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A TEXTBOOK OF GYMNASTICS

VOLUME II

Heaving and Balance Exercises, Marching, Running, Jumping, Vaulting and Agility Exercises

BY

K. A. KNUDSEN

Late Chief Inspector of Physical Education to the Danish Board of Education

TRANSLATED BY

F. BRAAE HANSEN

Inspector of Physical Education, South Jutland; State Training College, Hadersley, Denmark; Late College of Hygiene, Dunfermline; and Chelsea College of Physical Education (Men)

WITH 145 *ILLUSTRATIONS*



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Preface

TEXTBOOK of Gymnastics Vol. II describes those Swedish exercises, according to the Ling system, the special object of which is to develop muscular strength and agility. Most of these exercises are performed on apparatus and singly, whereas the exercises described in Vol. I are mainly free standing class exercises mostly performed without apparatus. The exercises in Vol. II affect principally the extremities, i.e. the arms and legs, whereas the exercises in Vol. I mainly affect the trunk. These two groups of exercises must be used in proper proportion to one another, and it is the duty of the teacher to make such use of the exercises within the two groups that the pupils will obtain the full benefit of his teaching.

The exercises contained in Vol. II, demanding strength and agility, lend themselves well to competition. But care should be taken that the exercises are always performed correctly. Ling demanded correct form in all exercises, also in those requiring strength and agility whether used competitively or not. To ensure good form the teacher must proceed gradually through preparatory exercises to the more and more difficult forms of the various exercises. In this way faults are avoided and time is saved.

Although these exercises are more suitable to male pupils, boys as well as men, than to female pupils, girls and women should be given an opportunity of taking part in exercises requiring strength and agility. As long as good form may be kept in each individual exercise, the exercise cannot be considered too difficult. It is a mistake to think that the feats of strength and agility which may eventually be mastered are only of value at gymnastic displays; they are of value as regards health and well-being and ought to be kept up as far as possible into ripe age.

K. A. KNUDSEN.

ODENSE, APRIL 1948.

The Author

KNUD ANTHON KNUDSEN was born in 1864, the son of a farmer in the Danish island of Fyn. He was educated at Odense Cathedral School from where he went to the University of Copenhagen to study theology. After having graduated he took up teaching and specialised in gymnastics, in which he had been keenly interested since his early boyhood. He considered Ling's Swedish gymnastics, becoming known in Denmark during the early eighties, as being better than the old Danish system based on Gutsmuth's German exercises, and in order to be better acquainted with the system he went to Stockholm as a student at the Gymnastic Central Institute, the home of Swedish gymnastics. After having taken his gymnastic degree in medical as well as educational gymnastics, he returned to Denmark, and when the Danish Government decided to introduce Ling's system into the Danish schools and therefore opened a civilian gymnastic institute in Copenhagen in the year 1898, he was made principal of this institute and six years later also chief gymnastic inspector for all elementary and secondary schools, as well as for the training colleges. During his inspectorship he did a great deal to improve the training of the would-be teachers, and it was due to his efforts that physical education was gradually put into the hands of the ordinary teacher and not as hitherto in many schools into the hands of specialists, mostly ex-army men. He retired in 1934 at the age of 70.

He has written a number of much used textbooks and handbooks of gymnastics. Since 1932 he has made thorough investigations as to the prevalence of spinal deformities. These investigations have been carried through by him not only in Denmark but in most European countries, and he has found that in average 50 per cent of men and boys suffer from easily detected deformities of the back, whereas the average is substantially smaller in women and girls and the deformities less pronounced. He has written and lectured extensively on this subject and his methods as well as his results have created notice, and have often been referred to by medical men and educationists.

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TEXTBOOK OF GYMNASTICS

VOLUME II

§ 1. Heaving Exercises

Introduction

The relationship between arm exercises and heaving exercises has been discussed on pages 165-166, Vol. I.

Heaving exercises are essentially exercises developing strength. Well developed shoulders form a necessary part of a well-shaped body. The muscles that are working most strongly during heaving exercises come from the ribs and the spine, and during their development they share in the development of the chest and the back and in giving them form, good or bad. Many heaving exercises it should be noted, are equally capable of forming the body well or badly. All depends on the way in which the exercises are carried out. Here again is a case where the teacher's knowledge and understanding are of paramount importance. In the hands of a well-informed teacher, heaving exercises will have a beneficial effect on the shape of the body; in the hands of a badly-informed teacher the exercises will be deforming.

Considering the exercises as form-giving, there is reason to distinguish between heaving exercises with straight arms (stretch hangings) and heaving exercises with bent arms.

Stretch hanging exercises where the body hangs freely down between straight arms (not balance hanging) have a beneficial form-giving effect, and they can be performed in one way only, the correct way. They produce a good stretching of the spine; its curves will be somewhat straightened, its mobility will be preserved. The ribs will be pulled upward so that their mobility is kept up too. During stretch hanging exercises, pectoralis major and minor and latissimus dorsi will be exposed to powerful passive extension, much needed by most people as the habitual and working postures of daily life generally tend to

shorten them. Short abdominal muscles will be extended, too ; they now act as ligaments preventing the ribs from being pulled too much upward. In this way it will be seen that stretch hangings are effective in hindering stiffness of important parts of the body. Their effect will be increased by a swinging of the body from side to side or forwards and backwards in beam, ropes, etc. They ought to be much used both by children and adults, especially by people who are stiff. Their beneficial effect is most evident in elderly people. For such stretch hangings should form part of their daily home exercises. Parents should often lift their children up by the arms, beginning already at the age of one year. Children like the exercise and it may often stop their crying.

While stretch hanging exercises have a beneficial effect only, heaving exercises with bent arms may be deforming. They are that when the shoulders during the raising of the body are brought forward. Round shoulders and "hollow chest" are now produced, perhaps permanently. The muscles employed are used wrongly ; those that pull the shoulders forward act more strongly than those that pull them back. Of the two big "heaving muscles" pectoralis major stretches almost horizontally across the body from chest to arm (Fig. 7) and latissimus dorsi almost vertically along the body as its most forward and strongest part comes from the crest of ilium nearly vertically under the arm. Consequently, during body raising, pectoralis major will pull arm and shoulder more forcibly forward than latissimus will pull them backward, especially so towards the end of the raising when the arms are much bent ; the result will be "hollow chest" and the disfiguring fault of round back. The closer together the hands grasp the apparatus (beam and particularly rope) the more the arms will be brought in front of the chest. As much of our daily work is carried out in front of the body with shoulders drawn forward, and as the pectoralis major (and minor) in that way often will be strongly developed and shortened, there is a tendency to let these muscles do the greater part of the work in body raising, and as a result the shoulders are drawn strongly forward in relation to the body.

In order to avoid this deforming influence of body raisings the muscles which keep the shoulders back must be developed and trained. For this purpose certain heaving exercises prove excellent, and as strongly as badly practised exercises deform the body, just as strongly do these same exercises form the

body well when correctly done. Latissimus dorsi must have assistance in acting against the pull of the pectorals, and this is given to it by the middle and lower parts of trapezius and by rhomboideus together with the rear part of the deltoideus, keeping the arm well back in the shoulder joint (Fig. 8). These muscles should be given the main work while practising body raisings, and the pectorals should be brought into action as little as possible. The ability to do this is gained only by a gradual and slow progression from easier to harder exercises. As soon as a heaving exercise is beyond the strength of those who are attempting it, the whole strength of the pectoral muscles will be put into use and it will not be possible to keep the correct position of the shoulders.

Besides the two groups mentioned (stretch hanging and bend hanging exercises) heaving exercises may also be divided into those in which the weight of the body is taken only partly by the arms, and those in which the arms take the full weight of the body in free hanging positions.

Exercises belonging to the former group are generally easier than those belonging to the latter. Exercises suitable for smaller children and women are therefore generally to be found in the group first mentioned. This is particularly the case when we are concerned with exercises involving body raising, in other words exercises performed with bent arms. And exercises of this kind are necessary both for children and women if the development of their heaving muscles is to be in keeping with the rest of the muscular system.

To the exercises in which the weight of the body is partly carried by the arms belong fall hangings, arch hangings, twining, climbing up or down inclined rope, and partly vertical climbing.

To the exercises in which the arms take the full weight of the body belong all free hanging exercises with straight as well as bent arms, performed on beam, rope, horizontal ladder, etc., i.e., stretch hanging and bend hanging arm travelling ; bend hanging body lowering, stretch hanging body raising ; upward, downward, and round circling ; heave swing, etc.

The transition from the one group to the other is gradual. Vertical climbing, for example, might as well be put in the one group as in the other. During climbing the body is hanging freely at the most difficult moment when the feet let go their grip on the rope and the body has to be heaved up by a bending

of the arms while the knees at the same time are raised before the feet renew their grip on the rope.

As regards exertion, the free hanging heaving exercises with straight arms are so easy that they are exceptionally suitable for smaller children and women, and heave swings with bent arms are so easy, too, that they may be used with advantage also by women ; the body raising is made easy by the push off with the feet, and the bend hanging position is kept for a short space of time only as the feet are placed on the floor in each swing forward and backward. The same applies to many heave vaults which may be said to belong more to heaving exercises than to vaulting.

During free standing arm exercises, most of the work is done by the extensors of the arms and the outward rotators of the shoulder blades. These exercises are easy and produce suppleness, but they are not very effective in developing strength.

During heaving exercises with bent arms it is principally the flexors of the arms and the inward rotators of the shoulder blades which are used. These muscles are developed much more strongly by means of heaving exercises than their antagonists through free standing arm exercises. In order, therefore, to find sufficiently strong exercises for the arm extensors and the outward rotators of the shoulder blades one must resort to other exercises. Such are found in hand lying exercises, in hand standing, especially if arm bending be added, in overswing on box, horse, etc., in "head spring," "hand spring," "flying hand spring," in all balance hanging positions, in other words, in most vaults. Although such exercises give work to the arms there is no reason to class some of them, such as hand standing, among heaving exercises. It should, however, be noted that the same shoulder muscles are acting in balance hanging as those acting in heaving exercises with bent arms, namely the inward rotators of the shoulder blades ; to these are added the muscles pulling the upper arms downward, the big heaving muscles. Exercises involving balance hanging, consequently many vaults, are closely related to heaving exercises. At the elbow joints, however, the extensors of the arms are acting.

Heaving exercises are amongst those that have been misused. It is possible to develop great strength of the arms so that they may be used for the performance of tricks and spectacular feats of strength. Because of that both teacher and pupil may be tempted to select exercises according to their spectacular effect

rather than according to their effects as regards harmonious development of the body, particularly so during periods of propaganda, in which gymnastic displays are of importance. Fortunately, the danger of misuse is less in Northern than in German gymnastics. The principal apparatus in German Turnübungen are horizontal and parallel bars, and the most popular exercises on these pieces of apparatus are such in which the arms alone have to struggle with the whole weight of the body. In the case of gymnasts who excel in these exercises the results will be over-development of arms and shoulders and a bad carriage of the shoulders. Furthermore, these exercises fix the chest strongly which means restricted breathing, because muscles such as pectoralis major and minor and serratus magnus demand a firm origin in order to work powerfully. Exercises of this kind are therefore unsuitable, both from a physiological and an æsthetical point of view, particularly so for young growing bodies, which are most easily deformed.

The English go to the opposite extreme as their principal means of physical development are ball games, i.e., running. During running the big muscle groups of legs and pelvis and the extensors of the back are at work. But here the chest is not fixed and the breathing can go on unhindered.

The development given by ball games is, however, lacking in harmony, too, for the development of the trunk does not keep pace with that of the legs. If one had to take the choice, however, between the development given by a one-sided use of the arms and that which is given by a one-sided use of the legs, the latter is to be preferred. This becomes particularly clear when one compares the bulk of the leg muscles with the bulk of the arm muscles. The muscles used in "leg exercises" such as marching, running, jumping, skating, ski-ing, dancing, etc., are those of the lower leg, the thigh, and the pelvis ; and as the pelvis must move during these exercises, the loin must move too, which means a fairly considerable work by the abdominal muscles and the extensors of the lumbar region. This mass of muscles makes up *four-fifths* of all the skeletal muscles. The rest, i.e., the muscles of arms, shoulders, chest, and the upper part of the back constitute about *one-fifth* only. It is obvious that exercises in which four-fifths of our muscles are brought into action are far more important to the development of the whole body and the training of organs such as heart and lungs than those in which only one-fifth is used.

Roughly speaking, such "leg exercises" should take up four-fifths of the time set aside for training, and "arm exercises" one-fifth only.

This agrees with the fact that ballet dancers obtain their beautiful bodily development by a training of the legs and by exercises involving great movements of pelvis and loin.

A. Stretch Hanging Positions

1. Fall Hanging Position (Beam).*—*To the beam—run ! Beam—grasp !* Front arrangement is taken at arm's length distance from the beam, which is first put at shoulder height, later lower, as far as hip height. The beam is grasped with overgrip, the hands at least shoulder width apart, later farther apart until double shoulder width is reached ; the arms are stretched.

Fall hanging—place ! The chest is brought quickly in toward the beam by a bending of the arms. The feet are lifted and thrown forward under the beam in one movement ; the heels are placed lightly on the ground, the ankles kept stretched ; at the same time the arms are stretched, the body strongly straightened so that it forms a slight arch upward, the shoulders pulled back so that the chest is raised between the arms, the shoulders so much behind the beam that the body is at right-angles to the arms.

From position—up ! While the arms are bent, the feet are lifted and in one movement brought back to the original position, after which the arms are stretched.

Hands—down ! The hands are moved quickly to the erect position.

Introduction.—To begin with, the teacher can let the pupils bend their arms before the feet are thrown forward, and in the same way before they are drawn back. *Fall Hanging*—1—2. *From position*—1—2.

* All beams at the ends both of the flat and sharp edges should be supplied with iron guards, which in line with the ends of the beams are bent at right angles, so that they form hooks to grip over the bolts and so prevent the beams gliding over the bolt and falling. This should also be the case with counterbalanced beams, unless the iron-work on which the beam hangs comes so far down as to act as a hook. Counterbalanced beams should always be moved evenly up and down without violence, as otherwise, if steel wire is used, a twist may form, which will cause it to be easily broken. For other precautionary measures refer to Vol. I, p. 58.

Common Faults.—(*a*) The body sinks by a bending in the hips, as a rule; then the back is rounded, the shoulder-blades glide away from one another, and the head falls forward.

(*b*) The feet are thrown too far forward.

2. **Arch Hanging Position.**—Beam or wall bars. *To the beam (wall bars)—run! Beam (bar)—grasp!* Front arrangement is taken half-a-step away from and facing the apparatus, which is grasped with overgrip—to begin with a little over head height, later at shoulder height—hands at least shoulder breadth apart, the arms somewhat bent. With pupils of varying height the wall bars should be used.

Arch hanging—1—2. On 1 the left leg is moved backward, still stretched, and the ball of the foot put on the ground, while the ankle is bent and the toes underbent; at the same time the trunk is moved in against the apparatus and lowered vertically as far down as possible by a strong bending of the right knee. On 2 the right foot is moved back to the left and the trunk is lowered quite down till the arms are stretched, if this stretching was not possible in the first movement by reason of a low grip. The arms must be about vertical, the chest pressed well forward, knees fully stretched, so that the arch of the body is made by the bending of the spine alone. The abdominal muscles must resist somewhat to prevent too much bending in the loin.

From position—1—2. On 1 the left foot is moved forward to its original place, while the knee is strongly bent; the right knee is still kept fully stretched, and the arms are also stretched as far as possible. On 2 the right foot is moved up to the left, the knees are stretched, and the standing position is taken.

Hands—down! The hands are brought quickly to the erect position.

Common Faults.—(*a*) The head falls forward.

(*b*) The knees are bent, heels not pressed back.

The Importance of the Exercise. Arch hanging is a good exercise for producing suppleness, especially for stiff beginners. That which has been made stiff and short from daily work and bad habitual posture will now be straightened and stretched: crooked elbows, stiff shoulders, round back; short abdominal muscles in particular will be extended and too slight pelvic inclination will be put right. There is no reason to fear that hollow back will be caused by arch handing if the hands do not grasp the apparatus below head level, because with the grip at that level the loin that is normally mobile, will not reach its

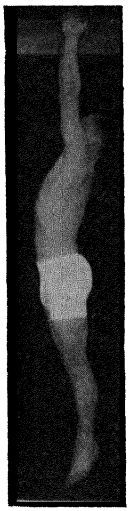


FIG. 1. Stretch cross hanging position.

limit of flexion, whereas on the other hand a stiff and straight loin as in long round back (Vol. I, p. 110) will benefit greatly.

3. Stretch Cross Hanging Position.—*Form file under the beam—run !* Flank arrangement is taken under the beam, which is placed at a little over stretch height.

With cross grip—up ! With a jump the beam is grasped with one hand on each side, the one exactly opposite to the other, so that the shoulders are at right angles to the beam. If the beam has no groove, the hands are either clasped or else put one just in front of the other without any turning of the shoulders ; in the latter case it must be stated in the command which hand is to be in front (*Left hand in front*, and so on). The head is pressed a little backward (Fig. 1).

From position—1—2—3. (*From position—down !*) In the first movement the hands let go and are moved as quickly as possible down to the sides, while the knees are bent deeply as in an ordinary landing ; in the second movement the knees are stretched ; in the third the heels are lowered.

Common Faults.—(*a*) The head falls forward.

(*b*) The legs are parted and bent, or they are held too far forward (especially if the abdominal muscles are too short) or moved too far backward.

The Importance of the Exercise and Muscle Work. Stretch standing and stretch cross hanging look somewhat alike, but differ in essential points. In stretch standing (Vol. I, p. 175, Fig. 70) the body forms a slight arch from hands to feet. In stretch cross hanging the arms are vertical and the arch is straightened by the weight of the body.

In stretch standing the outward rotators of the shoulder blades (trapezius II and III and serratus III) and the deltoid turn the shoulder blade, and by that stretch the pectorals and the latissimus dorsi. In stretch cross hanging the shoulder blades are turned by the weight of the body. The length of the body, reckoned from hands to feet, is increased as the trunk sinks down between the shoulder blades. Most of the muscles from trunk to arms will be extended, some of them to their utmost limit so that they will now be acting as ligaments.

These muscles are partly those from trunk to shoulder blade (in front: pectoralis minor and the lower parts of serratus magnus—subclavius might be mentioned too; and behind, trapezius III), partly those from shoulder blade to arm (supra and infraspinatus, teres minor, the long head of triceps, teres major, subscapularis, biceps, and coracobrachialis), and partly the muscles from trunk to arm (pectoralis major in front and latissimus dorsi behind).

If the last two mentioned muscles are very short it is they that almost alone carry the weight of the body and thus prevent the trunk from sinking into the vertical position straight under the arms. In the stretch standing position they keep the arms inclined forward if too short; correspondingly they keep the trunk somewhat forward in stretch hanging. If the abdominal muscles are short, too, which is generally the case, the pelvic angle will be diminished and the pelvis will be pulled forward; this means that the pelvis through a pull on the Y-shaped ligament will draw the thighs forward and the knees will be bent in the hanging position.

It deserves notice that in the stiff individual, the shoulder blades are rotated less outward in stretch standing than in stretch cross hanging; this indicates how beneficial exercises in the latter position may be to him. In the supple individual on the other hand the shoulder blades are rotated more outward in stretch standing than in stretch cross hanging if he carries his arms past the vertical position. If he is muscularly weak, too, he will need exercise performed in the bend hanging position.

The stretch hanging position here described is the so-called *long hanging* position (Fig. 2) where all muscles except the flexors of the fingers are passive. If a deep inspiration is taken in this position the trunk will sink down a little further, whereas it will be raised during a strong expiration.

Besides long hanging we have the *short hanging* position (Fig. 3). Here the muscles from trunk to arm are contracted and raise the trunk up between the shoulder blades as much as possible without any arm bending. It is useful to practise this little body raising with straight arms as by this the pupils get into the way of performing an ordinary body raising with shoulder blades lowered and well pulled back—trapezius III is acting here; it is well situated for a lifting of the trunk up between the shoulder blades (Vol. I, p. 179).

These remarks hold good for all free hanging positions with straight arms and for arch hanging but not for fall hanging position.

4. Stretch Overgrip Hanging Position.—*To the beam—run !* Front arrangement is taken under the beam, which is placed at a little over stretch height.

With overgrip—up ! With a jump the beam is grasped with the hands on the same side, at least shoulder breadth apart—in other words, with the palms facing forward (Fig. 2 and 3). The position, return movement, and faults are otherwise the same as in 3.

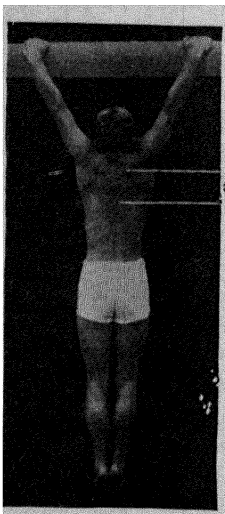


FIG. 2.—Long hanging position.

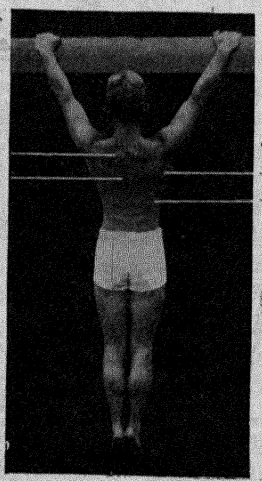


FIG. 3.—Short hanging position.

Stretch overgrip hanging position lends itself particularly well to body raising from long to short hanging (p. 9). During the raising the head is carried somewhat backward.

5. Stretch Undergrip Hanging Position.—Same arrangement as in 4, but the beam a little lower by reason of the more difficult grasp.

With undergrip—up ! With a jump the beam is grasped with the hands on the opposite side and at least shoulder breadth distance apart, in other words, the palms are turned backwards (Fig. 4). The position, return movement, and faults otherwise the same as in 3.

In this position the hands are supinated strongly and the mobility of the joints of the forearm is increased, which is often needed. The greater the distance between the hands, the greater the supination.

6. Stretch Oblique Hanging Position. Arrangement and beam as in 3. *Left hand in front, with oblique grip—up !* With a jump the beam is grasped with one hand on each side, at least shoulder breadth apart. The body is turned in the jump so that the line through the shoulders lies obliquely to the beam (Fig. 5). Position, return movement, and faults otherwise as in 3; but the body is turned again in the landing, so that flank arrangement is again taken under the beam.

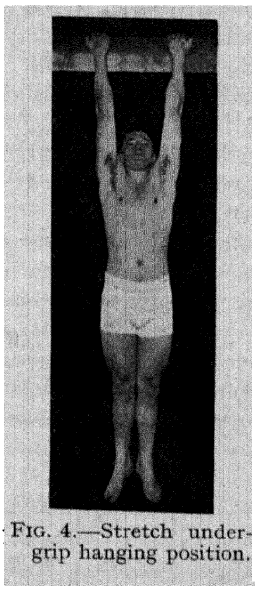


FIG. 4.—Stretch under-grip hanging position.

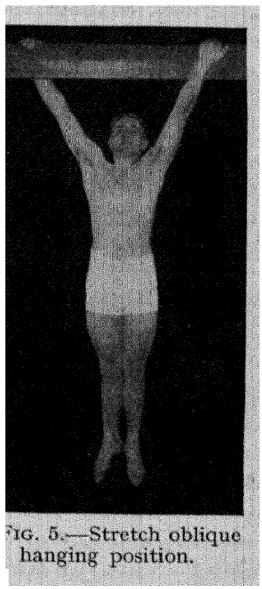


FIG. 5.—Stretch oblique hanging position.

B. Body Lowerings and Body Raisings

When we pass from heaving exercises in straight arms to heaving exercises in bent arms, body lowerings should be practised before body raisings, as it is considerably easier to lower the body than to raise it.

In trunk lowering there is this additional advantage that the bend hanging positions (which are here starting positions) may be taken up in good form, i.e., with the shoulders lowered and drawn well back. Usually the untrained pupil has not

sufficient strength to start a body raising by going from long hanging to short hanging position; he will therefore finish a body raising with the shoulders drawn high up. On the other hand, if he is allowed to lower the shoulders and draw them back before removing the feet from the supporting apparatus and taking up the bend hanging position, he will be able to maintain the correct position and his shoulder muscles will be trained in keeping it.

In fall hanging and partly in arch hanging position, body raising is so easy that it can be practised without any preliminary body lowering.

7. **Bend Cross Hanging, Body Lowering.**—Beam at head height. Flank arrangement under the beam. *With cross grip—grasp!* The beam is grasped with clasped hands, the arms bent, the head bent backward just under the beam, the chest lifted high up towards it; the smaller pupils can stand on toes.

Feet—off! The feet are raised backward and the bend hanging position is held for a moment.

Lower! The arms are slowly stretched.

Stand! The feet are put on the floor and the starting position is taken again.

After some practice the bend hanging position can be taken with a jump. The beam is then put at stretch height, and one hand grasps just in front of the other.

8. **Bend Undergrip Hanging, Body Lowering.**—As in 7, but facing the beam and grasping with undergrip. Instead of standing on the floor, a lower beam can be used to stand on, placed about knee level.

9. **Bend Oblique Hanging, Body Lowering.**—As in 8, but with oblique grip.

10. **Bend Overgrip Hanging, Body Lowering.**—As in 8, but with overgrip. The exercise is easier if it is taken at the wall bars.

The children, facing the wall bars, stand on a bar not lower than knee level, hands wide apart, if possible touching the uprights.

The exercise may also be done with the back to the wall bars, children resting on their heels. This form is particularly good as the arms on their own take up the correct position: moved well outward and drawn back.

11. **Fall Hanging, Body Raising.**—The starting position

is taken as described in 1 ; hands wide apart, preferably double shoulder width.

Body—raise ! The body is raised by a bending of the arms. During this movement the elbows must be held well away from the body all the time, so that when the bending is completed they are in line with the shoulders, as in across bend position. The aim should be to reach the beam with the top of the chest or even with the neck. In this position quick head turning may be taken in order to do away with any tightening of the neck muscles.

Body—lower ! The body is lowered again evenly to the starting position ; the teacher must see that during this movement the body does not sink down between the shoulder-blades.

Zig-zag arrangement at the beam allows the greatest number of pupils to work at the same time, especially if number-ones do body raising while number-twos do body lowering, and vice versa.

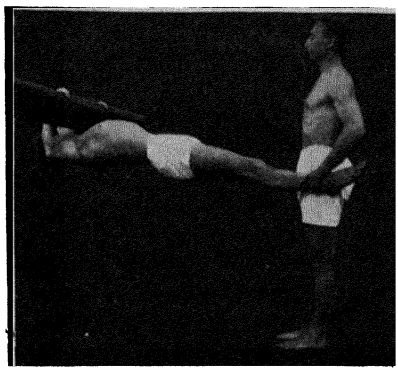


FIG. 6.—Fall hanging body raising with helper.

When the correct form has been learnt it is taken in time either a definite number of times, 5-10, or till "halt" is commanded. The time must be sufficiently slow to allow each raising to be carried through till the chest or the neck touches the beam. The exercise may be taken particularly with children—as *hang long sitting body raising.* The children sit in long sitting position under the beam grasping it with over grip. During the body raising the hips are stretched and the body is raised up to ordinary bend fall hanging position.

The most effective form of the exercise is *fall hanging body raising with helper* (Fig. 6). The beam is placed at shoulder level, number-ones standing on one side, number-twos on the other. Number-ones grasp the beam ; on the command *fall hanging—now !* they bend their arms, throw the feet forward towards number-twos opposite, who catch their feet ; the body is now straightened into horizontal fall hanging position. On

the command *ready—change !* number-ones pull their feet back quickly, number-twos grasp the beam and throw their feet forwards towards number-ones, who must be ready to catch them.

The beam may also be put at stretch level or a little above. Number-ones take up stretch overgrip hanging position; on the command *fall hanging—now !* they raise their legs, which are caught by number-twos, who lift them up by stretching the arms upwards; at the same time number-ones stretch themselves and take up horizontal fall hanging position. During the return movement they pass through angle hanging position, where number-twos let go their feet.

Fall hanging body raising is a typical example of an exercise which everybody is able to perform at once, and which therefore lacks the incentive which is always found when difficulties have to be overcome. The teacher must therefore endeavour to make the pupils interested by explaining its effect and by demonstrating (best on a naked back) the excellent position of the shoulders gained during the raising. He can also make them compete as to number of raisings completed and spur them on in that way.

The Importance of the Exercise and Muscle Work. The exercise is very suitable in training the muscles keeping back the shoulders, namely rhomboid and trapezius, especially part IIb. But these muscles are so strong that a few body raisings mean little as regards their further development; the exercise must therefore be repeated so often that fatigue is being felt.

It is the only exercise in which pectoralis major is not acting. The upper arms are namely moved from reach to yard position, exactly the opposite way of the one in which a contraction of the pectorals would have moved them. Therefore they cannot in this, unlike in other heaving exercises, pull the shoulders forward; and this explains why the shoulders on their own take up the correct position.

During body raising, the *biceps*, the *brachialis*, and the *brachio-radialis* act on the elbow; on the shoulder-joint act the *latissimus dorsi* (especially its upper part with its origin beginning at the spinous process of the seventh thoracic vertebra and with its fibres running across the back to the upper arm), and the rear part of the *deltoideus*, which—with the arms raised to shoulder level—forms a continuation of *trapezius IIb*. The two parts of the muscles here mentioned work together so

that the former pulls back the upper arm and the latter the shoulder-blade during body raising. The shoulder-blades are also adducted by *rhomboideus* and *trapezius III.* The upward pull of the former is counterbalanced by the downward pull of the latter. As the upper arm is pulled not only backward but also downward, by the rear part of the deltoid and especially by latissimus dorsi, the *middle part of the deltoid* must act in order to keep the arm at shoulder level.

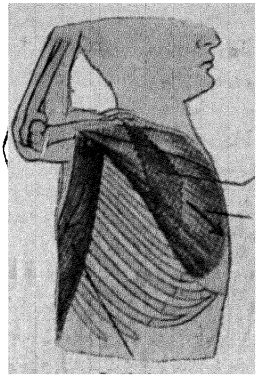


FIG. 7.

Gravity will bend the hip joints and round the back. The hip joints are kept straight by *gluteus maximus* and the *hamstrings* and the back by the *erector spinæ*, the work of which is very

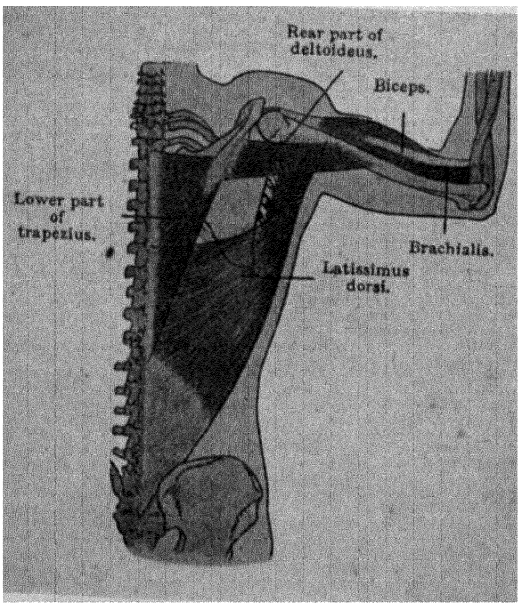


FIG. 8.

slight as the stretching of the hips and the upward pull of latissimus dorsi on the pelvis, the loin, and the lower half of the chest in themselves are almost enough to keep the back in the correct position.*)

12. **Arch Hanging, Body Raising.**—The starting position is taken as described in 2.

Body—raise! While the chest is kept forward, the body, with the shoulders down, is raised straight upward so that the face passes close to the beam. The elbows are kept as well back as possible; a straight line through them should be able to pass behind the back. If working in pairs one pupil can stand with his feet astride his partner's legs, grasping his elbows and pulling them back during the body raising. The head throughout is held somewhat back, with the chin drawn in. The ankles are stretched.

