, the stays become necessary for support, instead of the muscles; but, as their support is remote from the spine, as well as inadequate, it yields, and lateral curvature or crooked back ensues. Retreat to natural habits is now difficult or impossible; if the muscles retain any power, they increase the curvature; and the wretched being is reduced to the necessity of obtaining support and maintaining existence by stays still stiffer during the day, and by *night stays* when in bed!

By impeding the circulation of blood through the lungs, the use of stays not only prevents their proper development, and renders respiration difficult, but becomes a predisposing cause of convulsive coughs, consumption, palpitation of the heart and aneurism.

From the same cause, obstinate and dangerous obstructions in the abdominal organs, which are displaced by the pressure of the busk, are of frequent occurrence.

In females, the liver has frequently been found pushed several inches beyond the last ribs, and its superior surface perceptibly marked by them; and this produced solely by the pressure of the stays upon the organs contained in the chest.

The breasts, owing to compression, are, as well as other organs, liable to become schirrous; and an opening is thus made for cancerous affections and hysterical diseases; to which last, a sedentary life alone sufficiently predisposes.

Difficult labours and the utter wreck which they produce of health and of beauty, are equally the effects of the hip or hanch bones being altered, during youth, by the pressure of stays.

All this is supported by the highest authorities. Locke, who was a physician, says 'Whalebone stays often make the chest narrow, and the back crooked: the breath becomes fetid; and consumption probably follows.'

'I cannot conceive,' says Rousseau, 'how this abuse, which is carried in England to a surprising extent, does not eventually cause the species to degenerate; and I maintain, that the style which is adopted as a beauty is quite the reverse; for it is anything but agreeable to see a woman cut in two like a wasp. This defect strikes the eye in the naked figure: how can it be a beauty in the clothed one?'

'The only circumstance,' says Reynolds, 'against which indignation may reasonably be moved, is, where the operation is painful or destructive of health; such as some of the practices at Otaheite, and the strait lacing of the English ladies; of the last of which practices, how destructive it must be to health and long life the professor of anatomy took an opportunity of proving a few days since in this Academy.'

'Physicians and philosophers,' says Roussel, 'have exposed the abuse which arises from this; they have represented it as an obstacle which in children is opposed to their development, and which, in persons already formed, may so embarrass the exercise of the functions as to derange their order, and to alter the natural form of their organs; in fine, as a thing which shocks even the notion of beauty which they have in view. An unfavourable indication as to those stays is, that, among people who make no use of them, the women have a better shape than among those who regard this supplement or this corrective as necessary to the work of nature, and who think that human beings may be fashioned like matters of art submitted to the plane or the chisel. The little success of this practice ought to have enlightened them as to the falsehood of the ideas on which it is founded, to have inspired them with greater confidence in the simple operations of nature, and to have convinced them that these are as healthful and felicitous when they are not contradicted, as they are imperfect and irregular when we endeavour to blend with them our procedures and our caprices.'

Dr. Gregory, in his Comparative View of the State and Faculties of Man, with those of the Animal World, says, ' We laugh at the folly and are shocked at the cruelty of these barbarians, but think it a very clear case that the natural shape of woman's chest is not so elegant as we can make it, by the confinement of stays. The common effect of this practice is obstructions in the lungs 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.'

'The baneful influence of tight lacing,' says Dr. Duffin, 'on the form of the lungs and liver, is familiar to every one who has had an opportunity of spending a winter in the dissecting-room. These organs are often found moulded into shapes the most distant from natural; conforming, in fact, to the unnatural configuration imparted to the chest and lower ribs, resulting from long-continued injurious pressure. How then can they be reasonably expected to perform, in a proper manner, their peculiar functions, essential as these are to the preservation of perfect health?

'Nay, there are not wanting instances wherein this injurious practice has been carried even to a much more serious extent. We remember reading in the Times newspaper, a few years ago, a case similar to the following, which is extracted from the Nottingham Review, for October 3, 1834:—Laced to Death.—Harriet, youngest daughter of Mr. Tory, farmer of Wisbeach, died suddenly on the 18th instant, in consequence, it is supposed, of being too tightly laced. A coroner's inquest on the body returned the verdict —Died by the visitation of God. [It should have been—Squeezed to Death.]'

SECTION XIII.

COMPRESSION BY STAYS ANATOMICALLY DEMONSTRATED.

There is another deformity of the chest well deserving the attention of medical men, produced by too tight lacing of the stays; in which the chest, instead of having the shape of a truncated cone, with its base inferiorly, becomes so utterly changed as to seem inverted, by having its apex inferiorly.

Soemmerring has published an excellent work "On the Effect of Corsets *;" and as no man perhaps ever possessed a more accurate knowledge of anatomy, and all that relates to it, as he has treated the subject

* Ueber die Wirkungen der Schnürbrüste.

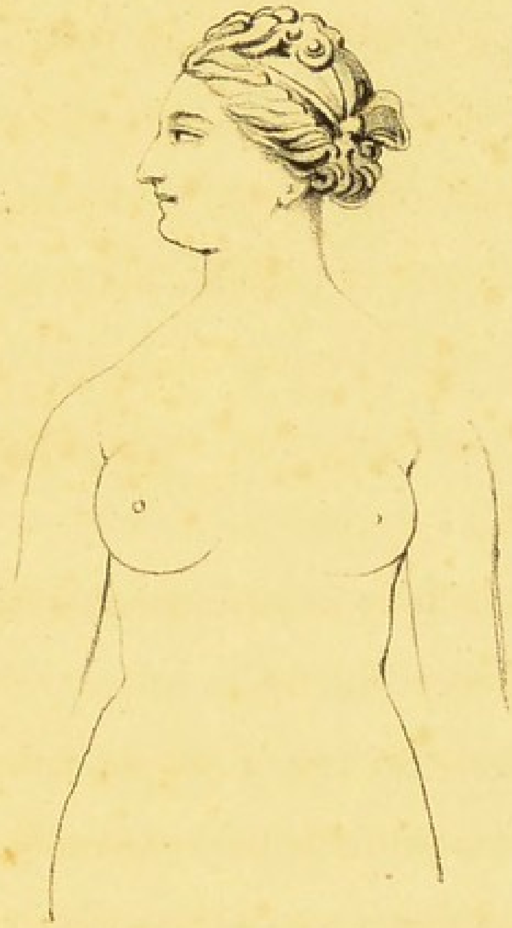
in the most masterly way, and as it is very closely connected with the other subjects of this work, I shall here profit by what he has done upon it.

The design of ladies in wearing corsets, is to render the body beneath the breasts as slender, and above the breasts as broad, as possible, and at the same time to carry the shoulders further back, because this shape is supposed to be agreeable to the eye. This form, however, of the chest is quite the reverse of the natural one, as will be clearly seen by an examination of Plates VII, VIII and IX.

We have seen that the chest, as naturally constituted, is of a conical form, the apex being uppermost; whilst the stays form a cone with their apex undermost. Let any one compare the figures in the plates referred to. It will be evident that the smallest diameter of the stays encompasses the largest part of the chest, and that the largest diameter of the stays encompasses its smallest part.

Further, all stays are hard and stiff below or at their

PLATE. V.



THE NATURAL WAIST.

PLATE IV.

THE ARTIFICIAL WAIST

apex; whilst the abdomen, on the contrary, where the point of the stays touches, is moveable.

The use of the stays, when they have the least effect on the chest, produces compression of the soft parts below, and throws up the viscera of the abdomen towards the chest.

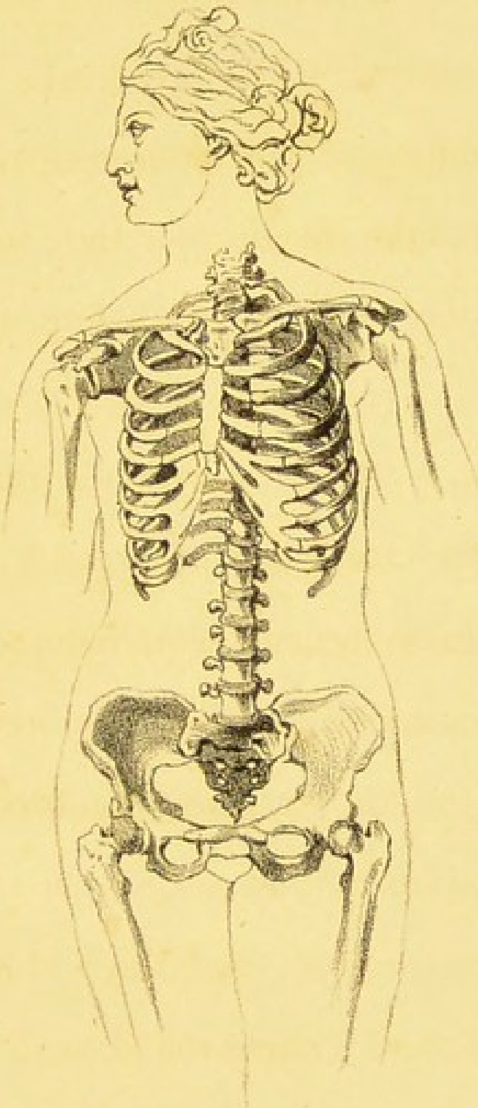
Not only will the moveable false ribs be thus pushed upwards, and close together, and the space between them diminished; but they will be so pressed that those of the right side will be brought nearer to the left, not only at their anterior extremities (the last perhaps excepted on account of its shortness), but also at their extremities towards the spine, (See Plates VIII. and IX.) In consequence, the inclination of the false ribs generally increases, and their cartilages are more bent; for the cartilaginous parts yield most readily, and the bony parts, on account of their elasticity, yield also a little.

If the compression be carried further, the lower true ribs will be carried upwards towards one another; the right will be carried towards the left, the sternum will ascend; and when the pressure is increased, the sternal extremities of the lower true ribs will necessarily be brought nearer to the spine, and the diameter of the chest, from before to behind, be diminished.

Whilst this is going on with the ribs, the bodies of the vertebræ are somewhat raised, their spinous processes gradually become more oblique, and pressed on one another, and at last the spine becomes bent.

