The portable gymnasium : a manual of exercises, arranged for self instruction in the use of the portable gymnasium / by Fr. Gustav Ernst.

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Edgar J. Cyriax

ERNST

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PORTABLE GYMNASIUM.

A Manual of Exercises,

ARRANGED

FOR SELF-INSTRUCTION

IN THE USE OF

THE PORTABLE GYMNASIUM.

BY

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ORTHOPŒDIC, ANATOMICAL, AND GYMNASTIC MACHINIST, ETC., ETC.

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TO

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THESE PAGES ARE HUMBLY

Dedicated

WITH SENTIMENTS OF RESPECT AND
GRATITUDE

BY

Fr. GUSTAV ERNST.

INDEX.

INTRODUCTION.

THE beneficial effects resulting from the employment of Gymnastic Exercises, as a curative agent in cases of spinal deformity, or other bodily weakness and contraction, are so generally known and appreciated that an advocacy of the system is here quite needless. I shall, therefore, abstain from entering on the merits of the various systems comprehended in the category of "mechanical assistance," and confine myself to a definition of the class especially adapted for those suffering from vertebral deflection or other local disarrangement, as well as to the more general movements which tend to develop and restore the symmetry of the human form. It may seem that the simplicity of this remedy, consisting as it does in pure muscular action, is devoid of all interest, and reduced to a mere display of physical power; and yet, if the attention be once awakened and fixed on the subject, there is an increasing charm involved in its principle; the fact being that on the exercise of the weak and suffering member health and beauty are dependant; it is, as it were, an innate gift of nature, the capacity for helping and restoring herself. We

all know that *use* has developed the "thews and sinews" of the artisan; *use* enabled the milk-woman to trudge with her heavy load day after day for many consecutive hours; *use* that lightens the domestic servant's toil; and *use* that wins the sharply-contested boat race or exciting cricket match. If, then, it be admitted that the simple *use* of muscular power can enable the weak to achieve the deeds of the strong, what effects may we not calculate upon, when, under judicious treatment, *use* is brought to bear upon the debility of an inert or, possibly, morbid frame?

The full amount can only be understood by those whose daily experience is derived from an immediate proximity with the sufferer and this species of antidote; and it is because I have long and thoroughly studied, and thereby become impressed with the importance of gymnastics in orthopœdic practice, that I now venture to publish a course of directions for the guidance of those who themselves pursue or introduce into the educational system of their families, a course of physical training.*

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* For the basis of my information on the subject I must offer my acknowledgments to my talented countrymen, Dr. Behrend, of Berlin; Dr. Heine, of Wurtzburg, and their contemporaries; and the no less celebrated Dr. Delpech, all of whom have elevated Gymnastics to the rank of a science.

It was at the request of Dr. Little that I, some years since, turned my attention to the production of an efficient "portable gymnastic apparatus," long experience having clearly demonstrated the necessity of keeping up regular daily practice. I consequently constructed an improved pedestal, such as should enable every family to carry about with it the necessary means for continuing the exercises especially required, as well as those taught in public or private institutions, and I have great satisfaction in finding my efforts most fully approved by many eminent medical practitioners, and warmly supported by a large circle of patients who have honoured me by practising the system I have adopted and teach. In common with all who pursue any one particular plan, I am open to criticism; but having *facts* for my foundation, I have no hesitation in offering my little manual to public notice, as a direction to those desirous of entering on a regular system of physical education; and I consequently look for the continued favour of the medical profession, being their agent, and as such explaining and carrying out their mechanically curative designs and directions, devoting thereto my most strenuous exertions and earnest endeavours.

In the following pages the exercises illustrated by

male or female figures, must not be considered accordingly appropriated, the whole of the series being intended for the use of both sexes.

In some instances I found it easier to explain the movement by selecting the figure of a gentleman as the subject; in others I have been enabled to adopt the more graceful form of a lady, with the additional advantage of variety in the designs.

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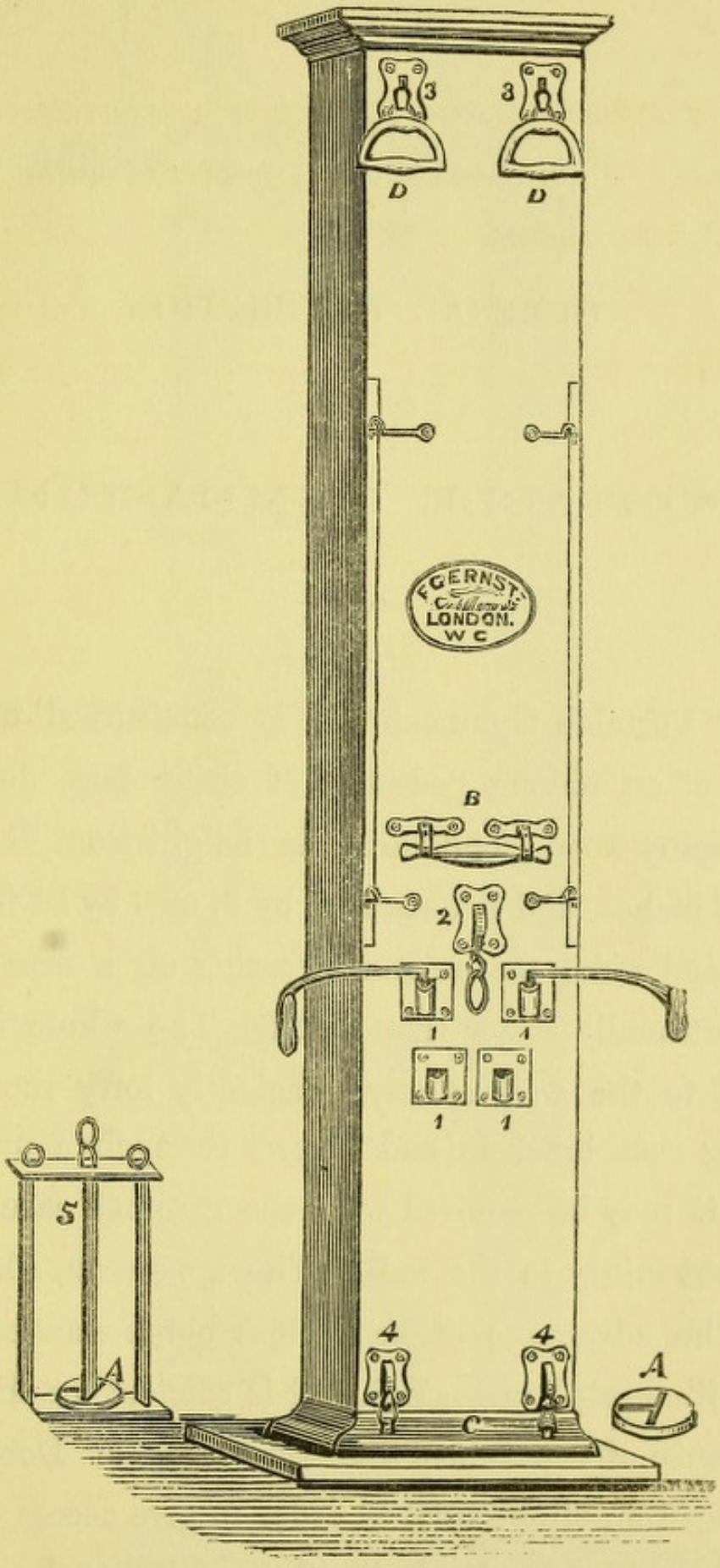

PLATE 1.

GENERAL DESCRIPTION

OF THE

PORTABLE GYMNASIUM.

THE "Portable Gymnasium" is constructed in the form of an oblong pedestal, of either best deal or mahogany wood; and varies in height from 6 to 9 feet 6 inches, and is usually 7 by 8, or 9 by 14 inches deep and wide, the pedestal resting on a firm base proportionally larger than itself. The whole is secured to the wall of any sufficiently lofty room by strong iron brackets and screws in such a manner that it may be removed with the greatest ease, and without injury to the wall. The apparatus, Plate 1, has the advantage of being less cumbersome than that illustrated in Plate 2, and is efficient for the performance of twenty-five different exercises. Doors are arranged on either side, in order to give access to the weight-carrier, and admit of the weights being increased or diminished, according to the strength of

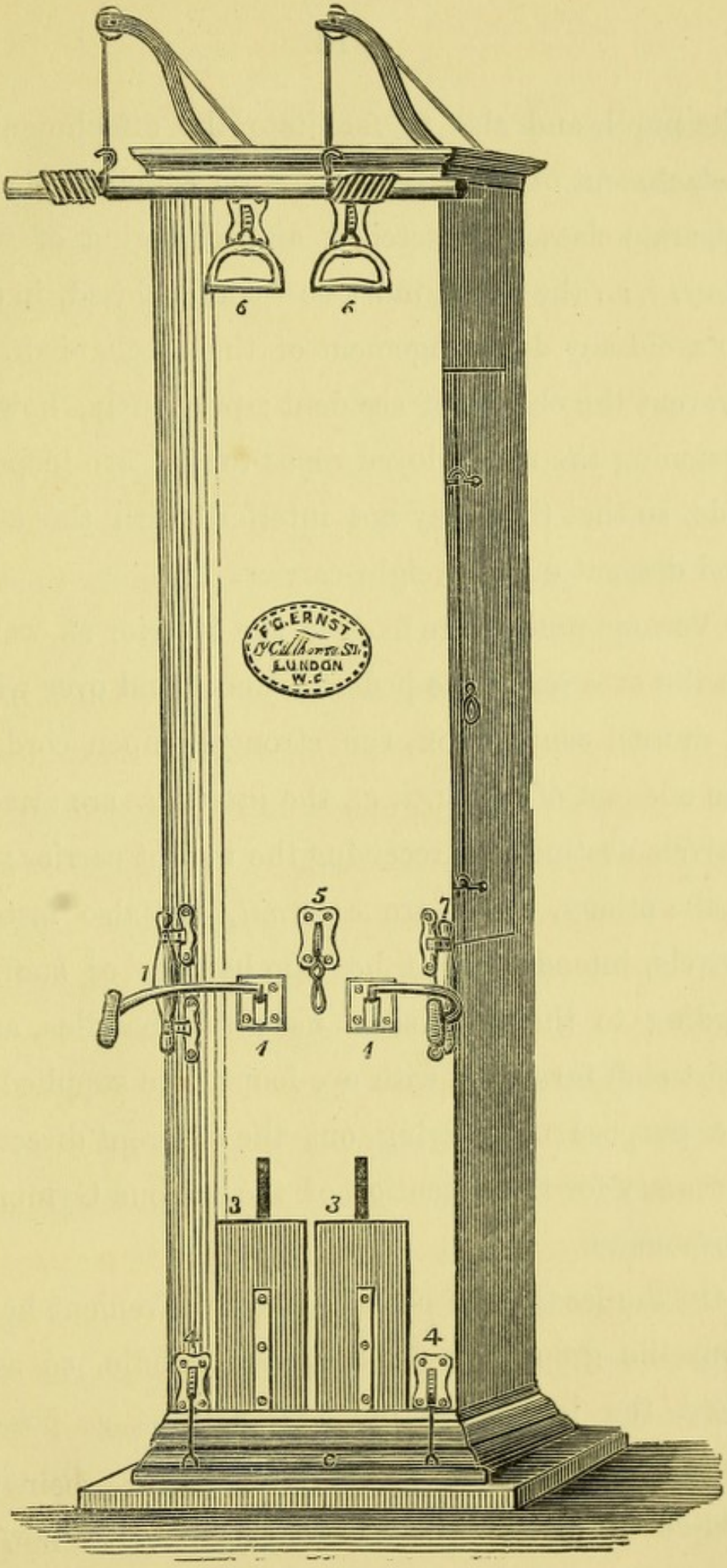

PLATE 2.

the pupil, and also to facilitate the attachment and detachment of the several ropes on which depend the separate classes of exercise; after changing of which they, *i. e.*, the doors, must be securely closed, in order to avoid any disarrangement of the mechanism, and prevent the chance of accident; previously, however, fastening the unemployed ropes to the eye-loops inside, so that they may not interfere with the ascent and descent of the weight-carrier.

Various pulleys are fixed in the interior as well as on the exterior of the pedestal, under and over which, in mutual conjunction, run strong hempen cords, to the one end of which, *i. e.*, the *internal*, are attached swivels destined for receiving the weight-carrier; and to the others, which are *external*, are also fastened swivels, intended for either the handles or staff, according to the exercise in use; two handles, and a short staff furnished with eye-loops, are supplied, for the purpose of carrying out the different directions necessary for the execution of the various Gymnastic movements.

On the face of the pedestal, at a convenient height from the ground, is fixed a firm handle, so as to afford the learner as much steadiness as possible while performing certain lateral exercises. On either side of the central pulley stands a vertical roller, the

office of which is to ease in an immense degree the traction in the lateral exercises; the revolutions of the rollers, as the cords pass over them, materially diminishing the labour and obviating the friction on the cords.

As it would be difficult, especially for children, to reach the upper swivels, when the top series of exercises is required, recourse is had to long webbing loops, which have a swivel sewn on them, and which being attached to the highest external swivels, afford a simple and ready means of drawing them down, so that either the staff or handles may be attached.

From the top of the larger pedestal, Plate 2, and peculiar to it, project two strong arms, their extremities terminating in pulleys over which pass cords, the ends of which are fastened on a long staff, an arrangement being provided on the staff for lengthening and shortening them, this is used in the jumping, climbing, &c., exercises, and also serves in the case of adults for a longer tractive medium.