Body—lower! The body is lowered gradually down to the starting position. The exercise is made harder by lowering the beam, by increasing the distance between the hands until there is double shoulder breadth between them, and by taking quick head turning while the arms are bent.

Common Faults.—(*a*) The shoulders are drawn forward (see pp. 1-4), which is shown by the elbows coming forward and the body being pushed away from the beam; the back is rounded.

(*b*) The head is moved forward.

(*c*) The feet are drawn forward.

13. **Changing between Fall and Arch Hanging.**—Beam not below shoulder level. From fall hanging the command is: *Arch hanging*—1. The body is raised in bent arms, the legs are lifted from the floor and swung backward to arch hanging.

Fall hanging—2. The body is in a corresponding way moved back to the fall hanging position. As the pupils easily forget to perform a full body raising, which is the best and strongest part of the exercise, the command may be given at first as follows: *Body raising*—1. *Arch hanging*—2. *Body raising*—1. *Fall hanging*—2.

* Fall hanging must consequently be classed as a heaving exercise and not, as done by some, as a dorsal exercise. Fall hanging as a dorsal exercise has been compared to front hand lying as an abdominal exercise, and it has been said that superficially the one may be looked upon as a reflection of the other. But if one performs these exercises, one will soon feel the exertion of the abdominal muscles in hand lying, whereas one is able to keep the position of fall hanging for a considerable length of time without feeling any strain on the extensors of the back.

14. Stretch Cross Hanging, Body Raising (Bend Cross Hanging Position).—Cross hanging position is taken as described above in 3.

Body—raise ! The body is raised as high up as possible while held exactly under the beam. The head and upper part of the body are bent backward and the aim is to reach the beam with the lowest part of the chest, with shoulders pulled strongly backward and lowered, elbows so far outward that the chest gets plenty of room to come forward between the arms. The legs are kept quite straight, together, and somewhat back—i.e., vertical (Fig. 9).

Body—lower !

By the backward bending the trunk takes up almost the same position as in fall hanging; only a slight movement forward of the legs is needed to put them in line with the trunk. The muscular work is also somewhat similar to that of fall hanging. The higher the trunk is raised and the more it is bent backward, the less will the pectoral muscles be working and the more so latissimus dorsi and the other muscles pulling back the shoulders.



FIG. 9.—Stretch cross hanging, body raising.

Stretch cross hanging body raising affords a full contraction of the heaving muscles, which is characteristic too, of only one other heaving exercise, namely undergrip hanging body raising. This is an advantage, and the practising of the two exercises should therefore not be forgotten. There is no danger of hollow back as the bending of the loin has not nearly reached its maximum.

15. Stretch Undergrip Hanging, Body Raising (Bend Undergrip Hanging Position).—When stretch undergrip hanging position has been taken as described in 5, body raising is commanded and done as stretch cross hanging, body raising (refer to 14, Fig. 9). Here, as in the previous exercise, the trunk is bent backward, although somewhat less, and the effect is the same as the shoulders are lowered and moved back, but only if the raising is done fully; if not, and if the head is moved forward so that the pupil may look over the beam, a much less satisfactory position of the shoulders will be obtained.

The exercise is stronger as the distance between the hands is increased.

16. **Stretch Oblique Hanging, Body Raising (Bend Oblique Hanging Position).**—After the stretch oblique hanging position has been taken as described in 6, body raising is commanded and performed as stretch cross hanging, body raising (refer to 14), but with a somewhat lesser backward bending of the head and upper part of the body (Fig. 11).

The exercise is stronger as the distance between the hands is increased ; but at the same time the shortening of the muscles employed will be less.



FIG 10.—Stretch undergrip hanging, body raising.



FIG. 11.—Stretch oblique hanging, body raising.

17. **Stretch Overgrip Hanging, Body Raising (Bend Overgrip Hanging Position).**—Overgrip hanging position is taken as in 4, but with double shoulder breadth distance between the hands.

Body—raise ! The body is first raised from long hanging to short hanging position (p. 9) to secure the shoulders taking up the correct position from the outset. During the further raising, the chest is brought well forward so that the face comes close to the beam, although the head is carried slightly backward. From the very first, the elbows must be moved as far back as possible.

This is the main point in the exercise, as in arch hanging, body raising, it should be possible to draw a straight line from the one elbow to the other behind the back.

The legs vertical, the knees quite stretched and together.

The body must not be raised higher than that good carriage, especially of the shoulders and head, can be kept—i.e., until the upper arms are horizontal.

Common Faults.—(*a*) The distance between the hands too small.

(*b*) The shoulders are drawn forward (see pp. 2-5); which is shown by the elbows coming forward and the body being pushed away from the beam; the back is rounded.

(*c*) The shoulders are lifted.

(*d*) The head and legs are moved forward; the knees bent and parted.

The Importance of the Exercise, Method of Teaching and Muscle Work. This exercise, perhaps more than any other, gives powerful work to the muscles that keep the shoulders in position, especially to trapezius IIb. It is therefore one of the best exercises for forming the shoulders. If the adductors of the shoulder blade have been well developed by exercises such as this, it will be seen that the shoulders will hardly glide forward even during heaving exercises performed badly and with elbows moved forward; but they are sure to do it if these muscles are poorly developed.

Stretch overgrip hanging body raising is the hardest of all body raisings, and unfortunately only men gymnasts will benefit from it, and even here they will not be able to do it in good form until they have gone through a preliminary training by using exercises such as fall hanging and especially arch hanging body raising.

A preliminary form, suitable for beginners and one which also women may practise, is *bend overgrip hang standing body raising with take-off* from the floor. The beam is put slightly above head level, later a little higher. The pupils stand close up to the beam, grasp it with overgrip, hands double shoulder width apart. On the command *body raising with take-off—begin!* a series of body raisings are now performed by the united efforts of arms and legs. *Halt!*—Gradually the arms have to do the most of the work; as soon as their strength allows the pupils may stop a short while in the bend over grip hanging position on the command *halt!* and remain there till the command *lower!* is given.

Another introductory exercise is *stretch overgrip high stride angle standing, body raising.* The pupils stand on a low wall bar, grasp a bar at chest level and lower the body into angle standing position by a strong bending of the hips. On the command *raise !* the body is raised till the head without being carried forward touches a bar ; the chest is pressed well down, and the elbows are brought well back (Fig. 12).

A third introductory exercise is *stretch angle hanging, body raising with helper* (*wall bars*). The number-ones stand with their backs against the wall bars, grasping a little below stretch height. As they lower themselves till their arms are straight, they lift the legs and part the feet. Number-twos standing

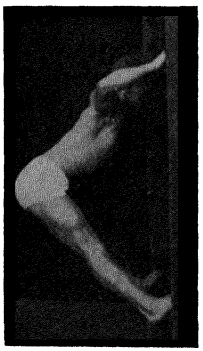


FIG. 12.—Stretch overgrip high stride angle standing, body raising.

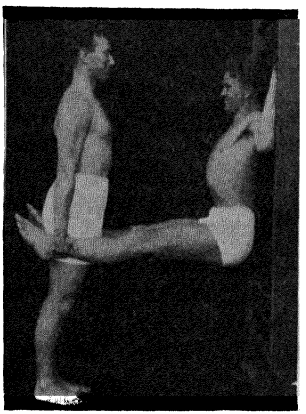


FIG. 13.—Stretch angle hanging, body raising with helper.

opposite, grasp the raised feet and hold them beside their hips as shown in Fig. 13. From this position body raising is performed with the elbows pressed against the wall bars and with the shoulders, if possible, slightly away from the wall bars.

In stretch overgrip hanging body raising (Figs. 7, 8 and 14) the elbow is bent by *biceps* and *brachialis* assisted by *brachio-radialis.* The upper arm is moved from stretch to yard position principally by an inward rotation of the shoulder-blade, as the movement in the shoulder joint itself is slight. The shoulder-blade is rotated inward directly by *pectoralis minor* and *rhom-boideus*, especially its lowest part, which is strongly extended. These muscles are, however, not strong enough to turn the

shoulder-blades against the weight of the whole body. They are therefore assisted by the two big heaving muscles, *pectoralis major* and *latissimus dorsi*, which, by raising the trunk, enable the inward rotators to move the shoulder-blades into position. As mentioned on p. 2, the pectoralis major pulls the upper arm more strongly forward than the latissimus pulls it back because the direction of its pull, especially in yard position, is horizontally across the trunk, whereas that of the latissimus approaches the vertical. In order to draw the elbows back the latissimus must have assistance. This assistance is given, particularly by parts of two muscles which pull in a horizontal direction across the back when the arms are in yard position. These muscles are the *rear part of the deltoideus*, moving the arm backward in the shoulder-joint, and the *trapezius IIb*, adducting the

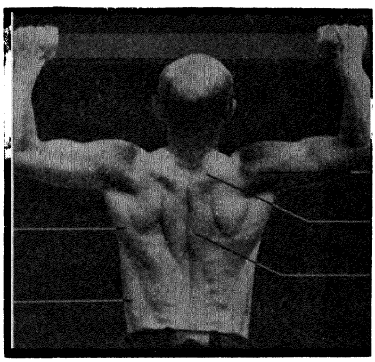


FIG. 14.—Bend overgrip hanging position.

shoulder-blade and fixing it against the outward pull of the deltoid. The trapezius as a whole, rotates the shoulder-blade outward (i.e., opposite the rotation here), but its part IIb is inserted so near the axis that it does not restrain the inward rotation of the shoulder-blade to any marked extent. The trapezius IIa is quite inactive and must necessarily be so as, owing to its insertion on the acromion, it is a very powerful outward rotator capable of hindering inward rotation of the shoulder-blade. This exercise is a striking example of how the trapezius IIa and IIb may act independently of one another. The lower part of the trapezius (III) is also acting during body raising; it holds the trunk up to the shoulder-blades at the

back just as the serratus magnus does in front. This part of the muscle does not greatly hinder an inward rotation either, owing to its insertion.

If the arms are to be moved further downward—or rather: if the body is to be raised higher than to yard position of the arms, as in stretch cross hanging and stretch undergrip hanging body raising, then the movement takes place chiefly in the shoulder joints by a further contraction of the latissimus dorsi and the pectoralis major. The shoulder-blade is strongly fixed and adducted by trapezius IIb and III, rhomboideus, and pectoralis minor, consequently the muscles from arm to shoulder

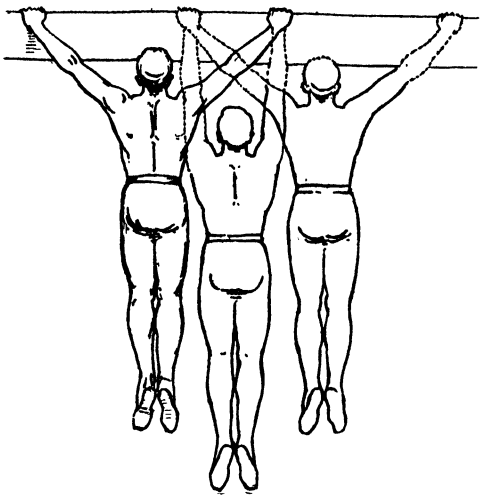


FIG. 15—Stretch overgrip hanging, arm travelling.

blade (those that diminish the angle between these bones) are also assisting, which can be easily seen on a lean and muscular back (Fig. 14). These muscles are the *rear part of deltoideus*, *teres minor*, the *long head of triceps*, *teres major*, and *subscapularis*.

C. Arm Travellings

18a. **Stretch Overgrip Hanging, Arm Travelling.**—Beam. In arm travelling to the left the right hand is first moved toward the left, to shoulder breadth distance or a little nearer; by this the body is lowered and swings to the left. This swing should be so utilised that the left hand grasps as

far along the beam as possible before the body gets time to swing back again. The quickest way of travelling with long steps is to grasp the beam with the greatest possible distance between the hands (Fig. 15).

Common Faults.—(*a*) The legs take part in the work and are parted.

(*b*) The head and legs are moved forward.

18b. **Stretch Overgrip Hanging, Arm Travelling with Side Swing.**—Single or double beam.

The legs are set swinging from side to side in a vertical plane by lateral bendings of the back, especially the loin ; the hands are moved rhythmically with the swinging ; the left hand is moved at the end of a left swing because the swing lifts the left shoulder, takes the weight off the hand and makes the movement easy. To prevent the body from swinging irregularly one should have the hands wide apart and travel with short steps only. In arm travelling to the left, one should begin with the left hand ; one is apt to begin with the right, but that will bring the hands too near together and the body will swing round.

If the exercise is performed in the more difficult form on double beam, the beams ought to be put as near together as possible. When starting to the left in the lower beam, the left hand should be moved to the upper beam at the end of a left swing and the right hand moved up in the following swing to the right, and correspondingly the hands should be moved to the lower beam during the next two swings.

The pupils cannot follow closely on one another because of the leg swinging ; consequently the exercise takes time ; only about four should be set to work at each beam.

Method of Teaching and Importance of Exercise. The greatest difficulty is to swing in the right direction. This is most easily learned if the pupil is made to swing "on the spot." The greater the distance between the hands, the easier it is to guide the swinging ; with the hands close together it is almost impossible to prevent the body from swinging round. In a left swing the body will turn to the left and the left shoulder will move backwards. One must therefore counteract this by keeping the left shoulder well forward. In the double beam while grasping the upper beam, the forearms are steadied by the lower beam and this makes the swinging of the body easier. As the swinging increases the hands may be lifted from the beam—left hand during a left swing and right hand during a right swing.

Smaller children may practise this in the wall bars, either facing or with their backs against the bars.

The exercise makes for suppleness first and foremost; the mobility of the loin is increased by extension of the muscles that check a side bending, i.e., the lateral parts of the abdominal muscles. The heaving muscles, too, especially the latissimus dorsi, are being extended strongly.

19. **Stretch Oblique Hanging, Arm Travelling.**—Beam. The arm travelling is done backward with steps so long that the body turns about half-way round for each step. The hands are moved either so close along the beam that they nearly glide along it, or in a large swing downward, touching the sides of the body, and thence backward-upward to the beam.

The exercise can be combined with body raising after each step, which makes it considerably harder. This should not be taken with women.

20. **Stretch Undergrip Hanging, Arm Travelling.**—Beam. Performed in the same way as in 18. However, the steps are often quite short because of lack of ability to turn the hands. The exercise to a special extent can give mobility to stiff joints in the forearm. Here, too, a body raising may be added, but only with men.

21. **Stretch Overgrip Hanging, Rotary Arm Travelling.**—Beam. The pupils take overgrip. In travelling to the left, the right hand lets go its grip, and, while the body is turned half-way round to the left and hanging by the left arm, the hand is moved closely under the beam and grasps on the same side as before—that is, with undergrip—so that the body comes to the undergrip hanging position. Then the left hand lets go, and while the body is again turned half-way round to the left, the hand is moved under the beam and grasps (still on the same side of the beam), but now with overgrip, so that the body comes to the overgrip hanging position. There can be either a short pause after each step, or the turning can continue in an even moment with no pause. The steps will then be short. After sufficient practice, long steps may be taken and the arm is moved in a long sweep past the leg to a new grip.

The exercise is one-sided, as it is more difficult to turn the body from overgrip to undergrip than vice versa. It should therefore be taken both to the left and right. The hand has to be supinated 180°; this is not easy—what one feels if one in stretch standing position with the palms facing forward tries

to turn the forearm and hand so that the palm faces backward. The turning from overgrip to undergrip hanging is made easier by a counter-turn of the body before each step, so as to give the body greater impetus. From undergrip to overgrip hanging the movement is easy as the arm is here untwisted. Except with women, the exercise can be combined with body raising, taken each time the body is in the undergrip hanging position ; this makes it considerably harder.

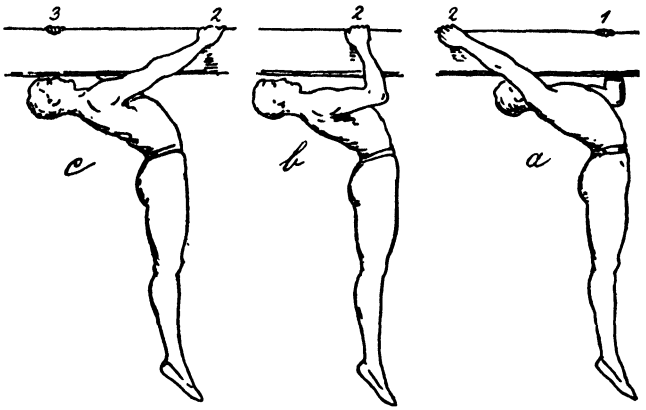


FIG. 16.—Bend cross hanging, arm travelling.

22. Bend Cross Hanging, Arm Travelling.—Beam. The travelling is taken backwards and in such a way that the body is held at the same height throughout, while the hands are moved past each other. The face all the time must be kept exactly under and close up to the beam (see Fig. 9). Beginners who have not strength to hang in one bent arm must therefore take short and rather quick steps. As their strength increases the steps are made longer and slower ; the body then, without any swing, must be brought entirely over on to the rear arm, which is strongly bent, before the forward arm, which is now stretched, releases its grip (Fig. 16).

23. Bend Oblique Hanging, Arm Travelling.—Beam. From bend oblique hanging position the weight of the body is transferred to the rear arm while the front arm is stretched (compare Fig. 16) ; at the same time the body is lowered sufficiently to allow the head, which is bent backward, to pass under the beam. The straight arm is now moved back as far

as possible, which may now be done without causing the body to swing; the body is then raised up on the other side of the beam, carried equally by both arms. During the changing of the grip, well-trained pupils may lower the arm to the side and hang suspended by one bent arm only.

24. **Bend Undergrip Hanging, Rotary Arm Travelling.** —Beam. In travelling to the left, the weight of the body is transferred to the bent left arm before the right hand lets go the grip; the body is turned while the left arm is kept bent, and the right hand grasps the beam on the same side as the left so that the position will now be bend overgrip hanging; the body is now transferred to the bent right arm and turned to bend undergrip hanging position, and so on.

Only strong and well-trained men are able to do this exercise.

25. **Bend Hanging, Vertical Arm Travelling.** - Two ropes. The pupil jumps up to bend hanging, moves the hands alternately in long and equal steps. The hands are kept well out to the sides so as to keep shoulder width apart; head well raised without stiffness; the legs vertical between the ropes. When the travelling stops the arms should be moved to the sides of the shoulders and the chest carried forward between the ropes.

The downward travelling may be done by moving the hands alternately or by moving them together in "jumps."

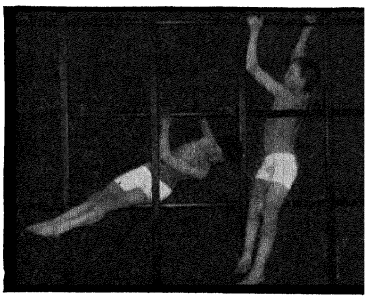
In a square ladder, supported in an inclined position on a beam, and in an arm ladder adjusted horizontally or obliquely, many excellent forms of arm travelling may be done. Many of these are particularly good because the apparatus ensures wide distance between the hands as, for example, in arm travelling in an arm ladder with the hands grasping the side pieces. Stretch hanging, arm travelling with turning, hands grasping rungs as wide apart as possible, should also be practised in horizontal ladder.

D. Twinings

Twining is most often taken in the square ladders, some forms on the double beam. It is taken horizontally, vertically, obliquely, and zig-zag. If the head goes first it is called back ward twining; if the legs go first it is called forward twining. As beginners find the grip difficult, it must be practised separately. It is a main rule that the hands must grasp the

apparatus from each side, one hand from below with undergrip, the other from above with overgrip, the arms crossed, and the hands well apart. In backward twining the pupil grasps the rung above the square into which he is moving, and in forward twining the rung over the square in which he is sitting. The grip for forward twining is most easily learned if the pupil before grasping turns towards the square he is going into, or to the side to which he is turning if he is going into the square immediately below the one he is sitting in.

Besides being heaving exercises, twinings are also lateral and abdominal exercises, as they cause valuable twistings and bendings of the body, and usually require a considerable amount of work from the abdominal muscles.



A FIG. 17. B

A. Horizontal backward twining.
B. Vertical backward twining.

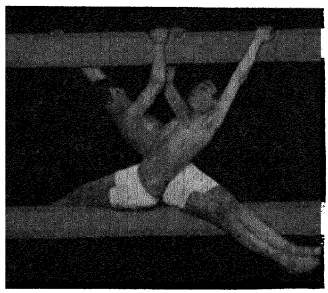


FIG. 18.—Pass twining.

26. Horizontal Backward Twining.—Square Ladder. The pupil seats himself in one of the outer squares of the ladder. If the twining is to be taken to the left, the left hand is moved into the next square, and grasps with undergrip; the right grasps in the same square with overgrip, the arms are crossed, and the hands as far apart as possible. Then the body is drawn into the square with the head first (Fig. 17A).

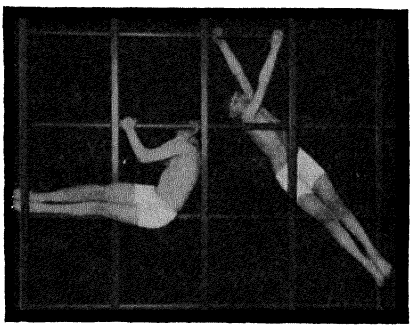
27. Pass Twining.—Double beam, lower beam in hip height with the flat edge upward, the upper one a little over head height measured from sitting position on the lower beam.

The pupils are arranged at the beam with their backs toward it, ones and twos on opposite sides.

(*For*) *pass twining—up!* The children grasp the top beam and get up to sit on the lower one, still facing the same way.

They sit in couples, close to each other, with at least a foot-length between the couples.

Grasp ! Twine ! (or 1—2). If the two working together have the right side toward each other, they grasp past each other with the right hand in undergrip, the left in overgrip as far along the beam as they can reach, the arms crossed (Fig. 18). On 2 they twine past each other, so that they come to sit with the left side against a new partner. For the next twining the left hand takes undergrip, the right overgrip. In the twining the knees must be straight as far as possible and the legs lifted to right angles with the body. In every other twining, the two pupils who have come to the ends of the beams sit still. If the children have endurance enough, the twining can be continued until all have come back to their original places; but, of course, it can be stopped at any time.



A FIG. 19. B

A. Horizontal forward twining.
B. Obliquely-upward backward twining.

The exercise is made harder by lowering the top beam, as the body must then be borne on more bent arms during the twining. The distance between the couples must in that case be somewhat increased.

28. **Horizontal Forward Twining.**—Square Ladder. The pupils sit as in backward twining. In forward twining the upper rung of the square in which each is sitting is always grasped. If the twining is to begin to the right, the left hand grasps in undergrip, right in overgrip, the arms crossed, the hands as far apart as possible. After this the body is pushed into the square with the legs leading (Fig. 19A).

29. **Vertical Twining with Alternate Turning.**—Square Ladder. The pupils seat themselves in the lowest row of squares or the row just above. *Twining upward* (*downward*), *head* (*feet*) *leading*—1—2. *Grasp ! Twine !* (or 1—2). On 1 they grasp the top bar of the square vertically above them, with the arms crossed and left hand in undergrip, right in overgrip, if they are going to turn to the right. On 2 the body is drawn

up with the head first into this square. The turning should be alternately left and right (see Fig. 17B).

The descent is done to the same command. On 1 the hands grasp in the same way, but the bar in front of the chest, and the legs are put into the square vertically below. On 2 the body is lowered into this square. The descent looks best if the body is allowed to glide down till the arms are stretched, or almost stretched, before it is turned.

The exercise can be done by as many pupils at the same time as there are vertical places in the ladder.

When the exercise has been learned, it can be done without command and as a race.

30. **Twining in Zigzag to the Side.**—Square Ladder. The pupil sits in one of the outer squares of the ladder. If the twining is to the right, he goes first with backward twining two squares obliquely upward to the right (Fig. 19B), and then with forward twining two squares obliquely downward to the right, then again obliquely upward and obliquely downward, and so on. The grasping is as described in forward and backward twining.

31. **Twining in Zigzag Upward and Downward.**—Square Ladder. In this twining the pupil goes two squares obliquely upward to the left and then two squares obliquely upward to the right, and so on. The descent is taken through the same squares either with forward or backward twining.

Forward twining downward is taken exactly like that described in twining in zigzag to the side.

When taking backward twining in zigzag downward, the pupil first lets the body glide down until he is hanging in the bar by his knees. The hands then grasp, as for backward twining, the bar to the side of the knees, and while the head is put under the bar the body is drawn into that square.

32. **Screw Twining.**—Square Ladder. The twining is done screw-wise round one upright. One moves up from square to square while turning to the same side the whole time. The exercise is therefore very one-sided, and the teacher must see to it that it is practised equally to both sides. It can be taken in couples, number-two sitting in the neighbouring square of number-one and facing the opposite way, each with the same side towards the upright. When the exercise is repeated they should both sit with the other side to the upright.

E. Upward Circling, Downward Circling, and Round Circling

33. Bend Undergrip Hanging, Forward-Upward Circling (Stretch Balance Hanging Position).—Beam at stretch height. *To the beam—run!* (*With*) *undergrip—up! Forward-upward circling*—1, or *Go!* On the last command the body is raised up till the arms are bent. By a bending in the hip-joints the legs, together and stretched, are swung up over the beam and lowered on the opposite side. By a pull of the arms and by a strong pressing back of the head, the body is brought up into the balance hanging position, while the arms are stretched; the head is up, shoulders lowered, and legs together, stretched, and moved a little backward (Fig. 20).

Very strong and well-trained pupils may begin the circling by raising the straight legs up to the beam as shown in Figs. 22 and 21 (here indicating the upward circling). When the feet have reached the beam, and not before, the body is raised up over it by a bending of the arms.

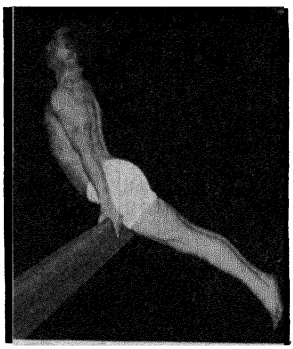


FIG. 20.—Stretch balance hanging position.

To avoid the swaying of the beam it is advisable to arrange the pupils so that they stand on alternate sides of the beam.

Forward-downward circling in four movements—1—2—3—4. On 1 there is a slight bending of the arms, and the body is moved evenly and gently forward-downward, while the hip-joints are strongly bent; the legs, fully stretched, glide down along the beam, and are stopped when the feet have come as far down against it as possible (Fig. 21). On 2 the legs are lowered to horizontal position and stopped there; the arms can be bent during this movement (this is the easier way) or kept straight (Fig. 22). On 3 the legs are lowered all the way down, after which the arms are stretched if they were bent before. On 4 the landing is taken.

Strong pupils may do two or more upward circlings in succession before landing.

Instead of downward circling *over* the beam, downward circling *under* the beam may be taken. From balance hanging

position the trunk falls backward with the head held well back ; at the same time the legs are carried forward so that the feet are brought near the beam. When the trunk is under the beam the body is straightened by a powerful stretching of the hip joints and brought into horizontal position at or as near beam level as possible. The swing forward of the body is increased by the arms pushing off, and the pupil lands well in front of the beam.

Trained and agile pupils may do forward-upward circling from overgrip hanging position. The difficulty here is to bend the arms sufficiently and to lift the body so much and at the right moment that it is brought in over the beam. It is most easily learned with the beam at head level. When later the beam is put at stretch height the exercise may be taken with a run

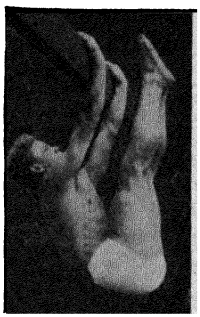


FIG. 21.

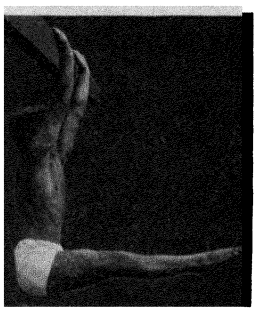


FIG. 22.

Forward-downward circling.

and a double take-off to give speed forward and upward. In the hardest form it is done slowly from stretch overgrip hanging position.

In balance hanging a *turning to oblique sitting position* may be taken. In turning to the left, the left leg is carried slightly away from the beam so as to allow the right knee to be drawn up and the body turned to a sitting position on the right thigh and seat. The hands now leave the beam, the body is raised with the shoulder line at right angles to the beam, left leg vertical, right knee bent, and lower leg parallel with the left. In this position arm movements such as arm raisings sideways and sideways-upward may be performed.

The difficulty in this exercise is to pull the knee up between the stretched leg and the beam ; it is difficult to keep the

balance, and one is afraid of falling forward. Number-twos may help number-ones by standing behind them and firmly grasping the ankles of the stretched legs and drawing them slightly backward. This support makes it easier to keep the balance for those performing the exercise and gives them confidence.

If done in *double beam* with the beams placed suitably apart the back of the head may be supported against the upper beam. This makes the turning easier, too. It deserves notice that in balance hanging a strong exercise is provided when the body is lifted backwards away from the beam while the back of the head presses strongly against the upper beam.

The descent may be done as a *backward-downward circling.* In reverse balance hanging (i.e., balance hanging with the back towards the beam) the body is lowered till the lower part of the loin rests on the beam. The body is now balanced over its centre of gravity and the movement backward may be easy and controlled. There is a pause in the stoop hanging position, firstly to show full control over the body, and secondly to prevent a too forceful swing by which the hands might be torn away from the beam. Number-two may help number-one by grasping one ankle during the first part of the backward circling and in that way prevent the movement from being too quick. This gives the pupil a feeling of confidence and makes the practice safe. If double beam is used the feet may be supported on the upper beam by which a too speedy circling is prevented.

Backward-downward circling may also be taken by pushing the seat backward while leaning forward, then lowering the body till the bent knees grip the beam ; finally either pulling the legs under the beam, which very supple pupils can do with straight knees, or continuing the movement backward as in the last stage of forward circling in two ropes (Fig. 27).

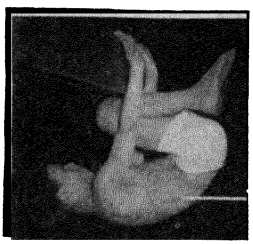
Introduction.—This exercise, which is difficult, should be introduced by the following preparatory exercises, each of which is in itself a good and attractive exercise for children.

(*a*) **Head over Heels.**—Beam just under hip height. The children stand close to the beam and grasp it with thumbs in front.

Head over Heels—go ! The children lean forward over the beam, bend the hip and knee-joints strongly, and swing round the beam bent in this way. To prevent the common mistake

that the hip-joints are too little bent, and that the feet, therefore, fall heavily on the ground, the teacher can emphasise that the feet must be put on the ground just under the beam. To teach the smaller children this, one can make them practise from undergrip hanging position to lift the knees up under the beam between the arms and then to take the same position when doing head over heels (Fig. 23).

(*b*) **Walk Standing, Forward-Upward Circling.**—Beam at shoulder height. *Left foot forward* (*with*) *undergrip—grasp ! Forward-upward circling—go !* There is a strong take-off with the feet, they are brought together and moved up to the beam, at the same time the body is brought up over it to balance hanging as before. To make the upward circling still easier, beginners may bend the knees while the legs are brought up to the beam.



Front edge of Latissimus dorsi

FIG. 23.

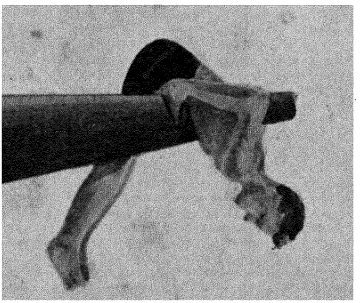


FIG. 24.