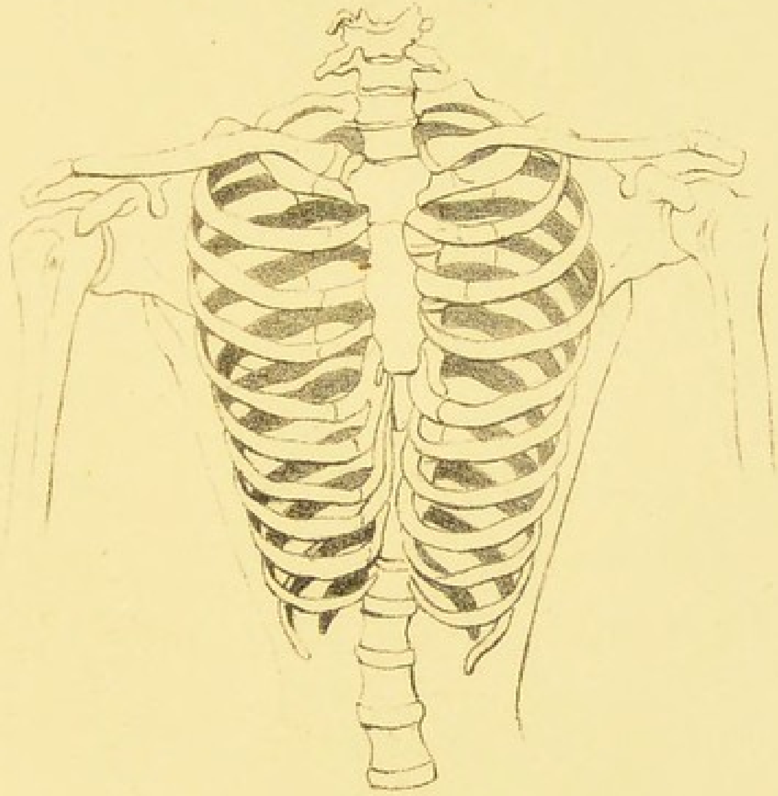
Superiorly the thorax naturally becomes smaller. The fifth and sixth ribs do not further suffer from the immediate pressure of the stays, but commonly form more or less of a circle round the chest. In the remaining upper ribs, the contrary, to a certain degree, is the case: the ribs are pressed from one another by the internal viscera; their interspaces are greater; the right is somewhat separated from the left: and their sternal stand off from their spinal extremities.

PLATE. II.



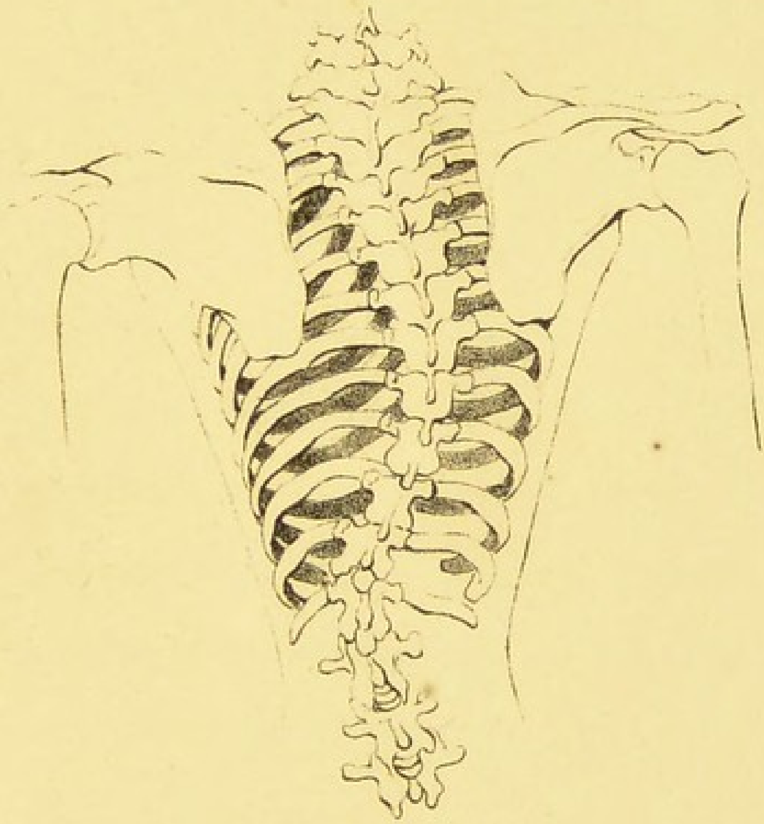
THE NATURAL SKELETON.

PLATE. VIII.



EFFECT OF STAYS.
Front View.

PLATE IX.



EFFECT OF STAYS.
Back View

To the act of breathing, the first, second, third and, at the utmost, the fourth ribs, contribute : it even appears as if they were more moveable.

To this space are the breasts, with the surrounding parts, pushed upwards (Plate VI.); and such persons appear to have larger breasts, but some part of these organs usually suffers from the pressure.

The shoulder blades are sometimes brought closer to one another behind; and their under part is pressed towards the spine; the back loses its fine rounding; and the arm is impeded in its free motion. Hence, when a tight-laced person, while sitting, reaches over, she must move the whole upper part of the body on the hips.

The clavicles are very much pressed back at their outer extremities, so that their anterior extremities project very much below the wind-pipe, and appear as if they would soon be dislocated.

By this forcible compression of the whole chest, the vertebræ are kept somewhat from one another, and straighter; the stays rest on the hips; and the ribs rest on the stays. Hence, it is explained, without any difficulty, how laced persons appear taller and longer.

It is not possible to avoid, in tight lacing, pushing the ribs more to one side than another, nor the spine being curved, and the patient having the high shoulder. (Plate IX.)

If all these changes take place externally, what changes do the internal organs suffer!—The under part of the lungs is compressed; the entrance of the blood is impeded; the diaphragm is forcibly pushed upwards, and embarrassed in all its functions, for the bony walls of the chest, when compressed by a machine like stays, are less fitted for the necessary expansion and contraction, and are consequently compelled to interfere, to a certain extent, with the functions of the diaphragm.

The viscera of the abdomen especially suffer, as they are chiefly encompassed only by soft parts; the stomach is pressed, and prevented from distending; it changes its situation and form, and bad digestion ensues; the duodenum is unnaturally pushed upwards; the liver has its shape altered, and its functions obstructed; the rectum, uterus, and bladder are pushed downwards.

Let us recollect, too, that the ribs must increase to the thirtieth year, and we shall perceive that, by the continued pressure of the stays, disfiguration must increase, because nature is impeded in increasing the mass and strength of the ribs, which it would otherwise do if the pressure was not employed.

As soon as the stays compress one side of the chest and permit the other to expand, the disfiguration is sure to increase rapidly by continued use, because the weak side is more and more weakened and pressed in, and the stronger one always more and more pressed out.

No proof is necessary to show that the stays prevent the spine bending backwards and forwards, or to one side, and consequently prevent the free turning of the body, since all stays, on account of their situation and strength, lessen the motion not only of the lumbar vertebræ, but particularly of the dorsal vertebræ, and most at that spot where nature has conferred the greater mobility.

If the stays are so long that they embrace the hips, they are still more mischievous. They press then the long cartilaginous ridge of the hanch bones, and considerably narrow the pelvis.

All this must be increased to a great degree when high shoes are worn, because thereby the abdomen is more stretched, and the viscera more pressed.

Soemmerring's figures, which I have given, illustrate these conditions. "I took," he says, "for my first figure, the representation of the Grecian Venus, as it is given by Audran;" and he adds that "the left side in the plate is the right in the original, and the right in the plate is the left in the original; and that he has now and then marked the outline a little firmer than in the copy." Audran's errors in the Venus are here corrected. In reference to Plate VI., Soemmerring says, "Whoever has an opportunity of seeing any one naked, who has been tight-laced, will see that my representation is far from being overstretched."

In order further to illustrate this, Soemmerring gives two measurements.—In a fine girl, the circumference of the head is twenty-two Paris inches. The circumference of the body in the same person, with the stays on, is twenty-one Paris inches, four lines and a half. In another girl, the circumference of the head is eighteen inches. The circumference of the laced body is fifteen inches. The circumference of the body under the arms is thirty inches, nine lines. Thus the body is full three inches less in circumference than the head.

SECTION XIV.

DISEASES PRODUCED BY COMPRESSION FROM STAYS.

"From 1760 to about 1770," Soemmerring says, "it was the fashion in Berlin, and other parts of Germany, and also in Holland a few years before, to apply corsets to children. This practice fell into disuse, in consequence of its being observed, that children who did not wear corsets grew up straight, while those who were treated with this extraordinary care, got by it a high shoulder, or a hunch. Many families might be named, in which parental fondness selected the handsomest of several boys to put in corsets, and the result was, that these alone were hunched. The deformity was attributed at first to the improper mode of applying the corsets, till it was discovered that no child thus invested grew up straight, not to mention the risk of consumption and rupture which were likewise incurred by using them. I, for my part, affirm, that I do not know any woman who, by tight lacing (that is, by artificial means), has obtained 'a fine figure,' in whom I could not, by accurate examination, point out either a high shoulder, oblique compressed ribs, a lateral incurvation of the spine, in the form of an Italic *s*, or some other distortion. I have had opportunities of verifying this opinion among ladies of high condition, who, as models of fine form, were brought forward, for the purpose of putting me to silence."

"I have found mothers of discernment and experience," he says, "who predicted that, in their twenty-fifth year, a hunch would inevitably be the lot of their daughters, whom they nevertheless allowed to wear corsets, because they were afraid to make their children singular."

"One is astonished," says Soemmerring, "at the number of diseases which corsets occasion. Those I have subjoined, rest on the authority of the most eminent physicians. Tight-lacing produces—

"In the head: headach, giddiness, pain in the eyes, pain and ringing in the ears, and bleeding at the nose.

"In the thorax: besides the displacement of the bones, and the injury done to the breast, tight-lacing produces shortness of breath, spitting of blood, consumption, derangement of the circulation, palpitation of the heart, and water in the chest.

"In the abdomen: loss of appetite, squeamishness, eructations, vomiting of blood, depraved digestion, flatulence, diarrhœa, colic pains, induration of the liver, dropsy and rupture.—It is also followed by melancholy, hysteria, and many diseases peculiar to the female constitution, which it is not necessary to enumerate in detail." *

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* DISEASES ASCRIBED TO THE USE OF CORSETS.

The number of diseases which are produced by stays, according to the testimony of medical men, is astonishing. They cause—

IN THE HEAD.

Pain in the head, according to . . . *Bonnaud.*

"Another effect of tight corsets," he observes, "is that those who have been long so closely laced,

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Giddiness	*Müller.*
Sleepiness	*Bonnaud.*
Apoplexy	*Müller.*
Tendency to fainting . . .	*Gruner.*
Pains in the eyes	*Müller.*
Earach	*Müller.*
Bleeding at the nose	*Bonnaud.*
Stoppage in the nose . . .	*Müller.*
Flow to the mouth and lips . . .	*Bonnaud.*
Obliquity of vision	*Camper.*
Swellings in the neck	*Winslow.*
Carotid aneurisms . . .	*Morgagni.*

IN THE CHEST.

Displacement of the bones of the chest from their situation	*Platner.*
Depression of the lower bone of the sternum .	*Müller.*
A false support given to the thorax, and the development of the real support impeded . .	*Brinckman.*
Hunchback	*Winslow.*
Inability to suckle in consequence of pressure on the breasts	*Ballexserd.*

become at last unable to hold themselves erect, or move with comfort without them; but, as is very

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Scirrhus in the mammary glands, and ultimately cancer, according to	*Oelsner*,
and all others, without any exception, who have written on the injurious effects of lacing.	
Pain in the region of the heart . . .	*Winslow.*
Sores on the chest	*Bonnaud.*
Impediment to the action of the lungs . .	*Platner.*
Adhesion of the lungs to the diaphragm . .	*Kositzki.*
Asthma	*Gaubius.*
Short breath (dyspnœa) . . .	*Josephi.*
Hooping cough	*Bonnaud.*
Cough	*Ballexserd.*
Spitting of blood	*Huxham.*
Abscesses in the lungs . . .	*Bonnaud.*
Cavities in the lungs	*Reinhard.*
Consumption	*Swieten.*
Impediments in the action of the heart . .	*Platner.*
Disturbance of the circulation, and hence inflammation, &c.	*Gaubius.*
Polypus	*Bonnaud.*
Water in the chest	*Bonnaud.*

IN THE ABDOMEN.