In Plate 1, Fig. 5, a sketch is given of the weight-carrier, with a weight A on it; this will easily explain the mode of increasing or reducing the resisting power. The weights are of two sizes, representing respectively a pound and a half-pound. At the bottom of the pedestal *inside*, a thickly-padded board,

resting on strong spiral springs, is placed, which prevents the noise and jerk of the descending carrier.

There is one superiority the smaller form of Gymnasium, Plate 1, possesses over the greater, viz., its size; for not being larger than an old-fashioned eight-day clock-case, and very little space being required for its use, it may be stationed in any room; while the general advantages appertaining to either form of Portable Gymnasium are so apparent that a few of the most prominent ones need only be enumerated. In the first place, the toil and expense of travelling to a further or less distant public Gymnastic establishment is dispensed with; the pupil, having the means always at hand, can commence the exercises with a frame whose strength has not been previously taxed by a tiring walk or ride, and rendered, in a degree, unfit for the performance of the prescribed exertion. Every needful movement, too, can be obtained from the pedestal, and at the same time the duration of the lessons is not limited to any set time as must be the case where there is a constant succession of pupils, as, for example, far more benefit is to be derived from a *quarter of an hour's practice repeated four times a day* than from *one hour's continuous use once in the same* period. It

also serves for adults or children—stronger or weaker individuals—the division of the resisting power into numerous separate weights rendering it adaptable to the capacity of either; nor is any accident likely to arise to children in using it, although it is desirable to have the surveillance of a competent person, so as to prevent them from tampering with the interior adjustment.

In an economical point of view it will, where there are several members in a family, repay itself in less than six months, if the expenses incurred by using a public Gymnasium are considered; for though it may be needed for restoration in a case of spinal deflection, or loss of muscular power, it will afford to the younger branches of families, in town or country, such salutary amusement as may rank with useful occupation when unfavourable weather or other circumstances preclude out-door exercise.

The symmetrical and even ornamental structure of the pedestal renders it an unobjectionable addition to the dining-room or library, and its transmission and packing can be so easily and cheaply effected, that to families often changing their residence it will prove a great desideratum.

DIRECTIONS FOR EXERCISING.

Severe cases of spinal deflexion are seldom met with where recourse has not been had to one or other form of mechanical support, which is constantly worn. Any such apparatus must be removed before commencing the exercise, otherwise muscular movement will be impeded, full bodily power restrained, the exercises imperfectly performed, and development limited. Immediately after the exercising period has expired the appliance should be resumed.

The exercises, especially at the commencement, must not assume the character of a toil or labour; begin with a definite number of movements, from six to fifteen, and such an amount of weight on the carrier as can be easily managed. For example, should six movements with two pounds weight occasion a sensation of strain on any one set of muscles, then the *weight* must be reduced, but not to so low an amount that the traction can be effected without some little exertion.

Having established the status as to *weight*, go on with the exercises for about three weeks, at the end of which time double their number, and after the lapse of a similar period increase the weight. With

this augmentation, diminish the number of movements to the starting limit and progress as with the lighter weight, from time to time adding a pound or half a pound, so that the ultimatum may be gradually and imperceptibly attained.

It is a general rule in cases where the bodily frame is *not* the subject of lateral spinal deformity, that either arm must alternately perform the exercises a like number of times, otherwise the flexor and extensor muscles of one side of the body will gain in volume over the other, and originate a deflection; whereas by *regular* and *alternate* use a perfect and general development will go on, and equal muscular antagonism be maintained.

The case is, however, very different in decided lateral curvature, for then a series of muscles on either side of the spine are affected, equally in degree, but differently in locality, and the deflection would be only increased by following the above axiom; an alteration in the system of treatment must be adopted, and one set of exercises practised with the right hand, another with the left, so as to exert and develope the deteriorated muscles on either side. Under these circumstances, the medical attendant's opinion is decidedly necessary, to define the particular kind and limit of exercise to be pursued.

It is important that during the exercises the position of the body, as indicated in each individual description and accompanying Engraving, should be strictly adhered to, or the object of the movement will not be attained.

All exercises must be executed carefully, a violent jerk, or sudden shock, will either produce a strain of the limb employed, or possibly throw the apparatus out of order*; no practical good can be derived from hurriedly dragging at the handle, and then as quickly losing hold of it, when the cord is perhaps fully extended. The principle embodied in Gymnastic manœuvres would be thereby entirely subverted, and an absurd and useless waste of time and material established.

It is considered necessary by the greater number of Gymnastic professors to allow a short interval of rest (about four or five minutes) between the different exercises, for the purpose of permitting the formation of muscular fibre in this intervening period.

The question has often been suggested, "When is the best time for taking exercise?" and may be thus answered: "If practicable, midway between the respective daily meals; but never immediately after them."

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* By slipping the ropes off the pulleys.

There being a separate set of cords for each class of exercises, the one required for practice must be attached to the weight-carrier. To facilitate the change, the ends of the cords in the interior of the pedestal are respectively marked "Upper," "Central," "Lower," so that no difficulty can arise in momentarily affixing whichever is needed.

CLASSIFICATION OF EXERCISES.

Contrary to the usually adopted plan, that of commencing with the Exercises for the superior extremity of the body, *i. e.*, the head, I have entered at once on a description of those most generally needed, the amount of spinal cases and trunk or general weakness being greatly in the majority over malposition of the upper, or deflections of the lower extremities. I have therefore given the prominence to that class most suitable for such infirmities, and in so doing have availed myself of the usual nomenclature in the appellation and descriptive use, as I do not claim for myself a fresh field of action nor new remedial agents, but simply the power of turning the best means to the best account. My arrangement is, therefore, as follows :—

I. The Fulcrum Chest Expander.

II. Central Exercises.

These are derived from the middle pulley, and are divided into :—

1. The Arrow Exercise.
2. Upward Extension.
3. Lateral Extension.
4. Lateral Extension and Flexion.
5. Adduction with Extension.
6. Abduction with Extension.
7. Traction and Upward Extension.
8. Upward Arm Rotation.

9. Trunk Rotation with Lateral Extension.
10. Angular Traction.

These exercises exert an influence over the whole muscles of the trunk and arms.

III. Upper Exercises.

These are derived from the pulleys at the top of the Gymnasium, to which either the short staff or the loose handles must be attached, and are as follow :—

1. Semi-rotatory Movement.
2. Inclined Downward Traction.
3. Rotatory Traction.
4. Downward Traction, with Forward Movement of Trunk.
5. Combined Traction and Extension.
6. Jumping Exercise.

Lower Exercises.

These are derived from the lower pulleys.

1. Back Upward Traction.
2. Upward Erect Traction.
3. Lateral Flexion of Trunk.
4. Lateral Traction.
5. Upward Traction.
6. Horizontal Inclination.
7. Upward Traction Chest Expander.

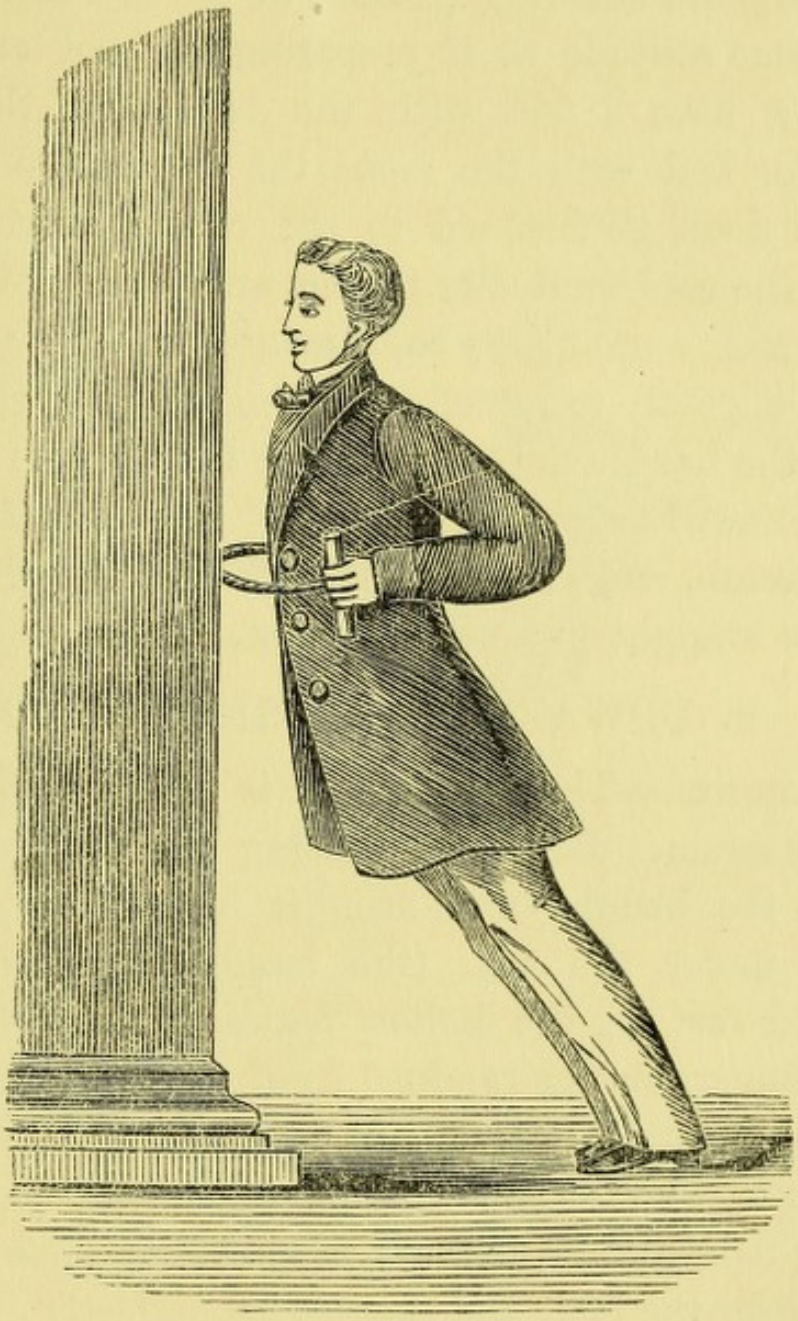
Head Exercises.

These are performed by means of the central pulley, with the head-piece, which is arranged accordingly :—

1. Lateral Flexion and Extension.
2. Forward and Backward Extension.
3. Rotation.

THE FULCRUM CHEST EXPANDER, Fig. 1.

The pupil, in this exercise, is placed in front of the Gymnasium (the feet being close together), about 12 inches from the handles of the Expander, which distance, after the lapse of a few days, must be increased inch by inch; the handles are then grasped, the arms being kept *close to the body*, which latter must now be allowed, by its own weight, gradually and slowly to fall forward; recline a second or two in the position indicated in the Engraving, and then slowly withdraw to the erect attitude. Continue this and all the following exercises *a given number of times*, commencing with six, and increase according to the medical practitioners opinion of the pupil's strength, especial care being taken never to tire or over-strain any one set of muscles. In cases of lumbago this exercise has been found of special service, the muscles affected by that painful disorder being particularly influenced by it.



FULCRUM CHEST EXPANDER—Fig. 1.

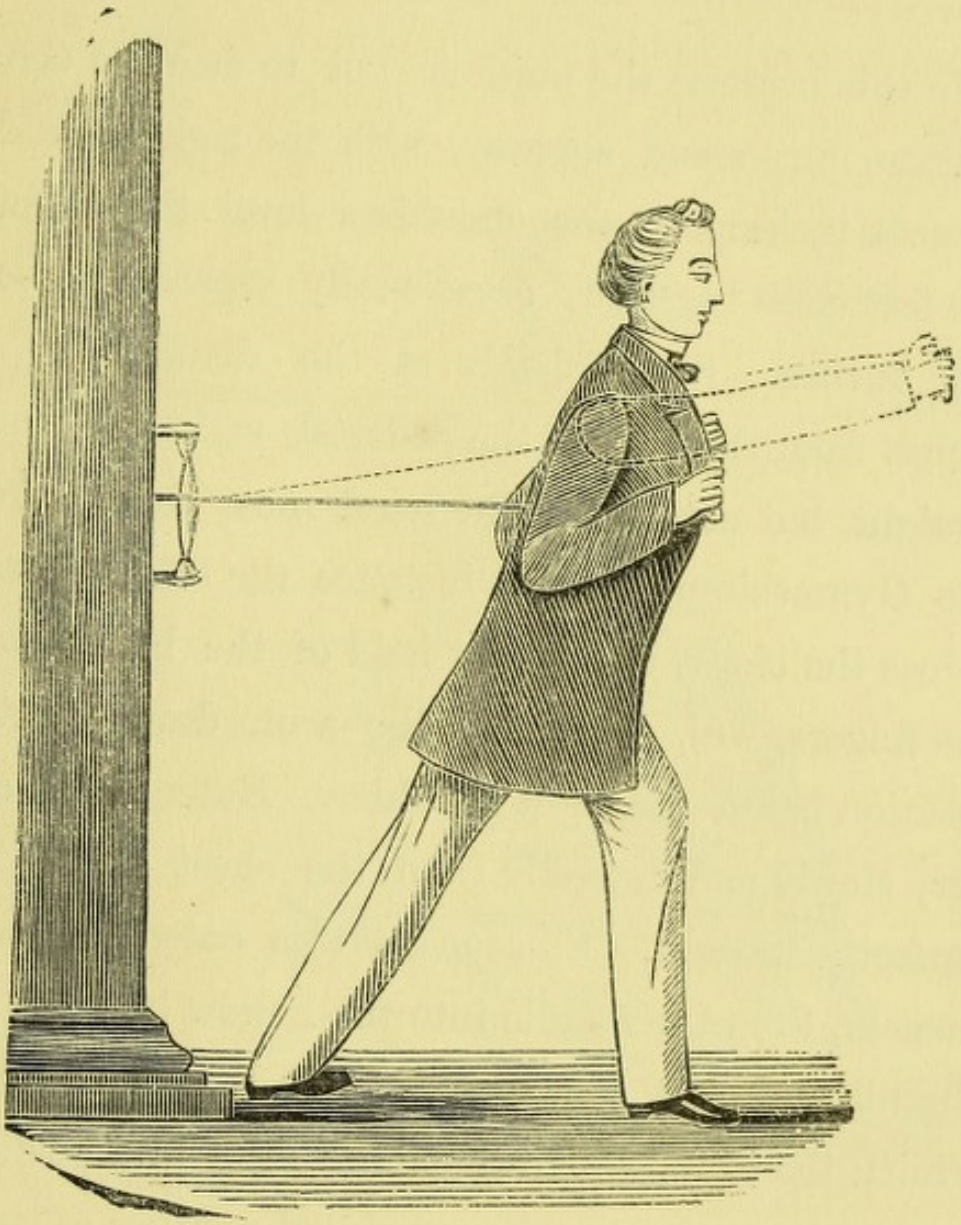
II. CENTRAL EXERCISES.