Downward circling from this position is done in three movements on the command, *Forward-downward circling—*1—2—3. On 1, the body is moved forward-downward with a strong bending in the hips, so that the pupils hang on their thighs with the hip-joints strongly bent and with the head downward, but with the knees stretched (Fig. 24). On 2, the legs are brought down while the knees are bent, so that the body hangs in bent arms with a right angle at the hip and knee joints. On 3, the feet are placed on the floor. Last of all, *Hands—down !* is commanded.

This form of circling is made still easier by using the double beam ; the top beam is then placed at such a distance from the lower one that the feet can be pressed against the upper one, and this helps to get the body raised up.

Forward-upward circling may also be done in the square ladder, where the same support is gained as in double beam. The pupil grasps the upper rung of the square in which he is sitting and performs the circling round this. The feet pushing off the rung above make it easier for him to get up. After having turned to a sitting position on the rung he has just circled, he circles up into the next square, and so on. The descent may be done by a forward-downward circling from square to square, turning about after each circling.

When the pupil's strength has been increased sufficiently, the beam is put up to about stretch height and the circling is done in unbroken continuation of the jump up to grip the beam ; the body is put in upward motion by the jump, and thus is more easily swung over the beam.

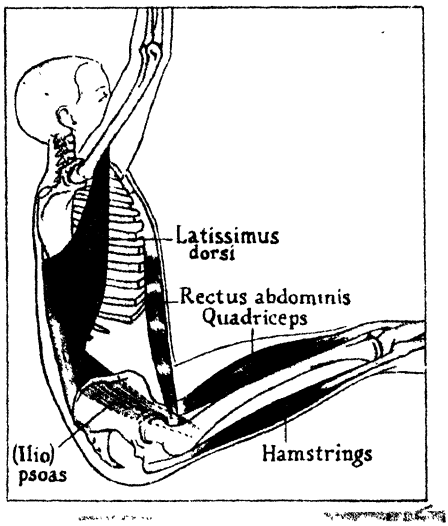


FIG. 25.

Muscle Work (Fig. 25).—In upward circling the same muscles on the whole, work as in an ordinary body raising (p. 20). In this movement the body, in addition, must be moved forward-upward, which, as regards the movement in the shoulders, is mainly done by *latissimus dorsi*. In addition, a great work is put on the *abdominal muscles*, which have to raise the pelvis, and with it the legs, which the *flexors of the hip*, especially

ilio-psoas, have brought forward. This exercise, therefore, is also a strong abdominal exercise; as it induces a strong shortening of the abdominal muscles, specially effective for correcting hollow loin, it is of very great value. The stooping is a further advantage.

34. **Bend Hanging, Half Forward Circling (Reverse or Stoop Hanging).**—Two ropes. *Half-circling*—1. The ropes are grasped at first at chest, later at stretch height; the body is raised in bent arms, first with, later without, a take-off from the feet; and by a bending in the hip-joints, the legs, stretched and together, are brought up over the head between the ropes. Here the body is straightened by a stretching in the hip-joints,



FIG. 26.—Reverse or stoop hanging.



FIG. 27.—Forward circling, final position.

the head is pressed back, and the back is a little hollowed (Fig. 26). As it may be difficult to get the balance at once in this position, the legs can be parted and the outer edges of the feet pressed against the ropes.

Down! The pupils come down the same way as they went up; the hip-joints are bent, the body is lowered, and the legs, together and stretched, are brought slowly down to the starting position, while the arms are bent. The feet are put on the floor and the hands let go the ropes. Trained pupils with much skill can hold the body stretched while they come down.

35. **Bend Hanging, Forward Circling.**—Two ropes. *Forward circling—up!* The ropes are grasped at first at chest,

later at stretch height. The body is raised with bent arms, and by a bending in the hip-joints, the legs, stretched and together, are brought up over the head between the ropes, and as far down towards the floor as the mobility in the shoulders allows (Fig. 27).

Downward circling—down ! The body is brought back the same way to the starting position, with bent hip-joints and with the legs stretched and together. After sufficient practice the circling can be done in straight arms.

Children may perform forward and downward circling in quick succession. They grasp the ropes at low chest level so as to be able to touch the floor easily at the end of the forward circling without letting go the grip on the ropes. The feet push off both in the upward and in the downward circling and the knees are raised up towards the chest so as to make the body swing round as quickly as possible. They may do it as a race a number of times, say three. By grasping higher the exercise becomes more difficult. All spaces between the ropes should be used so that, for example, eleven children may practise simultaneously at 12 ropes.

F. Climbing

36. **Climbing Position.**—Rope. During climbing the body is moved upward by the united efforts of arms and legs. The arms pull the body upwards by bending and the legs push it upwards by stretching. During this hands as well as feet must grip the rope so firmly that they do not slide downward as the body is raised. The flexors of the hands are developed by all hanging exercises and by any firm grip by the hands. The grip by the feet is learnt only in climbing and it is so difficult that special introductory exercises are necessary.

The position of the legs in climbing is similar to the one taken up when one sits on a chair with the legs crossed, and it may be practised in the following way : Cross the legs so that one foot rests on the other ; press the heel of the front foot against the instep of the other (by using the flexors of the one knee and the extensors of the other) ; bring the knees forcibly together (by using the adductors), and press the outer edges of the feet against one another. In this way the position may be introduced and explained.

At the rope itself the following introductory exercises are to be recommended.

(*a*) Different pieces of apparatus (stools, forms, box, buck, horse, etc.) are arranged closely behind the ropes. In sitting position so that the arms haven't to carry the body, the children may practise with ease the position of the feet (Fig. 28). The teacher may encourage the children to grip the rope firmly with the feet by his catching hold of the rope just above their knees and trying to pull the rope up. Later the children will practise on their own the raising of the body from the apparatus on which they are sitting without their feet sliding down. After these exercises the apparatus is placed two to three paces behind the rope. Stools and forms are now too low and must be put one on the top of the other. Climbing position is taken up as before, body inclined more backward, however, as a counterweight to the legs, which are carried well forward. The hands grasp at head level or slightly above. After a slight raising of the body they try to maintain the position while swinging forward from the apparatus. Helpers standing behind assist them in getting into the sitting position after the return swing until they have learnt to do it without help by lowering the body in the forward swing and raising it in the return swing.

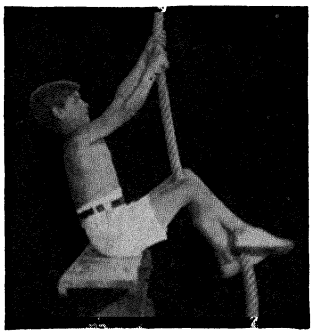


FIG. 28.—Climbing position.

(*b*) Number-one and number-two stand facing each other with the rope between them. Number-two grasps the lower end of the rope and lifts it so that a loop or a step is formed in which number-one places his right foot, which should be kept well turned outward. He now grasps the rope at head level, steps up on the right foot, raises the left foot, places it with the instep against the rope and the right heel and with the outer edges of the feet against one another. When the feet are in position the arms are stretched and the body lowered (Fig. 29).

In this position stretching of the legs may be practised. On the command *Stretch !* the body is raised as high as possible by a stretching of the legs. The arms assist by bending, the hands are not moved. On *Bend !* the body is lowered by a bending of

the legs and a stretching of the arms. The exercise is repeated a fair number of times.

(*c*) The rope is grasped at head level. Left foot is raised and placed with the instep against the rope from behind (Fig. 30). As the weight of the body is transferred to the arms the right foot is put in front of the rope so that it will be held firmly between the right heel and the left instep. The knees are brought so close together that also the calves press against the rope, which helps the feet to get a firm grip. The feet are brought so much forward that the rope passes between the thighs just above the knees. When the feet are moved forward the rope will

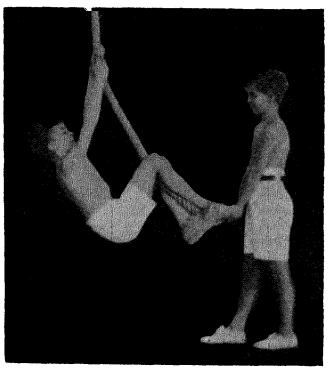


FIG. 29.



FIG. 30.

curve and consequently there is a smaller tendency for the feet to slide down (Fig. 31).

In this position the following exercises may be practised: *Letting go of one hand* (Fig. 31) and, if the grip is sufficiently low, hitting the floor with the hand; *stretching the legs* without moving the hands as in (*a*); all of it in order to practise a firm grip with the feet; *changing feet*, as a firm grip must be secured whether the right or the left foot is in front.

(*d*) Climbing position may be taken with a jump up on to the rope. On the command *Up !* the feet take-off, the hands grasp the rope high up, the body is raised by a bending of the arms, while the knees are raised as near to the hands as possible and the feet grip the rope as described. The pupils are told before-

hand which foot is to go in front and which hand is to be uppermost.

From this position with bent arms, hand walking upward till the legs are stretched may be practised (Fig. 32), and the return movement till the hands are close to the knees again without any sliding downward of the feet.

37. **Climbing.**—Rope. *Grasp !—up !* The rope is grasped as high up as possible, and the climbing position taken. The hands are then moved upward in three steps. With a strong bending of the arms the body is now drawn as far upward as possible ; at the same time the knees are lifted up to the hands, and the legs again firmly clasp the rope.

If the time is to be counted for the climbing, it is 1—2—3 for the moving of the hands, 4 for the body raising and knee raising. Each step in the climbing must be as long as possible. At the end of the upward climb the arms must be bent strongly, while the legs are held about straight, grasping the rope.

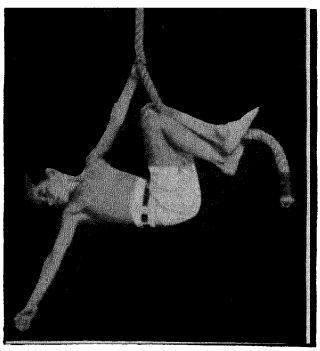


FIG. 31.



FIG. 32. Hand walking upward, final position

Just as the hands are alternately above and below, the legs must alternate in being in front. This can either be done by holding the one leg in front in one climb and the other in front in the next, or by changing the legs at each step.

Halt ! is commanded if the movement is to stop before the pupils have reached the top of the rope.

Down ! The body is lowered into the climbing position, the hands are moved down with long steps, while the legs, which

now keep the same grip, without changing, glide down the rope ; the body, especially the seat, is held well away from the rope. At about stretch height from the ground the legs let go the rope, legs and arms are stretched, the feet are put on the ground, and the erect position taken.

Climbing can be done in two ropes ; the hands then grasp a rope each, while the legs are put round both. This form of climbing is somewhat easier than climbing in one rope, and it is easier to keep a good position during the exercise, because the hands are at shoulder-breadth distance.

Climbing down can be done with the arms alone ; this, especially, should be practised in climbing in two ropes.

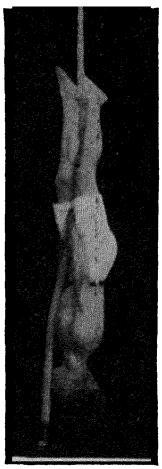


FIG. 33. Stoop hanging position.

Well-trained pupils can do the descent in stoop hanging position. It should be practised near the floor to begin with. The rope is grasped at shoulder level with the hands close together. The legs are raised as in half forward circling, then clasp the rope as in climbing position but with straight knees. The head is moved backward and the back is straightened. The rope is held straight in front of the body. The hands are now turned, one at a time, so that the thumbs are downward (Fig. 33). Some are able to clasp the rope so firmly with the legs that they can hang a moment suspended by the legs alone.

Common Faults.—(*a*) The climbing steps are made too short, as the knees and arms are not fully stretched.

(*b*) The back is rounded and the head bent forward.

(*c*) The legs do not help to push the body upward.

(*d*) The body is not held away from the rope in the descent.

The Importance of the Exercise.—Climbing is a strong and interesting heaving exercise, and as by the knee raising it makes the abdominal muscles work strongly and in shortened condition, it is also a good abdominal exercise and effective for correcting hollow loin. On the other hand, climbing is the heaving exercise which is most difficult to get performed with good carriage of the shoulders and chest, because the hands grasp the apparatus in front of the chest, and because the lifting

of the knees easily causes a strong bending up of the whole body. Climbing, therefore, should not be used as a rule before the pupils are 11 to 12 years old.

38. **Horizontal Travelling from Rope to Rope.**—Ropes. The pupil climbs up one rope with the other ropes on his left, stops in the climbing position with bent arms and stretched legs. With the left hand he seizes the neighbouring rope, relaxes the grasp with the legs, and hangs a moment between the ropes in bend hanging position, the hands well out to the sides of the shoulders. The second rope is now grasped by both legs and the right hand is transferred to the same rope, and so on. The exercise is first done near the floor, later higher up.

39. **Horizontal Travelling with Turning About.**—Ropes. From the same climbing position, as in 38, the pupil turns about backwards and seizes the rope with the *far* hand (not the near one). Supposing he starts with the vacant ropes on his left he turns right about and grasps the nearest rope with his right hand. The legs are then shifted directly to the second rope without any pause between the ropes. During the next step the body is turned to the left and the left hand grasps the next rope, and so on. It will be seen that only the first and the last rope are grasped with both hands. The turning about is done quickly, almost with a push-off by the hand that is moved.

40. **Side Travelling Downwards.**—Ropes. From climbing position high up in the rope the left hand is transferred to the neighbouring rope grasping it as low as possible while the right arm is stretched and the trunk lowered ; the legs let go, and for a moment the body hangs suspended between two ropes, one arm straight, the other bent. The legs grasp the new rope, and the right hand is moved down to the left one. The exercise is one-sided and should be practised to both sides.

41. **Side Travelling Upwards.**—Ropes. From ordinary climbing position at a low level the left hand is transferred to the neighbouring rope, grasping it as high as possible ; the legs let go ; for a moment the body hangs suspended between the two ropes, left arm stretched, and right arm bent. The legs then clasp the second rope as near the left hand as possible, and the right hand is shifted to the same rope, grasping a fair distance higher up than the left. The exercise is one-sided and should be practised to both sides.

G. Climbing Inclined Rope

42. Inclined (or Horizontal) Hanging Starting Position.—Inclined rope, or beam at head level, later stretch level.

On the command *inclined (horizontal) hanging, right leg—up !* the hands grasp with oblique grip at least shoulder width apart, right hand foremost. The body is now raised by a bending of the arms ; with a strong bending of hip and knee the right leg is hooked over the apparatus immediately below the right hand. The left leg, with straight hip and knee, is moved slightly outward and well downward so that the loin is bent backward. The trunk is kept parallel to the apparatus and close up under it, the arms are well bent, the head carried a little backward with the chin drawn in (Fig. 34).

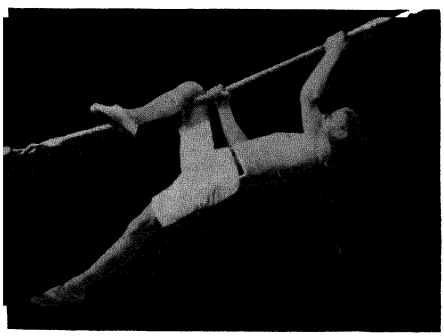


FIG. 34.—Inclined hanging starting position.

As the picture shows the weight of the body is held mostly by the hand and knee that are close together, especially by the knee. The knee should therefore be placed above the centre of gravity of the body. This is important in all inclined and horizontal climbing ; if it is done the movements will look well and will be fairly easy. The proper inclined (horizontal) hanging position should therefore be carefully practised.

On the command *down !* the right leg leaves the apparatus; the legs are brought together and lowered, after which the landing is taken.

Common Faults.—(*a*) The leg that is placed on the apparatus is insufficiently bent at knee and hip, consequently :—

(1) The lower leg is placed along and not across the apparatus and the grip is not firm ;

(2) The knee is not close up to the foremost hand.

(*b*) The free leg is bent at the knee, is carried too much outward and held too high (i.e., with a bending of the hip). This latter fault causes a rounding of the loin and back.

(*c*) Arms insufficiently bent.

(*d*) Head poked forward or hanging back.

43. **Climbing Inclined Rope.**—Inclined rope, or beam. When climbing position has been taken with, for example, the left knee over the apparatus and the left hand foremost, the left hand is shifted shoulder distance past the right hand. As the arms pull the body forward the right leg is swung over the apparatus close up to the right hand ; the left leg is not swung down till the right leg is just being hooked on.

Each pace is a shifting of one hand and a changing of the relative positions of the legs, and it is not done correctly unless the hand is shifted before the changing of the legs ; but the two movements must be done in quick succession and according to a certain rhythm. There is then a short pause before the next pace. The time may be indicated by the following counting, *one, two !—one, two !* and so on.

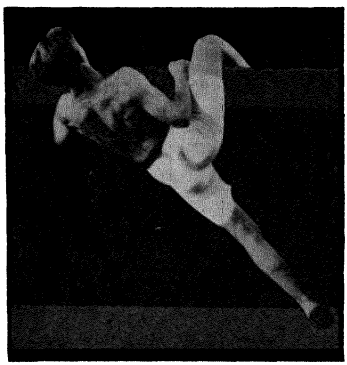


FIG. 35.—Swing climbing.

Introduction. As an introduction to the exercise the changing of the leg positions, which is found difficult by many, may be practised without any movement of the hands. The command is, *Leg changing*—1—2. Supposing the left leg is hooked on to the apparatus, then, on the command 1, the right leg is swung up close to the left hand and the left leg down as described above. On 2, the relative positions of the legs are changed.

To ensure that the movements follow one another in the right order, climbing inclined rope (inclined or horizontal climbing) is first taken by numbers. When the starting position has been taken up the following command is given, *Climbing by numbers* —1—2. On 1, the hand is shifted ; on 2, the legs change.

In the form described above the trunk is kept under the apparatus the whole time. The exercise may also be taken as horizontal swing climbing on the beam. In each pace the trunk is swung up to that side from which the leg is hooked on to the beam (Fig. 35).

Common Faults (beside those mentioned under 42).—(*a*) Hand and leg not moved according to the correct time.

(*b*) The trunk not pulled far enough forward by which the distance between the hand and the knee of the same side will become greater and greater.

(*c*) The right leg is hooked on to the apparatus close to the left hand, or vice versa.

44. **Horizontal Hanging, Mounting.**—Beam. The beam is grasped with overgrip. Left leg is hooked on to it close to the left hand. By a powerful swing of the right leg and a pull with the arms, the trunk is raised above the beam; the arms are now stretched, the left leg carried over the beam, and the balance hanging position is taken up. Instead of balance hanging one can take up ride sitting and from there go up to balance standing on the beam.

45. **Climbing Inclined Rope with Turning.**—Inclined rope. The rope is grasped with overgrip. If the climbing is done to the right, the right leg is hooked on to the rope close to the right hand, left leg straight and in line with the body as in horizontal hanging, but at right angles to the rope (Fig. 36). The right hand is shifted to the other side of the knee, grasping the rope with undergrip (Fig. 37); the left hand is now shifted; it grasps the rope with overgrip, as the right hand, and at shoulder width's distance. The trunk and the left leg are kept straight and are swung round so that they are now parallel to the rope (Fig. 38). The right knee quits its hold, and with a quick swing the left leg is swung in under the rope and hooked on to it just above the left hand; the trunk and the right leg are now straight, in line with one another, and at right angles to the rope (Fig. 39*e*). Corresponding movements are now repeated to the left, the left hand moving first, and so on. In that way the climbing is done with alternate turnings to the right and the left.

After some practise the changing of the legs may be performed as follows. When the one leg has quitted its hold both legs are brought together and held a moment in a vertical position close to the rope before the other leg is hooked on to the rope. The position reminds one of upward circling (see Fig. 21, p. 31). From this position well-trained gymnasts may lower the legs and the trunk to overgrip hanging position (Fig. 39*d*) and then in a body raising lift the legs up to the rope (legs together and straight) before the leg is hooked on. The exercise is now both a heaving exercise and a very strong abdominal exercise.

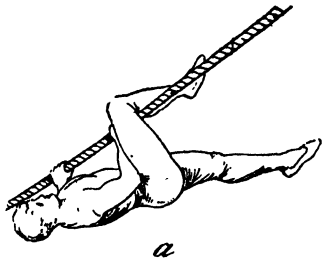


FIG. 36

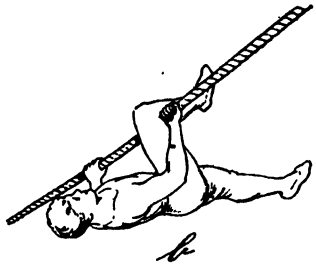


FIG. 37.

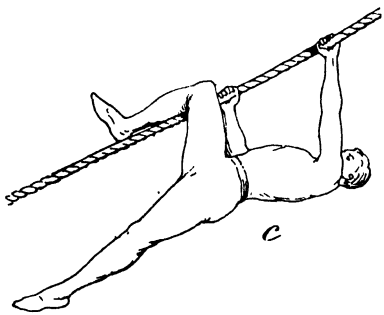


FIG. 38.

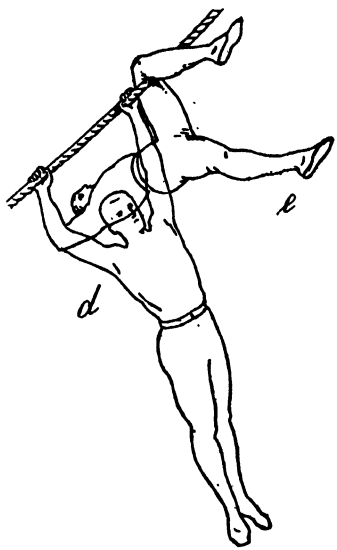


FIG. 39.

H. Game-like Exercises

Smaller children, as a rule, have but small chance of developing their arm and shoulder muscles. When they come to the gymnasium, therefore, they are not strong enough in the arms and hands to hang safely, much less to do exercises in the hanging position. They must have then, to begin with, many light heaving exercises, so that they can learn to be sure of their grip and feel that they can rely on their arms.

46. Heave Grasp Front Standing, Jumping through the Lowest but One Row of the Square Ladder.—Square ladder which reaches the floor. The children stand one in front of each square in the ladder; they grasp with overgrip the top bar of the lowest square but one, and jump through the square with help of the arms. They turn about and take a similar jump back again. When the exercise has been introduced it can be done as a race a certain number of times.

The exercise can also be done by the pupils in stream (quickly after one another), beginning from one end of the ladder. The child then moves one square to the side after each jump.

If there are two ladders with an equal number of squares, this form of the exercise can also be taken as a race, either between two children at a time or between two teams.

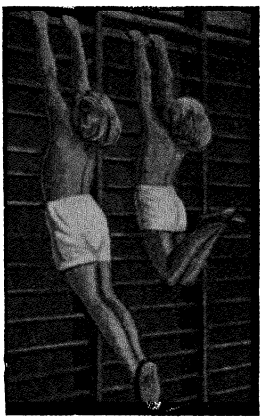


FIG. 40.

A. Hanging leg raising backward.
B. Hanging foot raising backward.

47. Hanging Position.—Wall bars. The children, facing the bars, grasp a bar as high up as they can reach. On the command, *Hang down!* the feet are taken from the floor, and on *Stand!* they are put down again. Gradually, as the children become more sure in hanging by their arms, they take the position higher up in the bars. Hanging position with the back to the bars is practised in the same way.

In these hanging positions leg parting ("cutting with the big scissors") may be done. The movements should be large and taken in fairly slow time; the legs are brought together with a click, imitating the sound made by scissors.

In hanging position facing the wall bars *foot raising backward* may be taken. The heels are raised towards the seat but the knees are kept near the bars (Fig. 40*b*); the head carried well back.

Later *leg raising backward* is taken. The knees, either bent or straight, are carried backward as far as possible (Fig. 40a). The exercise is a fairly strong dorsal exercise.

48. Hanging Position in One Arm.—As the exercise above; here, however, the children let go alternately with left and right hand and bring the arm down to the side.

49. **Fall Hanging Position.**—Beam at low chest level. Grasp with overgrip and run forward quickly to fall hanging and back again to standing position. Command: *To fall hanging—run! Back again—run! Repeat*—1—2.

In the fall hanging position the children can beat the feet against the floor ("beating the drum"). Also alternate knee raising can be done. The same movements can be taken in the bend fall hanging position when the children are strong enough to keep the arms bent. The correct position of shoulders and trunk is more easily kept with bent than with straight arms.

50. **Stride Fall Hanging, Hand Beating on Floor.**—The position is taken as described in 49, but with the feet apart. On a command the hands alternately beat the floor. This causes a marked twisting of the body, which gives considerably greater muscle work, for the body has to be twisted back against its own weight (Fig. 41).

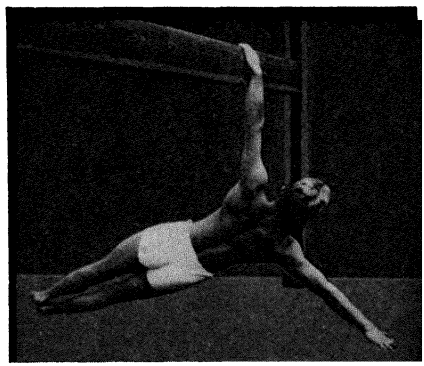


FIG. 41.—Fall hanging, hand beating on floor.

51. **Fall Hanging, Arm Travelling.**—Beam at hip level. In fall hanging position the children travel sideways; the hands and feet are moved in short, quick paces. Strong children are able to do the exercise with bent arms.

52. **Bend Cross Fall Hanging, Arm Travelling.**—Beam at hip level. Bend fall hanging is taken up lengthwise at one end of the beam, chest close to the beam. As the children travel backwards, one after the other, the feet are moved with short steps (Fig. 42*a*) or



A B

FIG. 42.—Bend cross fall hanging, arm travelling.

later, when the arms are strong enough, dragged along the floor (Fig. 42*b*).

53. **High Overgrip Spring Sitting, Knee Stretching.**—Wall bars. The children stand on a low bar grasping a bar at chest level, later lower. From there they take up spring sitting position with the knees well out and the trunk close to the wall bars. They now stretch their knees, pushing as far back as possible and lowering the body while the chest is pressed downward so as to bring the arms and the trunk in line with one another. There should be a strong bending of the hips (see Fig. 12, p. 20). The exercise is repeated a number of times.

54. **Horizontal Travelling.**—Wall bars. The leader steps up on to one of the lowest bars, grasping a bar almost as high up as he can reach, and then travels sideways along the row of wall bars. When there is room the next follows after. The exercise should be repeated to the other side.

To begin with the children move their hands and feet freely but they soon find out that the best way is to move the hand and the foot of the same side simultaneously. The hands should not be moved downward or the feet upward as the best position of the whole body is secured when the hands are grasping at stretch height; this brings the body close to the wall bars and makes the children look up.

The exercise is stronger and requires greater agility if it is performed as follows. Both hands are simultaneously shifted to the neighbouring section of the wall bars; immediately afterwards the feet are swung to the section beyond the one where the hands are grasping. If the hands and feet are moved together in a jump from one section to the next it is called "*monkey jump.*" After a slight knee bending the feet and hands push off in the jump, and this is carried on from section to section. If taken from high overgrip spring sitting position the body is swung from side to side before the jump. This is an enjoyable exercise, and agile pupils can travel sideways in a zigzag line.

Horizontal travelling can also be done with turning about, almost like rotary arm walk in the beam, but with the feet supported. The children begin with undergrip in the wall bars.

55. **Vertical Climbing.**—Wall bars, square ladder. For small children the wall bars are used. On the word *Up!* they climb up and grasp the top bar; on *Down!* they return to their places. After a little practise the descent may be done using

the hands only. The exercise may be taken as a race between two ranks, or the children may play at "Soldiers storming a fort" or "firemen climbing the ladders and hosing the fire." Older children may use the square ladder.

Later the exercise is done with a certain form, so that the left hand and right foot go together, and vice versa; in this case the square ladder is used. The exercise can be done on the sloping (oblique) ladder both on the upper and under side. The pupils can then go up on the upper side and down on the under side, the latter also on the arms alone. This exercise can form part of an obstacle race.

56. **Heave Swing.**—Double ropes. (*a*) *Straight arms.* The children grasp the ropes just under stretch height, move a little backward, and as they run forward set themselves in swing. Every time they are nearest the ground in the swing they touch with the feet to increase the speed and ease the work of the arms. The arms are kept quite stretched during the whole exercise. No landing is taken here, but when the swinging is to be stopped the feet are put against the movement for a couple of swings, and the children let go the ropes when they are vertical.

Later, a landing is performed at the end of a backward swing, the hands sliding down the ropes without letting go. Finally the landing may be taken in a forward swing, the hands letting go the ropes just before the end of the swing while the body is still moving forward.

The grasp may also be taken with the ropes crossed before the swing begins. At the end of the forward swing the body is turned about so that the ropes are uncrossed. A landing may then be taken, or the swinging may be continued with alternate crossings and uncrossing of the ropes. The turnings should be done to the left and right alternately.

(*b*) *Bent arms.* The children grasp the ropes slightly above shoulder level, move back till their arms are straight, and as they run forward they set themselves swinging. As the feet push off in the last step, the body is raised to bend hanging position with the hands well out to the sides of the shoulders. Every time they are able to touch the floor with their feet they take a couple of running steps so as to give the arms a rest and to increase the speed. The landing is taken first in a backward, later in a forward swing.

Heave swing can also be done with the pupils starting in

standing position on an apparatus such as box, horse, beam, etc. The arms are now kept bent throughout the swing forward and backward and the swing is adjusted so that the child returns to the standing position on the apparatus. In order to make the swing sufficiently large, the child must lean somewhat backward in the starting position and in the push off jump slightly backward before the forward swing.

The best apparatus for this heave swing is the beam if its distance from the ropes is suitable, Here many are able to work at the same time, and greater agility is needed to regain the starting position after each swing. The beam is first put at knee level but may later be put as high as chest level. In order to mount the beam at the high level the child stands behind the beam grasping the ropes and placing one foot against the beam ; it then mounts by doing arm travelling upwards in the ropes.

§ 2. Balance Exercises

Balance exercises are exercises in which the base of support is lessened and the balance is thus made more difficult.

The higher the centre of gravity lies above the apparatus, the more difficult it is to keep the balance. Toe standing position is much more difficult than spring sitting. Balance walk with the arms in ear or stretch position is more difficult than if taken with the arms in wing position or hanging freely by the sides. It must be remembered that here the base is immobile. If the base is mobile the opposite holds good. It is easier to balance a long stick on one finger than a short one. It is also the sideways movements of the rope which makes it easier for the tight rope walker to keep the balance. On a shaky beam, however, the case is different. Here the vibrations are so quick that the balance is made difficult.

Some balance exercises have a quite fixed form, others not, as in them freedom must be given to make the necessary counter-movements when the balance is being lost. The former, as a rule, are taken without apparatus, and done as free standing exercises on command and by all at once. The latter are done on apparatus usually, and are done without command and by one pupil at a time.

In the easy forms of balance exercises a number of muscles work in small, quickly changing, light movements. Through

them the body therefore gets a comfortable, mild movement distributed over the whole, which makes them good depleting exercises.

In the harder forms of balance exercises the strong contraction of certain muscle groups gives all the muscles a tendency to contract, which will hamper the breathing (see Vol. I, p. 86) and thus cause breathlessness. This tendency must be overcome, and the effort in that direction gives valuable help to the training of localising muscular work.

Balance exercises are pronounced co-ordination exercises (see Vol. I, p. 7), and thus help to train general agility and mastery over the body.

The work of the muscles round the hip joint will gradually be well co-ordinated; consequently balance exercises are also of importance as regards free and easy walking.

The lack of co-ordination in beginners manifests itself by big counter-movements. The more a balance exercise is practised, the smaller do the counter-movements become; in the fully trained they are so small as to be quite imperceptible; but that there are counter-movements may be seen by the play of the muscles at the ankle.