Disturbance of the functions of the diaphragm .	*Wormes.*

justly said, fall together, in consequence of the natural form and position of the ribs being altered. The

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Pressure on the stomach	*Ballexserd.*
Hence pains in the stomach . . .	*Wormes.*
Loss of appetite	*Müller.*
Sickness	*Schnizlein.*
Acidity	*Bonnaud.*
Vomiting	*Winslow.*
Vomiting of blood	*Wormes.*
Bad digestion	*Winslow.*
Scirrhus of the stomach	*Bacher.*
Flatulency	*Müller.*
Diarrhœa	*Bonnaud.*
Adhesion of the intestines . . .	*Rougemont.*
Induration of the mesenteric glands . .	*Winslow.*
Colic pains . . .	*Bonnaud.*
Tenesmus	*Bonnaud.*
Hæmorrhoids	*Bonnaud.*
Fistula in ano	*Bonnaud.*
Dysentery	*Bonnaud.*
Hypochondriasis	*Rougemont.*
Compression and obstruction of the liver .	*Mascagni.*
Jaundice	*Winslow.*
Inflammation of the liver . . .	*Wormes.*
Hardening and suppuration of the pancreas . .	*Bonnaud.*

muscles of the back are weakened and crippled, and cannot maintain themselves in their natural position

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Diseases of the spleen, inflammation, suppuration, and scirrhus	*Ballexserd.*
Diseases of the kidney	*Camper.*
Calculi	*Wormes.*
Strangury	*Bonnaud.*
Hernia of the bladder	*Bonnaud.*
Bloody urine	*Gaubius.*

Hysteria	*Bonnaud.*
Disturbance of the catamenia	*Platner.*
Leucorrhœa	*Müller.*
Hardening of the ovaries	*Targioni.*
Inclination of the mouth of the uterus towards the sacrum	*Mohrenheim.*
Scirrhus of the womb	*Wormes.*
Hæmorrhage from the uterus on the separation of the placenta	*Bonnaud.*
Sterility	*Josephi.*
Unhealthy children	*Platner.*
Ugly children	*Josephi.*
Monstrosities	*Diebold.*
Miscarriages	*Camper.*

for any length of time. The spine, too, no longer accustomed to bear the destined weight of the body, bends and sinks down.

Premature labour	*Müller.*
Difficult labour	*Unzer.*
Protracted labour	*Hannes.*
Adhesion of all the viscera of the abdomen to one another	*Aepli.*
Disfiguration of the viscera . . .	*Müller.*
Dropsy of the belly	*Morgagni.*
Herniæ	*Richter.*
Swelling of the upper extremities . . .	*Bonnaud.*
Swollen feet	*Wormes.*

GENERAL DISEASES.

Pains	*Gaubius.*
Want of energy	*Ballexserd.*
Melancholy	*Ludwig.*
Flying heats	*Bonnaud.*
Intermitting fever	*Reinhard.*
Eruptions	*Reinhard.*
Chlorosis	*Winslow.*
Atrophy	*Bacher.*
Epilepsy	*Müller.*
Tendency to disease of the bones . .	*Wegelin.*
Sickly and short life	*Camper.*

"Let any one compare the sixth with the fifth plate, and he will no longer wonder that a body, changed by the use of the stays to the shape of a wasp, loses its power to bear the weight of the head and the upper extremities without external support. The muscles of the back lose their power, because in the day they are not exercised, but kept in a state of inactivity by the stays, and at night are supported by the bed.

"Where tight-lacing is practised, young women from fifteen to twenty years of age are found so dependent upon their corsets, that they faint whenever they lay them aside, and therefore are obliged to have themselves laced before going to sleep. For as soon as the thorax and abdomen are relaxed, by being deprived of their usual support, the blood rushing downwards, in consequence of the diminished resistance to its motion, empties the vessels of the head, and thus occasions fainting."

It is peculiarly gratifying to know that the principles adopted in this work have the support of so able a physician as Dr. James Johnson, who, in a very valuable work just published, "The Economy of Health, or Stream of Human Life," takes nearly the same views.

"It is hardly necessary," says Dr. J., "to state that the vital function of respiration can be carried on only by the alternate expansion and compression of the lungs. This apparatus cannot be filled with atmospheric air, except by the elevation of the ribs, or the descent of the diaphragm.

"In health and in a state of nature, both these mechanical processes are employed, and then the individual derives all the advantages which free breathing can impart to the whole economy of the constitution. In certain diseases, respiration can be performed only by *one* of these processes; but then it is carried on imperfectly and laboriously. Thus, when the ribs are fractured, the chest must be secured from motion by bandages; and breathing is performed by the descent and ascent of the diaphragm.

"But how is it when both these mechanical processes are crippled at the same time? Thus, in fashionable female attire (and often in male attire also), the abdomen is so compressed by the stays, that the diaphragm can only descend in the slightest degree, if at all, while the whole of the middle and lower part of the chest is so firmly girt by the same cincture, that the ribs there are kept motionless! The vital function of respiration then is carried on by violent, though inefficient efforts of the diaphragm to descend, and by an excessive action of the muscles, and extraordinary elevation of the ribs in the upper part of the chest, where it is free from the pressure of the stays.

"Now, in this state of things, three distinct injuries are sustained, or injurious operations carried on:—first, the too great pressure of the diaphragm, the stomach and upper bowels, by its violent efforts to descend; secondly, the inaction of the lower lobes of the lungs, from want of space for expansion; and, thirdly, the inordinate dilatation of the upper portions of the lungs, where the ribs are free, in order to compensate for the compressed state of the lower portions.

"All these injurious effects are greatly increased by muscular exertion, as by dancing, singing, &c., when the circulation is hurried, yet impeded; and where demands are made on respiration, which the lungs are incapable of supplying. It is at those times that we see the upper part of the chest heaving, with almost convulsive throes, and the countenance flushed by the impediments thrown in the way of the blood's return to the heart.

"It is not a little remarkable that, in nine-tenths of those who die of consumption in this country (a disease that produces a fourth of the whole mortality), we find that the upper lobes of the lungs (corresponding with those parts of the chest that are most exposed to the atmosphere, least compressed by clothing, and more than usually strained in breathing) are the seat of excavations, commonly termed ulcerations, while the lower lobes of the lungs are generally found to be more or less consolidated, and comparatively impervious to air.

"This state of things is too remarkable, and too uniform to be the effect of chance; and therefore we are authorised to conclude that it is, partly at least, owing to the exposure of the upper parts of the chest to atmospheric transitions, with slight covering, both in males and females, while the upper lobes of the lungs are violently strained, and the air-cells torn during inordinate exertion. The consolidated condition of the inferior lobes of the organ of respiration corresponds in a most singular manner with the constrained position and impeded function of those parts during life, from the causes which I have already prescribed.

"Let it be remembered that the tight-lacing of the lower part of the chest, and the thin clothing of the upper part, are not confined to sex, to age, nor to class of society; but extend, more or less, to all, though more, certainly, to females than to males—and to the higher than to the lower orders of the community. A long, an attentive, and a mature consideration of this subject, has led me to draw the conclusion which is sufficiently obvious in the foregoing statement, and which I leave to others for confirmation or rejection.

"These are not the only evils resulting from the unnatural constriction of the middle of the body by tight-lacing—male and female *. The stomach and bowels are so compressed, that it is wonderful how they are able to perform their important functions at all! But, although the resources of Nature are almost inexhaustible in overcoming obstacles, yet the injurious

* Let any one look around him in the streets, the theatres, the ball-rooms, &c., and he will be compelled to acknowledge that the beaus are nearly as tightly girt as the belles. The mania pervades the dandy creation from the Neva to the Hellespont. The Hun and the Croat have their upper regions more nearly severed from their netherlands than even the Gaul and the Italian! John Bull has caught the frenzy, though his well-stuffed paunch makes a desperate resistance to the girdlo-mania of the continental fop.

effects of the habit alluded to are numerous, and potent enough to swell, very materially, the long catalogue of nervous and dyspeptic complaints. The growth of the whole body and the freedom of all its functions so much depend on perfect digestion of our food, and conversion of our nutriment into healthy blood, that any impediment to that digestion and that assimilation must inevitably derange the whole constitution.

"Although the evil of tight-lacing is as patent as the sun at noonday in an Italian sky, yet I have never known its commission to be acknowledged by any fair dame or exquisite dandy. It seems to be considered essential to the existence, or rather to the production, of a fine figure. And yet I never could discover any marks of stays in the statues of the Medicean Venus or the Belvidere Apollo. Whether the modern girdle possesses any of the attractive and fascinating qualities attributed to the cestus of Venus, I am not prepared to say; but I venture to aver that the Cyprian goddess was not in the habit of drawing her zone so tight as the modern fair ones, else the sculptor would have recorded the cincture in Parian marble.

"We have every reason, indeed, to believe that the waist of Venus was left as free from compression as her feet, and I need not point out the contrast between these extreme features in the statues of the ancient belles and those of our own days! We seem more inclined to wear the Chinese shoe than the Grecian sandal. We have no right to dispute about tastes; but I may venture to assert that the comfort and motions of the foot are not more abridged and cramped by the Chinese shoe, than are the functions of respiration and digestion by the tight stays *.

* I have little doubt that, to the disordered condition of the digestive organs, resulting from the above and other causes, is mainly owing the premature decay of the teeth, now so general a complaint among all, but especially the better classes of society. So universal is the evil, that dentists are now more numerous than druggists! As one prison formerly served Rome, when under the kings and tribunes—

"Sub regibus atque tribunis;"

so, one or two dentists were sufficient for the nobility and gentry of the British metropolis, in the days of our forefathers. At present, they would make a very formidable, if not a handsome regiment, consisting of three or four strong battalions! To terrify their enemies, too, they would require no othér weapons than those which they exercise in their daily avocations.

SECTION XV.

EFFECTS OF CORSETS ON PREGNANT WOMEN.

"LOOSE clothing," says a writer formerly quoted, "is at all times preferable to those corsets which deform the shape, impede the natural development of the organs, and expose the wearer to numerous maladies; but, during pregnancy, it becomes a matter of paramount importance.

"The ancient Athenians and the other Greeks were so careful with respect to their progeny, that particular magistrates were appointed, by special laws, to inquire into the kind of vestments worn by women. Such, also, was the case among the ancient Venetians. They were aware that either abortions or badly conformed children in mature age, would be the result of the opposite practice in youth. For this reason, women in all countries wear larger and lighter vestments than men.

"Women in this condition should indeed wear nothing that can exercise the slightest compression on any one part of the body."

Such compressions are regarded by many as the cause of sterility, partly because they interfere with the functions of the viscera contained within the chest and abdomen, and partly because they impede the development of the uterus.