1. The Arrow Exercise.

The pupil standing in front of the Gymnasium, in the same attitude as if preparing to shoot an arrow from a bow, holds with the *left* hand the fixed handle, and with the *right* the detachable handle, which must be fastened to the centre swivel; then draw the cord gradually till the arm is fully extended, and, after a moment's continuance in that position, allow it gently to retract. In commencing the traction, the handle must rest in the four fingers till the arm is nearly extended; it will then of itself pass to the thumb, and so allow the wrist to bring the hand in one straight line with the arm.

2. UPWARD EXTENSION, Fig. 2.

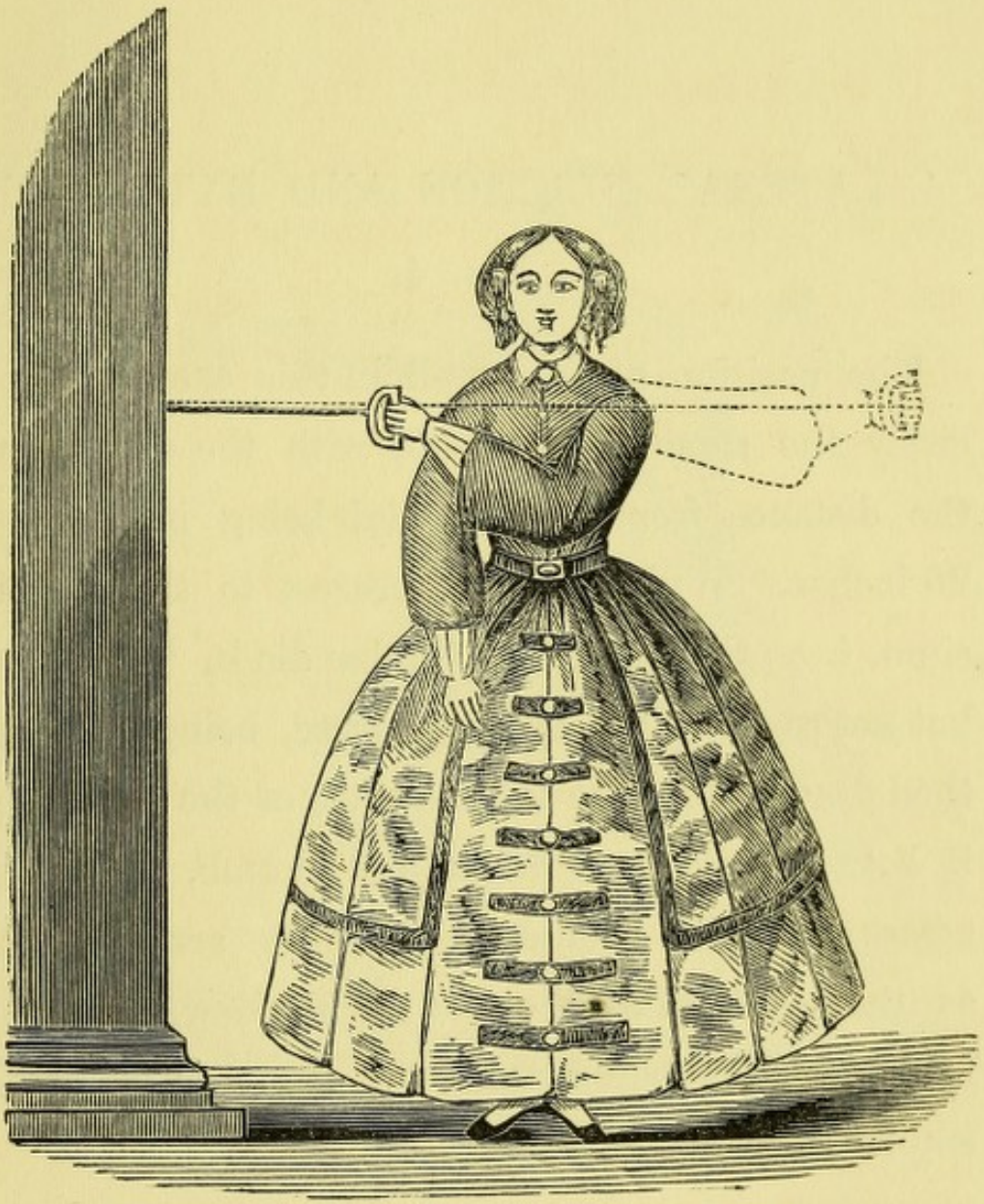
Position.—The pupil's back is turned towards the Gymnasium. Begin by passing the hand behind; grasp the handle, and bring it in front of the body from under the arm (the handle, when in front, should rest in the hollow between the thumb and first finger, and be retained so through the exercise). A step must now be taken forward, with the right foot, about 18 inches, the toe of the advanced foot being slightly turned out, whilst the knee is kept bent over the foot, and the left leg perfectly extended. Let the right arm be thoroughly stretched forward beyond the body, the hand elevated to the height of the chin, and the shoulder advanced; then allow the hand to resume its original place. Reverse the position of the hands and feet, and perform the movement the prescribed number of times.



UPWARD EXTENSION—Fig. 2.

3. LATERAL EXTENSION, Fig. 3.

In this exercise the pupil is not to face the Gymnasium, but stand sideway, with the right shoulder towards it, keeping the shoulders level throughout, the feet close together, occasionally separated about four inches. Stand firmly at the distance of 14 inches from the base of the pedestal, with the knees straight, but not stiff. The hand most distant from the Gymnasium, in this instance the left, is passed across the chest, and taking hold of the handle with the fingers, will, by flexing the arm, draw it into a position before the right shoulder. Extend the arm very slowly and laterally from the chest until it is perfectly straight. So soon as this extension commences, drop the handle into the hollow between the thumb and first finger, thus affording more power. Finish the exercise by returning to the first position, and repeat the action the appointed number of times. After an interval, reverse the body, and in the same manner exercise the right arm.

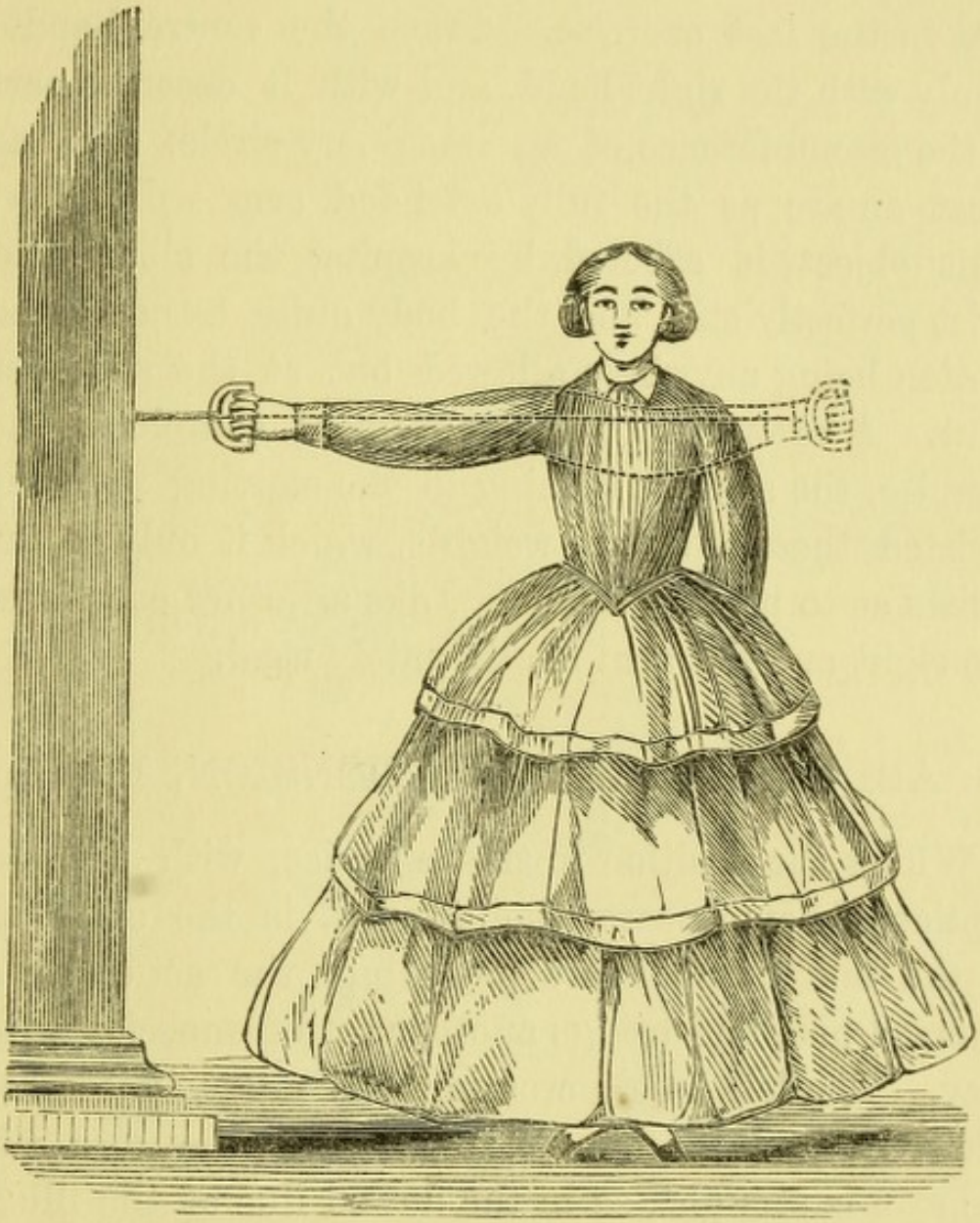


LATERAL EXTENSION—Fig. 3.

4. LATERAL FLEXION AND EXTENSION,

FIG. 4.

The position of the pupil in this exercise is precisely the same as in No. 3, with the exception of the distance from the pedestal being increased to 26 inches. With the hand nearest to the Gymnasium, *i. e.*, the right, take the handle in the fingers, but not grasp it, the arm, of course, being extended; then draw the handle to the centre of the chest, shift it between the first finger and thumb, and pass it across to the left shoulder, extend the arm as much as the position of the body will allow, and let it retract to the starting point. Repeat the movement, employing the hands alternately.



LATERAL FLEXION AND EXTENSION,

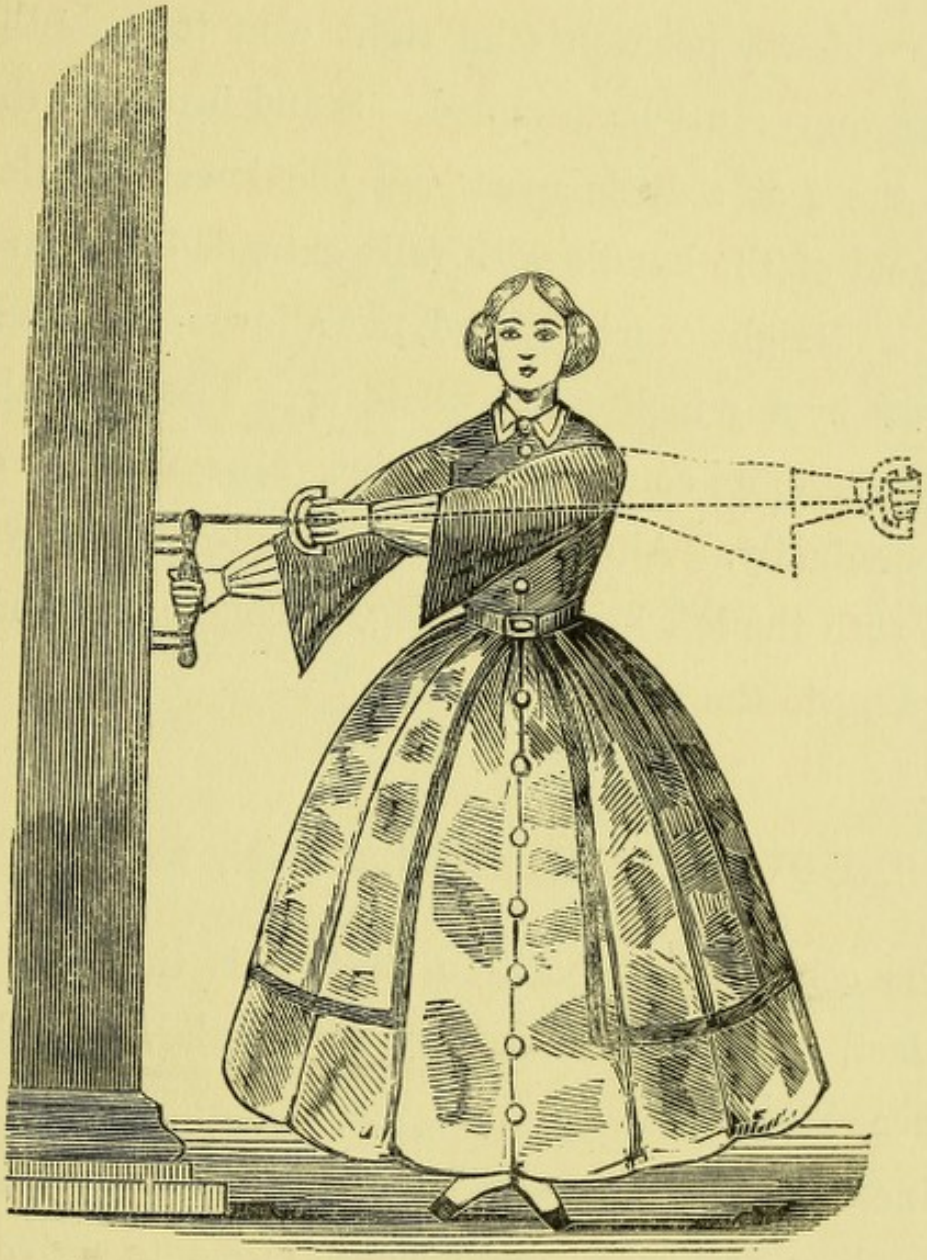
Fig. 4.