These exercises also put a certain claim on the will, as it depends on this, to a certain extent, whether one keeps the balance or yields to the tendency to lose it.

Balance exercises on apparatus are in general the most valuable, and they should be used more than they are used at present.

As many of these exercises take up a great deal of time for each gymnast, not more than four or five should be placed at each beam. The gymnasium must therefore be well equipped with beams if these exercises are to be used as much as they deserve. If there are not sufficient beams the exercises may be taken by one squad while other squads are working with jumping, vaulting, or heaving exercises, etc. But this, of course, means less exercise for the pupils at each apparatus.

The teacher should not neglect to make the exercises more difficult by increasing the height of the beam above the floor; the exercise becomes more attractive in this way.

The exercises here included as balance exercises proper are all performed on the feet. Balance exercises may also be performed on the hands, take, for example, hand standing position and walking on hands; but although the balance difficulty in

these exercises is great, they are classed as agility exercises. The reasons are partly that balance exercises on the feet are much more important to us in daily life than those performed on the hands, and partly that balance exercises and agility exercises are closely related in so far as both groups first and foremost develop a good co-ordination.

Many other exercises might, to a certain extent, be considered balance exercises; take, for example, heel raisings, knee bendings, lungings; marching exercises such as kick march, marching with after step, swing march, about turning during marching; dancing steps, and, above all, landings. A more difficult balance exercise than landings in the gymnasium is hardly found. When a steady and easy landing gives a pleasing effect the reason is first and foremost that it shows that all difficulty in keeping the balance has been overcome.

Ski-ing and skating are excellent balance exercises; and so is dancing; and dancing as an art with spiritual content (the ballet) depends to a great extent on the complete mastery of the balance.

It is worth notice that in dancing and in skating women may compete successfully with men as regards bodily control and beauty of movement (not as regards strength and staying power). This indicates that balance exercises adapt themselves particularly well to women's physical and psychical nature. It is therefore with good reason that special stress is laid on these exercises in gymnastics for women; they form the climax in their gymnastics just as jumping, vaulting and agility exercises do in gymnastics for men.

A. Knee Raisings

These exercises, as a rule, are done on the floor, but can also be done on a form or stool, which makes them harder.

1. **Wing (Yard, Ear, Stretch) Standing, Knee Raising [Wing (Yard, Ear, Stretch) Crook Standing Position].**—*Hands on hips—place! Left knee—raise!* While the hips are moved slightly over to the right the left knee is raised until the thigh is quite horizontal. The lower leg hangs down vertically, the ankle is stretched. At the same time the standing leg and the body are stretched to counteract the inclination to bend the knee and to round the back (Fig. 43).

Knee—lower ! Hands—down! On *lower !* the foot is put on the ground with the toes down first.

After some practice the feet may be changed quickly, first without, later with a hop.

While in crook standing position, instead of keeping the arms in a definite position, arm movements such as raisings, lowerings, and stretchings may be performed.

High crook standing position should be practised when ordinary crook standing position has been learnt. The knee is then raised as high as possible while the supporting leg is kept straight. The balance difficulty is now increased.

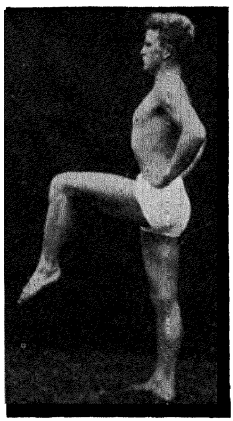


FIG. 43.—Wing standing, knee raising.

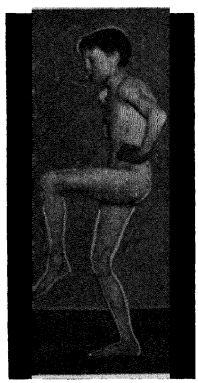


FIG. 44.—Faults (a) and (e).

Common Faults.—(*a*) The top of the trunk is bent over with round back, while the loin is pushed out; the head falls forward (Fig. 44).

(*b*) The body is inclined backward to counterbalance the raised knee, and inclined to the side.

(*c*) The knee is not raised high enough.

(*d*) The leg does not hang vertically; the toes point inward.

(*e*) The standing leg is bent (Fig. 44).

Introduction.—To begin with, the exercise should be taken with one or both hands supported on the wall bars, beam, wall, or neighbour; it is then called support side standing, knee raising. The command is, *Left side towards, to the wall bars (beam, wall)—run ! Right hand on hip, left at hip height—grasp ! Left knee—raise !* and so on. If the support is to be on a

neighbour, twos take a step backward from front arrangement, and on the command *Hands—support !* they place their hands on the shoulders of the ones in front of them. When the twos have taken the exercise, all turn about and the ones support on the twos.

The exercise should also be done from the toe standing position, which gives a stronger stretching to the body ; in that case support must always be used.

In order to induce the children to lift the knee high up, one may allow them to clasp the raised leg with both hands and to pull it up as high as possible keeping the supporting leg and the back straight. From this position leg lowering may be taken by numbers (*down and up—now !*) and later in time. The leg is lowered and raised quickly, the toes touching the floor and rebounding like a ball. After each movement there is a short pause in crook position so that the child may learn to keep the balance. This should also be remembered when the exercise is taken in time.

2. Wing Standing, Knee Raising in Marching Time.—*Hands on hips—place ! With knee raising, on the spot—march ! Ready—Halt !* Performed as described in 1, but in a certain rhythm, at first rather slow, later quicker, gradually increasing to the time of ordinary marching. The exercise begins and ends as Marching with Knee Raising.

3. Toe Standing, Knee Raising in Running Time with and without an Intermediate Hop.—*With knee raising, running on the spot—go ! Ready—halt !* The exercise is performed as described in 2, but in the time of a slow run and on the toes. An intermediate hop on the standing foot makes the exercise easier. Beginners take the exercise with the hands free, more advanced pupils with hands on hips.

The Importance of the Exercise.—The exercises in 2 and 3 are especially effective in training the hip and knee joints in quick and strong bending and stretching ; therefore, they are good preparatory exercises for marching and for high jump.

Introduction.—The exercises in 2 and 3 are introduced with support exactly as 1.

Common Faults for 2 and 3.—As given in 1 ; in addition :

(*a*) The body rocks from one side to the other.

(*b*) The knees are not fully stretched, and the heels are not brought to the standing or toe-standing position when the foot is put on the floor.

(*c*) In 2 the foot comes down heavily, because the toes are not put down before the heels.

4. **Wing (Yard, Ear, Stretch) Crook Standing, Knee Stretching Backward [Wing (Yard, Ear, Stretch) Run Standing Position].**—*Hands on hips—place ! Left knee—raise ! (Knee) backward—stretch !* While the knee is slowly stretched, the leg is moved so far backward that the tips of the toes are about an inch or two from the floor. This movement is counterbalanced by the body being inclined forward from the ankle of the standing foot, not in the hip-joint; in this way the back gets a strong overstretching, and the head is pressed a little farther back than in the erect position (Fig. 45). The aim



FIG. 45. — Ear crook standing, knee stretching backward.

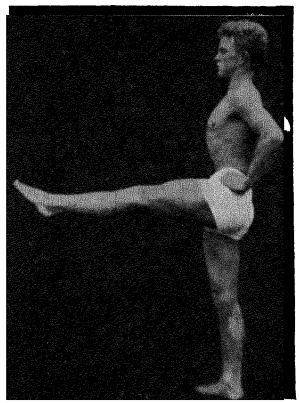


FIG. 46.—Wing crook standing, knee stretching forward.

must not be to lift the leg as high as possible behind, as this makes a further and unavoidable hollowing of the loin.

Knee—raise ! The knee is moved slowly back to the crook standing position. *Knee-lower !*

Introduction.—The exercise is introduced with support exactly as in 1. Toe support in run standing position may be used with beginners.

Common Faults.—As given in 1 ; in addition, while the knee is stretched backward, the body is inclined forward by a leaning from the hip-joints, or it sinks down by the loin being hollowed together with a falling forward of the head.

5. **Wing Crook Standing, Knee Stretching Forward (Wing Ankle Standing Position).**—*Hands on hips—place ! Left knee—raise ! (Knee) forward—stretch !* The raised knee is moved inward and at the same time stretched slowly straight forward. The ankle is stretched, the foot turned slightly outward, the knee as far as possible at the same height as before the stretching, the standing leg quite straight, and the back straight (Fig. 46).

The correct position of leg and trunk is difficult owing to the hamstrings ; they are strongly extended and will either prevent the knee from being raised high enough, or they will tilt the pelvis so that its inclination will be diminished, the loin pushed out, and the back rounded.

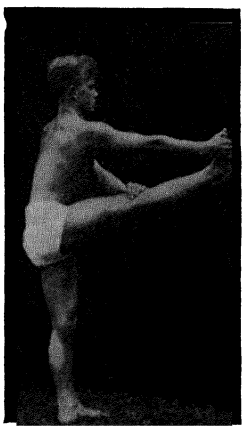


FIG. 47

During a stretching of the left knee one may grasp the foot with the left hand, and with the right push down the knee so as to stretch it without any lowering of the leg ; it may even be raised slightly past the horizontal position as shown in Fig. 47.

Introduction.—The exercise can be introduced with support exactly as in 1.

Common Faults.—As given in 1 ; in addition :

(*a*) The knee is lowered too much in the stretching and not fully stretched.

(*b*) The toes turn inward.

B. Leg Raisings

These exercises, as a rule, are done on the floor, but can also be done on a form or stool, which makes them harder.

6. **Wing Standing, Leg Raising Sideways.**—*Hands on hips—place ! Left leg sideways—raise!* The left leg is raised slowly as high as possible, straight out to the side, with the ankle stretched. The toes must neither be turned upward nor downward. The hips are moved so far to the right that the trunk can be held almost perpendicular.

Leg—lower ! Hands—down ! The foot is lowered slowly to the starting position.

Introduction.—The exercise can be introduced with support for one hand ; refer to 1.

Common Faults.—(*a*) The leg is not raised high enough and it is turned so that the toes point upward, by which the movement will be partly an abduction and partly a flexion of the hip.

(*b*) The body is inclined to one side.

7. **Wing (Yard) Standing, Quick Leg Raising Sideways in One Movement.**—*Alternate quick leg raising sideways in one movement*—1—2. On 1 the left leg is raised quickly sideways as high up as possible, and then lowered again without a stop ; on 2 the right. Arm raising sideways and lowering in one movement can be taken with the leg raising.

8. **Wing Standing, Leg Raising Backward (Wing Run Standing Position).**—*Hands on hips—place ! Left leg backward—raise !* Left leg is moved slowly backward to the same position as given in 4 (Fig. 45).

Leg—lower ! Hands—down ! The foot is lowered slowly to the starting position.

Common Faults.—As given in 4.

9. **Wing Standing, Leg Raising Forward (Wing Angle Standing Position).**—*Hands on hips—place ! Left leg forward—raise!* The left leg is raised slowly forward to the position described in 5 (Fig. 46).

Leg—lower ! Hands—down ! The foot is lowered slowly to the starting position.

10. **Reach Standing, Leg Swinging Forward.**—*Arms forward—raise ! Alternate leg swinging forward, Left*—1. *Right*—2. The leg is swung powerfully forward-upward so as to reach the hand without any lowering of the arm and without any bending of the supporting leg. Instead of doing alternate leg swinging, several leg swingings with the left leg may be performed in succession before changing to the right. In the downward swing the leg is now swung backward to the run standing position with toe support, partly to make the balance easier and partly to increase the speed of the swing. The exercise is done freely a number of times. The exercise produces suppleness of the hip joint by the marked extension of the hamstrings and the lower part of the adductor magnus. This effect is increased when the exercise is done with support and when the leg is swung as far forward-upward as possible Standing with one side towards the wall bars and the near hand

grasping a bar, one may try to kick upward to the level of a bar at the greatest possible height.

11. **Standing, Leg Swinging Forward and Sideways with Arm Swinging Forward and Sideways.** The leg is swung rhythmically forward and in a curve downward-sideways with corresponding arm movements; the movements carried out continuously a certain number of times without pauses in the final positions.

C. Knee Bendings

12. **Reach Kick Standing, Full Knee Bending.**—(*For single knee bending*) *right leg and arms forward—raise!* The leg is raised forward with the foot a hand-breadth from the floor, and the arms are raised to reach position.

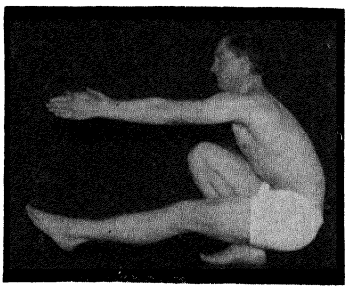


FIG. 48.—Reach kick standing, full knee bending.

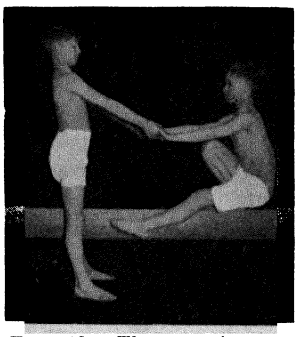


FIG. 49.—The exercise performed with ring grasp.

Left knee full—bend. The body is lowered as far as possible by a deep knee bending in the left knee without the heel being lifted. The pupils must try to keep the trunk about vertical, which makes the exercise very strong; to do this the ankle-joint of the standing leg must be strongly bent (Fig. 48).

(*Knee*)*—stretch! With arm lowering, feet—change!* and so on.

Introduction.—The exercise is introduced with support for both hands on a beam, which is at first somewhat over hip height, later somewhat under; the pupils are arranged half a step from the beam.

As the beam gives a firm support, one should not neglect to practise leg changing in the half spring sitting position. On the

command *Change !* the supporting foot pushes off strongly and the relative position of the legs is changed. The exercise may be taken in "individual rhythm."

Living support can also be used in the introduction, and for this the exercise can be taken either on a form, a stool, a low beam, or the floor.

In the first cases support with ring grasp is used ; the exercise is easier here than on the floor, as the free leg can be lowered ; thus the loin is less rounded, so that the centre of gravity can be kept farther forward (Fig. 49).

In the last case support with chain grasp can also be used. The pupils stand in open order in front arrangement, ones facing the spaces between twos, and such a distance from each other that they can grasp each other's hands. The teacher commands: *Right foot forward, hands —grasp !* All put the right foot forward and grasp a hand of each of their original neighbours, so that a long chain is formed. *Ones (with raising of right leg) left knee full—bend ! Knee —stretch !* When the knee is stretched the right foot is put on the floor again. *Twos (with raising of right leg) left knee full—bend ! Knee—stretch ! Foot changing— 1—2. Ones (with raising of left leg) right knee full—bend !* and so on. Finally, *Stand—erect !*

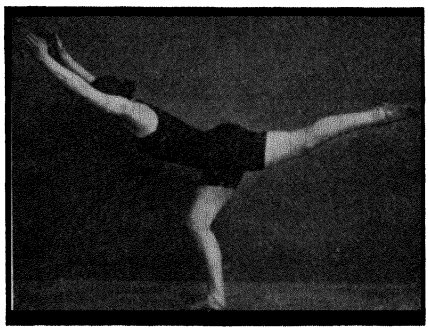


FIG. 50.* Stretch run standing, knee bending with trunk leaning forward.

After sufficient practise ones and twos can do the knee bending at the same time on the command, *(With raising of right leg) left knee full—bend !* and so on (see Vol. I, Fig. 56). Trained pupils may do the leg changing similar to the one with support on the beam.

13. Wing (Yard, Stretch) Run Standing, Knee Bending with Trunk Leaning Forward (Wing Horizontal Standing Position).—*Hands on hips—place ! Right leg backward—raise ! With trunk leaning forward, left knee—bend !* While the knee is

* The picture published by kind permission of the G.C.I., Stockholm.

bent, if possible, until it forms a right angle, the body and rear leg are moved until they are about horizontal. The head must be somewhat raised, and the back strongly straightened so that it forms an even arch with the leg in continuation of it (Fig. 50).

With trunk raising (knee)—stretch ! The knee is stretched and the body is raised to the run standing position. *Feet—change !* (—1—2). Finally : *With leg lowering, hands—down !*

The toe support front lunge standing position may be taken up after a series of rhythmical knee raisings and knee stretchings backward, together with arm swingings in a curve forward-downward-sideways. In connection with the final knee stretching backward the supporting leg is bent, the trunk leans forward, the free leg is moved backward to toe support, and the arms stop in yard position. The leg raising is then taken.

Horizontal standing position is a plastic position which is used much because of its beauty and the control and strength gained by it. The difficulty of it may be increased in various ways.

It may be taken up after walking a few steps, e.g., on the left foot after three paces, on the right foot after four paces.

The steps may be done as running steps ; the last step is then taken as a jump during which the position is taken up. The jump may be done with a turning about so that the pupils come to face the opposite way.

In horizontal position turning about may be performed on the supporting foot. The raised leg is swung forward past the supporting leg, the turning about is done quickly on the ball of the supporting foot, and the horizontal position is taken up with the pupils facing the opposite way.

Introduction.—With the hands supported on stool, form, beam, etc., the toe support front lunge standing is taken up. On the command *Leg—raise !* the rear leg is raised ; care should be taken that the leg is straight and raised sufficiently and that the supporting knee is not bent too much. The hands now let go the support and are moved to wing, yard, or stretch position.

The hands may also take support on the floor by a slight forward bending of the trunk in front lunge position. The trunk is stretched as the rear leg is raised.

Common Faults.—(*a*) The loin is pushed out instead of being hollowed.

(*b*) The standing leg is bent too little.

(*c*) The raised leg hangs too low and is not stretched enough.

14. **Standing, Side Leaning with Leg Raising and Single Arm Raising Sideways-Upward and Single Hand Placing on Hip (Half Stretch, Half Wing Side Lean Standing Position).**—*With arm raising sideways-upward and hand on hip, side leaning to the left*—1. *Raising*—2. On 1 the trunk leans to the left during abduction in the left hip-joint and excentric action of the adductor muscles. The right hip-joint is kept immobile by the abductors so that the right leg moves with the trunk during the leaning and is kept in line with it the whole time. The right arm is moved sideways-upward and the left hand is placed on the hip so slowly that the arms and the trunk reach their final positions simultaneously (Fig. 51). On

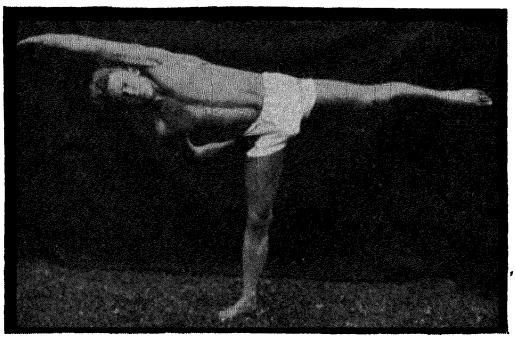


FIG. 51.—Side leaning with leg raising.

2 the trunk is raised slowly while the arms are lowered slowly to the erect standing position.

The exercise may also be done with the arms in stretch position. It is then more difficult.

When the difficulty of keeping the balance is sufficiently overcome, the body may be moved from side lean standing to horizontal standing position *either* by a slow turning of 90 degrees on the supporting leg, which is well bent, but otherwise kept stationary, and rotating the body so that the chest faces downward, *or* by a quick turning of the supporting foot, a bending of the knee, and a rotation of the body.

Importance of the Exercise and Introduction.—Side leaning is one of the most difficult balance exercises. It is valuable as the work of the adductors and the abductors at the hip is more

difficult as regards co-ordination in this than in other balance exercises. In horizontal standing position the hardest work is done by the extensors of the hips, but they are strong and well trained in keeping the body balanced.

Side lean standing position is best introduced from stride standing position. From this position side leaning with leg raising sideways from side to side is taken in "individual rhythm." One leans over as far as one is able without losing the balance, as practice is gained, slower and slower and with a pause each time in the side lean standing position. Stride standing position as a starting position is much easier than standing position.

D. Balance Exercises on Apparatus

The apparatus for these exercises—beam, upturned form—must at first be low ; as the pupils become more sure it can be put higher and higher.

If any pupil feels unsafe or is nervous about an exercise, either the teacher or another pupil should remain by his side to give him the needful support.

If the balance is being lost during an exercise performed lengthwise to the apparatus, one foot is taken off, and the pupil tries, with even, regulated movements sideways of the free leg and arms, and with small side bendings of the trunk, to regain the balance. If this is not successful, a deep jump sideways is taken if the apparatus is low ; if it is high, the knees are quickly bent, the hands take hold of the apparatus, and a deep jump or hanging position is taken. During an exercise done facing across the apparatus, effort is made to keep the balance by bending the knees and by making small movements forward or backward with the arms and body. If the balance is lost, a landing is taken forward (or backward). This landing should be introduced specially by itself.

The exercises are generally done on the flat edge of the beam ; when sufficient skill has been attained they should also be practised on the rounded edge, especially balance walk forward ; the beam should, however, not be above knee level in the latter case.

The upper beam may be put at such a distance from the lower one that the children can reach it and take support on it if they are losing their balance. This device, however, must not be over-done.

(a) Standing Balance Exercises on Apparatus

15. **Side Standing, Mounting (to Balance Standing).**—Beam under (later at) knee level. If the children are standing with the left side to the beam, they put the left foot upon it, and take standing position on one leg. To dismount, the children can either step slowly down to the floor on the right foot, or put the right foot on the beam in front of the left and step down with the left foot on the opposite side of the beam. In the latter case the children at once have the necessary arrangement for mounting the beam again.

Dismounting from the beam can also be done by a deep jump forward after a turn (right or left) on the beam.

16. **Front Standing, Mounting with a Run.**—Beam under (later somewhat over) knee height. The children take a short run and jump up on the beam ; they must be able to get the balance on the left foot as well as on the right, and therefore must be trained to take off with left and right foot. The take-off must not be closer to the beam, than that the leg which is put up first can be held practically straight (jump up, not step up !). In the upspring a turn is taken to the right if the left foot is put on the beam, and vice versa. In the balance position the non-supporting leg is kept to the side.

17. **Balance Hanging, Mounting.**—Beam at first at hip level, later higher. From balance hanging position the right leg is moved sideways and put on the beam (Fig. 52), the other leg is drawn up, and while the foot is put on the beam close up to the hands the body is raised up to the balance standing position (Fig. 53).

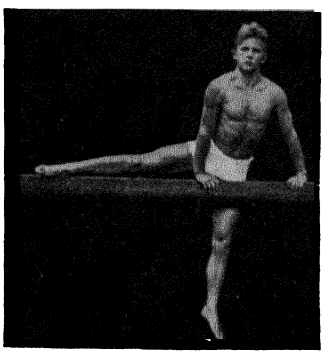


FIG. 52.—Balance hanging, mounting.

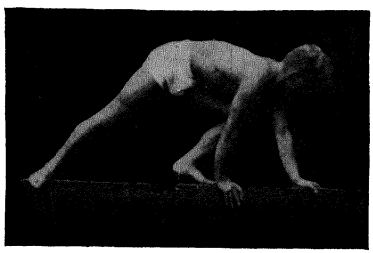
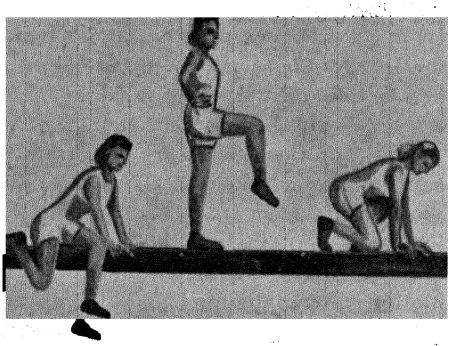


FIG. 53.

Dismounting is taken by a deep jump sideways or forward, or when the beam is high by the knees being bent and one hand grasping the apparatus for the landing.

Introduction.—The beam is at first put so low that the pupils can stand on the floor with one leg while the other is put upon the beam.

18. **Side Sitting, Mounting.**—Beam at low hip level; later higher. From side sitting position on the left leg, the right instep is placed on the beam ; the hands grasp the beam close together and just in front of the left knee (Fig. 54a). As the body is lifted the left foot is placed on the beam close to the hands (Fig. 54c), the body is raised, and balance standing position on one foot is taken up (Fig. 54b).



A B C

FIG. 54.—Side sitting, mounting.

19. **Ride Sitting, Mounting.**—Beam a little below hip level so that the children in the ride position can touch the floor with their feet ; later higher.

In the ride sitting position with the hands grasping the beam close to the body, the one foot is raised backward and the instep is placed across the beam ; as the body is raised the other foot is put on the beam close to the hands, and balance standing position on one foot is taken up. In the dismounting the knees are bent so that one or both hands may take support on the beam.

Trained pupils can with a swing of the legs—first forwards, then forcibly backwards—place both feet on the beam simultaneously while the weight of the body is shifted on to the hands. The body is then raised to balance standing position.

When the pupils have become used to the balance standing position on the beam, all the exercises described under 1 and 4-9 may be done on this apparatus, first at a low level and gradually at a higher level.

(b) Balance Walk on Apparatus

20. **Balance Walk Forward.**—The exercise is done as ordinary walking with short steps, though the toes must touch the beam, or form, first. The feet are turned very slightly outward, the head held well up, the eyes looking straight forward, preferably at a fixed point. The knees must not be kept stiff, but fairly springy.

The arm positions are of importance in balance walk. The easiest position is the one with the arms hanging free and easy by the sides because they are then ready for counter-movements. It is therefore used to begin with. The exercise is more difficult when the arms are fixed in a more definite position. In this case the necessary counter-movements must be provided by small displacements of larger parts of the body, particularly the trunk moving freely in all directions in the lumbar spine. Such movements may easily become so large that the balance is lost; consequently they should be adjusted very minutely; but it is just in that way that the sense of balance is developed. One should therefore not eschew the fixed arm positions out of a fear that they might make the trunk stiff and tense. We use them in such free standing exercises as are carried out according to a definite form, and in that way we learn to keep the balance without any counter-movements of the arms. When exercises of this kind are mastered, there is good reason to carry them out on apparatus or during walking. Greater control of the body and better co-ordination are gained in this way.

The *fixed* arm positions are the more difficult the higher the arms are raised, i.e., the higher the centre of gravity is moved upwards. The order of these positions as regards difficulty is therefore: wing, yard, ear, and stretch position. Yard position, however, might be said to stand by itself as in this position the arms are easily moved in the way the tight rope walker uses his balance pole.

Balance walk forward can be made more difficult in various ways: Some object, e.g., a gym. shoe, a ribbon, a peg, may be placed across the middle of the apparatus. One pupil picks it

up, the next replaces it. If the beam is low the object may be placed on the floor.

One can also put an obstacle across the apparatus and make the pupils pass over or under it. They may step over a vaulting horse saddle, a beam saddle, a fellow pupil sitting astride, a rope resting on jumping stands, etc.; or the rope may be placed at such a height that by stooping the pupils may crawl under it.

Playing with a ball during balance walk can be taken too.

Common Faults.—(*a*) The head falls forward, and the back is rounded.

(*b*) The walk is hurried instead of being stopped when the balance begins to be lost.

(*c*) The counter-movements are too great and violent.

21. **Balance Walk Backward.**—The exercise is done like walking backward, but on the whole foot. At each new step one feels the way with the foot before putting it down, in order to be sure that it is put properly on the apparatus and does not glide off. As there is no temptation here to look where the foot is put, it is easier than in ordinary balance walk to keep a good carriage with the head up and the eyes fixed on a certain point in front. The arms as in 20.

Balance walk backward and forward may also be done in couples, the children facing each other, grasping each others hands, one walking backward, the other forward.

22. **Balance Walk with About Turning.**—During ordinary balance walk about turning is taken to the side of the rear foot, as described in ordinary marching. To begin with, the turning must be taken slowly, gradually more quickly. After the turning the pupils can continue with ordinary balance walk or dismount. The arms as in 20.

Introduction.—About-turning on the beam is first practised on the floor, where all can take part together. The one foot is put a short step forward exactly in front of the other, so that both heels, for instance, are on the same crack in the floor. The feet must not be moved from this line in the turning. During the turning the feet must not be lifted from the floor.

23. **Balance Walk Forward with Kneeling.**—After each step the pupils go down to half-kneeling position (Fig. 55). Long steps are necessary for this; as the balance is made more difficult by this long step, the last part of the step is taken—as a support to the balance—in such a way that the foot glides

easily along the apparatus (about as in kick march), while the rear knee is bent. While rising from the position the forward knee is fully stretched and the rear foot is held somewhat backward (as in run standing position) before it is moved forward for a new step. The arms are in yard or wing position.

In the half kneeling position trunk twisting may be performed to either side. The twisting should be carried out till the shoulder line runs parallel to the beam. Yard position is the most suitable position of the arms.

24. **Balance Walk Forward with Knee Raising (and Knee Stretching Backward and Forward).**—At each step a knee raising (and knee stretching backward and forward) is taken as described in 1, 4, and 5. The arms may be kept by the sides or in yard, wing, and stretch position, or arm movements may be done together with the leg movements. Examples of these latter are: Knee raising with arm raising sideways, and knee stretching backward with arm raising upward; the arms lowered sideways-downward as the foot is put forward in a new step. Knee raising with arm bending, and knee stretching backward with arm stretching upward; the arms lowered sideways-downward as the foot is put forward in a new step. Knee raising with arm raising forward, knee stretching backward with arm parting sideways, trunk leaning forward with knee bending (to horizontal standing position) and arm raising upward, raising of the body to run standing position with arm lowering forward-downward.

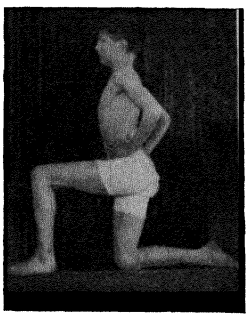


FIG. 55.—Half-kneeling position.

25. **Balance Walk with Single Full Knee Bending.**—The knee bending is taken at each step and performed as described in 12.

The exercise is taken from yard run standing position. While the standing leg is bent the free leg is brought forward to kick position; at the same time the arms are moved from yard to reach position. During the knee stretching the leg is moved backward to run standing and the arms back to yard position. The turning of the palms which must take place when the arms go from yard to reach position, and from there back to yard

position again, must take place just before the arm movement begins (see Figs. 48 and 49).

26. **Half Spring Sitting, Balance Walk (Caterpillar Walk).**—From half spring sitting position the free leg is stretched forward and the foot placed on the beam. The body is then shifted forward over the front leg during a bending of this and a stretching of the rear leg. This exercise demands a certain amount of strength, but the balance is easy as the centre of gravity is lowered considerably. The exercise reminds one of the movements of a caterpillar.

27. **Balance Walk Sideways.**—The feet are placed across the beam and the pupils do ordinary walking sideways with short steps. This form is difficult because the base is reduced from front to back. The counter-movements are here performed in a forward and backward direction, whereas in ordinary balance walk they are done from side to side. The counter-movements should be done by the arms, which are carried somewhat forward or hanging loosely by the sides. Beginners must lean slightly forward. During the balance walk full knee bendings may be taken when the feet are together; this makes it easier to keep the balance.

After some practice, various movements may be added :—

Turning about on every other step. One may count 1—2—3; 1 as the left foot is moved, 2 as the right foot is brought up to the left; on 3 the left foot is again moved and a turning about on the ball of this foot is performed as in turning about on the floor in marching sideways. The rhythm is as in slow step changing march.

Crossing the legs. By balance walk sideways to the left, right foot is carried past the left foot either in front or behind.

Crossing the legs and turning about. When the right leg is in cross position in front of the left the turning about is done to the left on the balls of both feet, after which the left leg is crossed in front of the right and the turning is done to the right, and so on.