If the stays are fastened on the hips [as modern stays almost universally are], no proof is required to show that, by narrowing the diameter of the pelvis, the development and birth of the child will be rendered difficult.

Even if a pregnant woman leaves off the use of the stays early, she carries her child with more difficulty than if she had not worn them at all.

Most pregnant women, indeed, are compelled to give up the use of stays, because the expanding womb gradually fills the pelvis and abdomen, contracts the chest, and pushes, to the great discomfort of the individual, the viscera upwards. Most persons in this condition, therefore, omit the use of stays with the greater cheerfulness, as they generally find all their unpleasant symptoms disappear on leaving the stays off.

But if the feelings of the person be not attended to, either because she does not know how to relieve them, or because she would rather endure them for the sake of a fine form, then these bad symptoms gradually increase; and if the compression by the stays be increased as the uterus enlarges, miscarriage frequently follows, and the life of the mother is endangered. All observers who have written on the ill effects of stays from their own experience have borne testimony to the correctness of this remark.

If things even proceed more favourably, so that the infant increases with the uterus, and attains its full size, still the upper part of the chest in the mother is so changed, that, after the first or second child, the high shoulder invariably occurs.

If constriction of the chest disposes females to irritation of the lungs, and leads to phthisis, &c., this effect will be much more rapidly produced during pregnancy, when the organs of the abdomen, being pressed against the lungs, diminish the expansion of the upper cavity and produce difficulty of respiration. The pressure of clothing over the chest produces either inflammatory swelling, or wasting away of the breast. It produces also imperfect secretion of milk, with all the inconveniences which thence result both to the mother and child. It may give rise to fatal hemorrhages and apoplexy.

Pressure of the clothes upon the abdomen is not less pernicious: it either forces the inferior organs to follow in their development a vertical direction, and leads to all the accidents of which we have spoken, or opposes the development and growth of the infant, and may even cause abortion.

When this is the case, the mother suffers considerably from headach, giddiness, difficult breathing or narrow-chestedness, nausea, vomiting, pains in the bowels, faintings, varicose veins, swollen bones, difficulty in making water, tenesmus, prolapsus of the rectum, constipation, coughs as well as herniæ, and a variety of nervous sensations.

All this is easily explained by laws of the animal economy familiar to us all.

Headach and giddiness the mother must endure, because the stays and womb, pressing at the same time on the thorax and abdomen, will often produce determination of blood to the head.

Breathing the mother finds difficult, because not only the stays, but the womb, narrow the chest, and impede the expansion of the lungs.

Nausea and sickness the mother complains of, because, by the pressure of the stays and the womb, the stomach is now pressed, and seeks to empty itself.

Pains in the bowels occur, because sometimes a portion of the intestines is pressed by the stays and womb, and becomes painful; or because the fæces cannot pass, flatus developes itself, and the intestine is distended in some part to a painful extent.

Faintings the mother is subject to, because the blood circulating with sufficient freedom through the descending aorta will, on account of pressure of the womb and the stays, be often impeded in its return by the veins, and the vessels of the brain will contain too little blood.

Owing to the same causes, swellings of the veins of the feet occur in many cases where they would never have happened if lacing had not been practised.

Pressure on the absorbents of the feet causes the fluids to circulate in them slowly; and the feet in consequence swell.

A frequent desire to make water occurs, because the bladder cannot properly distend itself, owing to resistance from the uterus and the stays, and the little water it contains is soon expelled by the pressure which is thus kept up.

Desire to go to stool occasions pains to the mother from the same cause.

Hence also the intestine in hernia is protruded, or the rectum prolapsed.

Hence likewise deafness, and insensibility and paralysis of the feet occur, from pressure on the nerves which supply the lower extremity.

The many remaining nervous sensations I will omit mentioning, as this subject is yet by far too obscure.

Not unfrequently have I seen, in laced pregnant women, many of these symptoms disappear or subside, especially sickness, fainting, giddiness and the difficulty of breathing, as soon as the band round the waist, or the stays, were loosened.

Nevertheless, when women have been long accustomed to stays, they cannot, even in pregnancy, omit them, but must moderately use them, and only gradually abandon the custom, as the too sudden relinquishing of them might produce mischief.

It is certainly astonishing that the female sex, which during pregnancy stand so much in need of expansion of the chest in order to contain the pushed up viscera, and which are exposed to all the above-mentioned ailments, seek before pregnancy to contract these parts so forcibly by every possible contrivance of art.

It is even more astonishing that mothers, who have not only experienced this widening of the chest, but who also know that, after many children, what is called a fine figure disappears for ever, that lacing leaves behind a high shoulder, and that they find themselves well during pregnancy, when they disregard all consideration about figure,—that even these mothers, I say, quietly permit their own daughters to follow the fashion, or recommend a fashion which their own experience must have taught them to be injurious in one of the most trying periods of their life.

Pecklin, B. Scarf, and Winslow were of the same opinion, that the use of stays cripples or kills children; Ludwig has seen impressions of the stays on the foreheads of children; and Siebold described a very large hernia cerebri, as possibly owing to a defective formation caused by the use of stays by the mother.

Malformations of the infant, club feet, or twisted feet, are often occasioned, like the generality of defects, by the tight lacing to which the mother has recourse, in order to conceal her pregnancy.

Such are the results of corsets and busks! These whims of misplaced vanity ought to be sacrificed by a good mother to more sacred duties, to the interests of her infant.

After all this, can we wonder that a clever writer should say, 'In times past, we were ignorant enough to admire, like our neighbours, slender waists; but, thanks to our medical friend, we are cured of this folly. We were wont to think that the loves and the graces played round such delicate forms; but in future we shall never see them without thinking of twisted bones, dropsy, consumption, indurated livers, fainting, spitting of blood, melancholy, hysteria, sour tempers, difficult labours, rickety children, pills, lotions, and doctors' bills.'

EFFECTS OF STAYS ON PARTURITION IN PARTICULAR.

From what has been said, it is clear that, as the bones of the pelvis cannot be deformed by the use of the stays, except when they rest on the hips, therefore, as far as the uterus and child are concerned, parturition is not made more difficult. [Unfortunately modern stays always cover the hips.] A well-formed, healthy uterus, a strong-made child, perform their natural part; a well-shaped pelvis offers no resistance; but in relation to the mother, we daily see that if, during pregnancy, attempts are made, by lacing, to fashion a fine figure, just in the same proportion the birth, especially if it be a boy, is difficult.

The bones of the thorax, the diaphragm, the muscles of the abdomen, which are called into action in parturition, have suffered very much, and the whole body is weakened by eight or nine months' continued indisposition: they cannot, consequently, have the proper strength at the time of parturition, nor be so quickly restored afterwards.

EFFECTS OF STAYS ON THE BREASTS, AND THE SUCKLING OF THE CHILD IN PARTICULAR.

The mammary glands, which secrete the milk, rest on the ribs, and consequently, when they are compressed by the stays, they are between two hard bodies, and must, as the hard bodies are stronger, give way.

The nipples by the slightest pressure, are depressed, and retract; they do not come sufficiently forward when the child is put to the breast; and they thereby cause the mother great pain. In fact, the mother is sometimes obliged to desist from suckling the infant, to the injury of both.

If the pressure of the stays on the mammary glands be sufficiently strong, the vessels contract in one part of the glands, and cause a difficulty in the secretion of the milk in this spot. Then occur swellings, inflammations, abscesses, which completely prevent the child from taking the breast.

If the pressure be kept up so strongly that the vessels completely close, mammary tumours form, which may ultimately become scirrhous, and can be cured only by means of the knife.

To the preceding doctrines I have heard but of one objector; and he appears scarcely to be deserving of notice.

"The main proposition of Mr. Coulson," he says, "is as follows:—'Our ordinary methods of dress, especially in females, are the chief causes of those deformities of the chest and trunk which are so prevalent in this country.'"—Unquestionably the use of stays is a chief link in the chain of causes producing these deformities in the more opulent classes of British society—those to whom this work is addressed.

"I deny the proposition, however," says this writer,—"1st, The effect of mechanical pressure on the living body is grossly exaggerated: the skull can scarcely be altered from its natural shape by great weight."—This is notoriously incorrect. See the *skull* of Caribs! and, what is more to the purpose, see all that Camper and Soemmerring have demonstrated as to the alteration of the *chest* by pressure!

"Man's mechanical methods," he proceeds, "of curing deformities, are founded on the principle, that the greater the pressure exercised, the greater the resistance of the vital parts!"—If this were true, the ladies who lace tightest should have the thickest waists! and a bandage round this writer's head would fortunately increase its capacity!

"2ndly, Among the poor, scrofulous, rickety and ill-fed, who live in damp situations, these deformities are of constant occurrence, although no tight clothes are worn, the poor being generally deficient in the ordinary articles of dress."—Nobody doubts that the poor, scrofulous, and rickety may well be deformed: my object is to show that even the opulent classes, who are exempt from such circumstances, are yet deformed by the constraint of stays, want of exercise, consequent enfeeblement, wrong positions, &c. As the operation of these causes is indisputable, where there is neither poverty nor want of food, the cause of such drivelling objection must be "deficiency in the ordinary article" of brains.

"3rdly. Amongst the youths at our best public schools, amongst officers in the army, with whom the fashion of dress has for a long time been tight as to the waist, no such deformities are prevalent; exercise and good diet fortifying the system sufficiently to resist the influence of pressure."—Well, then, exercise must be far more necessary where the pressure is far greater! That is the very point for which I contend. —Strange to tell, however, the man here grants that "exercise and good diet fortify the system sufficiently to resist the influence of pressure," although he has just before said, that pressure has little or no influence! and that "the greater the pressure exercised, the greater the resistance of the vital parts themselves," which should of course render exercise unnecessary!—I would recommend to this person to fortify a little his own understanding.

SECTION XVI.

CONSTRUCTION OF STAYS.

For the views in this section, I am indebted chiefly to the work of Mrs. Walker, already quoted.

Here we must observe, that the beauty of the waist, whether high, intermediate, or low, depends in a great measure on the form of the corsets or stays.

It is probable, that the necessity of supporting the figure in domestic duties, in maternal cares, and in dancing, has compelled women in all ages to use some kind of cincture. Whilst this was confined to the support of the breast, or to make the folds of a flowing robe fall gracefully, it was an ornament both useful and agreeable.

The ancients had accordingly several sorts of cinctures. One used solely to preserve the spherical form of the breast, was called by the Greeks tacnidion, and by the Romans strophium. Catullus and Ovid furnish ladies with rules for the use of this band; and it was in such general use at Rome that there was a class of shopkeepers there called strophiarii. The other cincture, called tainia zona, and sometimes mitra, was intended to encircle the figure, and fasten the waving folds of the drapery.

Women who from age had become corpulent, used the tacnidion or strophium to compress the increase of size produced by the labours of Lucina. Afterwards, a slender shape was esteemed a beauty; and mothers then instructed their daughters to compress and diminish their natural proportions.

Terence, in his comedy of the Eunuch, makes Phœdria say, in speaking of a young beauty whose charms had suddenly struck him, 'this girl has nothing in common with ours, whose mothers force them to diminish their height, and oblige them to pull themselves in with girths to make them appear thinner.'