5. ADDUCTION WITH EXTENSION.

The position of the body is precisely identical with that in the last exercise. Grasp the centre handle firmly with the right hand, and with it describe part of the circumference of an imaginary circle, *i. e.*, as great an arc as the fully extended arm will allow. This object is effected by keeping the elbow and wrist perfectly stiff, and the body quite tranquil, no motion being anywhere allowed but at the shoulder joint. A reversion of the movement completes the exercise, the arm, in turning to the starting point, is assisted thereto by the weights, which it only so far resists as to prevent a jerk. Like all other exercises, the right and left arm is alternately used.

6. ABDUCTION WITH EXTENSION, Fig. 5.

Whilst the position in this exercise, with the exception of being nearer the pedestal, is the same as in the one immediately preceding, the action is a reversed one, and brings another set of muscles into play. The left hand, crossing the chest, possesses itself of the *loose* handle, and extends the cord till the arm is straight, as in the dotted line of the illustration, Fig. 5, the stiffened elbow and wrist describing a horizontal arc; the traction in this exercise is from both Gymnasium and body; in the preceding it is from the former to the latter. The return of the arm is facilitated by the weights, care again being taken to prevent jerking the limb. The ability to perform this movement is greatly assisted by the right hand holding the *fixed* handle.



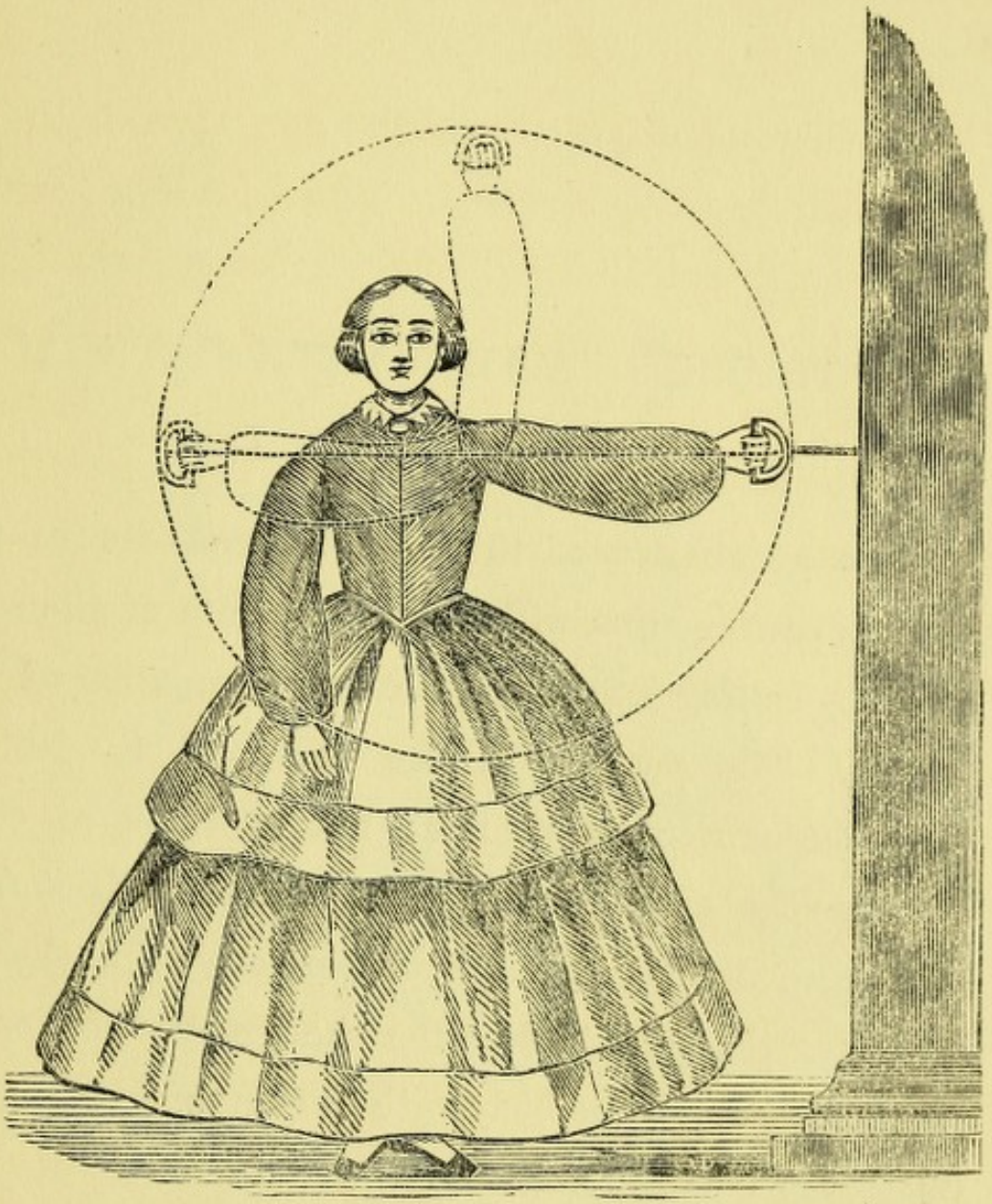
ABDUCTION WITH EXTENSION—Fig. 5.

7. TRACTION AND UPWARD EXTENSION, FIG. 6.

The sideway position (the right arm towards the Gymnasium) must be assumed. Stand firmly on the floor, the feet a little apart and the knees flexible; take hold of the handle with fully extended arm, and bring it straight over the head, not allowing the body to assist by any inclination whatever. Then let the hand resume its commencing point, always doing so very gradually. Alternate this up-and-down movement with the left hand, shifting, of course, the body according to the arm employed.

8. UPWARD ARM ROTATION, FIG. 6.

The commencing position in this is the same as the last, and the exercise almost similar, the difference being that in this, the arm, when it has attained the upward extent over the head, instead of descending vertically, describes a circle to arrive at the starting point, the muscles of the shoulder are brought thus into active use, and the arm performs a perfect revolution in its axis, care being taken that the body should not aid it by inclination or otherwise.

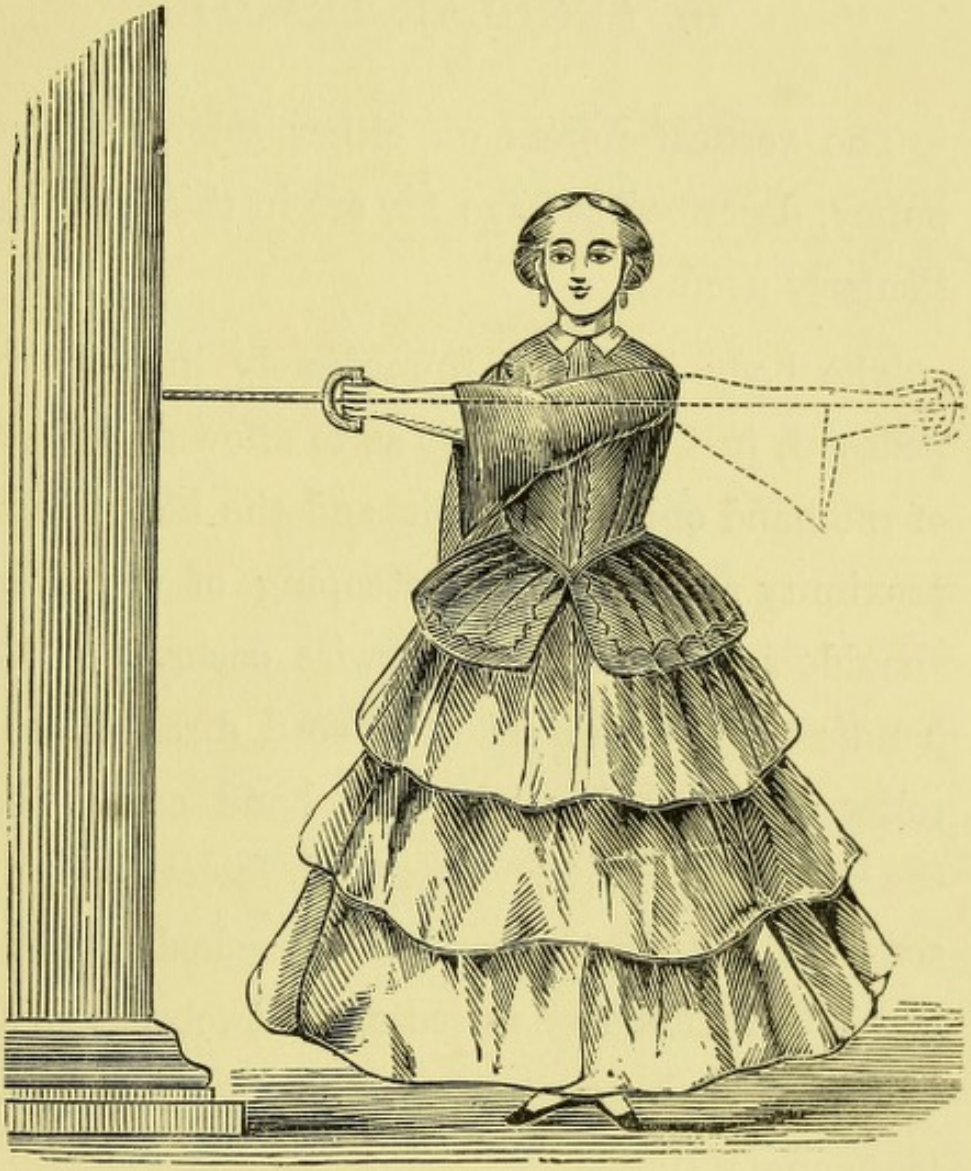


TRACTION AND UPWARD EXTENSION,

Fig. 6.

9. TRUNK ROTATION WITH LATERAL EXTENSION, Fig. 7.

The peculiarity of this exercise consists in the body's participation with the movements of the arm, thereby calling into action the lower muscles of the trunk. The position is the same as in No. 3, and the movement similar; but as the arm commences the extension, the body turns with it *from the hips*, the feet being kept perfectly still, thereby enabling the hand to describe the greater portion of a circle; rotate the body with flexion and extension, changing hands alternately.

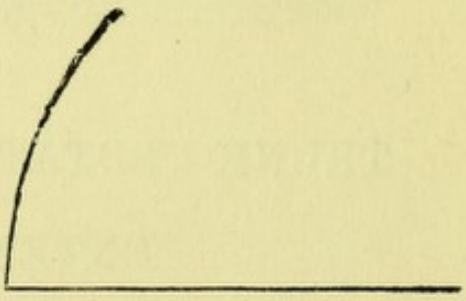


TRUNK ROTATION WITH LATERAL EXTENSION—Fig. 7.

10. ANGULAR TRACTION.

The vertical rollers on either side of the centre pulley, described at page 12, are in this exercise particularly useful.

The body is placed immediately in front of the pedestal, just so close to it as to allow of the passage of the hand only between it and the body, this close proximity preventing any stooping of the head and shoulders which might otherwise occur. The centre handle is then grasped (the cord directed on to the roller corresponding with the hand employed), and the hand and arm fully extended, laterally and horizontally. When the hand has reached this full extension, it should be raised about twelve inches in an upward line, when it will have described a slightly acute angle, thus—



and allowed to return in a gentle manner, carefully reversing the movement.