Muscle Work (Fig. 56).—In balance exercises when one stands on one leg a number of balancing movements occur, mainly in the following joints :

1. *Joints of the Foot.*—Movements sideways will take place here; they are prevented and hampered by the muscles whose tendons pass over both sides of the ankles. There can be movements also forward and backward in these joints (bending

and stretching), but here, as in the erect position and other positions where the feet are together, the line of gravity will fall so far forward that the *calf muscles* have the main work of holding the body, though under the steady controlling action of their antagonistic muscles on the front of the leg. The reason

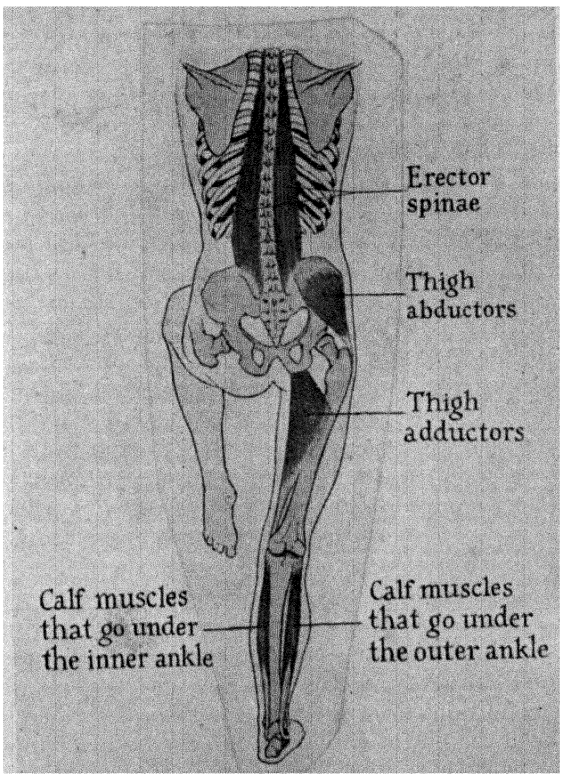


FIG. 56.

that the line of gravity is moved forward is that if it fell through the ankle-joint there would be but a small movement necessary before the body fell backward ; on the other hand, there is a fair space from the forward border of the base of support to the centre of the ankle-joint.

2. *Knee-joint.*—Here no side movements can take place, but this joint helps to keep the balance by small bendings; it is easier to keep the balance on a slightly bent knee than on a stiff, stretched knee. In the movements of the knee in the slightly bent position the *quadriceps extensor* works.

3. *Hip-joint.*—In the ordinary standing position on both fect the trunk rests over a base line, the line joining the hip-joints; here, in the position on one foot, it rests over a point, the head of the femur. This gives no special changes from front to back; in this plane, the trunk, as usual, is mainly kept up by the *extensors of the hip.* On the other hand, it means increased work from side to side and obliquely, which work is done by the group of muscles lying about the hip-joint. In addition to this, by movements in the hip-joints one can help to balance the body over the foot. As the base of support for the foot is so large from front to back, no great help is required of the hip muscles in that direction, but much help *is* needed from side to side, where the base of support is narrow, and therefore the *abductors and adductors*, with quick alternating contractions, must keep the vacillating line of gravity over the base of support. The conditions are entirely changed if one stands crosswise on a beam with both feet upon it; there is then no difficulty in keeping the balance from side to side; but now, though the conditions over the line through the hips are as in the ordinary standing position, the *flexors and extensors of the hip* must work in quick, intermittent contractions to keep the body in balance over the base of support of the feet, which is now short from back to front.

4. *The Joints in the Spine.*—With regard to these, especially the joints in the flexible lumbar curve (on which the upper part of the trunk can sway, as the whole trunk can sway over the hips), the conditions answer exactly to those described in 3. In order to keep the line of gravity within the base of support, the muscles of both sides must work in steady alternation. If, on the other hand, one stands crosswise on a beam on the balls of both feet, it will be mainly the abdominal muscles and back muscles which must help to keep the balance.

5. *Shoulder-joints.*—The arms make quick movements to and from the sides or forward-backward to act as balance poles in keeping the balance.

Of the muscle work in standing, knee raising, we must further remark that in raising the knee (mainly by *ilio-psoas*) there is a

tendency to tilt the pelvis, so that its inclination is lessened. Above, this leads to the loin being pushed out and the back rounded; and below, because of the *ilio-femoral ligament*, to the knee of the standing leg being bent. These faults especially appear when the raised knee is stretched, as the *hamstrings* then pull so strongly that by their pull on the tuberosity of the ischium on the side of the raised leg they further tilt the pelvis.

E. Game-like Exercises

28. **Standing on One Leg.**—On a given signal one foot is raised; no notice is taken of how this is done or of which foot is raised. In order to keep the children in the position for a short while one of the following devices may be adopted :—

(*a*) Counting aloud to 10, 15, and so on before changing the feet.

(*b*) Running on the spot with heel swinging backward-upward (Vol. I, p. 163), stopping alternately on the right and the left foot on the word *Stop !* or after counting up to 7, 8, or so.

(*c*) Raising one foot backward-upward and grasping it with the hand of the same or the opposite side.

(*d*) Lifting the foot up in front and by an outward rotation in the hip-joint placing it in both hands held level with the pelvis; the trunk kept upright.



FIG. 57.

(*e*) Lifting the knee and clasping it with both hands. After some practice the children may "say good morning to the knee" by raising it and bending the head forward till the forehead touches the knee (Fig. 57).

In *c*, *d* and *e* the changing of the feet may be done either slowly, or quickly with a hop.

(*f*) Standing on one foot and with the knee raised the children may imitate the cobbler: beat the knee a number of times with one hand as with a hammer; sew a few shoemaker stitches moving both arms to yard position, then changing the feet.

(*g*) Standing on one foot with the other lifted backward-upward, the children try to touch the supporting foot without losing the balance.

(*h*) Standing on one foot with the hands clasped they do "threading the needle."

(*i*) Standing on one foot they can take a shoe off, hold it up above their heads and put it on again without touching the floor with the raised foot. May be taken as a race.

(*j*) All the exercises mentioned under *a*—*i* may also be done by the children standing on stools or forms; in that case, however, the feet changing should not be done with a hop.

If the foot is raised up behind, after some practice, it can be grasped with the hand on the same or the opposite side; the latter is the harder. Foot changing can be done slowly or quickly.

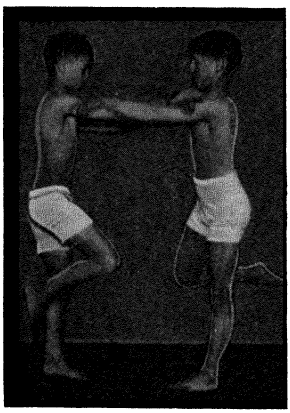


FIG. 58.—Hop fight.



FIG. 59.—"Greeting the big toe."

29. **Hopping on the Spot.**—Position as in 28. The hopping can be done on the spot without or with a turning during the hopping.

30. **Hopping from Wall to Wall.**—Position as in 29, the children arranged in ranks along opposite walls. They may hop to the middle of the floor, meet, turn round, and hop back again; or the ranks may pass through one another to the opposite wall, change feet, and hop back again. The hopping may also be done sideways.

It is a powerful exercise, developing strength of the leg muscles and good co-ordination. The muscles round the hip-joint, those between pelvis and thigh bone, benefit in particular; and as strength and good control of these muscles are of

importance as regards marching, running, jumping and numerous movements in daily life, hopping exercises should be used greatly for little children. Hopping forms part of many of their own open air games but here often done one-sidedly.

31. **Hop Fight (Cock Fight).**—The children stand on one leg and grasp each other's shoulders in couples ; each then, while hopping, tries by using his arms to make his opponent put the raised foot on the ground (Fig. 58). They can also fold their arms and hop toward each other, and try to do the same by sudden pushes. This last form (cock fight) can be taken with the children standing in a ring drawn on the floor ; they then try to push each other out. There can be two or more in each ring. ("King of the Ring.")

32. **"Greeting the Big Toe" ("Toe to Head").**—The children raise one foot, grasp it with both hands, and move it up to their forehead. Changing of feet (Fig. 59).

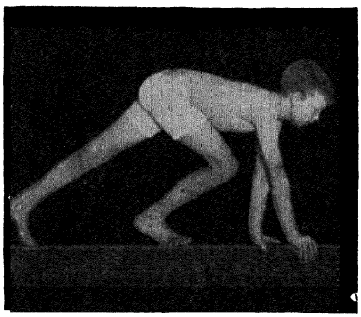


FIG. 60.—Balance walk on all fours.

33. **One Hand Wrestling.** —The children stand in couples, left side towards one another, left hand clasping partner's left hand with thumb grip. Right foot is placed sideways in lunge position, the outer edge of the left foot against the partner's. By pulling, pushing, giving way suddenly, etc., each tries to make the partner move one foot.

34. **Hopping Pull.**—The children work in couples. They clasp hands, grip their nearest foot with the free hand and try while hopping to pull their partners over to the wall. It is a powerful exercise.

35. **Balance Fight.**—Form, beam. The children stand on the apparatus in couples and facing one another. Each one tries to push his partner down. The little children use forms, the big ones beams.

36. **Balance Walk on Fours.**—Beam not above knee height. The children walk along a beam on the hands and toes, with the knees outside the arms (Fig. 60). Little children use a form.

§ 3. Marching and Running

A. Marching

Walking should be light, elastic, economical of energy, and should bring the walker well forward over the ground. If it is otherwise, the fault lies in a one-sided or incomplete physical development, which has given rise to stiffness in the joints, heaviness in movements, lack of control over the body, and the like.

A single step is a slight exertion, but as the body is carried and moved forward step by step in marching the work done becomes considerable measured in kilogrammetres. A couple of hours' quick marching puts a greater strain on the body than most other forms of bodily work. Even if fairly thinly clad, a quick walk on a cold wintry day gives one a feeling of warmth. The reason is that it is the biggest muscle groups that are active during walking: the calf muscles, the extensors of knee, hip, and back. It is principally through walking that these muscles are developed, and one's walk will be easy and free only if they are strong and springy.

Each individual has developed his own particular form of walking through daily practice throughout life, he has formed a fixed habit. As the work of walking is very complicated, involving activity of most of the muscles and joints of the body, there is room for many faults and wasteful movements, the causes of which are manifold. Very often a son or a daughter walks just like either father or mother. This may be due to inherited peculiarities in the skeleton or the muscular and nervous systems, etc. But the impulse to imitate plays a part too. The children watch their parents and they cannot help imitating their ways of moving, not least their peculiarities and faults. The way in which a beloved and respected gymnastic teacher walks may be reflected in his pupils. And the daily work a man has to do may leave its mark on his walking. One engaged in intellectual work walks differently from one who does bodily work. Hard physical work, especially during adolescence, often makes walking heavy. Ill-fitting foot gear may influence the walking, too.

The style of walking may be changed effectively though, even if the bad habits have become fairly fixed. In some cases the practice of correct walking may be enough, but as a rule

more radical means have to be adopted. We must use special marching exercises aiming at eradicating definite faults. Also ordinary leg exercises such as heel raising, knee bending, knee raising, and leg raising may be helpful.

A good development of the legs cannot be considered sufficient, however, because many faults in walking are due to poor development of the trunk. Exercise of the trunk is therefore of great importance also as regards walking.

Free and easy walking will not be secured without a proper training of the whole body. There is hardly any other movement which shows so clearly a person's standard of physical development and education.

The better the teacher knows the details of walking, the easier it is for him to detect faults and to find means of correcting them. But above all, he must be able to make the pupils see their faults and instil in them a desire to correct these faults. When dealing with ingrained habits of this kind the teacher can only set the pupils going by showing ways and means. The pupils must take the



FIG. 61.*

*The statue is of the ancient Greek goddess of victory, Nike, from Olympia, where, according to an inscription on the pedestal, it was erected about 420 B.C. and where it is still found. It is a masterpiece from the period when Greek art was at its highest, and it shows a female figure beautifully developed through physical exercise. The legs, which are clearly seen, are finely shaped, strong, slender and straight.

The picture is included here because it shows the position of the feet which the Greeks at that time must have considered the correct one during marching; they are slightly turned outward. The demand put forward nowadays by certain women gymnasts that the feet should be turned straightforward during walking is unjustified both from the point of view of beauty and from the mechanical point of view. An outward turning of the foot as shown in Fig. 62b must be the correct one.

matter into their own hands and work with a will if good habits are to be formed.

Walking is a constantly broken fall. To begin with, the body is set falling forward, the left foot is moved quickly close along the ground, while the knee is bent so much that the foot does not drag, and the right foot at the same time pushes the body forward, as otherwise the steps will be too short. After a full step the left foot is put on the ground, slightly turned outward ; the toes must touch the ground nearly at the same time as the heel, i.e., a moment after ; the knee nearly stretched. The body continues its movement, and the right foot is moved a step forward in the same way as the left. The walk must be even and rhythmical without the body rocking and without the feet being crossed or knocked against one another.

It is by a strong stretching of the knee and ankle of the rear leg that the body at every step is pushed forward over the front foot. The trunk is inclined slightly forward, the head lifted, the back straight. The arms swing freely straightforward and backward by a slight movement in the elbows and a somewhat larger one in the shoulders ; the left arm moves with the right leg, and vice versa. The elbows must not be moved out to the side in the movement of the arms, but must be kept close to the body, the back of the hand facing straight out to the side. In marching, all the pupils must put the foot on the ground simultaneously, so that the sound of the feet is short and sharply defined.

In the following paragraphs the details of marching are dealt with more thoroughly.

Feet.—The reason that in walking the feet must point almost straightforward is the following :—

The speed forward of the body is caused mainly by the "unrolling" of the rear foot—i.e., by the raising of the heel until only the tips of the toes touch the ground. The unrolling is therefore like an ordinary heel raising, but while in heel raising the body is raised straight upward (because it is resting vertically over the foot), in marching it is pushed forward, because the heel is not raised until after the body has passed over it and no longer rests on it. In order that the unrolling shall be able to give the body the strongest possible push forward, the foot must be practically in the direction of the walk (a line drawn through the middle of the heel forward through the big toe should point straight forward). If the foot is turned

out the unrolling does not come over the toes (big toe), but more or less over the inner edge of the foot, and some of the work of the calf muscles is lost as far as the movement forward is concerned. The less the body is pushed forward in a step, the shorter must the step become. By turning the feet outward an inch or so is lost at every step. In this way, to walk, for instance, a mile, some 50 or more extra steps would need to be used, and in that case both more strength and more time are used. Fig. 62 shows the loss caused by the feet being turned outward. Besides this, the knees will be pressed inward during the unrolling, which is consistent with the fact that people who walk with the feet turned out are often knock-kneed and flat-footed. This, too, is indicated in Fig. 62—(a) shows the impression of a flat foot, (b) the impression of a normal foot with high instep.

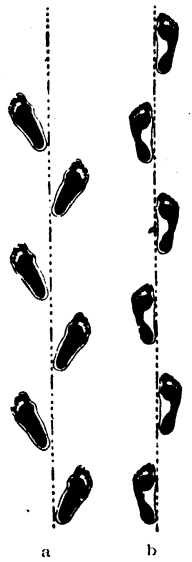


FIG. 62*.

The opposite fault of turning the toes in during walking is quite as ugly, but occurs less often; it especially is found with bow-legged people. The steps are here not shortened so much.

The fault of raising the toes too high as the heel is put on the ground, is counteracted by such forms of marching as toe march, kick march, ankle bending march, and to some extent linger march.

Knees.—As stated before, the knees must not be kept quite straight at the moment when the foot is put on the ground, but as the great majority of people walk with the knees bent too much, there is good reason for using in gymnastics forms of marching where the knee is quite stretched. It is wasteful of strength to walk with bent knees; the body is in that case lowered unnecessarily far when it falls forward over the front foot, and then must again be raised in order to get vertical over this foot. In addition, the steps become shorter, for the foot would reach somewhat further forward if the bent knee were stretched.

To correct bent knees the following forms of marching can be used: toe march, kick march, and especially marching with

* Elin Falk: Gymnastik med lek och idrott.

firm steps. People who walk with bent knees are often inclined to keep their knees rather stiff. Exercises such as marching and running with knee raising will counter-act this tendency.

Legs.—As soon as the foot leaves the ground after unrolling the leg swings forward like a pendulum. It will thus be seen that the weight of the leg helps to bring it forward at each step. The muscles have to assist, however. This is obvious, because sometimes we take long, and sometimes short steps, sometimes we walk quickly and at other times slowly. If the leg were to swing as a pendulum, i.e., influenced by gravity only, the time and the length of the steps for each individual would never alter, and a squad consisting of people with legs of unequal lengths would never be able to march in time.

The swinging forward of the leg differs from the swinging of a pendulum, too, because of the knee joint. This makes the work of the muscles during walking easier. At the time when the rear leg swings forward its hip-joint is lowered. The foot would consequently hit the ground if no bending of the knee took place. How this knee bending is brought about will now be discussed.

Let us for a moment suppose that only gravity acted on the leg during its swinging. In that case the lower leg would swing forward just as quickly as the thigh irrespective of the knee-joint, and there would be no bending of the knee.

It is not gravity alone, however, which swings the leg forward; the flexors of the hip joint too, are acting, especially the ilio-psoas, by their pull on the thigh-bone; to this must be added the forward movement of the pelvis produced by the push-off of the foot and the pull of the oblique abdominal muscles. These forces give the thigh greater speed forward than gravity alone would do. The lower leg, being relatively at rest when the swinging begins, will be somewhat behind because of its inertia, and consequently the knee will be bent and allow the foot to swing free of the ground.

At the end of the swing the leg must be stretched so as to enable the foot to be put down as far forward as possible. This stretching requires no effort. When the thigh stops its forward movement the lower leg is still swinging forward as a pendulum suspended from the knee-joint, and this swing does not stop till the knee is almost stretched. It will thus be seen that the bending as well as the consequent stretching of the knee is performed in an easy manner. If the hamstrings or the flexors

of the knee be too short, the natural stretching of the knee will be hindered and the step shortened. This is often seen in elderly people but one may come across it in young people, too.

The forward moving of the body during walking increases the swing of the leg and thus the length of the step. Besides this the oblique abdominal muscles (probably assisted by the rotators of the spine) pull the hip of the swinging leg somewhat forward, and this will add further to the length of the swing and the step. When the left leg is swung forward these muscles will not only pull the left hip forward, but by their pull they will also bring the right side of the chest forward, in other words, hinder the trunk in turning to the right what it otherwise would do when the left hip is swung forward. Consequently there is a slight rotation of the pelvis round a vertical axis and an accompanying slight twisting of the lumbar spine at each step.

Pelvis.—As the feet are not put on the ground on the same straight line, but a little to the side of each other (a foot's breadth or less), the body must be displaced a little to come from the one foot over on to the other; the centre of gravity, therefore, moves in a zigzag line. This displacement should take place with the least possible expenditure of energy as it has to be done at each step, i.e., 120 times or more a minute, according to the rate of walking. The easiest—and therefore the correct—way is to move the lower part of the trunk as the centre of gravity is situated there.

When the left leg carries the body, the pelvis is moved towards the left by adduction of the left leg caused firstly by concentric work of the adductors and then by excentric work by the abductors.

During this displacement the pelvis is not kept horizontal; the side of the pelvis that is not supported is lowered somewhat. The spinal column and the pelvis form a cross, the spine being the vertical, the pelvis the horizontal part; and through the spine the weight of the upper part of the body is transferred to the sacrum. When one is standing on both feet the pelvis is horizontal and the pressure in both hip joints is equal; but as soon as the weight is transferred to one leg during a step the pelvis will be pressed down into an oblique position; while one is resting on the left leg the pelvis will tilt down towards the right, and vice versa. The pelvis is then rocking up and down, and the "springs" that allow this rocking are the abductors which are developed first and foremost by these movements of

the pelvis during marching and running. These movements are slightly bigger in women than in men because of the women's broader pelvis and are consequently more noticeable.

These sideways movements may be either too big or too small. If the abductors give too much they will be too big. In that case the walking looks loose and slack, as seen in young women who have never exerted themselves in bodily work or in physical exercise and consequently lack firmness of the body. It is, however, much more common that the movements are too small. This fault is due to faulty innervation and co-ordination, in other words it comes from bad habits that have crept in, habits which should have been counter-acted by well conducted physical exercises including proper marching exercises.

When the rocking movements of the pelvis are too small, the displacements from side to side will also be too small. The centre of gravity must then be shifted by a swinging sideways of the shoulders. Marching now becomes a "waddle," and it will often be met with in young people who have been put to hard bodily work at a too early age, but it is particularly characteristic of old age, and the less one does to preserve natural flexibility, the sooner it will appear. The spine will gradually lose its flexibility and come to swing like a stiff pole from side to side during walking. That a supple spine plays a big part in free and easy walking is shown here better than anywhere else.

The swinging of the trunk from side to side is a greater exertion than the sideways displacing of the pelvis; consequently the waddling form of walking is uneconomical and fatiguing; it is therefore rightly called "*heavy*," whereas the correct form of walking is called "*light*" or— to use a stronger expression—"*buoyant.*"

Besides this rocking movement and the turning already mentioned, the pelvis performs a turning round a horizontal and frontal axis. As the one leg in the push-off is furthest back, the pelvis is brought into the same position as in standing leg raising backward, i.e., the leg is carried further back than the Y-shaped ligament of the hip allows, and as a consequence the pelvis must tilt forward. When the leg swings forward, the pelvic inclination is again diminished.

The three movements of the pelvis during walking are: *A turning round a vertical axis; a rocking from side to side;* and *a turning round a horizontal-frontal axis.*

Spine.—The movements of the pelvis produce corresponding movements of the spine owing to the intimate connection between pelvis and spine.

When the left leg from its extreme backward position is swung forward, the internal oblique abdominal muscle of the left and its continuation, the external oblique abdominal muscle on the right, pull the left half of the pelvis forward, by which the swing of the leg is quickened and the stride made longer. In this way a slight trunk twisting to the left is performed with the chest as the fixed part and the pelvis as the moving part (compare Vol. I, p. 241 and p. 249).

When the weight of the trunk is shifted on to the left leg, while the right leg is swinging forward, the right side of the pelvis is slightly lowered. The spine must now bend to the left in the loin in order to bring the centre of gravity above the left foot. If no other movement of the spine took place the shoulder line would slope to the left. To prevent such sloping the spine must bend slightly to the right above the loin. It will thus be seen that a slight S-curving of the spine is formed at each step, and that the movements of the pelvis send a wave-like motion up through the spine.

A corresponding increase and decrease of the lumbar curve is caused by the turning of the pelvis round a horizontal-frontal axis.

All the movements of the pelvis are accompanied by movements of the spine. The ease with which the spine takes part in these movements depends (more than generally believed) on the development of its joints and muscles, and not only those of the loin but those of the dorsal region as well. The easier the spine moves with the pelvis and the better its muscles can produce and adjust the necessary movements, the easier and more economical does the walking become. A slight scoliosis or a round back with the accompanying stiffness and unequal muscular development is enough to mar the ease and beauty of walking.

A thorough training of the muscles and the joints of the spine is of importance also as regards walking (and running).

Arms.—Walking is a crosswise movement; sculptors call it chiastic from the Greek letter "X". The crosswise or chiastic movement is particularly noticeable in four-footed animals. Nearly all of them put front and hind leg of opposite sides forward at the same time or almost simultaneously. Man's

arm and leg movements are also done crosswise and evidently for the following reason. When the left leg is swung forward the left half of the pelvis is pulled forward by the oblique abdominal muscles as stated above. These muscles pull as vigorously on the right half of the chest as they do on the left side of the pelvis, and in order to fix the right side of the chest the right arm is swung forward. The left leg and the right arm swing forward together, and the muscle which swings the arm forward is pectoralis major. To its pull forward on the arm corresponds an equal pull backward on the chest, i.e., a pull opposite the one exerted by the oblique abdominal muscles and therefore a pull that helps to fix the chest.

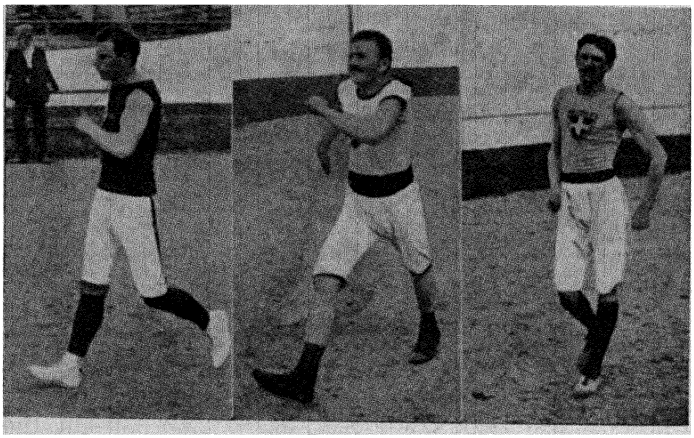


FIG. 63.

When the left leg and the right arm begin their forward swing, the left arm begins its swing backward. The muscles acting here must also come from the trunk; they are particularly the rear part of the deltoid and the muscles fixing the shoulder blade against its pull (especially trapezius IIb) (Vol. I, p. 178). These muscles exert a pull forward on the left side of the chest corresponding to the backward pull on the arm. It will be seen that the left arm causes a pull forward on the left side of the chest while the right arm at the same time causes a pull backward on the right side. Both help to fix the chest against the pull of the oblique abdominal muscles.

The quicker the walk, the harder the oblique abdominal muscles work and consequently the more powerfully the arms

must swing. In walking races, an ugly (Fig. 63) and an uneconomical exercise compared to running, a strong turning of the pelvis is recommended in order to make the steps long, and one is further advised to swing the bent arms energetically across the body. According to what has been stated, these movements of pelvis and arms correspond well. Untrained participants in walking races complain of tender pectorals, a sign that these muscles are used in the arm swinging.

The effect of the swinging arms on the body may be easily demonstrated as follows. Stand with closed feet, or still better on one foot; swing the arms forward and backward as during walking. When the right arm swings forward and the left arm backward, the left hip will be pulled forward, and vice versa, the more forcibly the stronger the arm swingings are.

The swinging of the arms makes walking easy, whereas walking without arm movements, as when carrying a parcel under each arm, is very tiring.

The arms must swing forward and backward in parallel planes. It is a common fault that they swing obliquely forward in front of the body. The cause of this fault is that the point from which the arm swings (i.e., the shoulder) is too far forward; if the shoulders are pulled back the arms will also swing straight forward and backward. Occasionally the opposite fault is seen—namely, that the arms swing obliquely behind the body; this is found in people who, when they walk, hold the trunk too far back, hollow the loin, poke the abdomen forward, and draw the shoulders back without straightening the back.

The arms must swing according to the rate of walking; the quicker the walk, the bigger the arm swinging. The arm swings like a pendulum both in shoulder and in elbow joint. It ought to swing slightly more in the shoulder joint than in the elbow joint. It is a common fault to swing it too little in the shoulder and too much in the elbow joint; but the opposite fault is often found, too. The arms must fall into a natural rhythm with the legs if the walking is to be free and easy.

During walking, the body is moved up and down in a wave-like motion. It is raised highest when the trunk is straight above the supporting leg, and it is lowest at the moment both feet rest on the ground. One gets a vivid impression of this upward and downward movement when looking out over a crowd of people moving forward without keeping step. The expression "a billowing crowd" is very fitting. Ones own

movements up and down may be realised when one passes along a hoarding with horizontal cracks between the boards. What is seen through the cracks seems to be dancing up and down.

The extent of these movements depends on the give in the knees. One may have formed a habit of giving too much, which means a heavy and uneconomical walk ; or one may have formed the habit of walking with a light step and a slight give in the knees. By an easy calculation, one may see how much strength is wasted by a "hopping" walk. Supposing we do a mile in 2,500 steps ; the man who lifts his body 6 cm. per step will lift his body 50 m. higher per mile than the one who only lifts his body 4 cm. per step ; he has been "walking up-hill," so to speak.

If the spine and the legs were stiff the body would be shaken at each step just as it would if one sat in a carriage with rimless wheels rolling from spoke to spoke. Fortunately shocks of this kind are absorbed in the human body in various ways :—

(1) The *arch of the foot* is springy, the better the higher the instep is. In the case of flat foot the foot acts as a block and not as a spring.

(2) The *knees* give in a slight bending at each step.

(3) The supporting *hip-joint* gives ; the free hip-joint is pressed down by the weight of the body against the abductors at the supporting hip. It is this swaying of the pelvis, more than anything else, that breaks the fall of the body. This is felt in all landings on one foot (p. 119).

(4) Finally, the *spine* gives because of its curves and its inter-vertebral discs.

Marching and running are taken in time when nothing else is commanded, and always begin with the left foot, except in marching and running sideways to the right. In general, marching and running are taken from flank arrangement, and are done in a ring whose size and shape depend on the condition of the room or ground ; if the pupils are in two or more lines the inner line must shorten the steps so much in the wheelings that the outer line can keep abreast. The wheelings are taken without a special command. The teacher, as a rule, should stand outside the ring.

During the first few steps in marching (and running) the distance between the pupils should be somewhat increased

(without special command) so as to enable each pupil to walk freely and unhindered by the one in front and behind.

The different forms of marching and running are practised from standing position as well as from ordinary marching and running; changing from one special form of marching (running) to another should also be practised.

The length of pace and cadence in marching for men are about 30 inches and 125 to a minute; in running 40 inches and 170 to a minute. In ordinary marching a little more than 100 yards will consequently be covered in a minute, and in running nearly 190 yards. These figures are somewhat smaller in the case of women.

1. **Ordinary Marching.**—*Forward—march !* There should be a fairly long pause between the explanatory word and the executive word, because when *forward* has been said the pupils begin to lean forward, and this, if not properly controlled, may lead to one foot being advanced too soon and the pupils will not start the marching together. *Ready—halt ! Halt* comes as the foot (left or right) is put on the ground. The other foot is then put forward as usual, and the rear foot is brought directly up to it in marching time. At the same time the swing of the arm stops, and the correct erect position is taken. The halt is best introduced by making the pupils step forward 1 (2, 3) steps keeping the same time as in halt during marching. Children may count aloud for one step, 1—*stand ! ;* for two steps, 1—2—*stand ! ;* and for three steps, 1—2—3—*stand !*

It is often the case that the arms do not swing freely from the shoulders ; it may therefore be advisable to practise larger swings of the arms than normal, but this should not be adverted to so long as to make it a habit.

If the distance between the pupils is to be increased during marching, the teacher commands: *To double distance—change !* All except those in front shorten their steps without altering the time until the distance is doubled.

If the ordinary distance is to be taken again, the teacher commands : *To ordinary distance—change !* All except those in front lengthen their steps without altering the time until the ordinary distance is gained.

Common Faults.—(*a*) At the start the left foot is placed forward too slowly and not far enough ; it is raised too high

because the rear foot does not push the body forward at the same time.

(*b*) The toes on the forward foot are raised too much as the foot is put down; the foot is turned too much outward or inward.

(*c*) The knee is insufficiently bent as the foot is put forward, causing the foot to drag; and the knee is kept too bent as the foot is put down.

(*d*) The rear instep and knee are not stretched with sufficient force during the pushing-off and too little ground is covered in the step.

(*e*) The trunk is brought forward with rounded back or the trunk is kept too erect with the abdomen protruding.

(*f*) The swinging of the arms is too vigorous and the arms are moved obliquely forward in front of the body owing to the shoulders, from which they are suspended, being carried too far forward. At the elbows the arms may be held too stiffly or bent too much; one arm may swing more than the other.

(*g*) The head is not kept up.