In the collection of antiquities in the Medicean cabinet, there is a description of a Cameo representing Venus waited on by the Graces, in which the vestment of the Goddess half conceals her person, and the girdle which encircles her is seen below her breast.

'In some antique statues,' says Winckelman, 'this cincture was as wide as a girth, as is the case in the statue of the colossal Muse in the chancery at Rome, and in that of Aurora on the arch of Constantine. The Bacchante of Villa-madama and the Tragic Muse, the austere Melpomene, have both the cincture wide.'

This was an essential part of women's dress, quite different from the other cincture, which was worn over the robe.

A German author, Mr. Boettiger, in his delightful work entitled 'The Morning of a Roman Lady,' shows us exactly how the strophium or breast-band was attached. 'Sabina,' says he, 'has put on the under tunic, which corresponds to the chemise: this tunic was fastened under the throat till the toilet was completed. The young Cippassis unties this cincture, and afterwards encircles her mistress's breast with a purple band, which was used formerly instead of busks and elastic corsets, as being both more simple and more convenient.'

These bands, which in all probability gave rise to the first idea of corsets, had not been long in use before they were decorated with everything that the love of fashion and the desire of pleasing could invent; and the corset of the young Roman girls became the most striking part of their dress, as it is, even at the present day, amongst the Italian women, according to the paintings and narratives of our artists.

Busks, which have been used in modern times to prop up women's shapes, were in all probability the invention of the middle agès, for there is no mention made, in the customs of antiquity, of the whalebone busk, much less of the steel busk.

Some models of the lower empire seem to prove that they were invented by the Italians of that time. It seems probable that they were introduced there, as in other parts, by the Italian merchants, who for many years engrossed the whole commerce in matters relative to the toilet.

When stiff whalebones and extreme tightness are added to this, it would seem that a wasp, or one of those glittering insects that flutter over the surface of water, is no inapt resemblance of a woman dressed up in this ridiculous apparatus. What can be more absurd than to see a being whose body appears united by a very small tube to the hips, and the hips themselves rendered of an enormous size by excessive padding?

Joseph II. endeavoured, but unsuccessfully, to abolish the wearing of whalebone stays in his dominions: he issued a decree in which he prohibited the use of any corsets whatever in the orphan schools, convents, and every establishment devoted to the education of girls; and, for the purpose of throwing a kind of disgrace upon this injurious custom, women condemned to corporal punishment or hard labour were obliged to wear stays and hoops.

It is indeed grievous that fashion, to which so much is sacrificed, should, some years ago, have reintroduced these foolish customs, and that the figures of our young girls were again submitted to its barbarous edicts.

As the simplest cincture, the mere devices to cover and support the bosom in modern times may be noticed.

On this subject Raynal, in his work upon the commerce of the two Indies, has given us a few pages. Speaking of the charms, ornaments, and dances of the priestesses of Brahma, 'Rien n'égale le soin qu'elles apportent à la conservation de leur sein. Pour l'empêcher de grossir ou de se déformer, elles l'enferment dans deux étuis d'un bois très-léger, joints ensemble, et bouclés par derrière. Ces étuis sont si polis et si souples, qu'ils se prêtent à tous les mouvemens du corps, sans aplatir, sans offenser le tissu délicat de la peau. Le dehors de ces étuis est revêtu d'une feuille d'or, parsemée de points brillants. C'est sans contredit, (adds the grave writer,) la parure la plus recherchée, la plus chère à la beauté, et ce voile qui couvre le sein sans en cacher les palpitations, les molles ondulations, n'ote rien à la volupté.'

It is not altogether improbable that the use, at night, of a cincture of flexible cloth, which would support the breast without weakening it, or altering its position, might be useful in its preservation. What strengthens this opinion is that, if we may believe more recent accounts than those of Raynal, not only the Bayaderes, but also the greater part of the Indian women, use preservatives of this description, made not of elastic wood, but of a stuff woven from the very fine bark of a tree in Madagascar. So salutary, we are told, is this custom, that these women preserve the beauty of the bosom to a very advanced age.

A cincture, however, formed with this view, and known under the name of the girdle of Venus, was, owing perhaps to faulty contrivance, productive only of injurious effects.

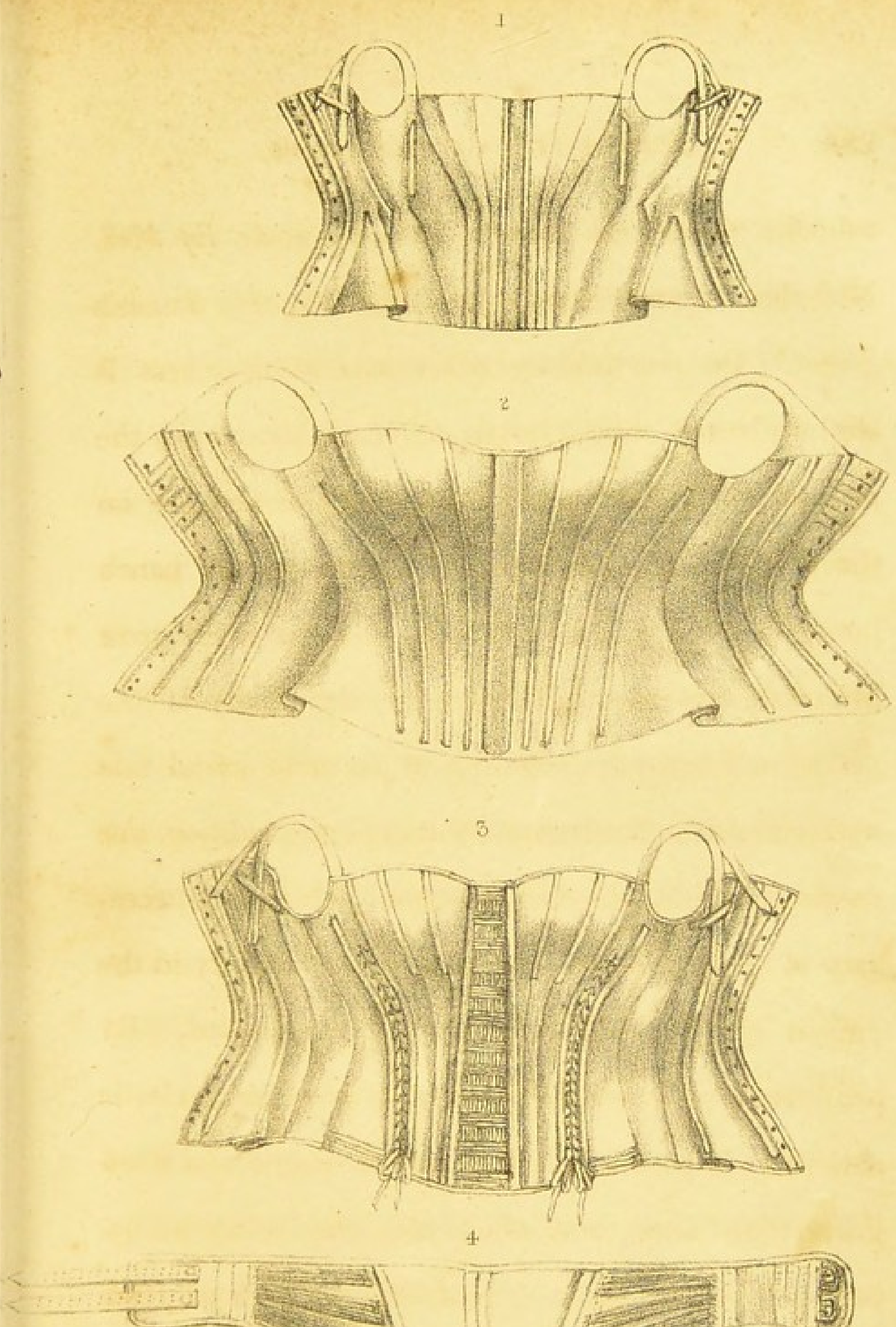
We know, indeed, that what are technically called slings, are of great utility in supporting the breast, where pain occurs previous to accouchement, or subsequently, from milk being too abundant. The pressure of the bands by which they are attached, is not, however, without inconvenience.

A cincture-corset, with holes for the arms, and belts which cross behind and fasten before, gives pain by the limited pressure of the latter, and it injures the muscles of the shoulders.

The corset without shoulder-straps is very apt to alter its position.

But to speak of those which are truly useful.—A valuable *Corset for growing girls* is made by Mrs. Nicholas Geary, Stay-maker, No. 61, St. James's Street. Its pressure on every part of the chest is slight; being elastic in front, it yields to all the motions of the body; and by exerting no pressure on the edges of the hip, or, more correctly, the hanch bones, it does not (by forcing these edges to grow inwards), diminish, during youth, the cavity of the pelvis, or hazard the suffering which must attend that malformation in mothers.—With a slight addition, this forms an admirable *Exercise Corset,* absolutely necessary in all exercises of the arms, and especially in the Indian Exercises, for which it was constructed. By an ingenious contrivance, of employing very elastic shoulder-straps, which are of greater length and fixed lower than usual, and which also play freely in the lateral direction, under a transverse band on the back of the stays, the most perfect freedom of motion is ensured.—See Plate X, Fig. 1.

Demi-corsets for the Morning are made about eight



MRS. NICHOLAS GEARY'S, CORSETS.

or ten inches in height, furnished here and there with light whalebones. In other respects, they are of the form of the upper part of the common corset; but the back edge ends in two long flaps, which are fastened in front by means of a tape. They are made by Mrs. N. Geary, with as many as possible of the advantages of her more complete corset, which, after some preliminary observations, must next be noticed.

The proper object of *The Complete Corset* should evidently be, gently to support the figure, without diminishing the freedom of motion, and to conceal the size of the abdomen when it becomes disproportionately large, either from corpulence or from accidents which naturally occur.

This portion of clothing, therefore, should never be so tight as to impede the free action of the muscles, or of the organs of the chest and abdomen. Every corset that does so is injurious. Freedom and grace of motion can never exist when any part of the body is painfully compressed.

A little consideration of the shape will show that, in the back of the stays, extension throughout is chiefly wanted; in the front, extension throughout, and pressure inferiorly perhaps; and on the sides, extension throughout, slight pressure or support above, toward the bosom perhaps, and adaptation or pliability chiefly in the middle and below.

The extension throughout the back should be produced by two pliant whalebones, or, in some cases perhaps, by two thin steels.

The extension throughout the front, and the pressure, if necessary, to repress any prominence inferiorly, should be produced by a tempered steel of about an inch and a half wide, bent inward in a semicircular form, and sufficiently long to extend over the prominence.

The whole front, however, should be capable of expansion horizontally or laterally, by a portion of it, corresponding to the busk, placed over it, and like it extending from the top to the bottom of the front, being formed of numerous transverse elastics, while the lining behind the busk is divided longitudinally; so that this structure expands, in the transverse direction, with every flexure of the body.