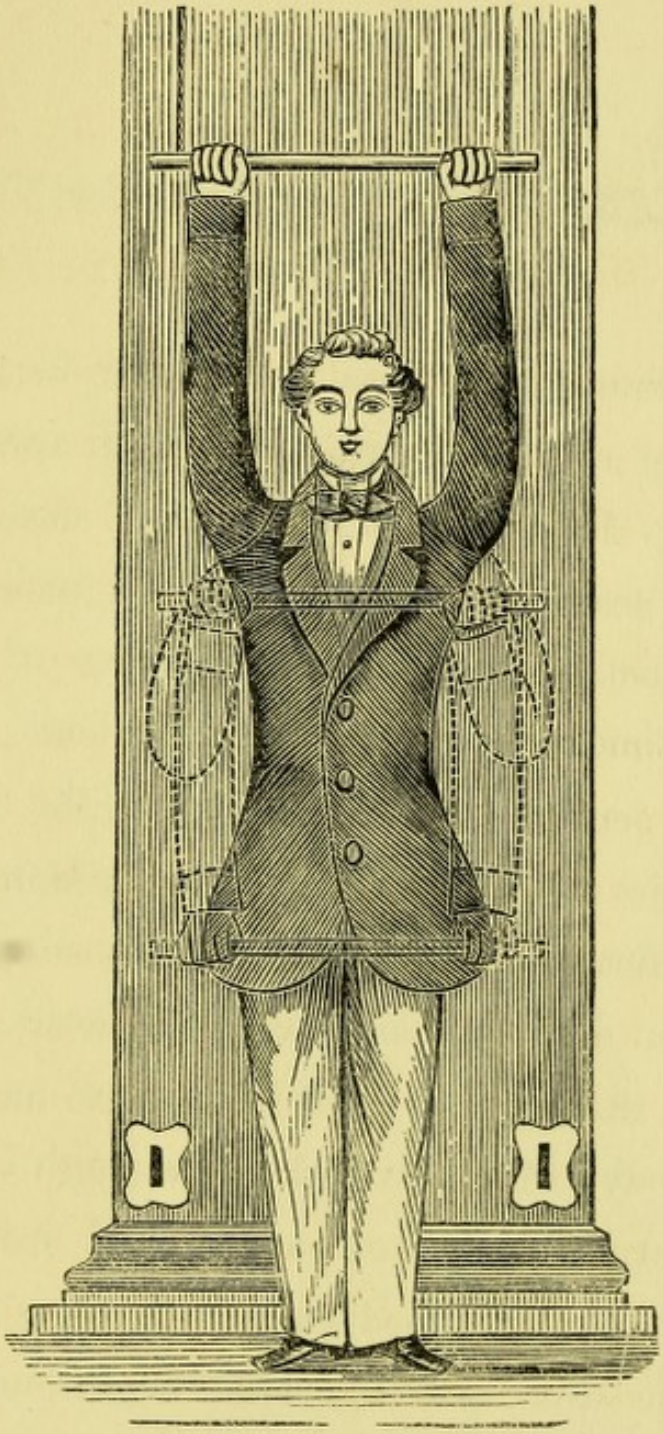
I have confined the number of "Central Exercises" within the foregoing limit, as I have found

them sufficient and efficient for all ordinary purposes. In severe and extraordinary cases I have frequently varied the movements, and added to them others, suggested by the circumstances; but as these instances are rare, I have at present omitted them to avoid prolixity.

II. UPPER EXERCISES.

1. SEMI-ROTATORY MOVEMENT, Fig. 8.

The short staff having been previously attached to the two upper swivels for the accomplishment of this exercise, the pupil must be placed with the back to the pedestal, the head and shoulders coming in contact with it, and thus remaining during the whole exercise. The heels should be kept close together, the toes turned out, and the legs quite straight. The arms being fully extended over head, the staff must be grasped by both hands, and brought down in front of the body (the arms remaining perfectly stiff) as low as possible; this effected, the arms must be flexed, and the staff allowed gradually to ascend to its starting point, so as to be again in readiness to re-perform the movement, which very much resembles that of turning a fly-wheel.

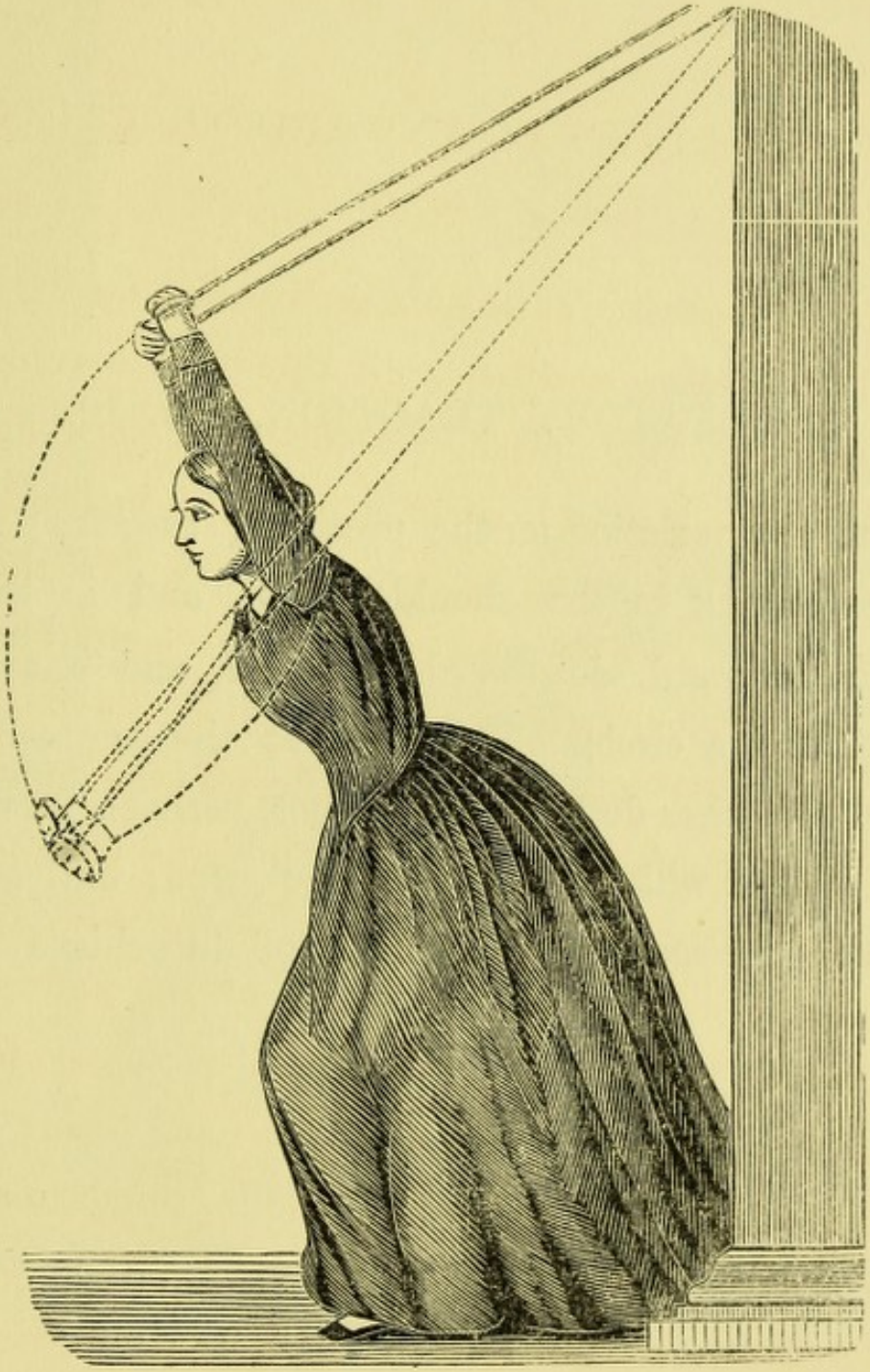


SEMI-ROTATORY MOVEMENT—Fig. 8.

2. INCLINED DOWNWARD TRACTION,

FIG. 9.

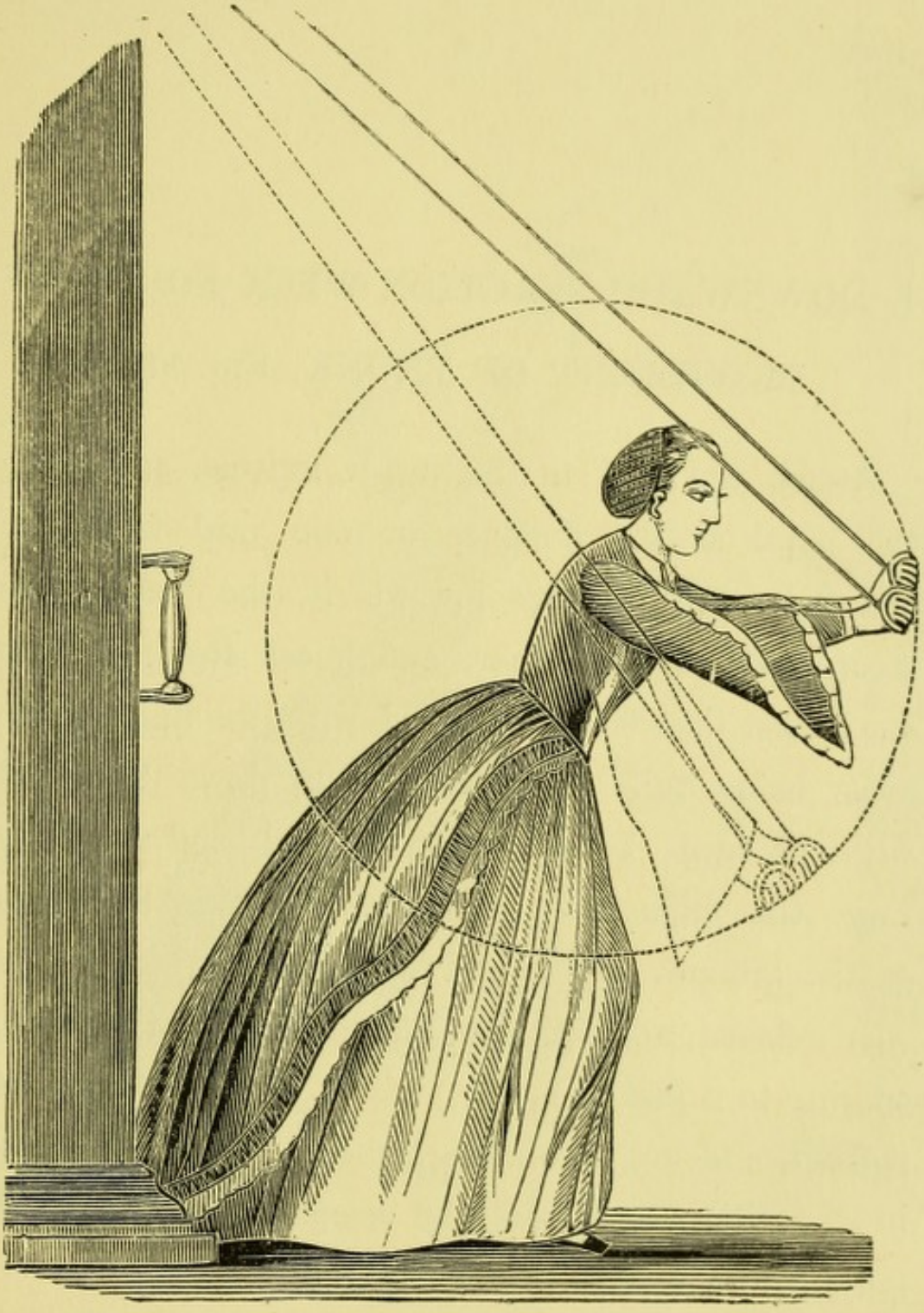
In this exercise, substitute the handles for the staff, and take up a position with the back towards the Gymnasium, the left heel being fixed close to the base of the pedestal, and the right 18 inches in advance, the heel being opposite the instep of the left foot. The knee of right leg must be bent, but that of the left perfectly straight; incline the body forward over the advanced leg. *Before* assuming this position, indicated in the Engraving opposite, *face* the Gymnasium, lift the arms over the head, take the handles in the fingers, draw them out, and quickly turn the body, which will then be rightly placed. Keep the arms always extended, and bring them down in front of the body, allowing them to ascend in the same way. After several repetitions of this movement, reverse the feet, and continue according to the above directions.



INCLINED DOWNWARD TRACTION—Fig. 9.