(*h*) The proper erect standing position is not taken up on the command *halt !*

Muscle Work.—As marching is a very complicated exercise, the muscle work must also be extremely complicated. In broad outlines, however, it is easy to see which muscles are working mainly. If we begin at the hip-joint at the moment when the foot is put forward on the ground, the *adductors* must work first, as they help to bring the body over the foot, though this is mainly done by the unrolling of the rear foot. At the same time there is a stretching of the hip-joint, mainly done by the *gluteus maximus*. When the body has in this way come vertically over the leg, gravity will cause too great an adduction in the hip-joint; this is prevented by the *abductors* (*gluteus medius* and *minimus*). When, after this, the leg is to be moved forward, this is done by the *flexors of the hip*, especially *ilio-psoas*, helped by gravity, which puts the leg into swing. These last muscles have to do the least work by far, and are therefore also the least developed, whereas all the others are very big and strong. It is thus seen that the whole ring of muscles around the hip-joint take part, each in turn, in the work at each step. The knee-joint, which is slightly bent in the first part of the step, is prevented from bending too much by *quadriceps*, and is stretched

at the last moment of the step by the same muscle. The unrolling of the foot (that is, the heel raising on the rear foot) is done by the *calf muscles.* As the body is inclined forward the *erector spinæ* muscles are working to carry the upper part of the body. The *oblique abdominal muscles* are acting by pulling forward alternately the left and the right half of the pelvis when the legs are swung forward. *Pectoralis major* swings the arm forward, and the *rear part of the deltoid* together with *trapezius IIb* swing the arm back.

2. **About Turning during Marching.**—*Left (or right) about—turn !* The turning is done in four movements in the same time as the marching. If it is to be taken to the right the executive word falls on the left foot ; the right foot is then put forward in an ordinary step (first movement) ; the left foot is then put half-a-step straight in front of the right, turned somewhat outward, without the body being turned (second movement) ; while the heels are raised and the arms are kept still and close to the body a quick turning is taken on the toes ; at the end of the turning the right heel is lowered, so that the body comes to rest mainly on the right foot (third movement) ; after this the left foot is moved a full step forward in the new direction, and is put distinctly on the ground with a slight beat (fourth movement), after which the marching is continued.

Introduction.—Turning about on the march can be introduced on the spot. *Placing the left foot forward, about turning—* 1—2. On 1 the left foot is moved forward a short step and put on the ground in front of the right, as described above. On 2 the turning is taken. If 1—2 is commanded again, on 1 the left foot is again moved forward in front of the right and turning is taken on 2, and so on. Finally, the teacher commands : ***Left foot inward—place !***

Common Faults.—(*a*) The foot which is moved last before the turning (second movement) takes too long a step and is not put in front of and across the other. The legs are then crossed after the turning, so that the turning cannot be quite completed, and the first step is not taken in the right direction and is not full.

(*b*) The knees are bent in the turning.

(*c*) The arms swing in the turning.

(*d*) The turning is too slow.

3. **Turning with Halt during Marching.**—(*a*) ***Turning to the left (right) with halt.*** During marching, the teacher com-

mands, *Turning to the left (right)—halt ! Halt* falls on the left (right) foot ; the right (left) foot is put forward in an ordinary step, the heel raised, however ; a quarter turning is performed on the ball of the right (left) foot while the heels are brought together and lowered.

(*b*) *About turning with halt.* During marching the teacher commands, *Turning left (right) about—halt !.*—The turning is done in four movements as described under 2 ; but in the fourth movement the feet are brought together in the halt.

4. **Wheeling during Marching.**—If during marching in flank arrangement the direction is to be changed, the teacher commands : *Left—wheel !* The leader (leaders) then makes a curve so that the direction is changed 90 degrees. If the wheeling is to be 180 degrees the command must be : *Left about—wheel !*

5. **Toe March.**—*On the toes, forward—march !* While the heels are fully raised the left foot is moved forward. The steps must be shorter, the swing of the arms and the inclination forward of the body less than in ordinary marching. The body must be well stretched.

Ready—halt ! The halt is taken as in ordinary marching, but in three movements, as the heels are lowered in a separate movement after they are brought together.

If the exercise is taken from ordinary marching the command is : *Heels—raise ! Heels—lower !* In changing to ordinary marching the first marching step may be slightly marked.

Common Faults.—(*a*) The heels are not raised high enough.

(*b*) The knees are kept too stiff as the feet are moved forward, and are not sufficiently stretched when the feet are put on the ground.

6. **Marching with Long Steps.**—*With long steps, forward—march ! Ready—halt !* The length of the step is increased to a good three foot-lengths ; the forward inclination of the body and the swing of the arms are increased.

The steps may be made very long, like in lunging forward. Each arm is then alternately swung forward-upward to half stretch position and downward-backward to half drag position.

Changing from ordinary marching to marching with long steps, and vice versa, can be done with a slight marking of the first step after the command.

7. **Marching with Short Steps.**—*With short steps, forward—march ! Ready—halt !* The length of the step must be con-

siderably less than in ordinary steps. The forward inclination of the body and the swing of the arms must be lessened.

8. **Marching on the Spot.**—*On the spot—march ! Ready—halt !* The steps are taken on the spot. The foot is raised with a slight bending of the knee. The arms are kept still.

9. **Closing-up during Marching.**—If the leader is to stop at a certain place and the others to close up, the command is : *Halt in front, close—up !* The leader or the few in front then halt immediately, the others gradually as they get their proper distance.

10. **Quick March.**—*With quick steps, forward—march ! Ready—halt !* The time is considerably quicker than in ordinary marching, without the steps being made much shorter.

11. **Marching with After Step.**—*With after step, forward—march ! Ready -halt !* The left foot is moved a somewhat longer step than usual with a good bending of the knee, while the right foot pushes the body strongly forward, and is then moved up behind the left, where for the sake of the balance it is supported on the inner side of the toes. After a moment's pause in this position, with good stretching and steady balance, the right foot is moved forward in the same way. *Halt* is commanded as the rear foot is approaching the front one ; it is then moved forward and the other foot closed up as in ordinary marching.

This form of marching, which is at first taken by numbers, gives practice in unrolling the rear foot strongly and thus in lengthening the steps ; also in a steady movement of the body during marching.

12. **Step Changing March.**—*With step changing, forward—march !* The left foot takes a step forward, the right is brought up behind it, and the left foot is immediately moved forward again. Step changing is thus taken in three movements, of which the first and second are taken on the toes, the third on the full foot. These three movements are taken in the same time as one ordinary step.

If step changing is taken in quicker time the command is : *With quick step changing, forward—march !* All three movements are then taken on the toes, and while the rear foot is swung forward for a new step, the standing foot takes a hop forward, as in polka step. Children and beginners find this form easier than ordinary step changing march. The hop may be taken as a long hop forward while the rear leg is swung forcibly forward

for the next step (*step changing march with a hop forward*).

A hop may be added also when the step changing march is done slowly; but it must be light and not high; the knee must be slightly bent, and the free leg carried fully forward before the hop is taken. The exercise will now be light and graceful, demanding great control and a well-developed sense of form. It is very suitable to well-trained women gymnasts.

Instead of changing at every step, the change can be made on every third; the command then is: *With step changing on every third step (forward)—march!* Two steps are taken, and after that a step changing. *Ready—halt!* or *To ordinary marching—change!* The word of command falls when one of the feet at the end of a step changing is put on the ground; as usual in changing to ordinary marching, the first step after the command is marked.

A single step changing is commanded: *Step—change!* Step changing march trains lightness and freedom in the movements of the legs and feet.

Introduction.—To begin with, the steps are taken straight sideways, alternately to left and right, the children standing in a row one behind the other and placing their hands on the shoulders of the one in front counting aloud, 1———1—2 and ———1——2—3, and so on. When the rhythm has been mastered the teacher may grasp the leading child by both hands and gradually lead the progression obliquely forward from side to side, and, finally, straight forward.

Common Faults.—(*a*) The steps are too heavy and stiff.

(*b*) The feet are turned too straightly forward and the body is turned from side to side.

(*c*) During the change the rear foot is moved forward by the side of the front foot.

13. Marching with Firm Steps.—*With slow and firm steps, forward—march!* When the leg is moved forward to take a step the knee must be bent rather more than in ordinary marching, and it must not be stretched until the moment that the foot is put firmly on the ground, but then it must be very strongly stretched. The steps are short; the time is slow, but can gradually be increased. The arms are kept still; the body is strongly straightened. *Ready—halt!*

The aim of this form of marching is to correct the common fault of the knees being bent too little as the leg is brought forward, and incompletely stretched as the foot is put on the ground.

14. **Marching with a Beat on Every Third (Fifth, Fourth and Fifth) Step.**—*With a beat on every third (fifth, fourth and fifth) step, forward—march !* The first beat is made on the third step of the march. To do this the foot is put firmly on the ground without being lifted higher than usual ; the beat must only be heard, not seen. The whole foot must be put on the ground at the same time in the beat, otherwise it does not sound clear and sharp.

This form of marching sharpens the sense of time by its demand of simultaneous response.

15. **Kick March.**—*With kicking steps, forward—march !* The left foot is thrown quickly forward with a strong stretching of the knee and ankle ; the toes are moved along as close to the ground as possible without being dragged. The body, which during this movement must be steadily balanced on the right foot, is inclined slightly forward, because the lower part of the trunk is held a little back as a counterweight to the leg which goes forward. The back must be well-straightened, the head raised, arms steady. After this position has been held for a moment, the right foot pushes the body forward ; the left foot in this way glides a little forward and is put on the ground, the right is thrown forward, and the same position is now taken on the left foot as before on the right. The time, which is fairly slow, must be kept exactly so that all stretch the legs forward exactly at the same moment. The movement then sounds almost like a strong arm stretching.

Ready—halt ! or *To ordinary marching—change !* The executive word falls when the foot is stretched forward.

Well-trained pupils may take kick march from ordinary march or even from quick march. If the executive word *march !* falls on the left foot, the right foot is put forward in an ordinary step with a slight beat ; the left foot is then thrown forward, body and arms kept perfectly steady in the prescribed position during the pause (the first movement of kick march). This sudden change from continuous movement forward to relative calm gives a strong impression of control over the body.

Kick march counteracts the tendency to keep the toes turned up too much when the foot is put on the ground in ordinary marching, and trains a steady and beautiful movement of the body.

The exercise as described above, is an exercise for men and unsuitable for women. As many women, however, are inclined to walk with bent knees, especially nowadays when high heels

are the fashion, a form of marching which will counteract this tendency is needed. Kick march done with less vigour, with slower and gentler stretching of the knees and taken in slow time, may be used. Stress should be laid, in this form too, on a well-balanced carrying of the body.

Introduction.—Kick march is at first taken by numbers, so that the faults can be corrected and steady balance cultivated. *By numbers, kick march*—1—2. On 1 the left foot is thrown forward; on 2 the body is pushed forward, the foot put on the ground, and the right foot thrown forward; on the next 1 the left foot is brought forward, and so on.

Common Faults.—(*a*) As the leg is carried forward the pelvis comes forward, so that the upper part of the trunk has to lean a little back as a counterweight; in this way the loin is hollowed, the back is rounded and the head falls forward.

(*b*) The foot is thrown too far forward and raised too high.

(*c*) The arms are not kept still.

(*d*) The balance is unsteady.

16. **Knee Raising March.**—*With knee raising, forward—march!* On *march!* the left knee is raised quickly up to the crook position or rather higher (pp. 52-54); immediately afterwards the left foot is put on the ground with the toes touching first; as the heel touches the ground the knee is fully stretched. In the next movement the right knee is raised and lowered in the same way. The trunk, during this movement, must be kept vertical and fully stretched. The arms can be by the sides or on the hips. The time at first should be somewhat slower than in ordinary marching. The steps are made very short (about 1½ foot-lengths).

Ready—halt! or *To ordinary marching—change!* The executive word falls when a foot is put on the ground. The other knee is then raised once more. The exercise may also be done with a short pause in crook position, after which the feet are changed quickly. The time may be indicated by counting, 1——*and*—2——*and*—1——*and*—2.

The knee raising may be done on every third or fifth step only. *With knee raising every third (fifth) step, forward—march!* The teacher counts, 1—2—3. On 3 all stop in crook position long enough to master the balance while 2 or 3 beats are counted during the pause. The quicker the marching, the more difficult it is to keep balance.

Knee raising march works away stiffness in the hip and knee-joints, and is a good preparatory exercise to certain jumps, especially high jump.

Common Faults.—As given on pp. 53-54; in addition, the steps are made too long and heavy.

17. **Marching Sideways.**—*Sideways, to the left—march !* As the heels are raised the left foot is moved a short step straight sideways, the right foot pushes off and is closed up to the left, the latter is again moved sideways, and so on.

Marching sideways is done lightly with stretched knees and on the toes, with the feet turned as much outward as they are in the erect position. The body is kept well stretched, as in heel raising or toe march forward, the arms still. The time is a little quicker than in ordinary marching.

Ready—halt ! The executive word falls when the feet are together; one more step is taken, and when the feet are together again the heels are lowered. Halt is consequently taken in three movements, just as in toe march.

If the exercise is to be done from ordinary marching the command is: *To marching sideways, right—turn ! Turn* falls on the right foot; the left foot is moved forward, and the turning is taken mainly on the ball of the right foot. *To marching forward, left—turn !* The executive word falls as the left foot is put on the ground; the feet are then brought together, and the turning is taken on the ball of the right foot, while the left foot is moved forward as in ordinary marching.

Common Faults.—(*a*) The feet are turned too directly forward; the heels are not brought together.

(*b*) In marching sideways to the left, the left foot is turned too far outward and the right too far forward, so that the body is turned and the march is half sideways and half forward.

(*c*) The knees are bent, especially that of the leading leg.

(*d*) The body sways sideways to make the work of the legs easier.

18. **Marching Backwards.**—*Backward—march !* While the heels are well raised the left foot is moved a good foot-length backward. The right foot pushes the body back over the left, just as in marching forward it pushes it forward. After this the right foot is moved backward, and so on. The knees are kept almost stretched in the marching; the feet are turned outward, as in the erect position; the body well straightened and the arms still; the head is turned so that the pupils look over the shoulder which is toward the centre of the ring.

Ready—halt ! The executive word falls as a foot is put on the ground. The other foot then takes a step ; when the feet are together the heels are lowered. Halt is thus taken in three movements, as in toe march.

19. **Marching with Knee Raising and Knee Stretching Forward.**—This exercise may be taken from standing position or from ordinary marching.

With knee raising and stretching forward, forward—march ! The left knee is raised quickly to crook position and immediately stretched forward so that the leg, if possible, is horizontal with the foot turned slightly outward and the ankle stretched. The leg is then lowered without any bending of the knee and the foot put lightly on the ground in a short step. Corresponding movements are then performed with the right leg. The arms are by the sides or placed on the hips, and the trunk is kept very straight, which will be found difficult during the knee stretching forward. The exercise, which is done in time, is performed in two movements as the knee raising and stretching are done in one continuous movement. With beginners it may be done by numbers and in three movements. On 1 the knee is raised, on 2 it is stretched, and on 3 the foot is put down.

Ready—halt ! The teacher says *halt !* as the knee is being stretched forward ; the foot is then put down and the heels closed.

Common Faults.—(*a*) The leg is turned inward and lowered during the knee stretching.

(*b*) The steps are too long by which the pelvis will be pushed forward and the upper part of the body inclined backward.

(*c*) The foot is placed heavily on the ground.

20. **Marching with Leg Swinging.**—This exercise is always taken from erect standing position.

With leg swinging, forward—march ! On the word *march !* a short step forward is taken with the left foot ; the right leg, fully stretched and with the foot turned slightly outward, is swung forward-upward as high as possible and without any pause lowered again and placed at a short step's distance in front of the left foot. The trunk is kept straight in a vertical position, the arms by the sides or placed on the hips. If taken by the pupils standing side by side in rank, the hands may be joined for mutual support, the leaders at each end placing the free hand on the hip. The exercise can also be done on the spot. The time is twice as slow as in ordinary marching. *Ready—halt !*

Halt ! is said as a leg is being raised forward. The foot is put down and the rear foot closed up.

This and the previous marching exercise produce mobility of the hip-joints.

Faults as in 19 (*b*) and (*c*).

B. Running

Running is distinguished from marching in that the rear foot is unrolled so strongly that it leaves the ground before the front foot is put down ; running is therefore a series of small jumps. *Marching, running,* and *jumping* are exercises of the same kind ; if walking is much hurried or exaggerated it tends to become running; if running is overdone it becomes jumping (high or long jumping). Dancing also is closely related to running, as it consists of a series of running steps, hops, or jumps of different kinds.

Running is done in the following way : the left foot is brought quickly forward as the knee is bent, while the right foot pushes strongly off, and by that throws the body forward, after which the left foot is put forward on the ground with the toes only touching at the distance of a running step. As the body continues its movement the right foot is moved a step forward in the same way as the left, and so on.

During running the feet are kept a little turned out and the knees turned out correspondingly to the feet. The gymnastic running is taken on the toes It is perhaps the most economical of energy to run on the full foot ; but when the object is to develop the ability of running, and not to use the run for one or another practical end, it should be taken on the toes ; this form gives most work to the calf muscles, and this trains them to yield their best work. The ankle must not be kept too stiff ; it gives a heavy tramp in the running (just as in jumping it gives a heavy landing). The calf muscles must be made used to yielding as the body comes forward on to the forward foot, and then to throwing the body strongly forward in the unrolling ; they, in other words, must bear the body like springs. It is of importance here, just as in marching, that the unrolling does not begin too early, because then it leads to too much of a high jump and too little of a long jump—i.e., the strength is wasted and the speed forward lessened.

As the front knee gives in the landing it should be moved slightly outward, corresponding to the outward turning of the

foot. It is a bad and common fault, especially in women, to keep the knees too close together so that during the running the one knee passes close by the other while the heels are kicked obliquely outward. This makes the running ugly and heavy. The fault is generally found in people who are knock-kneed, and as a rule the feet are also turned outward too much. When running is done correctly the feet should pass one another closely, whereas the knees should be slightly apart. In women's gymnastics many teachers demand a very small angle (approaching nil degrees) between the feet in erect standing position. This leads to the knees being kept together in knee bendings and landings, etc., but this may tend to made the adductors too short, and short adductors cause the knees to be kept too close together during running.

The movements of the pelvis during running are like its movements during walking. It is displaced from side to side so that the balance, now on the one and now on the other leg, may be secured. This displacement is, however, smaller in running than in marching as the feet in running are placed practically on one line. The rocking movement, on the other hand, is more marked as the fall in each step is larger. The spine must accompany the movements of the pelvis with correspondingly larger bendings from side to side, which together with the increased leaning forward of the trunk, puts a considerable strain on the extensors of the back during running (the deer and other swiftly running animals have strong dorsal extensors). Here, as in walking, there is a turning of the pelvis round a vertical axis and a consequent twisting ot the lumbar spine at each step; both movements are naturally bigger in running than in walking because of the longer strides. During the leaning forward of the trunk the back must be kept straight, the head lifted, and the shoulders lowered. If the head be carried forward and the back rounded, both common faults, the position, besides being ugly, is bad from a physiological point of view. During running, if ever, the chest should be roomy and mobile; the lungs are heavily taxed, and consequently the breathing ought to be as unhampered as possible.

The arms swing crosswise in time with the legs as in marching, their tracks parallel, and the hands should be brought equal distances in front and behind the hips. Arm swingings during which the one arm is swung very far forward while the other one is swung back to the side of the hip only, do not look

well. As the arms have to swing quicker in running than in marching, they are shortened by a bending to about right angles at the elbows (a short pendulum swings quicker than a long one). This bending is kept unaltered so that the swinging takes place in the shoulder joints only. Some people have developed the habit of swinging the arms in the elbow joints too. Such a movement is at once detected as unnatural and out of harmony with the other movements involved by running. What the arm swinging means is at once realised if one tries to run with the arms kept still. Strong twistings of the upper part of the trunk will now be needed to keep the body well balanced ; the running will be much more difficult and it will not bring the runner well forward over the ground.

In running more work (measured in kilogrammetres) is performed in a given time than in most other exercises. Running is therefore a most valuable exercise. Better than any other exercise it fulfils one of the two great claims put on gymnastics, namely, to give strong all-round movements by which the muscles as well as other organs such as heart and lungs are stimulated to greater activity, development and strength.

The exercise necessary for a child's physical and mental growth and development is obtained through running, and the child itself chooses that exercise by instinct. As soon as it has become steady on its feet it uses every opportunity to run, skip and jump. Parents sometimes try to curb this desire for movement ; they should rather encourage it, as no parent could wish for a better proof of the child's health, and it is just through such movement that all its organs are strengthened for life. There is no better cure for pale city children than running about by the seashore or in the country. Healthy children show an endurance which often puts grown-up people to shame.

Running was used by the ancient Greeks at the Olympic Games, in fact the only exercise used during the first three-quarters of the first century about which we have records (Fig. 64). Physical education of the English youth has reached a high standard ; and running, which forms an essential part of all ball games, is the principal exercise in the English system. It might be worth mentioning that it is through races that the breed of racehorses has been improved.

On the other hand, running fulfils only to a lesser degree the other of the two aims of gymnastics, that of giving form and being corrective. A faulty carriage will not be corrected by

running exercises; and arms, shoulders, and chest cannot be properly developed by running only.

The teacher must remember that running is an exercise which may lead to overwork quite easily, and it should not be misused. For this reason it is of the greatest importance that the progression be gradual; the length of time for the running must be increased only little by little. But if that rule be kept it will be found possible to train almost anyone up to a high degree of endurance; if the rule be neglected serious harm may be done.

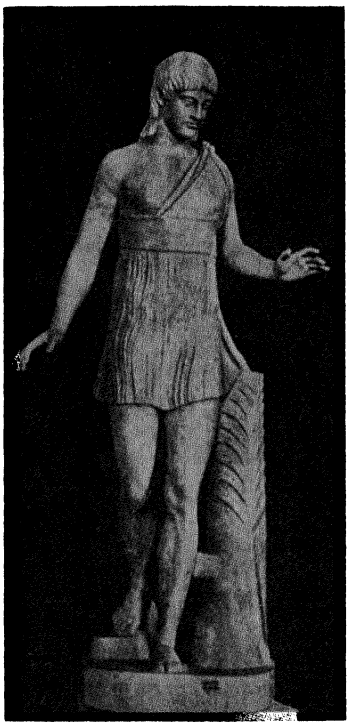


FIG. 64.—The runner from the Vatican Museum in Rome.

Generally, running should be taken out of doors, especially in the form of ball games. In the gymnasium most emphasis should be laid on training beautiful form and lightness in running. Endurance running can often be used here, especially with less trained pupils.

The length of step and cadence in running for men are about 40 inches and 170 to a minute. The figures are somewhat smaller in the case of women.

Halt must not be commanded immediately after a strenuous run, but ordinary marching should be taken for a while as a depleting exercise, so that the breathing can be calmed little by little. During running the teacher must allow any pupils who feel much fatigued to fall out and change to marching.

21. **Ordinary Running.** *Running forward—go! Ready—halt!* to *To marching—change!* In the two (with halt, three) first running steps after the executive word the speed is stopped by the body being held back and the feet set against the movement, so that halt can be made or ordinary marching begun. The time of the halt can be counted, 1—2—3—4, and for the changing to marching—1—2—3.

Common Faults.—(*a*) The ankles are kept too stiff, so that the footfall sounds heavy ; the heels are put on the ground.

(*b*) The knees may be turned inward and the toes too far outward (knock-knees), the feet swing outward in a curve instead of passing close to one another with the knees carried slightly outward.

(*c*) The body is kept too vertical, so that the steps are not long enough.

(*d*) The back is rounded and the head falls forward, which hampers the breathing.

(*e*) The shoulders are pulled forward, so that the arms swing in front of the body.

(*f*) The mouth is held open.

Muscle Work.—The muscles which work during running are mainly the same as work in marching ; but naturally they do a much greater work here. As a rule the toes only touch the ground ; the knee and hip-joints are strongly bent, which gives the *calf muscles* and the *extensors of knee* and *hip* considerably more work. The body is inclined further forward, therefore stronger use is made of the *erector spinæ* muscles.

22. **About Turning during Running.**—*Left* (*right*) *about—turn !* The turning is done in four short steps, without any falling out of line and without the time being lost.

23. **Wheeling during Running.**—Performed in the corresponding way to wheeling during marching (p. 88).

24. **Running with Step Changing.**—(*a*) *One foot kept back.*

With step changing, running forward—go !—At each step a hop is taken while the free foot is kept slightly back. It is done as running with an intermediate hop and in slow or quick time. If done in slow time the free foot is kept somewhat behind the supporting foot and the hop is fairly long. If done in quick time the hops are short and follow one another in quick succession while the free foot is kept by the side or even slightly in front of the supporting foot. This latter form, which is called *hop running*, is freer and easier than the slow one.

(*b*) *One foot thrown forward.*

One foot forward, with step changing, running forward—go !—During a hop at each step the free foot is kicked quickly forward. The hops are short, the back straight, and the body inclined slightly backward.

A single step changing is done on the command *Step—change !*

25. **Running with Knee Raising.**—*With knee raising, running forward—go !* The knees are raised right up to hip height at every step without the back or the standing leg being bent. The steps are short, the arms by the sides. This is a very strenuous form of running, and must only be taken for a short time. It is easier if it is taken with an intermediate hop (step changing); a little hop is then taken on the standing foot while the other knee is kept up.

26. **Running Sideways.**—*Running sideways to the left—go !* While a strong heel raising is taken, the left foot is moved a short step straight sideways; at the same time the right foot pushes off strongly from the ground. In the following steps both feet take off almost at the same time; the heels are brought together while the feet are off the ground. The feet are kept turned out as in the erect position, the knees nearly stretched, the body well straightened, and the arms still and in to the sides.

Ready—halt ! The excutive word is given fairly slowly, and the class comes to halt as soon as possible.

Common Faults.—As given in 17.

27. **About Turning during Running Sideways.**—*Left (right) about—turn !* The turning is taken as quickly as possible without the rhythm being broken.

28. **Endurance Running.**—One-half to five minutes. The running is taken on the toes or on the whole foot, in time or without time as it suits the children best, for the difference can be considerable. The breath must be taken through the nose, the mouth kept closed. The running begins rather more slowly than ordinary running; not until after about half a minute can the speed be increased. The length of the run is also increased very gradually; every fourth or fifth time it is taken half a minute is added. The children must be in good training before the run can be extended to five minutes. Any child must fall out if he feels much fatigued. The teacher must keep his attention on the least strong children and on those who have been absent on account of illness. The teacher now and then during the running informs the children how long they have been running. Now and then he commands an about turn or wheeling in "S" over the floor, so that the children may not always have the same side turned toward the centre of the room. The running must be followed by a couple of minutes of ordinary marching.

29. Running a Race.—25 to 100 yards. This is better taken out of doors. The children are divided into teams, with as many in each team as can be distributed over the breadth of the course, with at least two arm's-length distance between them. Each team quickly takes up position at a marked-out line. On the command, *Ready !* the children put one foot exactly on the line, the other is put so far back that the front knee is strongly bent, the trunk leans well forward over the knee, the arms are forward, the hands and mouth closed. On *Go !* a clap, or a whistle, the race begins. A pair of reliable children can mark the goal and be judges. The best or two best in each team can be picked out, and after the necessary rest run a final heat. If there is a great difference in the ages and sizes of the children, suitable handicaps can be given. If racing is taken in the gymnasium, the children can run up and down the room two or more times. Running a race can be taken from various lying positions and over various obstacles. If the run is taken across the gymnasium it can begin or end by the children hanging from the top wall bar.

C. Game-like Exercises

Infants have not much sense of time, but time exercises prove amusing, especially when they are combined with stamping (marked step or beat), clapping of hands, counting aloud, and so on, as they are fond of noise, not least when it is systematised. The children's sense of time, therefore, should be trained by a number of time exercises with the time marked. There is a rich opportunity of doing this in marching. At the same time as the child is taught to keep step with the other members of the class it must learn mastery and control of its movements. Marching exercises combined with singing are excellent both for young children and for older classes. Certain exercises suitable for infants and older children will be described in the following.

30. Marching on the Spot with Stamping (in Time).—*Stamping on the floor—go ! Halt !* The stamp is made by lifting the knee slightly and putting the foot firmly on the ground, unlike the beat, which is done with straight knee. This form of marching is taken because it is easier to move the feet in time on the spot than in marching forward.

31. **Marching with Stamping and Clapping.**—*With stamping and clapping, forward—march ! Halt !*

32. **Marching with Stamping, Changing suddenly to Noiseless Toe March ("Light Steps, Heavy Steps").**—Practised in order to make the children used to walking lightly. The change is best done at a whistle.

33. **Marching as Dwarfs and Giants.**—The command may be : *Marching like dwarfs—go !* The children make themselves as small as possible by bending the knees and walking in spring sitting position. *Marching like giants—change !* The children suddenly make themselves as big as possible by stretching the knees, raising themselves on their toes, and stretching the arms up.

34. **Marching Sideways in Flank Arrangement with Hands on Shoulders of the One in Front.**—*Hands on shoulders—place ! Heels -raise ! Sideways to the left—march ! Class- -halt !*

35. **Marching Slowly.**—*Slowly, forward—march !* In slow march all the movements of the legs may be done with particular care. The knee is well bent as the leg is moved forward ; the ankle is straight ; the toes are placed on the ground, and the knee is fully stretched as the heel is lowered. There should be no muscular tension in the free leg during its swinging forward. The muscles of the supporting leg must act firmly and at the proper moment. To begin with it is found useful to make the pupils look down so as to help in the controlling of the leg movements (in spite of the fact that the erect carriage cannot be kept).

Heavy walking may be due to one or more of the following mistakes : too slight knee bending as the leg is swung forward ; too great bending of the knee as the foot is put down ; the toes raised too much so that the heel touches the floor too long before the ball of the foot ; too slight difference between the contractions and relaxations of the leg muscles. These faults are sought counteracted by a certain exaggeration of the correct movements.

36. **Marching with Two Steps and One Step Changing.**—Step changing is taken after two ordinary steps to the counting, 1——2——1—2—3.

37. **Marching with Three Steps and Two Step Changings.**—Step changing is done twice in succession after three ordinary steps to the counting, 1——2——3——1—2—3 and 1—2—3.

38. **Marching with Three Steps and a Curtsey.**—Three ordinary steps are followed by a curtsey. Supposing the third beat falls on the left foot, the right leg is advanced with straight knee and ankle ; by a slight bending of the left knee a curtsey is performed. The teacher counts, 1—2—3—4. (*four* said somewhat drawn-out).

39. **Marching with Knee and Heel Raising.**—During slow marching with knee raising a heel raising is added at each step, but the heel raising should not be done till the knee is just passing hip level. By an easy movement the back is further straightened without any tenseness. The rhythm should be like a slow waltz rhythm.

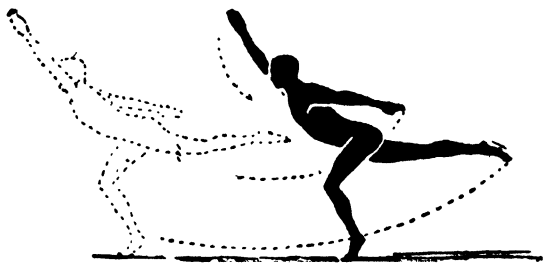


FIG. 65.*Seven-league Boots.



FIG. 66.*

Beginners will have difficulty in keeping the balance. The exercise is therefore introduced in ranks with chain grasp ; but soon the pupils ought to be able to do it steadily without support.

40. **Seven-League Boots.**—Marching with very long steps. The children compete with one another as to who can cross a certain distance in the fewest number of steps, each keeping his own time.

The steps can also be taken as a series of jumps with large arm swingings (Fig. 65).

41. **Free Marching.**—Free marching during which each child marches according to its own time may by contrast heighten the children's sense of time in marching done in step. It may also teach them to move lightly and easily from place to place, e.g., across the gymnasium while the teacher, with his back turned, listens and afterwards tells them whether it was done lightly or not.

* L. M. Törngren · Lärobok i Gymnastik.

42. **Running on the Spot with and without Stamping.**—Can be done in two ways. The feet can be swung up somewhat behind—this is the best form for small children—or the knees can be slightly raised. The children most easily keep time in the running by stamping on the floor or clapping their hands.