Persons whose breasts are close may wear, inside the corset, at the upper extremity of the pocket of the busk, a piece of cotton wadding covered with white kid, to prevent the disagreeable chafing which the corners of the busk may produce: but it must be remembered that this adds to the thickness, and consequently to the pressure, and it should not, therefore, be unnecessarily or carelessly done. At the other end of the busk, may be placed a flat wadding.

The extension, support and pliability on the sides, may have somewhat varied means, according to the form of the individual.

The great fault of the common stays is, that though extended and supported both before and behind, they want both extension and support on the sides. They consequently fall into creases;

the sides are fretted; and the corset soon loses its shape.

Corsets should support the breasts without hurting or displacing them. The breast is far more beautiful in its natural position, than when pushed up and compressed in the mode so foolishly adopted by many women.

In forming the gores for this purpose, the desire of raising up the breast, and giving it a conventional beauty, must never lead to the making these too short: it deforms the breast; marks it with long whitish streaks; and the finer and more delicate the skin, the more it is exposed to those serious inconveniences.

All shoulder-straps should pass over the top of the shoulders; and if, instead of being made merely easy, they are made elastic, they should, I fear, be always so constructed as to be capable of being, at pleasure, rendered inelastic, to prevent the back being sacrificed.

With regard to these corsets, Mrs. N. Geary has introduced many remarkable reforms. They are now made lighter than they were lately; and the bosom is so formed as no longer to press injuriously upon the breast or to form a crease above it. The formation of the bosom, indeed, and of all parts adapted to prominences, in Mrs. N. Geary's stays, is a matter of great ingenuity, and of extraordinary beauty. To this she was led by a desire to obviate the perpetual and just complaints made by ladies of the tightness across the chest, just below the bosom gores, in the common stays. To obviate these, she forms the whole stay of some nineteen or twenty longitudinal portions, or portions extending from the top to the bottom of the stays.—See Plate X, fig. 2, and Plate XI. Each of these constituent portions is wider above or below, than it is in the middle. By means of this gradually increasing width, the bosom and other prominent parts are formed. A moment's reflection will show that, by varying the width of any one or two of these portions, such stays become capable of adaptation to every possible variety of form; and that the bosom and all the prominent parts are thus formed without a single gore or gusset. Instead, therefore, of presenting sharp angles which cut in upon the sides, and which either tear the skin or are themselves torn up, these portions, supported by slender bones, or thin steels where necessary, curve gently and smoothly over every corresponding curve of the chest, and at once exhibit all the beauty of the most perfect form, and yield the most perfect comfort. With great propriety, also, the bones at the lower and lateral part of the stays are all thrown either before or behind the hanch, so that upon the side, above the hanch, there is no bone to bend by the heat of the body, to form itself into an angle, and to excoriate the side, as in all other stays. Mrs. Geary's stays, constructed on these principles, are preservative at once of health and beauty, and are indispensable to dress.—See Plate XI, which gives a perfect idea of their advantages.

Mrs. N. Geary's gestation stays are, like all others now in use, furnished with elastic portions; but they have this advantage over every other, that they present the same general structure which has just been described (see Plate X, fig. 3); so that a lady passes from the use of her common stays to that of her gestation stays, retaining all the advantages of the former, and only gradually adding new accommodations as they may be required.

To these may be added Mrs. Geary's belt (Plate X, fig. 4), which is also ingeniously constructed.

Besides the corsets which have now been described, namely, the corset for young and growing persons, the demi-corset for undress, and the more complete and perfect corset, various others, now of little or no importance, may be mentioned: as the stiff stays, which still linger among elderly persons, and those younger ones in whom deformity and the ruin of constitution, produced by their use of late years, have rendered it difficult to lay them aside; the easily laced corset, which might rather be called the never-laced corset, in which many shorter laces on each side, being attached to one tape, are all pulled at once, but in which the numerous strings get mixed and entangled in such a manner that it requires much time and patience to re-arrange them, besides frequently breaking, and by their excessive pressure always fretting the side; the corset with pulleys, which is never in repair; and the corset with double rods, which is less complicated, and might perhaps be rendered useful, if stiff stays should ever again be introduced.

SECTION XVII.

LATERAL CURVATURE OF THE SPINE.

I MENTION this as illustrated by Plate IX, as well as by Plate XII, and as completing the list of the worst deformities of the chest.

Riolan says, and after him Guillemeau, that, in nearly all the French girls of that time, the right shoulder was the highest, because the right side is usually the strongest.

The Dutch physicians have also observed that, in their country, on account of the use of stays, not one in a thousand ladies in high life was quite straight; and it is well known that nowhere are stays worn so tight as in Holland.

The lamentable effects upon the spine produced by the use of stays in our own days, are well known. It forms a powerful link in the chain of causes, so clearly traced by Donald Walker, producing the greatest and most universal deformity. It is here, therefore (as promised in a previous section) that I lay before the reader, from his "Exercises for Ladies," an abridged view of his theory of deformity and its cure by exercise, as necessary to demonstrate the principle on which exercise is applied, and to obviate some ill-founded objections which have been made to the doctrines previously delivered.

OF THE FUNCTIONS OF THE BODY AS CONNECTED WITH EXERCISE.

The movements of the body are of two kinds.

The first take place without consciousness or any act of the will. They consist of the exercise of the vital functions for the preservation and support of life: as of the stomach, intestines, heart, &c., and also of the exercise of all the muscles when they act involuntarily.

The second are the movements performed consciously and voluntarily, when we put in action any muscle for a particular purpose. It is these last which constitute exercise.

By exercise, the power of the muscular fibres is increased.

When a limb is moved, the muscles which are actuated swell by the more frequent and copious flow of blood into them, and heat is developed. If the motion be long continued, the limb grows stiff; a sensation of lassitude is felt; and a difficulty of further contraction is the result. If the motion were violent, and the blood were called in excess into the limb, inflammation might arise.

If, on the contrary, after intervals of repose, we perform the same motions, and many times repeat this, we observe an increase of bulk and energy in the part, in consequence of the more active conversion of nutritious matters into its substance, and also a perfection of action which was not previously enjoyed.

Hence, in labouring men, the limbs employed in their occupation are larger in proportion than the rest: this is the case with the arms of smiths, bakers, boxers, wrestlers, &c., and the legs of porters, couriers, dancers, &c.

Generally speaking, the effect of active exercises on any part or any animal, is greater the more it is in motion.

The person, however, who is constantly employed in muscular exercises never acquires great strength. If continued exercises are also violent, what is gained does not make up for what is lost, and he wastes quickly.

If, on the contrary, exercise and repose are alternate, it favours nutrition and the development of muscular power.

The person, then, who acquires the greatest strength is he who practises muscular exercises which require great force, but who follows them up with sufficient intervals of repose.

To have an idea of the extensive effects of exercise on the rest of the organisation, it is enough to observe that the locomotive muscles and their levers, the bones, form a mass much larger and heavier than all the other organs, and that their actions also are by far the largest and most powerful. It is thence evident how vast must be the influence of the repeated and continued action of such organs on the rest of the economy.

When the body is in a state of repose, the interior functions are, indeed, in exercise; but, as the organs which execute them do not receive any impulse or excitement from without, their action is slow and feeble. Not only the muscles themselves lose their suppleness and energy; the whole organisation is enfeebled; and, if the state of repose continue, the strongest man will ultimately become weak and indisposed.

On the contrary, under the influence of exercise, the interior functions increase in activity and power.

In this way, the contractions of the muscles produce a general excitement, making all the organs partake of their activity. It is thus that every one must have observed, after active exercise, palpitation of the heart, high pulse, heat, redness of the skin, perspiration, &c.

It is, however, in its effect upon the nourishment and material composition of the body, that it is most interesting, in relation to the present views, to notice the consequence of exercise. It is especially in contributing to this function that exercise spreads equally over the body, heat and vital energy, and maintains an equilibrium among all the functions.

OF THE CONSTRAINT TO WHICH THE BODY IS WRONGLY SUBJECTED.

The excessive, or too long continued, action of locomotive organs, is not so frequently injurious to them in women, as is the state of inactivity, arising from constraint, by which their structure is often wasted and their capability of action lost.

'It is important,' says Camper, 'to keep the spine of the back straight, and it is desirable that the care of watching after this should be left to the wisdom of nature. But unluckily parents will not refer to nature, and prefer the use of whalebone stays. It is in consequence of this error (owing to the debility and wrong positions it causes, as will presently be seen) that we see so many misshapen and deformed persons in Holland, England and France.

'The little girl, in the attempt to render her thin and genteel, speedily becomes hump-backed. This strange abuse, however, exists chiefly in towns, and among persons in easy circumstances, to such an extent, that, out of one thousand females, scarcely ten have the back-bone straight. The consequence of this is a general enfeebling of the constitution, a contracted chest, diseases of the loins, and a difficulty of giving birth to offspring, which is often fatal to the mother, owing to the contraction of the pelvis. The head and even the face frequently get a turn sideways; for the brain not being in a state of exact equilibrium, renders the skull misshapen. When the backbone is much bent, the individual rarely reaches a certain age, but dies of dropsy.

'It is very rarely, and by accident, that men are not straight, and then they are generally humped behind, because in climbing up steep places they are more liable to falls. If boys, therefore, are straight in figure without the aid of whalebone stays, why should it not be the same with girls? And how happens it that the daughters of wealthy parents have generally this defect, except that their mothers have the cruelty to keep them in a state of torture in their clothes?

'There is added to this another abuse: that girls may appear to have a long waist, their whalebone stays are made longer than is suitable, and nothing certainly is more dangerous,'—by compressing the brim of the pelvis.

How much at variance with the doctrines of this great anatomist are those of Mr. Shaw, when he tells us that 'If a girl is naturally strong, and is permitted to have enough of active exercise, she may counteract the ill effects of long continuance in a bad position; but if she be weakly, and have not proper exercise, the lower part of the spine must yield to the weight of the upper part of the body;' and that 'taking this view of the causes of distortion, I would concur in part with the opinion of those who believe that stays are useful: however, they should be worn only by weakly children, to prevent the spine from sinking while they are obliged to sit up; for stays will never cure a distortion, nor give strength to the muscles. We have only to observe the fine figures of the peasant girls, to be convinced that stays are not absolutely necessary; but if children are brought up artificially, they must have some artificial support.'

Dr. Duffin similarly errs in thinking that 'a moderate and equable degree of compression, given to muscles much called into exercise, so that it does not unduly interfere with their power of contraction, is undoubtedly beneficial.'

There is, I will venture to assert, no 'compression of muscles' that does not 'interfere with their power of contraction,' or that is not injurious exactly in proportion to its 'degree;' and the more muscles are 'called into action,' the more injurious must such 'compression' always be!—This mistake arises from the utility, real or supposed, of belts around the loins; but such utility, if it exists, depends on their supporting the internal abdominal organs, not on their 'compression of muscles.'

To the constraint of dress, is added the absence, I may almost say the impossibility, of exercise. The only exercises, indeed, to which, in their hours of relaxation, young ladies have access, are in general only a few insignificant games, or amusements extremely limited.

OF THE DEBILITY WHICH IS CAUSED BY CONSTRAINT.

A weakening of the function of any organ always results from want of use: the member having been for some time in a state of repose, has no longer similar power.