3. ROTATORY TRACTION, Fig. 10.

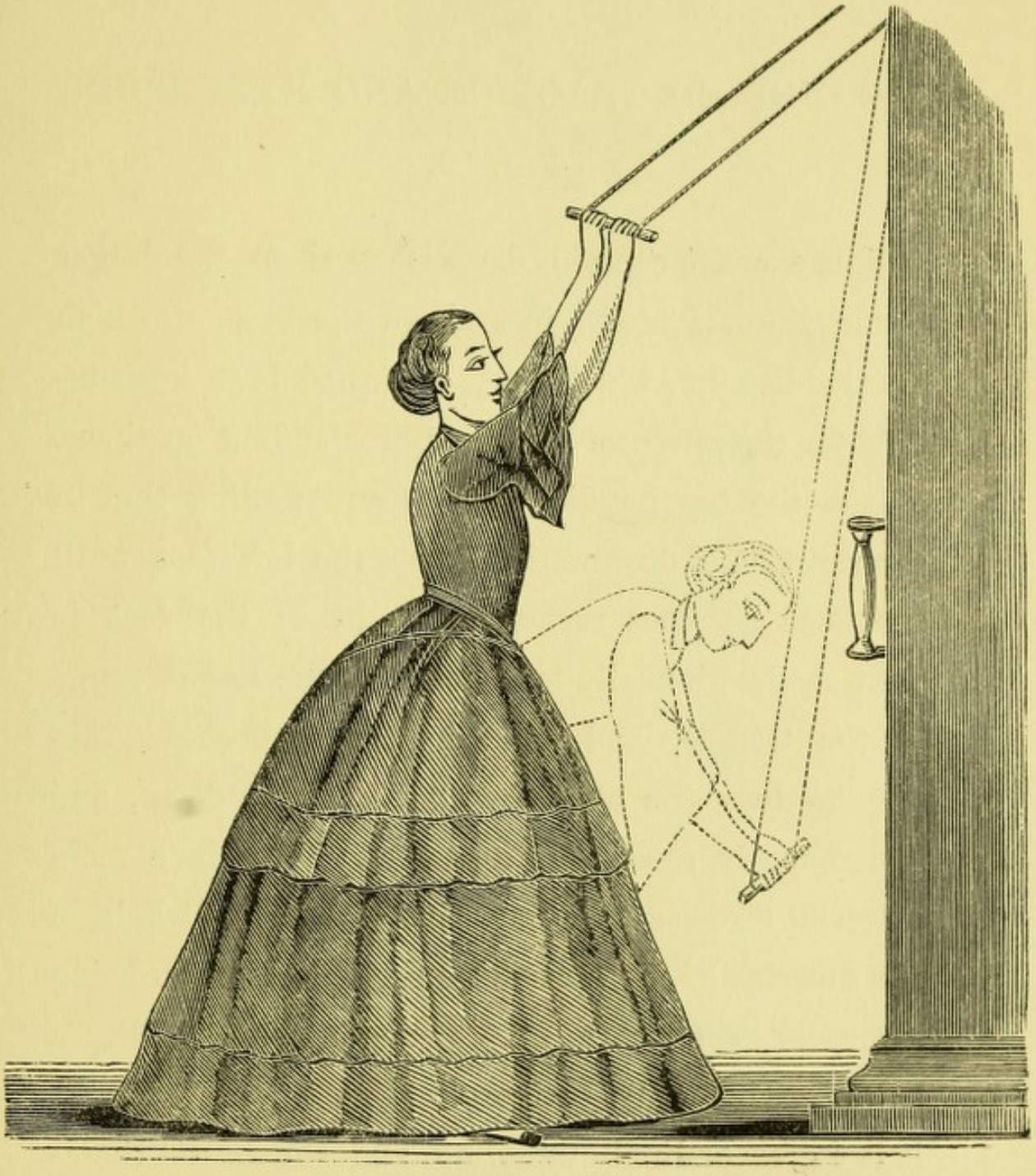
This is a variation on the preceding exercise; the arms rotating in the shoulder joint, and in their passage, forward, downward, backward, and upward, completing a circle. This will, at the commencement, be rather difficult, and cannot, perhaps, be very well effected without flexion of the arms; but, after a time, practice will enable the pupil to achieve this feat.



ROTATORY TRACTION—Fig. 10.

4. DOWNWARD TRACTION WITH FORWARD MOVEMENT OF TRUNK, Fig. 11.

Attach the staff to the upper swivels, and place the pupil at the distance of one yard from the pedestal, with the face towards it, the body quite erect, feet close together, and knees straight; the staff must then be lightly held with the fingers, the arms being fully extended. Draw down the staff with stiff arms, keeping them so, and bend the body from the hips till the staff is within 18 inches of the ground. The hold on it being now somewhat relaxed, allow the weight to draw up the arms, offering to it just so much resistance as will prevent it from *suddenly* descending, when the arms will be in a position to resume the exercise. Repeat the movement the given number of times.



DOWNWARD TRACTION WITH FORWARD MOVEMENT OF TRUNK—Fig. 11.

5. COMBINED TRACTION AND EXTENSION, FIG. 12.

This exercise can only be performed on the larger Gymnasium, Plate 2, just above the base of which are treddles 3.3, which must be turned down horizontally for the purpose. The pupil standing on them, grasps the top handles firmly, and pulling that in the right hand downwards, raises the left foot until the knee becomes rectangularly bent; the foot is then made gradually to descend to the lowest range of the treddle, and the left hand is brought into play to draw the other handle similarly down, and consequently raise the right foot. This is a most powerful exercise, bringing into action the whole of the muscles of the human frame, the exertion being somewhat similar to that necessary in climbing a ladder. Generally invigorating as this exercise is, it is correspondingly fatiguing, and should not therefore be recklessly persevered in when commencing its practice, especially by pupils possessing but a small amount of physical strength.

COMBINED TRACTION AND EXTENSION,

FIG. 12.

6. JUMPING EXERCISE, Fig. 13.

This exercise is again exclusive to the larger Gymnasium, Plate 2, and requires to have so many additional weights put on the carrier as will almost balance the weight of the person exercising. The projecting arms at the top of the pedestal are employed, and the cords which pass over the pullies at their extremities being shortened by winding round the long staff to which they are attached, so that the pupil standing in front of the pedestal, with either back or face towards it, and with arms extended above the head, can only reach the staff by a slight jump of 10 or 12 inches from the ground. This done, the arms must be allowed to flex so much as to bring the staff on a level with the chin, then bend the knees, and give a smart spring, and this, combined with the antagonistic power of the weight, will draw the body up to, and in the same attitude as when it first obtained possession of the staff. This exercise is very amusing to children, and materially developes the muscles of the loins and lower extremities; but care must be taken to proportion the weight to their respective sizes and strength.

All the exercises termed "Upper," described in Nos. 1, 2, 3, and 4, can as well be performed on the projecting arms as on the top swivels, but less weight will be required on account of the increased leverage.

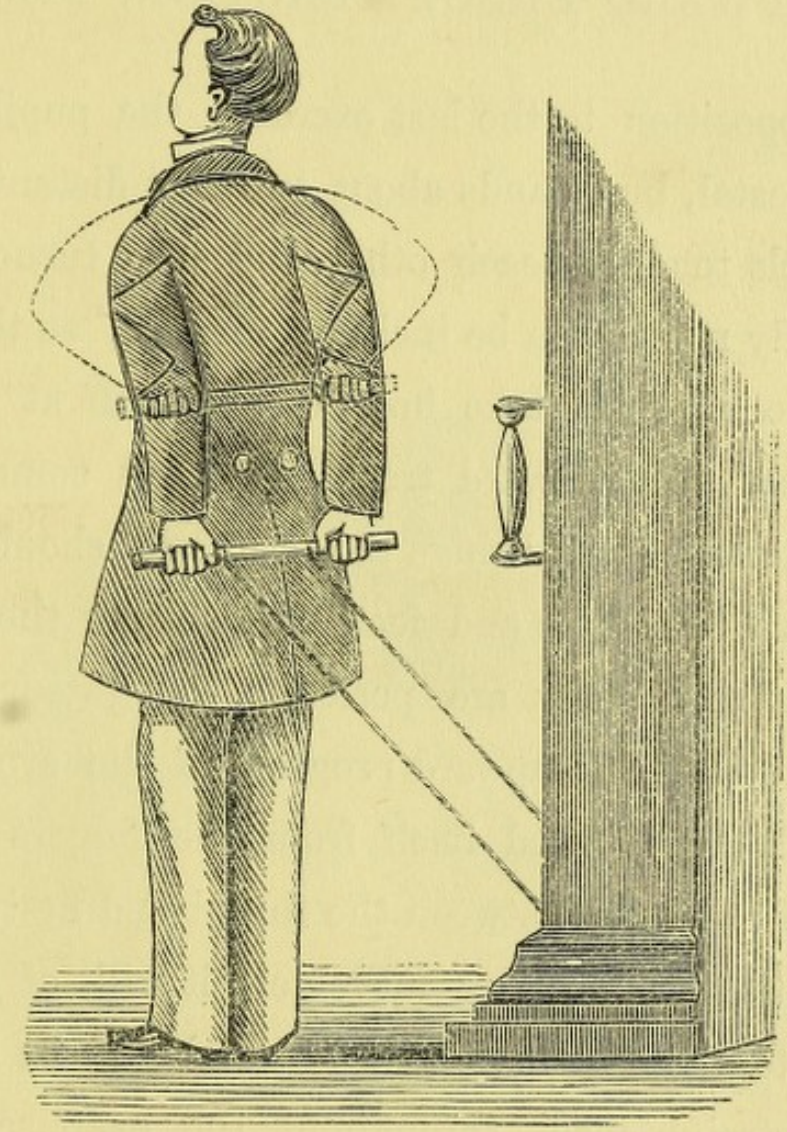
JUMPING EXERCISE—Fig. 13.

III. LOWER EXERCISES.

The following class of exercises is performed from the base of the pedestal, with the staff, or loose handles, either of which must be employed as specified in the instructions.

1. BACK (UPWARD) TRACTION, Fig. 14.

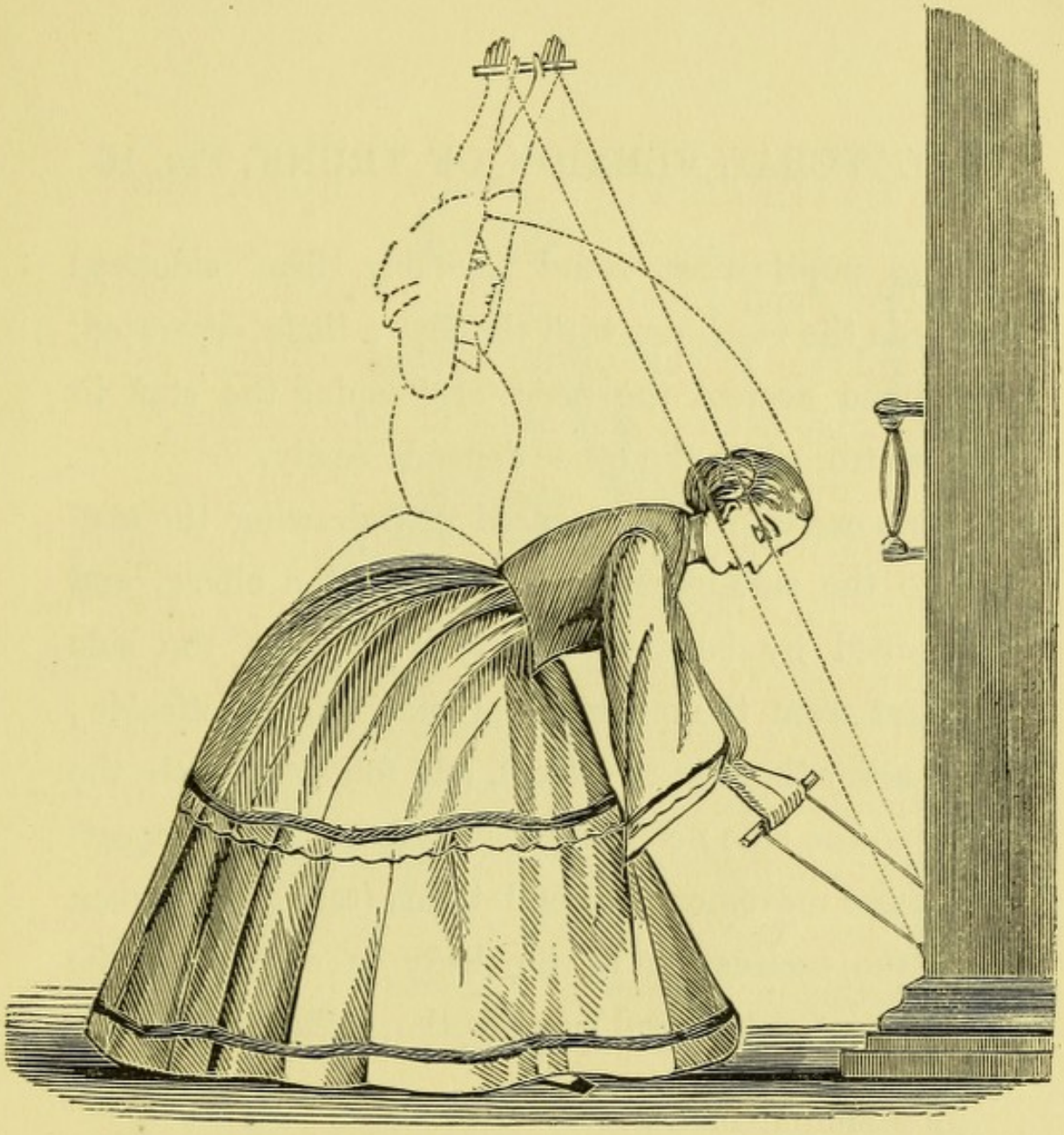
Attach the staff to the swivels, and place the pupil with the back to the pedestal; the heels must be close together and the toes turned out. Keep the upper part of the body well erect, and pass the hands behind it, the arms being held straight. Then allow the knees to flex, so that the staff may be grasped at either extremity with the hands. When this is done, raise the body to its perpendicular position, and in so doing draw up the staff as indicated in the illustration. Then keep the shoulders well back, and continue the traction as high as possible towards the shoulder blades; hold the hands in that attitude a few seconds, and, finally, allow the staff to descend as low as possible without bending the body.



BACK (UPWARD) TRACTION—Fig. 14.

2. UPWARD ERECT TRACTION, Fig. 15.

In opposition to the last exercise, the pupil faces the pedestal, but stands about two feet distant, with the heels touching each other and toes turned out. The body must then be inclined forward, so that the fingers can lightly take hold of the staff at its extremities. The upward traction is first commenced from the loins, and brings the head and shoulders in a line with the hips and feet. The arms then continue it until they are perfectly straightened over the head. In the upward progress of the arms, the staff will have shifted itself from the fingers to the palm of the hand, between the thumb and first finger; and in the retrogressive movement it will, of course, revert to the fingers. The arms should be kept as much straightened, throughout the exercise, as is possible.



UPWARD ERECT TRACTION—Fig 15.