43. **Running without Time, with Turning About on a Signal.**—On a signal the children must turn about as quickly as possible and continue running in the opposite direction.

44. **Running with Heel Swinging Backward-Upward.**—During running on the toes with short steps the heels are swung backward-upward alternately as high as possible (Fig. 66; see Vol. I, p. 163).

45. **Kick Running.**—During running on the toes with short steps, the legs, fully stretched at knee and ankle, are swung forward alternately; the body kept erect and inclined slightly backward; the arm swinging greatly increased.

46. **Galloping.**—If the left foot is to be in front the children turn half to the right. This form of running is somewhat similar to running sideways, as after the left foot is moved forward there is a hop by which the right foot is brought quickly forward to the left, with an audible closing of the heels. This gallop can either be taken round the room in flank arrangement or across the room in front arrangement. Forward galloping may also be taken with, say, four steps left foot leading, then four steps right foot leading.

47. **Running with a Slight Knee Raising.**—The running is done on the toes with short steps, and the knees are raised ("prancing horses").

48. **War Dance.**—This is a kind of knee raising march, but while the left knee is raised high up a little hop is taken on the right foot and the right arm is swung forward, bent at the elbow, until the upper arm is about horizontal and the forearm vertical; then right knee and left arm; hands closed, body well stretched.

49. **Changing between Running and Marching** (or between different forms of running).—In order to teach the children a good control of the body when changing suddenly from running to marching the following exercises may be taken:—

(*a*) *Eight running steps and eight marching steps.* With practice the running steps are made quicker and longer as this makes it more difficult to change to ordinary steady marching.

(*b*) *Four running steps and four firm marching steps.* The four marching steps are done in slow time with a beat on each step.

(*c*) *Eight running steps and four running steps with knee raising.* The knee raising may be done with or without an intermediate hop.

(*d*) *Running with two short steps and one long step.* The long step is taken as a running jump (p. 124). The teacher counts, 1—2—3, with a stress on 3; or instead of 3 he may say *jump !*

50. Running Sideways in a Ring with Chain Grasp ("Dancing Round the Christmas Tree").—The children join hands in a ring and run round. They can count aloud, 10, 20, 30, and so on, till they reach a number which the teacher has given beforehand—for instance, 80 or 100; on this number they quickly take spring sitting position; the point is then to keep the balance in this position.

51. With a Hop and a Jump.—The children stand in a ring and number off in twos; the twos fall in behind the ones, ones join hands, while twos put hands on their shoulders, arms bent. During the song they do running sideways—say, to the left; on "three" in the song all in the outside ring clap hands, pause for an instant without breaking the time until the one to the right in the inside ring is in front of them; they put hands on his shoulders and the running continues.

"With a hop and a jump we dance along,
We're keeping time to a rollicking song,
And to change our partners we are free
As soon as we all cry. 'One, two, three.'"
(Say to tune *John Peel*)

Twos change partners in this way several times, always with a clap, which must be absolutely simultaneous. After this the running should be taken to the opposite side. Ones and twos must change places. The game is strenuous, and must not be played for very long.

§ 4. Jumping and Vaulting

The exercises of this group are among the strongest, most beautiful, and liveliest exercises in gymnastics. They are especially fitted to arouse the spirit of competition, which, as long as it is kept within proper limits, is a splendid means of putting life and speed into the work. They often claim a certain

daring, and thus teach courage and self-confidence. A jump or vault always consists of a series of movements which must be exactly suited to one another in time, strength, and speed, if the movement is to be successful, and therefore it trains co-ordination (refer to Vol. I, p. 7).

All jumps and vaults begin with a take-off, with or without a run and preparatory jump, and end with a landing.

Jumping exercises are those which are performed by help of the legs alone without support against any apparatus (free jumps). When the jump is assisted by the body being *suspended* from the hands during the whole or part of the jump it is termed a heave jump. Vaults are those where the arms assist by the body being *supported* by the hands on some apparatus. To jumps belong introductory jumps, long, deep and high jumps, and heave jumps ; all others are vaults.

The apparatus used for jumping and vaulting exercises must not be placed too near a wall, other apparatus, or the like, as the children in the landing may possibly fall against such, and so hurt themselves.

A. The Run, Take-off, and Landing

1. **The Run.**—Most jumps and vaults begin with a run in order to procure the forward impetus in the jump. The run begins from the erect position with a heel raising and a couple of walking steps which pass over into running. This run must increase in speed the nearer the pupil comes to the place for the jump, and yet must be so regulated that it can end at its greatest speed on a fixed spot with a particular foot forward in the last step. In this transition from strong run to jump lies the greatest difficulty, as in order to get the run regulated the pupil will be very much inclined to stop the speed in the last steps instead of increasing it. He therefore must take care that the steps suit both in number and length, so that the transition to the jump can take place without any slackening of speed. The length of the run must be according to the length of the jump.

Introduction.—The run is short at first and measured by a certain number of steps from 1 to 3, which can be practised walking before they are taken running. This short run, which is especially used for small high and long jumps, must begin alternately with left and right foot. The pupils learn by this

run to take off with either foot, to increase the speed, and to get up speed in a few steps—i.e., quickly to collect themselves and be ready for a sudden output of strength ; besides this, the run with a certain number of steps makes the transition to the jump easier. To begin with, the heel raising should be commanded. The short run should also be used to a certain extent in jumps and vaults which need a preparatory jump in order to train the pupils to take off for the preparatory jump with either foot. When this has been taught it is easier to get a long run to suit.

When, after this, a run with any number of steps is to be introduced, the run at first is comparatively slow, or even a walk ; but in this case, too, the speed must increase towards the place of the take-off. During this introduction the pupil must think more of the run than of the jump. (In spite of this the jump often may turn out unexpectedly well, which shows the importance of a proper run and correct transition from run to jump.) Later the speed of the run is increased.

Common Faults.—(*a*) The run does not begin from the erect position ; no heel raising is taken.

(*b*) The run is made uneven by a little hop or change of step being taken, or by short steps being taken in between longer ones, and so on.

(*c*) The run is not taken in a straight line, but in a curve or zigzag.

(*d*) The run is on the full foot instead of on the toes.

(*e*) The speed is slackened at the end of the run, either by the steps not suiting or by the trunk being raised.

(*f*) The arms swing too strongly, so that they even pull the shoulders up and down ; they are swung in front of (across) the body ; they are not swung equally, the one being straight, the other bent.

2. The Take-off.—The take-off can either be done by one foot at a time, as in high jump and long jump (single take-off), or it can be done by both feet at once, as in most vaults (double take-off). Any take-off is done by a quick bending, followed by a quick and strong stretching in the hip, knee, and ankle joints. It must always be taken on the toes ; this must especially be observed after a run, as otherwise the take-off is a heavy "stamping" action ; the ankle-joint, however, must not be kept stiff, but must be springy, so that the heel is pressed down and almost touches the ground. It is only in this way

that the strong calf muscles come to work with full elasticity and strength. When a single take-off is used, it should be practised on each foot in turn, as the last foot does the greatest work.

When a double take-off is used, there must be inserted between the run and the jump, a little long jump, the so-called preparatory jump. The preparatory jump has no other object than that of bringing the feet together for the take-off; it cannot in itself increase the speed for the jump. The smaller and quicker it is, and the less strength used for it, the better. It must therefore be made short and quite flat over the ground. The forward inclination of the body at the end of the run must be kept during the preparatory jump.

In a few exercises (such as standing, overswing with single take-off, the so-called "hand spring") a preparatory hop, the *forehop*, is taken, i.e., a short hop forward on one foot at the end of the run.

Introduction.—The preparatory jump can be taken with beginners as an independent exercise without any jump following. The pupils then remain standing for a moment before the apparatus, up on toes, with slightly bent knees, the hands supported on the apparatus.

Common Faults.—(*a*) The take-off for the preparatory jump is too strong, so that the preparatory jump is too high. In this way the speed forward is checked.

(*b*) The preparatory jump ends heavily (on full foot) and with the heels apart.

3. **The Landing.**—In the landing* the fall of the body must be stopped gradually, as the ankle, knee, and hip-joint yield softly and elastically just at the moment that the toes touch the ground. The knees are bent to right angles and pressed well outward; the feet are turned out at the same angle as in the erect position, with the heels raised, the arms stretched down along the sides, the trunk vertical, and the head well up. The knees are then stretched just as quickly as they were bent, and the heels are lowered; during this movement the balance of the body must be steady, so that the exact erect position can be taken before the pupil leaves the landing place. Thus, in a landing the legs must work like a spring which is pressed together and quickly springs up again.

* The word "landing" is also used in a wider sense to denote the whole part of the jump from the moment when the body begins to descend.

Importance and Introduction.—The landing is an important part of all jumping and vaulting exercises. It depends on the landing whether the jump or the vault is to end without any danger to the performer. A well-controlled landing is a safe landing; it is in the impact with the floor that the accidents happen.* The impression of strength and beauty given by a well-performed jump or vault will be enhanced by a good landing but entirely destroyed by a bad one.

The landing is a *difficult part* of most jumping and vaulting exercises, and a long and definite training is necessary. Above all, a landing is a balance exercise. The body has not only speed downward but also, as a rule, speed forward, and its position must be adjusted so carefully that the speed downward-forward is stopped at the moment when the body is balanced on the toes, i.e., on a base of support which is very narrow from back to front.

Landings require good co-ordination, but a great demand is also put on the leg muscles, especially the extensors of the knees. The impetus of the falling body puts a much greater strain on these leg muscles than an ordinary standing knee bending does. Consequently, the muscles of the legs must be strong and well-developed before a landing can be done as it ought to be done. Both nerves (the co-ordination) and muscles must be highly trained.

The teacher cannot teach a landing carefully and properly unless he is familiar with all its details; he must know which faults to avoid and how to counteract the various faults. The movements, during landings, in the three main joints, ankle, knee, and hip, will now be discussed.

The *ankle joints* are hinge joints. They must be in a position that enables the knees to be moved well outward during the knee

* The accidental mishaps are sprains of the ankle joint, more rarely of knee, elbow, and shoulder joints, fracture of the legs and, in a fall forward, of the arms, displacement of abdominal organs (stomach, kidneys, liver, uterus, etc.), concussion of the brain, strain of the lumbar spine. But, fortunately, all these injuries are rare and may be prevented by careful training in landings During such training all the tissues dealt with here will be strengthened. The joints will be stronger so that greater strain is needed to injure them. The resistance of the bones will increase proportionately with the strength of the muscles—the stronger the muscles, the stronger the bones. The tissues that keep the abdominal organs in place will be strengthened. So here the old truth holds good that if it be dangerous to practise physical exercises, it is still more dangerous not to. The untrained runs the greatest risk; the clumsy individual is the one most easily hurt.

bending, i.e., the feet must be turned out. When the feet are turned forward, a common fault in women gymnasts, the base of support will be small from side to side. The difficulty of keeping the balance will then be increased; there is a greater danger, too, of twisting an ankle by one of the feet turning over on its outer edge. The fault of turning the feet too much outward is less common; it may be found in people who are knock-kneed and walk with their feet turned out. In such cases the knees will be pressed inward during the landing.

Beginners often keep their ankles too stiff; their calf muscles contract too strongly and do not give. This produces heavy landings and sore feet.

The *knee joints.* It is by a yielding in the knees above all that the fall has to be broken. They must be moved well outward as this will make it easier to keep the trunk vertical; one is inclined to lean the trunk forward when the knees are brought too close together (refer to Vol. I, p. 155). When the knees are moved outward the adductors are extended. Landings will therefore counteract knock-knee (which is of special importance to women).

The trunk should be kept vertical as this means greater work for the extensors of the knees and corresponding development. When the knee is bent so that the thigh is horizontal the length of the thigh-bone will be the length of the lever on which the weight of the body is acting at the moment. The more the body leans forward, the shorter is the lever on which the weight acts (the lever must be reckoned from the knee joint to the point where a vertical line from the centre of gravity of the trunk crosses the thigh-bone) and the less the work for the extensors of the knees. For this reason people with weak extensors always lean forward in landings. Only people with strong extensors are able to keep the trunk vertical in a landing, and it is only they who are able to stop in the spring standing position and from there quickly and easily stretch the knees, making their legs act like a spring pressed down and quickly released.

The weaker the knees, the smaller the knee bending, because when the knee bending is small the lever on which the weight of the body acts, is short, and the work of the extensors of the knees is made correspondingly less. Pupils with weak extensor muscles must learn to bend down to spring sitting position. This position is easier than spring standing owing to the fact that the muscles on the back of the thigh come into contact with

the calf muscles, and in that way the extensors of the knees are assisted in the carrying of the body. To this should be added that it is easier to keep the balance in the spring sitting than in the spring standing position as the centre of gravity now lies lower.

The knees should give quickly in a landing. When the extensors of the knees are kept too tense the knee bending comes too late ; the landing will then be heavy and cause a jar up through the body.

The *hip joints*, like ankles and knees, should give as soon as the feet reach the ground and in that way help to break the fall. This bending of the hips is also important for another reason. The bending makes the lower part of the trunk move somewhat backward ; because of this the upper part of the trunk is brought into a vertical position and the small of the back is less likely to be hurt. It must be remembered that in practically all jumps and vaults the body has speed forward ; it should therefore be inclined backward at the moment the toes touch the ground (see Fig. 73). The line of gravity now falls behind the loin, and the trunk, because of its inertia, will tend to bend backward in the loin as the fall stops. This is the danger point of the landing. In big jumps and vaults the heavy upper part of the body will bend the loin backward suddenly and with great force unless the abdominal muscles are ready and able to prevent it. A bending backward of this kind may hurt the lumbar spine and make a person bedridden for months. Fortunately the effects are generally less serious. But even a slight bending backward, not uncommon, may be unpleasant enough. A quick bending of the hips will prevent all this, as it will bring the trunk into vertical position as already stated. After a short practice the bending becomes quite natural ; only the absolutely untrained forget it.

As mentioned before, the body must be inclined backward, because of the forward speed, at the moment the feet are placed on the ground. Owing to its inertia, the body will continue its movement forward. If it be vertically above the feet at the moment they touch the ground one will fall forward in the landing as beginners often do. In order to "stand" in the landing the body must incline so much backward that its forward movement stops just when it is vertically above the feet. It is easily seen that a high degree of co-ordination is needed for this.

Ordinary knee bendings, especially deep knee bendings, are excellent as *introductory* exercises (see Vol. I, pp. 152 and following). With the hands grasping an apparatus or with chain grasp, the knee bending and stretching may be done without any pause in the spring sitting position and according to the usual time in landings.

Also skip jumps with straight knees and a good give in the ankles is a good introduction to landings.

In preparatory exercises for landings, the first consideration is to eliminate the difficulty of keeping the balance. The difficulty of keeping the balance tends first and foremost to make the beginner commit the fault of contracting his muscles too tensely and the result will be that he does not give quickly and at the right moment. The first landings should therefore be *landings with support.* The following may be used.

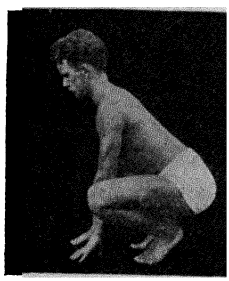


FIG. 67.—Crouching position.

(*a*) **Four Standing (Crouching) Jumping on the Spot.**—After the command *On all fours—down !* the word *Jump !* is given. The children jump as high as possible and land again on all fours ready for the next jump. This exercise is so simple that it may be taken with the children at their first lesson. It takes up so little time that it can be used at every lesson (10-12 jumps may be done within half a minute) and it is most valuable as it introduces all the essential points in a landing.

The position on all fours needs no detailed explanation ; it may, however, be necessary to point out the position of the knees, outside, and not between the arms (Fig. 67). The first jumps may be a little awkward. The children may kick their legs about, swing the heels up instead of letting the legs hang down straight ; they generally keep their arms in front of the body and do not raise the trunk ; and in the landing they bend forward so as to reach the floor without bending the knees deeply. But all these faults will soon be done away with. The exercise teaches them to keep the knees well apart as they have to make room for the arms. It is easy for them to give quickly and softly in all the joints of the legs as they have no difficulty in keeping the balance. The extensors of the knees work from full extension to full contraction and are therefore

well trained. And the exercise makes for suppleness of knees and ankles.

The exercise is suitable not only for infants but for children throughout the school, because the demands as regards height and lightness of the jump can be constantly increased. If one uses it in one's private morning exercises it will keep one's legs strong and supple far into old age.

Well-trained gymnasts can do it from the ordinary spring sitting position, i.e., without the hands being supported on the floor and with the arms by the sides. They will soon discover how much more difficult the exercise is when the balance has to be mastered.

When at any time during the training the pupils might bend the knees insufficiently in landings after jumps and vaults, just because of the balance difficulty, the teacher would do well in allowing them to land on all-fours for a time. It must not be forgotten, however, that four sitting position as part of the landing has this disadvantage that the trunk cannot be kept erect. If it be used too consistently the pupils will get into the habit of leaning forward in all landings, a habit which they may have difficulty in getting out of.

(*b*) In **Grasp Spring Sitting, Jumping on the Spot,** the pupils, in spring sitting position, grasp a wall bar at head level or slightly above. The jump is first taken vertically upward without the arms pulling the body towards the wall bars. This form is very suitable for little children. As the hands are supported on the bars and not on the floor it is possible to keep the body vertical in the landing, the more so as the wall bars prevent any leaning forward. The knees must be moved outward, otherwise they will knock against the wall bars. The grip on the bars makes it possible to use the arms so as to make the jump high and the landing light. The children may practise it in individual rhythm, each one jumping as often as possible till halt is said, or it may be taken in joint-rhythm a certain number of times.

Older children and grown-up pupils may use the arms in pulling the body towards the wall bars so that the lower part of the chest touches the bars. The arms now work as in jump to balance hanging position on a beam and they must be fully stretched. As the body cannot be carried forward as much as in jump to balance hanging on the beam the head must be carried well back as in a high trunk bending backward. The legs

are moved slightly backward, too, so that the whole body forms a slight curve backward. The work of the arms is considerable, and the exercise is altogether valuable and beautiful. It can be taken in individual rhythm or in joint-rhythm. In the latter case number-ones may jump up as number-twos land ; number-ones beginning in spring sitting position and number-twos in toe standing position ; as number-ones jump up number-twos go down into spring sitting position, and so on, number-ones always a beat ahead.

(*c*) **Stretch Hanging, Landing.**—The beams a little above stretch height. On the word *down !* the children open their hands and fall down into four sitting position (the hands supported on the floor), later into spring sitting position with the arms by the sides. The arms should be moved down the shortest way, i.e., closely along the sides of the body.

The children can practise freely, remaining a moment in the four sitting position, or performing the landing in time. But finally the teacher should conduct the exercise by numbers so as to instruct and correct.

An exercise of this kind should be taken when the beam has already been put up for other exercises and only when there are beams enough to enable at least half the class to work at the same time ; otherwise time will be wasted.

(*d*) **Standing, Jumping Upward,** which is a useful exercise, too, for the training of landings, is described on page 120.

The landings previously described have all been *vertical landings.* The following exercises introduce landings after a forward movement in which the body is inclined backward when the feet touch the floor. They might be called *oblique landings.* It is not easy to learn these oblique landings because the difficulty of keeping the balance is considerable. It would be a mistake to go on practising vertical landings till they have been mastered before introducing oblique landings. When vertical landings have been roughly learnt, oblique landings are taken up, and one proceeds along parallel lines with the two forms and with ever greater demands as to performance.

The following exercises are recommended.

(*e*) **Standing, Jumping Forward.** Described on page 121.

(*f*) **Standing, Jumping Over Low Apparatus.** The children practise freely jumping over lying or standing stools or forms, over a beam or a rope at low level, etc. If stools be

used each child can stand in front of his stool at his section of the wall bars or in open order. Now and then the jump is taken to the teacher's command.

(*g*) **Jumping Forward with One (Two, Three) Step.**—The exercise is described on page 121. If it be taken for the sake of practising landings, and if the children are keen and well disciplined, they may be allowed to practise freely on the gymnasium floor. The exercise should, however, be practised mainly to the teacher's command so that the children learn to use both feet equally well. The development of a "best foot" should be avoided. To begin with the landing is always on all-fours.

After some practice the children can jump towards the wall bars, towards a beam at hip level, or towards a partner standing with both hands stretched forward. The child takes support on the apparatus or is supported by its partner, and in that way a landing with the trunk held vertical is learned. The exercise can be taken freely, especially at the wall bars; the support should be loose and should be done away with gradually. If taken to the teacher's command it is an excellent preparatory exercise for landings in time, with or without counting aloud.

(*h*) **Long Jumps.** Two chalk lines are drawn so near together that the children can easily jump across. If too wide apart the landing becomes so difficult that the jump will be of no value as an introduction to landings. But it is necessary to keep to the landing on all-fours for quite a long time because of the balance difficulty and even when the jumps are short.

(*i*) **Jump Over Low Apparatus.**—Practised as standing jump but with a short run, first taken freely, especially with little children, later with a short run, three, two and finally one step. As the children must learn to take off with either foot, these jumps should generally be taken to the teacher's command.

The class arrangement should be such as to enable all to jump at the same time. Children can easily do 10-15 jumps in succession as the exercise is not very fatiguing. It is waste of time to let only two or three children jump at a time while the rest are looking on.

The beam is a good apparatus for trained children who can clear a fair height, but only when many beams are at disposal. For a class of about 30 one should have six and not less than four beams in use; the children stand opposite the beams at

the distance required by the run, five or six children at each beam, or—when there are not enough beams—10 or 12 in two ranks. On the command, *Take off with the left (right) foot, ready—go !* each squad jumps and the next squads move forward and take up the proper distance for the run.

When the children are familiar with the class arrangement they can in this way be given a splendid training in high jump without encroaching too much on the time set apart for other exercises.

(*j*) **Crook Standing, High Jump** can be done on stools, forms, or low beams with the flat edge upward. When stools are used the exercise can be taken in open order ; at the beam zigzag arrangement is used as this gives good room for each pupil and prevents the beam from swinging.

The exercise may be done freely or to command. While four sitting position is used for the landing the children on the word *Ready !* get up from this position, turn round, and place one foot on the apparatus ready for the next jump. After each turning the foot nearest a certain wall must always be placed on the apparatus ; in that way the children take off alternately with the left and the right foot.

This exercise is valuable because the take-off with each foot is practised and the jump will be extra high. Because of this extra height, the work of the leg muscles in breaking the fall of the body will be greater than in the previous introductory jumps ; the harder the muscles have to work, the more tense they will be ; it will therefore be more difficult to give softly in the landing, and it will also be more difficult to find the balance.

When the landing on all-fours has been practised for some time the pupils may work in couples, number-twos standing with the arms stretched forward ready to grasp the hands of number-ones in order to steady them in their landings, and to help them in keeping their trunks vertical.

(*k*) **Standing, Deep Jump Forward.**– Described on page 122. As in (*j*), the landing from a greater height puts more strain on the leg muscles and makes the balance more difficult.

(*l*) **Stretch Hang Standing (Stretch Hanging), Deep Jump from Wall Bars.**—The children, with their backs to the wall bars grasp the bars as high up as possible. Both legs, kept together, are swung vigorously forward, the leg swinging is stopped with a jerk, the hands let go the grip, and the landing

is made first on all-fours (crouching position), later in spring sitting position with or without support from the partner as described under (*g*) (see Vol. I, p. 311). The children may practise the exercise freely. *Halt !* must not be said sharply as in that case a child may let go the grip at the wrong moment and consequently have a fall ; the keener the child is to obey the teacher's command, the more likely this is to happen. When the exercise is done to command so that the children remain in the four sitting position after landing, the word *up !* can be given, on which the children in the quickest possible way take up the starting position. After some practice the exercise is done from stretch hanging position. The height from which they jump should be increased gradually but very slowly as otherwise a less agile child might let go the grip at the wrong moment and have a nasty fall hurting the back.

(*m*) **Leap-Frog.** The previous introductory exercises to landing after jumps are also to a certain extent preparatory exercises for landings after vaulting. As regards the movements and the positions of the body, jumps and vaults are different, however, and this will consequently influence the landings. Owing to the support of the arms in vaulting, the body is brought into positions not found in jumping. The body is generally bent or inclined forward, and it must be raised by a sudden stretching before or during the landing. To this may be added that in vaulting the body is projected forward at a greater speed than in jumping (long jump excepted). Because of all this the landings after vaults are somewhat different from those in jumping and considerably more difficult ; special training is therefore necessary. Almost all vaults are done by the pupils one at a time. It would be waste of time if the teacher now tried to instruct each pupil as regards his landing, keeping him in the spring standing position while correcting details, etc. Instruction in landing must be done as a class exercise, but there is only one vault that lends itself to this, namely leap-frog. This is a vaulting exercise in which each pupil in turn takes the place of vaulting apparatus for his partner, and we have here an opportunity of practising landings in vaulting that should not be missed.

Leap-frog is described on page 145. The landing is done at first on all-fours. The children must not fall down heavily on their hands, but should touch the floor only lightly.

They may be divided into groups of three. Number-one is

the "back"; number-two vaults, while number-three stands with his hands stretched forward in readiness to save a fall and to support number-two so that he may land with the trunk vertical as described under (*g*). The spring sitting (later the spring standing) position is kept a moment before the landing is finished.

Front standing, heave jump in double beam is another exercise that lends itself to classwise teaching of these landings. Five or six pupils may use each beam at the same time; that means 20-24 pupils when four beams are at disposal. Heave jump in two ropes may also be practised when there are 10-12 ropes at hand.

In all these exercises the landings should be taken by numbers to begin with and with the teacher taking charge. The pupils remain in the spring sitting (or spring standing) position, the teacher corrects, and the knee stretching and heel lowering are then done on the command, *Stretch—lower!*

After some practice the landing is done in time, the knee stretching immediately following the knee bending, so that the "springy" character of the landing is produced. The counting is done firstly by the teacher, later by the pupils. A sharp and energetic counting is very helpful. 1 is said as the feet touch the floor; 2, as the knees are being stretched; and 3, as the heels are lowered. Sometimes the pupils should be kept on the toes (after 1—2). This teaches them to get a good balance on the toes, and furthermore, the heel raising is an excellent exercise for developing a high instep and making the foot "like a spring." This heel raising should not be omitted in the frequent landings during a lesson. A very valuable little exercise is withheld from the pupils if the heel lowering be done simultaneously with the knee stretching.

A landing should be judged not only by the eye but also by the ear. Lightness is a sure sign that the muscles act properly with a springy give. The children must therefore be told to listen to their landings. Little children may understand this by contrast when at one time they are told to jump down as heavily as possible, "like a block of wood," and the next time told to be "as light as a feather." Finally, they may be asked to perform a landing one at a time in order to show how lightly they can jump.

Common Faults.—(*a*) The joints of the leg, especially the ankle joints, are kept too stiff at the moment that the feet touch the ground ; the landing then sounds heavy, a harmful jar goes up through the body, and the balls of the feet easily get sore.

(*b*) The feet are not turned out sufficiently ; this makes the balance more difficult, and the ankles more easily come to harm.

(*c*) The knees are not bent quickly and deeply enough ; they are turned inward.

(*d*) The trunk falls forward in the landing, the head falls forward, the eyes look down.

(*e*) The hip joints do not yield sufficiently and quickly ; as the lower part of the trunk in that case is too far forward, the upper part is inclined to bend suddenly and strongly backward ; this can be dangerous for the loin (especially with women).

(*f*) The landing is not completed.

The better the landing is introduced, the quicker the mats may be dispensed with ; this should be aimed at, because mats are dusty, hamper to a great extent the introduction of good landing, and cause almost as many accidents as they prevent, as they often give an unsure and uneven surface to land upon.

A special landing is landing on one foot, or *divided landing* as it is called. One foot touches the floor and breaks the fall partly, but immediately afterwards the other foot is put down helping to break the fall. Divided landing is used in a few jumps and vaults. As there is only a slight bending in the hip, knee, and ankle joints of the leg on which the main part of the landing is taken, the fall must be broken by an additional movement of the pelvis, which, only being supported on the one side, is lowered on the opposite side and thus gives quite an important amount of spring. Besides, the other leg is brought up so quickly that it can help to break the fall too. It will be seen that the pelvis performs a rocking movement as in marching and running (page 79), but more marked. The side bendings of the spine caused by the rocking of the pelvis is also marked, and if the abdominal and dorsal muscles be not strong enough an unpleasant bend in the small of the back may result. Divided

landing requires greater muscular strength and better control than ordinary landing.*

B. Introductory Jumps

4. **Standing, Jumping Upward.**—(*By numbers*) *one jump upward*—1—2—3—4—5. On 1 there is a quick heel raising, on 2 a quick knee bending, on 3 a take-off. The body then springs vertically upward and is straightened by a strong stretching; the head and legs are pressed a little backward, the ankles stretched. When the feet again touch the ground there is a springy yielding of the ankle, knee, and hip-joints, until spring standing position is reached; on 4 there is a quick knee stretching, and on 5 a heel lowering.

When the jump has been practised by numbers, it is taken in time as far as the landing, so that the pupils stop in the knee bending. Corrections are now given as regards the trunk, which must be vertical, and the knees, which must be moved well outward (see Vol. I, pp. 153-155, Figs. 49-53, and pp. 158 and following). The command for the jump then is: *Stopping in the landing, one jump upward—go! Stretch! Lower!*

After this the whole exercise is done in time on the command: *One jump upward—go!* The teacher can then lead and support the time by counting 1—2—3 for the jump, emphasising 3 (the take-off), and again 1—2—3 for the landing, so that 1 falls as the toes touch the ground, 2 as the knees are stretched, 3 as the heels are lowered. Later the pupils themselves can count aloud at first for the landing only, later for the whole exercise; this can help greatly toward getting the movements distinct and simultaneous.

Jumping upward can be combined with a turning, about turning, arm swinging sideways and upward (Fig. 68), leg parting, and arm swinging sideways with leg parting.

Introduction.—Jumping upward at first should be practised with support for one hand on a wall bar, or on a beam at hip height, both by numbers and in time. Support may also be given by a partner, ring grasp being used.

*If one, while standing on both feet with heels raised, relax and fall down on the heels with stiff knees, a much worse jarring up through the body is felt than if one does the same standing on one foot only. This indicates how much the give in the hip joint means in breaking the fall when only one hip joint is supported.

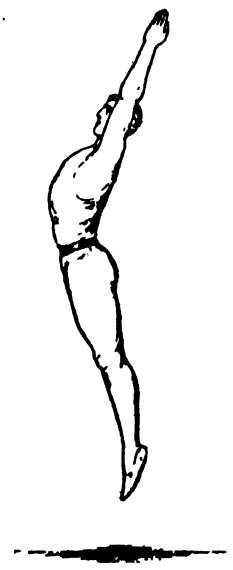


FIG. 68

Common Faults.—(*a*) The heel raising and the knee bending in the first and second movements are done too slowly.

(*b*) In the jump the knees and ankles are not stretched, the head is poked forward, and the back is not straightened.

5. **Standing, Jumping Forward.**—*Jumping forward*—1—2—3—4—5, or *go!* While the knees are bent in the second movement the body is inclined a little forward, the arms are moved back to the drag position, and the hands are clenched.

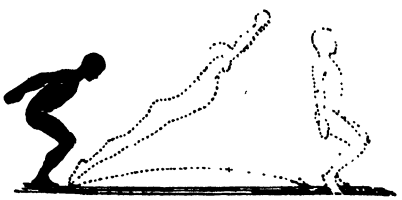


FIG. 69 *

Together with the take-off in the third movement, the arms are swung forward to about reach position to assist the movement forward in the jump, and are then brought quickly down to the sides again (Fig. 69).

After the jump has been taken in mass—in which case correct form and steadiness are more important than the length of the jump—it can be taken as an individual exercise over chalk lines or the like, so that emphasis is now laid upon the length of the jump too.