The proofs of this are innumerable; being afforded by all the acts of our lives in which habit is more or less irregular. We feel that they are less perfectly repeated after intervals of cessation.

If this repose endure for a long time, movement of the limb becomes almost impossible.

On this subject, Mr. Shaw observes that, '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 the state of parts which are not kept in due activity; for if they are not exercised, they degenerate, so as even to lose their peculiar characters, and gradually to become similar in structure to the common cellular membrane.

'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; they fall into the same condition, and assume the same appearance, with the cellular membrane.

'The effects produced upon the muscular frame, when there has been long confinement to bed, or when, for the purpose of deceit, the limbs have been bandaged so as to prevent the muscles from acting, are well known. But there are other sources of the diminution of the muscular power, which are still more important to observe; as, for example, the confinement of young persons who are slightly distorted, for months together, to one position, or the encasing them in machines, which not only preclude the necessity of any muscular exertion, but, by pressure on particular parts, cause the muscular substance to waste.'

Of the effect produced upon the osseous system by want of exercise, he observes that, 'there are several instances of dislocated joints, where the margins of the old socket have wasted, and the cavity has been filled up by a spongy cellular structure.—In one instance, the head of the thigh-bone has completely lost its round appearance, and is not one-third part of what may reasonably be considered to have been its original size...The head of the humerus, that had been dislocated, and driven between the ribs, was found, upon dissection, to be wasted, soft and spongy.

'This law is not confined in its operation to the muscular and osseous system, but extends to every part of the body.'

The reason why continued repose of a member decreases nutrition in it, and subjects it to waste, evidently is that, the irritability caused by movement not taking place, the flow of the blood which it caused ceases also.

When to this is added that pressure which produces absorption and waste of the supporting muscles, the organic injury is at its height—the means of adequate support are gone.

A medical friend mentions to me an instance, which he himself witnessed, of several of the muscles of the neck being partially divided by the long-continued use of a tight necklace.

I have seen also, at Mr. Parris's, a cast from a lady's arm, in which the great muscle of the shoulder, the deltoid, has evidently had its superficial fibres cut through by the pressure of the shoulder-straps of stays.

'That such,' says Mr. Shaw, '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.'

But a simple experiment, which occurred to me on this subject, and which the most vigorous or active may at any time perform, will satisfy all who try it that the constraint and pressure of muscles is fatal to their action. If a leathern strap is buckled very tightly round the loins, and the experimenter then lean to one side, he will be unable to regain the vertical position without great difficulty.

Physiologists agree that the constraint and pressure produced by stays enfeeble the muscles of the spinal column.

Portal states that the muscles of the back are larger and stronger in women who have not worn stays, than in others; that it is scarcely possible to demonstrate these muscles in those who have worn stays; and that these muscles have been so weakened by pressure and want of use, that (when the stays are removed) they are incapable of supporting the body.

Van Swieten says that 'those wretched women who have been long accustomed to wear these coats of mail (loricæ) can never lay them aside, lest the chest should fall forwards, in consequence of the weakness of the dorsal muscles, which, when in health, and properly exercised, are capable of supporting the spinal column erect and firm, even under heavy burdens.' 'I could not,' he says, 'view but with pity those miserable women who, not even during sleep, dared to take off their stays; who frequently could not turn themselves in bed, much less raise themselves up when in bed, or maintain the body in an erect position.'

The author of a work entitled 'A Comparative View of the State and Faculties of Man with those of the Animal World,' says, '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 obstructions in the lungs, 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 civilised 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 of their limbs never having suffered any confinement.'

Unhappily, the means almost always employed to compensate for this persevering destruction of natural power, is increased use of its causes!

On this subject, however, the voice of science will ultimately be heard. 'Nature,' says Camper, 'should be allowed to act freely, in order to strengthen the child. We should carefully avoid compressing the shoulders by bandages, even of wool or baize, or putting any support in front of the throat: everything employed in this case as a remedy only increases the evil. I am speaking here of bodies that are bent to one side (scolioses), not of those that are hump-backed (cyphoses). The first may be remedied by external means, but for the latter there is no remedy. If you doubt what I say, ask those parents who have spared no pains to make their daughters' shapes straight, and they will tell you that they have uselessly employed suspenders, collars, steel plates, and steel corsets. Then look at the daughters themselves, and their monstrous conformation will convince you of the truth of what I have advanced!'

OF THE WRONG POSITIONS WHICH RESULT FROM DEBILITY, AND FROM THE EMPLOYMENT, IN THE PARTICULAR PURSUITS OF EDUCATION, OR THE COMMON ACTS OF LIFE, OF MUSCLES UNFAVOURABLY SITUATED.

MR. Shaw says, 'The most probable source of many distortions is either in the cessation of the actions of some particular part, or in the undue and partial exercise of others.' It would have been more correct to say that both these causes operate.

The use of stays and other restraints, as well as sedentary habits, causing, in the manner just described, debility of many of the muscles, naturally induces the use, in the particular pursuits of education or the common acts of life, of other muscles, of which the power is less impaired, but which are less favourably situated for the purpose in view.

This is the great cause of wrong positions of the figure, and all their fatal consequences.

This Mr. Walker illustrates by the most remarkable of the wrong positions resulting from debility or from the improper employment of the muscles in standing, sitting, writing, drawing, guitar-playing, harp-playing, pianoforte-playing, riding, lying in bed, and all the acts of common life, for which I must refer to his work, which shows that, in all, the right arm is preferably employed.

Thus, as the most frequent curvature of the spine is lateral, its causes are also lateral.

The tendency of the greater number of the acts described, and especially of the frequent and long-continued act of writing, the similarly-continued act of drawing, and the long-enduring state of sleep, is added to that of all the common acts of life, in producing deviation and deformity, primarily and fundamentally, toward the right shoulder; and it is for these reasons that deviations to that side so greatly exceed those in the opposite direction.

'I find,' says Mr. Shaw, (blindly still as to the important conclusion it affords,) '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!'

Those are egregiously mistaken who imagine that the cause of lateral curvature is ever perpendicular in its operation;—they fail to observe that, when lateral curvature arises, even from some fault in a foot, it is solely because its influence is laterally applied, through the oblique neck of the thigh-bone, that it can have the slightest effect on the spinal column.—This, however, is rare compared with the lateral influence arising from the excessive employment of the right shoulder, as the preceding observations so fully demonstrate.

Considered, then, both in its relation to surgery to my present subject—exercise—this, says Donald Walker, is a simple, clear and important principle, now, I believe, for the first time enunciated—"that THE ONE-SIDEDNESS WITH WHICH ALMOST ALL THE ACTS OF LIFE ARE PERFORMED IS THE GENERAL

CAUSE OF THE GREATEST AND MOST UNIVERSAL DEFORMITY, AND THAT ITS PREVENTION REQUIRES AN EQUAL AND SIMILAR USE OF THE OTHER SIDE."—He clearly demonstrates the truth of this proposition.

OF THE DEFORMITY IN WHICH WRONG POSITIONS TERMINATE.

It has been already shown that the intervertebral substance permits extensive motion of the spinal column; and that when the spine is no longer bent to any particular side, it returns to the erect position, by the elastic resilience of this substance, aided by suitable muscles.

Now, even in a healthy man, unequal action of the masses of muscle, situated laterally and posteriorly to the spinal column,—if such action be frequent, excessive, or protracted,—may evidently impart an unsymmetrical form to the cartilages and bones which they powerfully influence; and if so, the unequal action of these organs must very easily induce deformity in the delicate woman who is subject to perpetual constraint, who is consequently enfeebled, and to whom wrong position has become habitual!

'The moment,' says Camper, 'that the vertebral column leans to the same side, either from bad attitude or from the corset being too tight, this elastic substance is bruised; so that the cartilaginous masses of the superior vertebræ are compressed, and adhere, directly the cartilaginous layer placed between the vertebræ is destroyed, to the inferior or following of the vertebræ: nutrition then ceases, the vertebræ assume a triangular shape, and the back-bone is bent in the manner represented by Cheselden.'

Such deformity will be most easily produced in early life, when even the osseous portions of the spinal column are more or less cartilaginous, when debilitating causes retard ossification, and when all habits of one-sided action act with greatest power.

But, at any period, the muscles which should support the vertebræ may become so enfeebled by want of exercise as to be incapable of their functions, or so perverted in action as only to perform them ill.

This deformity is seldom observed before the seventh or eighth year of age; and is more frequent in early life.

'When the spine of a girl about the age of twelve or thirteen,' says Mr. Shaw, '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.'

'On a more careful examination,' says Dr. Duffin, 'it is found that the central groove of the back deviates from a straight line; that there is a greater distance between a given point of the original perpendicular spinal line and the top of the elevated shoulder-bone, than between the same point and the corresponding top of the opposite side. The right breast presents a more than ordinary fulness, and the corresponding collar-bone displays a proportionate elevation.

'In proportion as the inclination takes place in the upper part of the back, between the shoulders, nature, in order to counterbalance the evil, and preserve the equilibrium of the body, calls into action the muscles of the lower part of the spine on the opposite side; so that, in confirmed cases, a double curvature is produced.' And it is in consequence of this, as Mr. Shaw observes, '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.'

'As the infirmity advances, a similar counterpoising power is exerted by the muscles of the spine attached to the vertebræ of the neck, and a third or upper curve is then formed, so that the spine presents a serpentine appearance, inclining to each side alternately;' and perhaps, as Mr. Shaw observes, 'with a slight bend outwards, which will be most observable in the loins, and especially when she is sitting.'

The ribs, in consequence of the alteration in the form of the spine, make a hump on the side opposite to the compression of the back-bone, and a hollow on the side towards which the vertebræ inclined: the hump and the projection of the shoulder being caused by those ribs which rise from the convexity of the spine; while the ribs attached to the concavity are depressed, and permit the other shoulder to fall downward.

When the lowest curve is completed at the pelvis, the prominence of the hip, on the side opposite to the prominent shoulder, becomes very conspicuous, and the spine, when viewed from behind, presents a serpentine appearance.—(See Plate XII.)

'The whole of the right side,' says Mr. Shaw, '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 become 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.

'Although habitually balancing the body on the left leg is one of the principal causes of slight distortion of the spine, and especially of the apparent enlargement of the right shoulder, we shall generally find, that when the distortion is increased so far as to have the appearance of the italic *S*, the patient no longer stands on the left, but on the right foot.

'When a girl so affected is in certain positions, one leg appears shorter than the other *; and 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 that the body is carried obliquely forwards, or with one side rather more advanced than the other.

'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 shortening of the leg is only apparent, and depends on the curve at the loins altering the position of the pelvis.

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.'

'The longer the deformity exists,' says Dr. Duffin, 'unless the causes whence it proceeds be discontinued, the more conspicuous it is sure to become.

'Pinæus, who flourished towards the close of the sixteenth century, asserts (so common was it at that period) 'that of fifty females of the higher or more civilised ranks of society, scarcely two could be found who had not the right shoulder higher, and more projecting than the left,'—an assertion which, but slightly modified, may, with considerable truth, be applied to young women of a corresponding class in in modern times.'—The Doctor might, I believe, with truth, have said that, in later times, and in the great capitals, Pinæus' estimate would be under, rather than over the truth. The reader has already seen, that Camper makes the exceptions only one in a hundred.