3. LATERAL FLEXION OF TRUNK, Fig. 16.

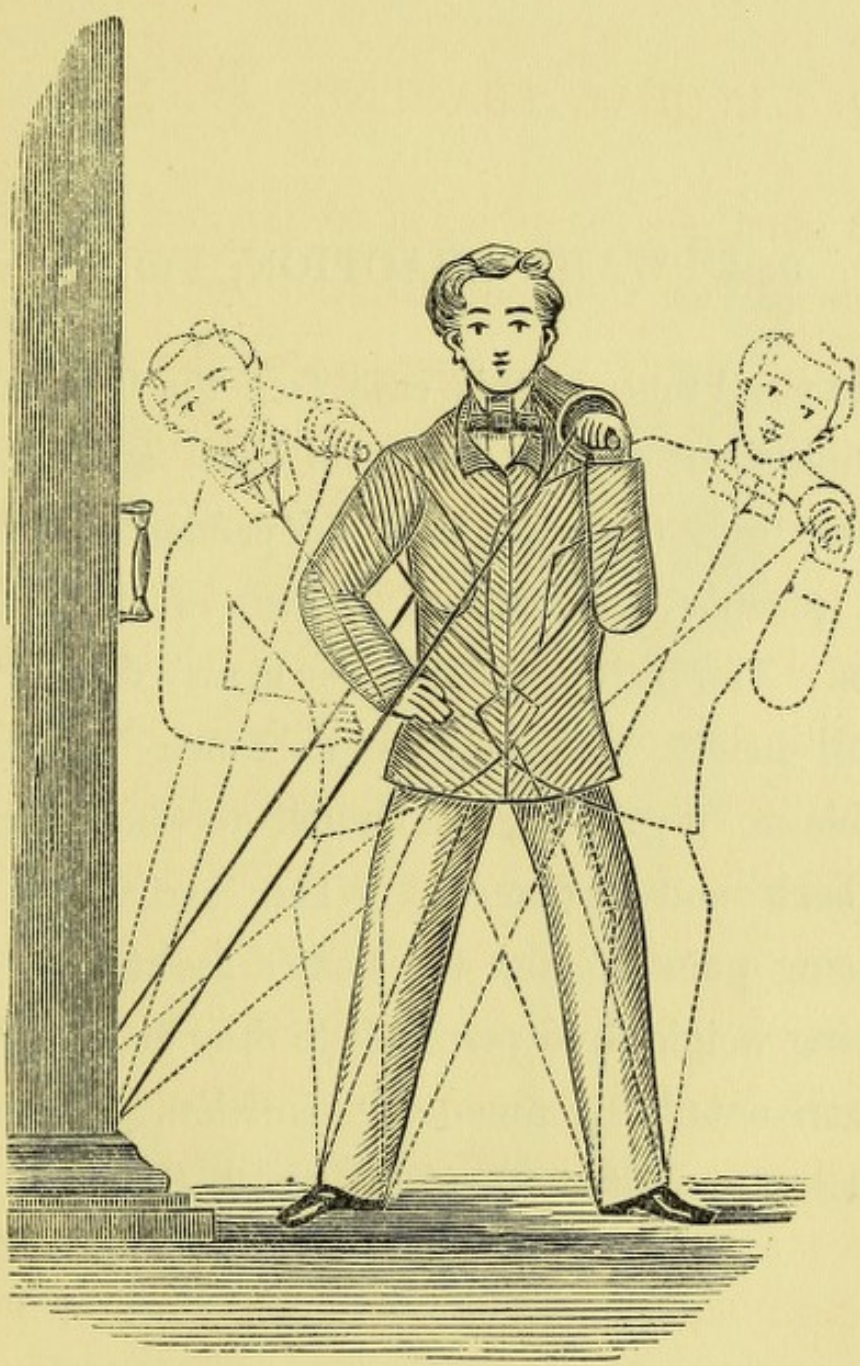
The pupil must stand tolerably firm sideways towards the machine, with the feet a little separated, the hand nearest the pedestal grasping the staff in the centre, while the other depends easily.

This exercise is commenced with drawing the staff up to the side by means of flexing the elbow, and continued by bending the body over to the side farthest from the pedestal as much as practicable; then allow the arm to retreat, and follow it with the body to the side nearest the pedestal. After repeating these movements several times (care being taken that the inclination of the body is only from the hips), turn round, and exercise the hitherto idle arm in a similar manner.

LATERAL FLEXION OF TRUNK—Fig. 16.

4. LATERAL TRACTION, Fig. 17.

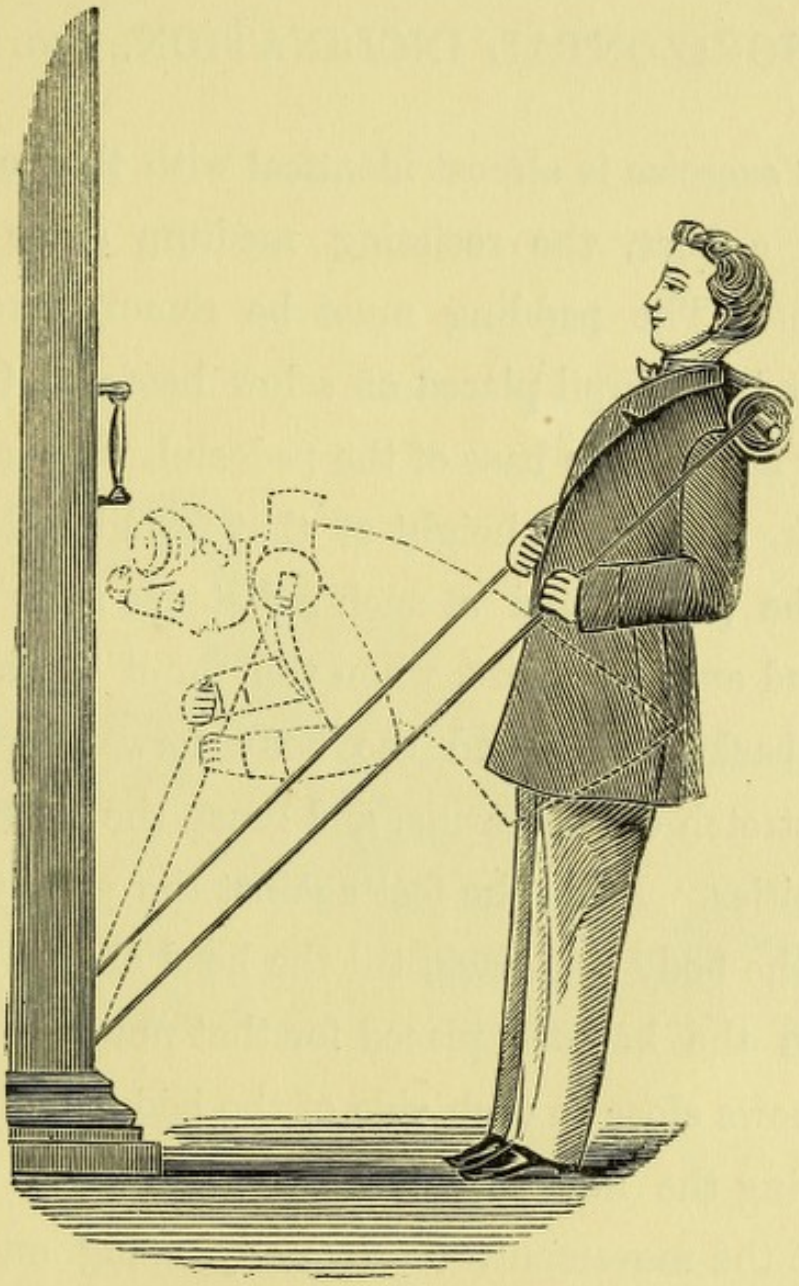
A pad must now be attached to the staff, which is to be placed over the shoulder, one cord passing in front of the chest, the other across the back, the position being the same as in the preceding exercise. The body in its erect position resists the weight for a minute, and after that period allows itself to be gradually drawn down by it towards the Gymnasium, flexing the knee nearest to it, and, of course, fully extending the opposite leg. By a gentle effort return the body to the upright attitude, and incline towards the opposite side, continuing the traction on the weight until the body is inclined as far from the pedestal as practicable. Let the weight now exercise its influence to bring the body erect, in readiness to perform the movement again. After a few repetitions the padded staff must be transferred to the other shoulder, for the completion of a like number of tractions.



LATERAL TRACTION—Fig. 17.

5. UPWARD TRACTION, Fig. 18.

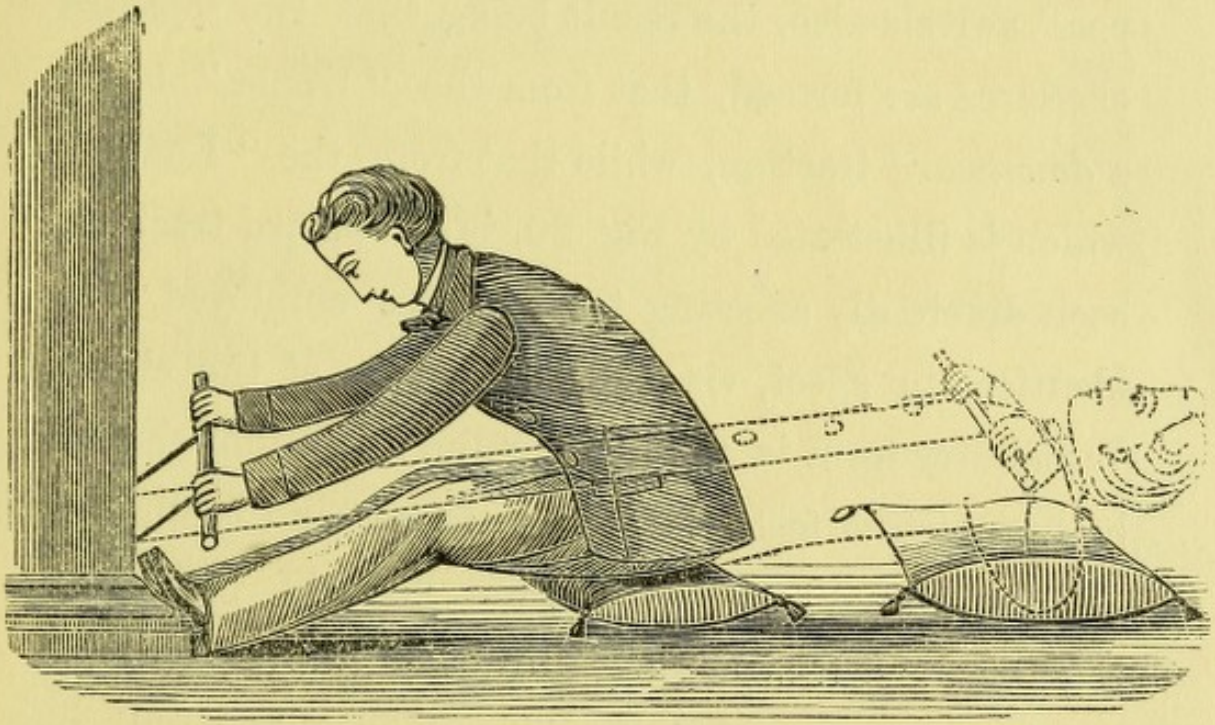
The pupil must in this case face the Gymnasium, standing about 3 feet from the base, and stooping forward from the hips, take the padded staff on his back, placing it exactly on the top of the shoulder blades. The body must then be slowly drawn up to its full height, and inclined as much backward as possible to give full development to the muscles of the back and abdomen. When arrived at this balancing point, lessen the bodily resistance to the opposing weight, and permit it to drag the trunk into the horizontally commencing position. A definite number of repetitions complete the exercise.



UPWARD TRACTION—Fig. 18.

6. HORIZONTAL INCLINATION, Fig. 19.

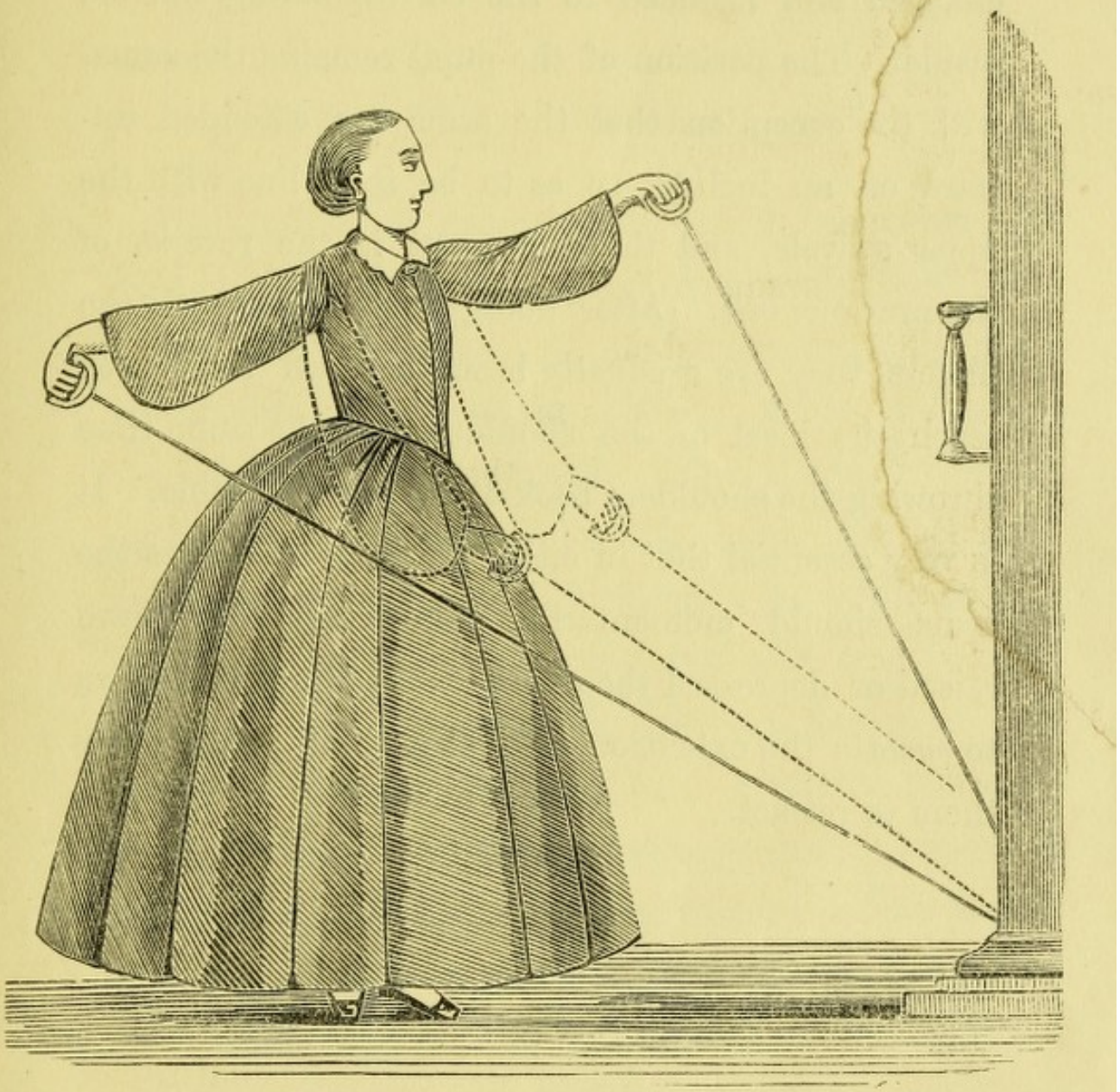
This exercise is almost identical with that of rowing in a boat, the resisting medium alone being different. The padding must be removed from the staff, and the pupil placed on a low hassock, the feet resting against the base of the pedestal, while another hassock, double the height of that forming the seat, must be put behind at such a distance as to receive the head and shoulders, when the pupil is fully reclined backward. Bend the body forward over the legs, stretch out the arms, and grasp the staff at its extremities. Press the feet against the pedestal and bring the body well back, till the head and shoulders rest on the hassock placed for that purpose. Keep the elbows close to each side of the body, flex them, and bring the hands as near to the chin as can be. Repeat the movement, occasionally using one hand only, which must, in that case, hold the staff in the centre.



HORIZONTAL INCLINATION—Fig. 19.

7. UPWARD TRACTION CHEST EXPANDER, FIG. 20.

This exercise, though classed among those of the "Lower" series, may be performed from the "Upper" swivels also, the result being that two separate exercises are formed, that from the "Upper" being a *downward* traction, while that from the "Lower," which is illustrated by Fig. 20, is an *upward* traction, each differently affecting the muscles employed, but identical in effect, viz., the expansion of the chest. Whichever form is used, the pupil's position should be from 4 to 5 feet from the pedestal, and facing it; the body must be kept erect, but not stiff, the heels together, and toes slightly turned outward, as indicated in the annexed Engraving. Previously, lengthen the cords emanating from the base of the pedestal by attaching the webbing straps, and bring the arms forward without bending them. The handles are then taken hold of by the tips of the fingers, and the cords slowly drawn out on either side of the body, until the hands are level with the shoulders, and as far back as the shoulder joints will permit. This extension accomplished, allow a gentle retrogression, and repeat the exercise a limited number of times.



UPWARD TRACTION CHEST EXPANDER—Fig. 20.

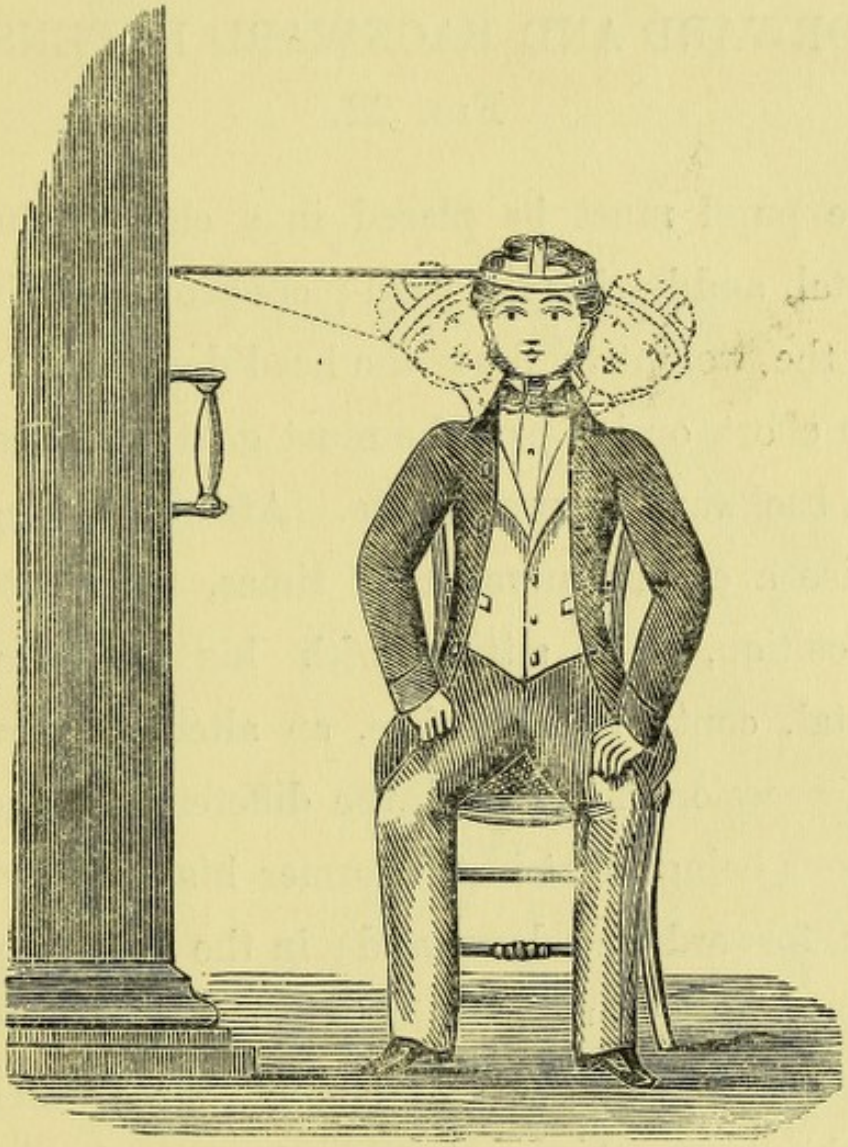
In the " downward traction " the webbing must be attached to the top swivels, and the weight-carrier changed and fastened to the corresponding swivels inside. The position of the pupil remains the same, with the exception that the arms are extended upward on an incline, so as to be in a line with the upper swivels, and the movement is the reverse of the previous one. After taking the handles with the fingers, they are gradually brought down until they reach the level of the shoulders, at the same time throwing the shoulders back as much as possible. It is very essential that in either of these exercises the arms should momentarily stop when they have raised or depressed the cords to the shoulders, so as to *sustain* the extension, and after that pause allow them to retract.

EXERCISES FOR THE HEAD.

The species of deflection for which the following exercises are specially needed is, happily, rare and uniform in character, so that comparatively few movements are required. When it is desirable to make use of gymnastic help, a proper band is supplied, which encircles the head, and is secured on by straps. It is fitted with eye-loops to receive the swivel terminating the cord that passes over the central pulley, the eye-loops being so arranged as to render the head-piece available for any exercise. The opposing weight generally requires reducing, as there is not so much power in the head to move or drag it as exists in the arms The pupil's own feeling will be the best index as to weight, for should the traction prove difficult, the power must, of course, be lessened. I give but three varieties of exercise, and they will be found generally sufficient for any head mal-position.

1. LATERAL FLEXION AND EXTENSION, FIG. 21.

The patient must be placed in a chair with the side on which the contraction exists farthest from the Gymnasium, and fix the eyes on some object level with the head (the head being kept well up and properly placed in the padded band); incline it very gently to the shoulder nearest the pedestal, and then allow it to retreat. If the contraction be severe, the head cannot be expected to yield very much from the first few lessons, but the extent of the traction should be daily noticed, and imperceptibly the head will be found more easily able to advance to the opposite shoulder. Where habit has given an inelegant appearance to the carriage of the head, the exercise must be employed with the right and left sides alternately towards the pedestal.



LATERAL FLEXION AND EXTENSION,

FIG. 21.

2. FORWARD AND BACKWARD EXTENSION, Fig. 22.

The pupil must be placed in a chair facing the pedestal, and having the head-piece properly adjusted, allow the weight to draw the head downward, when, by an effort on his part, he must gently incline it as much backward as practicable. After repeating this exercise a certain number of times, he must alter his position, and, sitting with his back to the pedestal, continue, as before, an alternate elevation and depression of the head, the difference of the two positions being, that in the former his head will be drawn forward and downward; in the latter, upward and backward, thus affecting the *whole* muscles of the neck, and powerfully developing those which are the subjects of either weakness or loss of volume. The pupil must very carefully prevent the body participating in the movement.

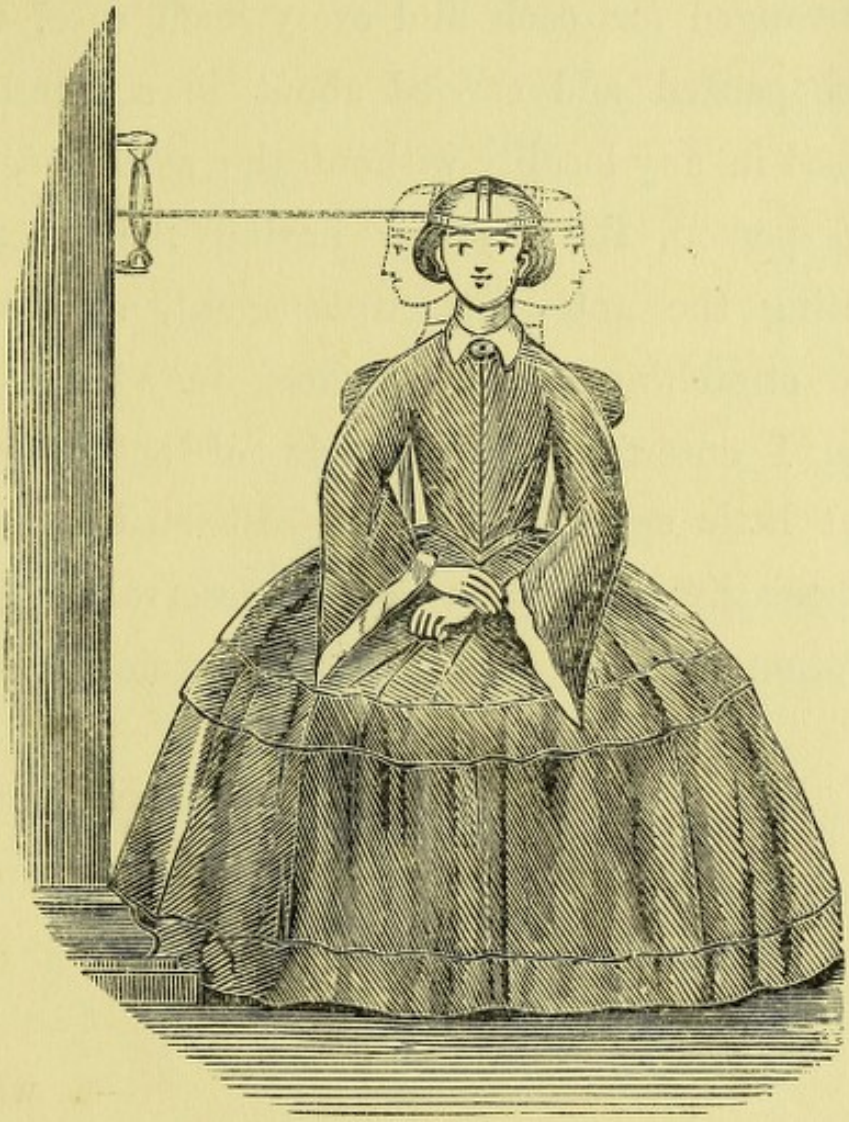
FORWARD AND BACKWARD EXTENSION,

FIG. 22.

3. ROTATION, Fig. 23.

The pupil assumes a sitting attitude, with the side of the body towards the pedestal, the head-piece comfortably arranged, and the body held perfectly still and upright. The exercise consists in turning the head first over one shoulder then the other. As the traction is from the apparatus, the sides must be changed, otherwise an unequal influence will be exercised on the two sets of muscles; but this is provided no particular contraction exists. In the latter case it is highly important that the medical attendant's directions as to the kind and duration of movement should be obtained.

In terminating my little Manual of Exercises, I must beg my pupils and readers to dismiss from their minds the idea (should such be entertained) that I have touched upon the *whole* system of Gymnastics, or muscular movements; I have but entered on those, and by no means all even of them, which particularly appertain to the "Portable Gymnasium:" the more athletic feats, such as require space and other appliances, I have left unnoticed, they do not form part of my course of instructions; nor have I yet adverted to the various minor appliances used for local contractions, such as those of the ankle, knee,



ROTATION—Fig. 23.

hip, wrist, or elbow joints. I think these latter inventions hardly come within the strict limits of Gymnastics, and yet are so nearly allied as to deserve passing mention. I have special inventions suited and arranged for each and every such case, which can be packed and carried about in a small box, and used in any locality without the assistance of a second person, the sufferer having the means of regulating the anti-contractible agent, so that all painful stretching or sudden shock may be avoided; but as I entertain the thought of enlarging the present little essay, and having restricted myself to the speciality of Gymnastics, I reserve a general description of them for a future occasion.

FR. GUSTAV ERNST.

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