'During childhood, back-boards, steel stays, constrained positions of the body, concealed pressure and similar expedients, are resorted to with a view to force in, or bind down, the high and projecting shoulder, erroneously supposed to be alone in fault. This treatment, it need hardly be observed, is almost invariably productive of an aggravation of the mischief it is designed to remedy, as well as injurious to the form of the chest.

'If the shoulders be braced by means of straps to a plate of iron placed on the back, it is evident that the action of the muscles, with which nature has endowed the body for the express purpose of holding the shoulders in a graceful position, will be superseded, and will, for want of due use, become proportionately incapable of performing their wonted office when the strap is removed.

'Artifices of dress being now substituted for mechanical contrivances, the manipulations of the waiting-maid supply the place of well-directed medical and surgical skill; or, in more pointed cases, the machinist is resorted to, who not unfrequently increases the deformity he undertakes to cure.

'Machines of every description, for the prevention of deformity, or for the cure of bad habits, should be avoided: they are at best very inefficient substitutes for the means provided by nature. In young persons, in whom we may wish to correct round shoulders, or a habit of stooping, we can attain our object, and at the same time improve the general health and strength, more by the superintendence of their exercises and amusements, so as to make a moderate demand for muscular exertion of particular parts of the body, than by the use of back-boards, collars, or any kind of mechanical contrivance.'

On this point, I have only to add that Riolan, chief physician to Mary de Medici, observed that most of the women of his time had the right shoulder larger than the left; and that Winslow first showed that, by the pressure of stays, the lower ribs also were depressed, and their cartilaginous portions unnaturally bent.

OF MR. SHAW'S MISTAKE AS TO THE ORIGIN OF LATERAL CURVATURE.

'In consequence,' says Mr. Shaw, '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 the subject have fallen into this error, and have described the curve at the loins as the last which is formed.'

I shall endeavour to show that they were right in this, though they did not clearly see the cause.

'In cases of diseased 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.'

That is to say, Mr. Shaw has shown this hypothetically; while his own practical observations, in spite of his hypothesis, tend to prove that the first curve is formed at the right shoulder.

A circumstance not less decisive establishes this, namely, that, in seven cases out of eight, the curvature between the shoulders is toward the right side. Now for this, the excessive action of the right arm can alone account; and consequently, it is there only that the first curve can be formed.

'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.'

Mr. Shaw here takes for granted what has been just shown to be untrue. But there can be no doubt that the correction of any one of the spinal curves will *tend* to rectify the rest.

'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 at the shoulders, and I have found by experience that I was practically 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 mis-shaped, 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.'

I have just said that the correction of any one of the spinal curves will tend to rectify the rest; for if the lumbar *necessarily* accompanies the dorsal curve, it follows that the latter will as necessarily disappear with the former. Still, however, it is evident that common sense would direct preferably the removal of the curve first formed, or rather the removal of the causes which form it, in the excessive employment of the right arm.

'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.'

That the lower curve as directly affects the motions of the lower extremities, as the upper curve affects the motions of the upper extremities, proves nothing as to the prior formation of either, and is not therefore to the present purpose.

'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.'

It is a suitable close of such illogical argument, that Mr. Shaw only 'suspects' that the position of the shoulders is a cause of little importance in the production of lateral distortion! and that he assures the reader of his 'conviction' on the subject! Both the facts he himself has stated as to the position of the shoulder in standing, writing, and lying in bed, and the circumstance that, in seven cases out of eight, the curvature between the shoulder is toward the right side, prove that the wrong position of the right shoulder is the great cause of this universal deformity.

'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.

'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. [All writers have agreed that this, as a remote cause, produces general debility; but it is not an immediate or a local cause.] The second is 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. [But this is vague talking. The question is, Why do the lumbar vertebræ yield to the left side? Obviously, because the dorsal vertebræ yield to the right shoulder, compelled by its excessive employment.] The third cause I would name, is the habit of lounging or balancing the body on one leg. [But this raises the right shoulder.] The fourth, the habit of sitting awry while writing or drawing. [But this also raises the right shoulder.] The fifth, the habit of sleeping on a soft bed and with a high pillow. [But this likewise raises the right shoulder.] The sixth, the more frequent use of the right than of the left arm. [But this too can act only by raising the right shoulder.] And, lastly, I would assign as a cause of curvature most of the attempts that are made to correct the figure, or to model it into a certain form. [But these attempts owe their existence only to the same ignorance which Mr. Shaw here displays of the fact, that it is the one-sidedness with which almost all the acts of life are performed, that is the general cause of this deformity.]

I have dwelt thus long on the mistake of Mr. Shaw, because, if the cause of deformity be misunderstood, its cure is not likely to be well conducted.

OF EXERCISE AS THE REMEDY OF DEFORMITY.

In any attempt to cure deformity, it is evident that the causes which have a tendency to produce it, should first be guarded against. All sorts of collars and other machines should be rejected; children should not be suffered to remain too long bent to one side; they should never be allowed to carry or raise a very heavy weight with one hand; the right arm must not be used more frequently than the left, &c. &c.

No mode of treatment is so capable not only of preventing spinal deformity, but of curing slight degrees of it, as suitable exercises. But these exercises must be superintended by a person acquainted with the common causes of deformity, and with the various functions of the muscles which may rectify it—a kind of knowledge not always found even among medical men.

Mr. Shaw says, 'we may now inquire how far certain exercises are calculated to improve the figure.'

And he exemplifies this by exercises utterly unfit for ladies—by some, indeed, of the most violent exercises that can be imagined, such as climbing a rope ladder, a pole, or a single rope, as is done by a sailor! These are wrong in all cases. But no man can direct or guide exercises for the remedy of distortion, who, like Mr. Shaw, is ignorant of its cause, and thinks it generally begins in the lumbar region instead of the dorsal. Mr. Shaw has accordingly given no plan of treatment founded on its real cause—the one-sidedness I have described.

In proof of this, I need only quote the following passage :—'Were the curve of the spine in one direction only, it would be easy to describe the sort of exercise proper to remedy it; but as in all common cases of lateral curvature, there are several curves, the exercise that is useful in counteracting the one may increase the other.'

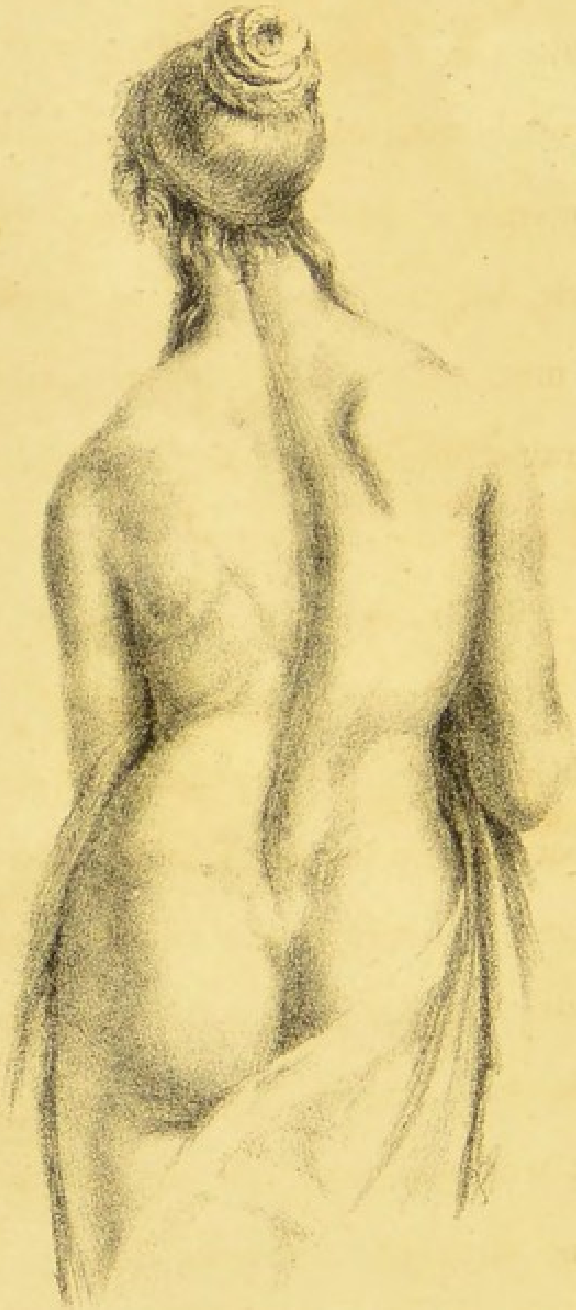
Now this is absolute nonsense; for, as one curve generates the rest, it is evident that the exercise which is capable of correcting that curve, will correct the whole.

It is fair to observe that the preceding views of the author of "Exercises for Ladies," derive remarkable support from certain views of Soemmerring. While that illustrious anatomist traced the cause of deformity to the relative weakness of the left and strength of the right side, he only missed the observation that the weakness of the one, and the strength of the other, were mere effects of *a yet higher cause*—the neglect to employ the one, and the incessant employment of the other side, or, as it has been expressed, "the one-sidedness with which all the acts of life are performed."

"If," says Soemmerring, "we put stays on the chest of a child from ten to twelve years old, or even one older who has never worn them, we are assured that it is impossible so to put them on, first, that the ribs shall not be pressed more to one side than the other; secondly, that they shall not press under and over against another, or to one side; thirdly, that the whole spine, which is usually in a straight line, shall not bend to the right or the left; or, fourthly, what is most common when everything goes on pretty well, that the upper part of one-half of the chest shall not be raised evidently higher than the other, and thus high shoulders be produced.

"The change in the shape of the chest unfortunately is not detected until it has gone to a great extent, and is evident to all. But this change takes place the easier, first, because we scarcely ever see a chest entirely symmetrical, but chiefly find the right half larger than the left, both generally and in particular parts; secondly, because the stays are put upon young persons whose bones are not fully formed, but yield on pressure, if they cannot develope themselves. Stays are of a conical figure, which never yields: in order to accommodate itself to this pressure,

PLATE XII.



CURVATURE OF THE SPINE

produced by means of a shape the reverse to that of the chest, that half of the cavity gives way most which is the weakest, and presses consequently on the other, or the stronger, and causes it to expand by the continued pressure. This pressure takes place usually on one side, backwards and upwards, because the ribs are here most bent. If this expansion increases to a considerable projection, it pushes the shoulder-blade forwards, presses the arm upwards, and also causes the high shoulder, as is represented in Plate XII.

"We have already seen how, in the natural state, the weight of the body by several degrees rests more on one foot than on the other, which narrows one-half of the chest and widens the other. But how much more must this take place under such powerful pressure as the stays exert! Thus, if, on an average, all the right true and false ribs are longer, and at the same time stronger, it follows that the pressure of well-applied stays acts more powerfully on the left side of the chest than the right, and must also considerably lessen the capacity of the left half."

These views at once support the doctrines which have been laid down in this work, and clearly point out the best mode of treatment.

THE END.

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