6. **Jumping Forward with One (Two, Three) Step(s).**—When performed with one step, the following command is used. *Jumping forward with one step, left foot*—1—2—3—4 or *Go!* On 1 the left foot, a little turned out, is moved a step straight forward and put on the floor with the toes only touching; on 2 the right leg is swung quickly and strongly forward-upward past the left, which at the same time pushes strongly off so that the body is projected forward, describing a curve not too low. The body is straightened and the landing taken. On 3 the knees are stretched; on 4 the heels lowered.

* L. M. Törngren: Lärobok i Gymnastik.

When two or three steps' run is taken, the exercise may be done a few times by numbers in a corresponding manner. After a short practice the jump is taken in time, first with the teacher counting, later the pupils themselves. The increasing speed in the run should be indicated by the counting, which can be made very stimulating in this exercise. The exercise begins with a heel raising so as to give the pupils the habit of doing the run and the take-off on the toes. During the heel raising the body should fall forward so as to make the first step long and in that way give speed. To emphasise the heel raising a long drawn out 1 ! may be commanded. The rhythm for a jump with one step run will then be, 1——1—2, with two and three steps, 1———1——2—3. One does not count further than three even with three steps' running, as the last two steps follow one another in very rapid succession. The count for the take-off should be commanded with special emphasis. The counting for the landings will always be 1—2—3 (as mentioned under 4).

These jumps forward serve as good practice for the run and the stretching of the body. They are nice exercises which require and develop good control of the body and springiness.

The jump may also be taken as *run standing, jump forward with one* (*two, three*) *step*. When taken in this form it is easier to get speed forward at the very start. The usual heel raising before the first step is omitted.

The jump can also be taken with a turning to the left or right in the landing, which now becomes more difficult. The exercise may then be done in couples. The pupils stand side by side and join hands. When the run is taken with one or three steps they begin with the foot nearest the partner ; when taken with two steps they start with the foot furthest away. In the jump they turn and face one another, clasping both hands and supporting each other in the landing. The jump can also be done with a *double turning*. In the first landing, as the knees are being stretched, the pupils jump and turn to their original fronts. This form too may be done in couples.

7. Deep Jump Forward, with Single and Double Take-off.—Stool, form, low beam. *On the stool* (*form, etc.*)*—up ! Throwing the left foot forward, deep jump forward—go !* While the left leg is swung forward fully stretched in the knee and ankle, the right knee is a little bent, and there is a take-off on the right foot, after which this foot is swung quickly forward

and brought up to the left. In the jump the body, which must be very well straightened, is moved in a curve upward and forward from the apparatus. To prevent the body falling forward in the landing, the eyes must be fixed on a point high up. To begin with the landing is taken on all-fours.

If the exercise is to be done with double take-off the command is: *With double take-off, deep jump forward—go!* After a slight and quick knee bending (without a heel raising beforehand) a double take-off is taken. In this case, too, the body must be strongly straightened during the jump and be moved in a curve upward and forward; the legs are held well back, so that the body may not fall backwards in the landing. Arm swinging sideways-upward may be added.

Young children may take a deep jump after a run along a form. When confidence and practice have been gained they may do it on a sloping form, the one end of which is resting on a low object such as the top section of a vaulting box, the pad from a horse, a low beam, etc. For older children the beam on which the form is resting, may be put up so high that the children must take support with one hand in the landing and turn so that they finish with one side towards the beam (Fig. 70).

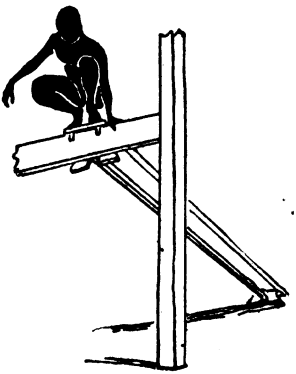


FIG. 70.*

Common Faults.—(*a*) The take-off is not taken until the foot which has been thrown forward is still.

(*b*) The body is not raised in the take-off.

(*c*) In the effort to straighten the body in the jump the head and pelvis come forward.

C. Long Jump

8. **Long Jump, with Free Run.**—In shorter long jumps, where the form is most important, the bending of the hips, which is caused by the throwing forward of the legs immediately after the take-off, must be entirely straightened out, so that the body is fully stretched before the landing (Fig. 71). If the

* L. M. Törngren: Lärobok i Gymnastik.

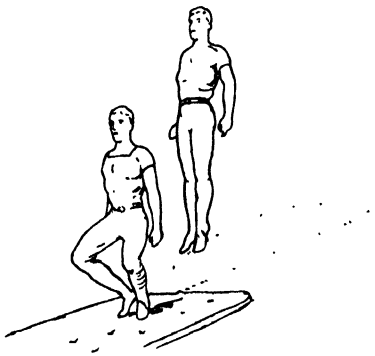


FIG. 71.

take-off is taken from the low box or the like, more time is gained for this stretching, and it is therefore more easily learnt. This latter form is excellent. The quick run projects the body forward and a vigorous take-off sends the body upward. The run should be made longer and quicker as the pupils gain practice. It is a lively exercise, especially when done "in stream." For the take-off the following pieces of apparatus may be used : Low box, a buck or a horse lying on its side with the legs towards the starting point.

In longer jumps, where the aim is to get as far as possible, the legs must be kept forward by a strong knee raising—that is, by a bending both in the knee and hip-joints until the landing. The arms swing vigorously forward. Long jumps requiring a long preparatory run, and which are better out of doors, are the jumps which best train a strong and quick run.

9. **Running Jump.**—A running jump is a rather short long jump, where the landing is taken on one foot. In the jump the body must at once be strongly straightened, the head well lifted, and the arms held into the sides. The foot which takes off is moved backward ; the other must not swing further forward than to about vertical under the body ; the body with the rear leg must make a fine arch. Both legs are kept stretched if the length of the jump is the main point. If emphasis is laid on the height of the jump, by taking it over a rope or the like, the front knee is a little bent. In the landing the front foot touches the ground first ; it must be kept a little turned out ; the leg yields like a spring in all its joints, and the knee is pressed a little outward. After this the rear leg is brought quickly forward, and takes its share of the landing, after which the run is continued. This is "hurdle" jump.

With smaller children the jump can be taken over the saddle, rope, form, or prone comrade.

D. High Jump

10. Front High Jump with One (Two, Three) Step.—*Front high jump with one (two, three) step, beginning with the left*—1—2—3—4 (—5—6); or *Go !* After the take-off the knees are bent quickly high up in front of the chest, while the back is kept as straight and vertical as possible ; the pupils should try to get the feet as high as the seat. To counterbalance the raising forward of the legs, and, in addition, as a help toward lifting the body, the arms are swung simultaneously forward slightly bent. After this the knees are stretched and the back fully straightened out, while the arms are brought straight down to the sides. This stretching of the whole body, to which a pressing backward of the head at the right moment greatly contributes, should be taken as soon as the apparatus is passed, and, at any rate, must be finished before the feet touch the ground in the landing ; if this last is not the case, the quick yielding which must take place in the joints of the legs is prevented, so that the landing becomes stiff and heavy. The eyes look forward or a little upward ; this makes the balance in the landing steadier.

These smaller high jumps, where the correct performance of all the details of the jump is of much more importance than the height, should be taken by more than one at a time (for example, up to half the class at a time), so that each can get as much practice as possible. As apparatus, a long jumping rope, one or more low beams, a row of forms, and the like, can be used (see p. 115).

In order to teach the pupils to take-off with their "weak foot" (generally the left) the jump may be done after walking (not running) say, three steps. Some pupils form a habit of always using a three steps' run. To counteract this, four or five steps' run should be practised too, and either foot should be trained in the take-off.

Introduction.—The jump can be practised over a low beam or stool. One foot is put on this apparatus, after which there is a take-off by a strong stretching of the leg (see p. 116).

Common Faults.—(*a*) The take-off is too heavy and with the full foot.

(*b*) The knees are not pulled high enough up in front of the chest ; the knees are not together ; they are moved in under the seat.

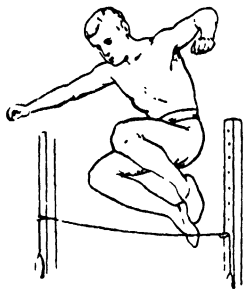


FIG. 72.

(*c*) The back is rounded and the trunk bent forward, so that there is not room for the knees to be sufficiently raised.

(*d*) The legs are carried to one side in the jump (Fig. 72).

(*e*) The body is not balanced during the jump; the arms then make large movements in order to gain the balance (Fig. 72).

(*f*) The body is turned a little to one side in the jump.

(*g*) The stretching of the body is omitted, or is performed too late.

(*h*) The eyes are directed toward the ground, which causes the head to bend forward and the body to fall forward in the landing.

11. **Front High Jump with Free Run** (Fig. 73).—Performed as in 10. As long as the jump is not bigger than that all the pupils can be sure of doing it, several can jump at the same time. On the other hand, when the limit of their capabilities is being neared, one only must jump at a time. If it is difficult for a pupil to take off with a particular foot, he will train himself

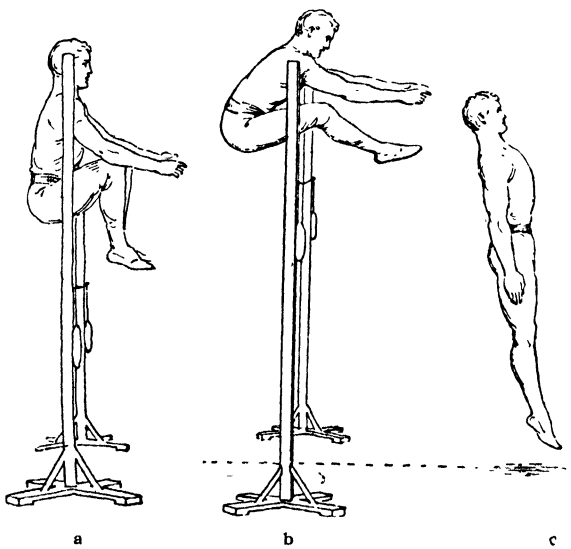


FIG. 73.—Front high jumping.

to be able to do this most easily if, for some time, he jumps only off that foot.

In front high jump it is often the foot which takes off last which catches the rope, because the knee is not raised quickly enough to allow the feet to be together as they pass the rope. In the moment of the jump the body, which has been inclined somewhat forward in the run, must be raised with a sudden stretching; this gives room for the knees to be lifted higher (the pupils must "use their backs in jumping"). The trajectory in which the body moves during the jump must be short; by this the jump gains in beauty and steadiness, and, as a rule, also in height. The take-off, therefore, must be as near to the rope as possible without the feet catching as they are raised. Front high jump should be practised frequently over fixed obstacles at such a height as the ability of the pupils allows. Often it should be taken with the pupils following as close after each other as possible ("in stream"). It can also be taken off the low box, or other low apparatus.

In the lower high jumps, which the pupils can easily manage, the back should be kept straighter, the knees more bent, and the body less inclined forward than in high jumps of greater height (see Fig. 73, a and b).

Importance and Muscle Work.—High jump, like running, is a classical exercise. It looks simple but is in reality very difficult. Mere strength is not enough; the proper use and control of the muscular strength are much more important as a fine co-ordination is needed. High jump is an agility exercise par excellence.

It is one of our best educational exercises. Very few and simple apparatus are needed; the exercise takes little time, and many can work together; it can be used in the gymnasium from the first lesson to the last, and it is of equal interest to the beginner and the fully-trained gymnast. Only people who have reached a high standard of physical education will be able to perform a high jump with vigour, springy lightness, and full control.

In the take-off, the following muscles are acting (firstly those of the rear leg, then more powerfully those of the front leg.) The *calf muscles*, the *extensors of knee and hip and of the back* ("using the back in jumping"). After this powerful extension, the whole body is bent together as the *flexors of the hips* pull the knee as near up to the chest as possible. This means a

decrease of the pelvic inclination and a rounding of the loin by a contraction of the *abdominal muscles;* to enable these to contract strongly the chest must be fixed against their pull by a contraction of the *extensors of the back.* Immediately afterwards the body has to be fully straightened from head to foot by a quick stretching, and the legs must be ready to yield in all joints during the landing, and this yielding should be followed by a quick stretching so well controlled that the body will stand perfectly still in the erect position at the end of the jump. All these big movements, besides many smaller ones, follow in quick succession. To this should be added that the jump, if well done, should look as if no effort were required. It is, therefore, readily understood that this jump is an exercise demanding a high degree of co-ordination, and that it may rightly be termed an agility exercise.

12. Standing Front High Jump with Double Take-off.—In this jump after a double take-off, there is a very high and quick knee raising with the feet together, assisted by a strong arm swinging forward with slightly bent arms. As the movement forward in the jump cannot be very great, the jump must be taken from close to the rope. If taken from box or form, greater time is allowed for the stretching of the body before the landing.

13. Oblique High Jump with One (Two, Three) Step (Fig. 74).—The pupil stands a little obliquely to the rope. If one or three steps are taken he begins with the foot which is further from the rope; if two steps, with the foot nearer the rope. In the last step before the jump the arms are moved back to drag position, then after a strong take-off the leg nearer the rope is swung over, then the other leg, both being kept fully stretched in knee and ankle. At the same time as the first leg is swung forward, the arms are quickly and strongly swung forward and stopped suddenly in the horizontal position; they are kept still then for a moment while the first leg is swung down and the other up, and then lowered together with the latter. This arm movement is taken both because it helps to lift the body in the jump, since it counterbalances the throwing forward of the legs, which would otherwise cause the trunk to fall backward; and because otherwise the hands would catch in the rope when this is at hip height or higher. The body must be inclined a little forward, but with the trunk as straight as possible. In the landing, which is divided between the feet,

first one and then the other foot is put on the ground, the second a short step in front of the first, and the movement forward continues in a walk.

When the jump has been learnt it can be taken "in stream." Two sets of jumping stands with ropes may be put out in line with one another. When a pupil has jumped over the first rope he continues forward and jumps over the second. In this way the left and the right foot will take-off alternately.

Introduction.—In order to teach beginners the proper take-off and the right movement of the legs, the exercise may be taken at walking pace across a low rope.

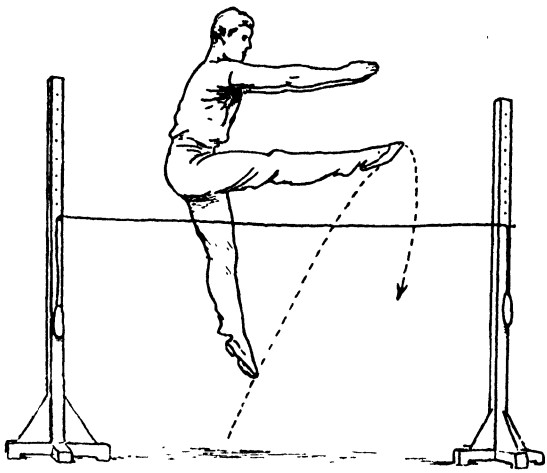


FIG. 74

Common Faults.—(*a*) The arms swing too little or too far forward; they either do not come up to horizontal position or are above it, or they are lowered too early.

(*b*) The take-off is done in such a way that in the jump the body is moved out of the line of the run; in this way the balance is lost in the air, the arms are not able to move together, and are forced to swing a little out to the side as a counter-movement.

(*c*) The legs, especially the first, are swung somewhat out to the side instead of straight upward.

(*d*) The knees are bent.

(*e*) The legs are crossed in the landing.

14. **Oblique High Jump with Turning.** When the pupil stands with the left side towards the rope he places the right foot a long step obliquely backward while turning half to the right; the right knee is bent slightly, both arms are moved somewhat to the right. Now both feet push off strongly, first the right and immediately afterwards the left; the right leg, stretched forward, is swung across the rope, and the body is turned with the chest facing the rope while the left leg is swung backward. The body should be in a horizontal position facing downward and with the arms carried out sideways as the rope is passed. The landing is made on the right foot, the knee a little bent and the body leaning forward; the left foot is put down behind the right or—if a turning on the ball of the right foot is done—in front of it. The swinging sideways of the arms helps to keep the balance. It is a fine jump requiring agility.

E. Heave Jumps

Heave jumps are exercises which are both heaving exercises and jumps, as the arms carry the body in the hanging position during most of the time that the feet are off the ground. They are easy, as a whole, and therefore specially suitable for beginners and girls.

15. **Side Standing, Heave Jump in Double Beam.** At first the upper beam is put at a little over head height, the lower beam at knee height; by degrees both beams can be moved higher up, especially the lower one.

The pupil stands with the left side towards the beam, half-a-step away. As he takes a double take-off he inclines the body forward, so that as he jumps up he can grasp the top beam as far forward as possible, and thus produce a forward swing of the body. As soon as the hands have grasped the beam, one on each side (the right hand close in front of the left), the arms are bent, by which the swing forward is increased; by a bending in the hips the legs are moved up towards the top beam, being kept quite stretched; after this the hip-joints are strongly straightened and the head pressed back, so that the body is lying about horizontal and fully stretched under the beam (Fig. 75). The body is then pushed forward by a stretching of the arms, the hands let go their grip, and the pupil lands on the other side of the beam as far as possible from the place

from which he jumped. The hand nearer the lower beam grasps this to help in keeping the balance in the landing; the other hand is brought quickly down to the side.

After some practice several jumps can be taken immediately after each other, so that the landing serves as the take-off for the following jump.

Common Faults.—(*a*) The hands do not grasp the beam far enough forward; this makes the jump too short.

(*b*) The head is bent forward.

(*c*) The loin is hollowed too much just before landing; therefore the feet come in under the body, so that the latter falls forward in the landing.

(*d*) The hands leave the beam too early or too late before the landing.

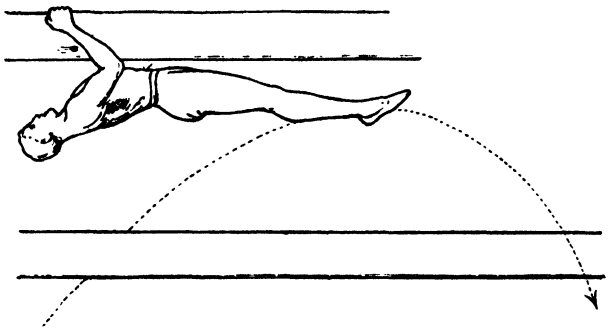


FIG. 75.

16. **Front Standing, Heave Jump in Double Beam.**—Top beam a little over head height, lower beam at knee height, later a little higher. This lower beam can be replaced by a rope, which is placed about a step away from the beam on the landing side of it. In this case the jump can be made much higher. The jump is first taken from the standing position. The pupil stands facing the beam, so far from it that he can just reach it in the jump. The pupil grasps with overgrip, and the arms are bent immediately the beam is grasped in order to increase the forward swing of the body. In order that the feet may not touch the lower beam or rope, both hip and knee joints must be strongly bent; but as soon as they have passed the apparatus they must be stretched, so that the body comes to be almost horizontal. The body is pushed forward by a stretching of the arms, so that the landing comes as far as

possible from the beam; in the landing the arms are swung forward-downward to the erect position.

After the pupil has had sufficient practice in doing this jump from the standing position, he takes it with a short run and preparatory jump; it can then be made longer. He must avoid coming too close to the beam for the take-off.

Introduction.—At first this exercise should be practised on single beam. When the lower beam is not removed a beginner who fails might hurt himself badly on it. Later a rope takes the place of the lower beam, and this will teach beginners to lift the knees high up so as to clear the rope.

Common Faults.—As given in 15 (*b*), (*c*) and (*d*).

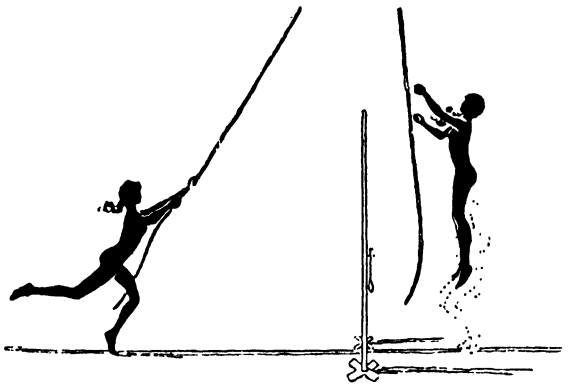


FIG. 76 *

17. Heave Jump in Two Ropes (or Rings).—The rope over which the jump is to be taken is placed a few steps in front of the ropes. The jump is taken with (*a*) a run forward, (*b*) a run backward.

(*a*) *With a Run Forward.*—The pupil grasps two ropes at about chest height, walks back as far as possible, and stands, with one foot a step behind the other; the arms are stretched obliquely upward and the body is inclined a little backward, so that by pulling this forward the arms can help to get speed in the run, which, as a rule, can only be two or three steps long. When the pupil in the run has come directly under the point from which the ropes hang, and the hands have been lowered correspondingly, he takes a new grasp as high up as possible with a sudden movement, and immediately afterwards takes a

* L. M. Törngren: Lärobok i Gymnastik.

single take-off. The arms are strongly bent, and the legs are kept stretched and moved forward by a bending in the hip joints. As the rope to be cleared is passed, the whole body is stretched out to almost horizontal position, and before the forward swing is at an end the hands let go the ropes and the pupil lands, swinging his arms forward-downward. As long as the rope is low, the jump should be made as long as possible. By degrees, as the rope is put higher up, the length is limited. The exercise can be done in one rope and with a turning about just before the landing as shown in Fig. 76.

(*b*) *With a Run Backward.* –The pupil grasps two ropes at about shoulder height, takes a couple of steps forward, so that the arms are about straight, and stands with one foot a step in front of the other. Then he takes a strong run backward and a single take-off as soon as the arms are straight; after the take-off the arms are bent and the legs are swung backward in order that the forward swing can be so much the greater. During this swing the body must hang stretched with head and legs pressed somewhat backward, the arms bent, the hands as far out to the sides of the shoulders as possible. Just before the legs reach the rope they are lifted by a bending in the hip joints, but still kept stretched. This lifting of the legs is no effort when they are lifted at the right moment, i.e., when the legs are projected forward by the swinging of the whole body; but the legs feel very heavy when they are lifted too soon so that the proper rhythm of the exercise is broken. A jump of this kind will be successful only if the movements at the different stages fall into the right rhythm. As soon as the feet have passed the rope the hip joints are stretched and the whole body is fully straightened to about horizontal position. Before the swing forward is at an end the ropes are released and the landing is taken with an arm swinging forward-downward.

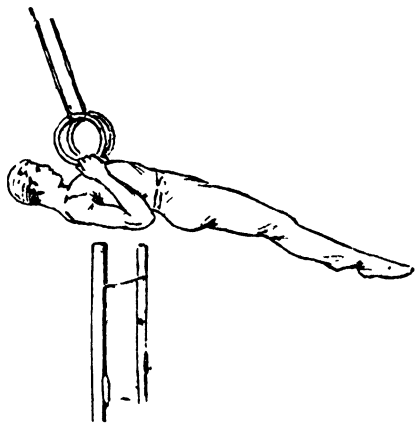


FIG. 77

When the exercise is done in rings, the legs, after having passed the rope (Fig. 77), are swung vigorously backward so that the body is in a vertical position just when the swinging forward stops. The hands now quit the rings and the arms are swung forward-downward.

Introduction.—Some strength is required to keep the arms bent while swinging forward. For this reason beginners, especially women, are allowed to put their feet on the floor in a quick step as they swing forward.

F. Upspring to Balance Hanging

By upspring to balance hanging we understand vaults, in which the body is brought into the balance hanging position. Balance hanging is a preparation for vaulting, as the pupils practise letting the arms and legs work together, as they must in vaulting. Besides this, they learn to keep the shoulders, chest, and head in the right position in the balance hanging position.

18. **Front Standing Upspring to Balance Hanging (Balance Hanging Position).**—Beam first a little under chest height, later higher. *To the beam—run !* The pupils stand facing the beam, half-a-step away.

Beam with overgrip—grasp ! The hands are put on the beam with overgrip, shoulder-breadth apart, the arms stretched.

To balance hanging—up ! The pupils take a jump forward as a preparatory jump, and take off close under the beam. By a strong stretching of the legs and arms the body is lifted up to balance hanging position (Fig. 20, p. 30). The head is held up; the chest forward; the shoulders drawn well back, and the body so high up between them that they are in their correct lowered position in relation to it; the back well straightened, and the legs stretched together and pressed well back, so that the body forms a slight curve from head to heel.

From position—down ! By a bending in the hips the legs are moved forward to about vertical position; next they are swung quickly and strongly backward so that the body is lifted, if possible, up to horizontal position on the stretched arms. To make this possible the shoulders must be a little forward in front of the hands. The arms then push the body a little backward, and the landing is taken at arm's distance from the beam, while the hands keep the grip.

Hands—down ! The exercise can also be taken with a run.

Introduction.—The landing, with beginners, can be practised in two movements, so that they can learn the correct swing of the legs. The command then is : *From position*—1—2. On 1 the legs are moved forward ; on 2 they are swung back, and the landing is taken.

This exercise lends itself well to practise in "individual time," especially as the height of the beam is increased. During such free practise the pupils may try to jump down lightly from balance hanging position and immediately up again in one continuous movement, using the landing as a new take-off. The landing is now taken close to the beam as the preparatory jump forward in the take-off is not needed. This form of the exercise should also be practised in "joint-time." The command is, *Down and up go !* The word *go !* should be slightly drawn out to give the pupils time to move the legs forward before they are swung back.

The dismounting from balance hanging position may be done *over* the beam. The left leg is swung over and hooked on to the beam in half-crook sitting position ; right leg carried well backward as in balance hanging ; the trunk inclined forward. While the body leans towards the left, the left hand is shifted to a grip just beyond the left knee with the thumb forward ; the right leg, kept straight, is swung over the beam, the left leg pushes off the beam and is then stretched, after which the legs are closed and the landing is made with the whole body erect and the head lifted. The landing may be made with the side to the beam or facing it.

After sufficient practise the left leg is swung over the beam to half-crook sitting position during the jump upward to balance hanging. After a short pause in this position, the landing is made as described above.

Well-trained gymnasts may do the exercise in one continuous movement without any pause ; it is a fine exercise requiring both strength and agility.

Common Faults.—(*a*) The preparatory jump is too high.

(*b*) In the position the body sinks down between the shoulders, so that the latter are too far forward and too high up. The distance between the hands is too great. The back is not stretched, the head and legs fall forward.

Muscle Work.—The *extensors of the arms* are working strongly, the more, the higher the beam is put. Because of this it is a valuable preparatory exercise to vaulting; for this reason the teacher must not omit practice on a beam at the highest possible level.

As regards the shoulders, balance hanging is really a heavy exercise. While the arms are being stretched they act like levers raising the body, and when they are stretched they may be looked upon as props between which the body is suspended. The muscles acting are the *heaving muscles*, the *pectoralis major* and the *latissimus dorsi* of each side. The yoke formed by the shoulder blades and the collar bones is resting on the arms and the trunk is suspended from this yoke by the *pectoralis minor* and the *trapezius III* (see Vol. I, p. 179). As the latissimus dorsi, the pull of which acts in a vertical direction, is not able to overcome the forward pull on the shoulder-blades and the collar bones by the pectorals (major and minor), the *horizontal part of the trapezius IIb* (Vol. I, p. 178) must act in order to keep the shoulders back. The continuation of this muscle, the *rear part of the deltoideus*, must act too, partly to counteract the forward pull on the upper arms by the pectoralis major muscles and partly to keep the body close to the arms.

The muscle work is essentially the same as in body raising (see pp. 20-22).

When the muscles mentioned extend as in long hanging position, the trunk sinks down between the arms so that the shoulders are brought close to the ears. When the body is now raised between the arms, almost the same takes place as when changing from long hanging to short hanging position (see pp. 9-10).

The legs are moved backward in the hip joints by the *gluteus maximus* till the movement is stopped by the Y-shaped ligament. The legs are now carried further back, together with the pelvis by a hollowing of the loin during a contraction of the extensors of the back (reversed action as the spine is the fixed part and the pelvis is moved).

As balance hanging, which the Swedes call by the fitting name *introduction to vaulting*, by some is regarded as a heaving exercise, one might use the term heaving exercises for all vaults during which the body for a moment is raised and supported on the downward directed arms. In stride vault, for example, the arms by their stretching have a great share in

the lifting of the body ; and it is clear that as soon as the body has to be raised by the aid of the arms, the heaving muscles must work whether the arms push on the shoulder-blades, as in vaulting, or pull on it, as in heaving exercises.

For so far, all vaults of that kind can be considered heaving exercises. They take a greater share in the development of the heaving muscles and the muscles keeping the trunk up to the shoulder-blades than is generally realised. But it must not be overlooked that the contractions of these muscles are only small and take place with the muscles in a shortened condition. Vaulting can therefore in no way take the place of heaving exercises proper as in these the muscles are often working from extreme lengthening to extreme shortening. The effects of vaulting on the shoulders are similar to the effects of the movements in balance hanging position which are so common in exercises on horizontal and parallel bars. The vaulting exercises make the muscles strong, but short, and are in no way corrective as regards the carriage of the shoulders. As is well known, exercises on parallel and horizontal bars result in stiff and often round shoulders.

G. Upsprings to Standing

These are vaults in which the pupil jumps up and stands on a piece of apparatus with good carriage and steady balance.

19. **Standing Upspring (Between the Hands).**— Apparatus crosswise. Beam saddle, horse with or without pad, buck, box. The hands are put on the apparatus. A double take-off is taken ; by this and by a strong stretching of the arms the body is lifted up over the apparatus with the knees kept together and lifted high up towards the chest ; while the hands then push off as strongly and quickly as possible, the feet are put down on the apparatus from above, and the erect position is taken distinctly and with steady balance.

The landing is taken with single or double take-off ; in the latter case the arms can be swung upward. To make the pupils used to remain standing on the apparatus, now and then it should be claimed that the landing be not taken before a command is given.

After some practice the landing can be taken in immediate continuation of the upspring, so that the knee stretching,

which otherwise brings the body to the standing position, is taken so strongly that it gives a double take-off for the landing.

After sufficient practice arm swinging sideways or upward can be added in the landing.

This exercise should be taken soon with a run.

The upspring is easiest on beam saddle or horse without pad because of the pommels, from which the hands push off. These apparatus are therefore used first. A beam saddle may be put on a beam so low that even little children can practise this vault.

Upspring on horse with pad, on box or on buck, is more difficult as there are no pommels for the hands to grasp; the arms must therefore work harder and the knees must be raised considerably higher, which means increased contraction of the abdominal muscles and the flexors of the hips, furthermore the body must be lifted as at the beginning of a balance vault. A run is also needed here. Upspring of the latter kind is therefore taken with older children and grown-ups only; a good preliminary training is necessary.

Well-trained gymnasts may perform the vault on a beam at hip level or slightly higher. It may be done from the standing position in twos, one standing by on the other side to save his partner from falling. The flat edge of the beam is uppermost.

The main point in upspring is the quick straightening of the body when the feet have been put down on the apparatus. A strong push off with the hands is necessary. To secure the quick stretching beginners must do the vault on an apparatus at about hip level. As they become more practised the height is increased.

20. **Upspring to Kneeling Position.**—Box, buck, horse with pad crosswise.

After a short run the pupil vaults to kneeling position by drawing the knees up between the arms. If the speed forward be too great one will fall forward.

The dismounting is of special importance in this exercise. Here it is not the feet but the legs that have to push off. The push-off must project the body so far upward and forward that the feet can go clear of the apparatus and be ready for the landing. The push-off from the kneeling position is provided by a quick bending and stretching of knee and hip joints, together with a leaning forward of the trunk to secure speed forward. In the bending one goes down almost to kneel sitting position.

To begin with, assistance from a partner is needed. The partner stands in walk position on the far side of the apparatus, reaches forward and joins hands with the one who is going to jump. During the dismounting the partner moves his front foot a step backward to make room for the landing. This support is so helpful that even girls 11-12 years of age are able to do the exercise (Fig. 78).

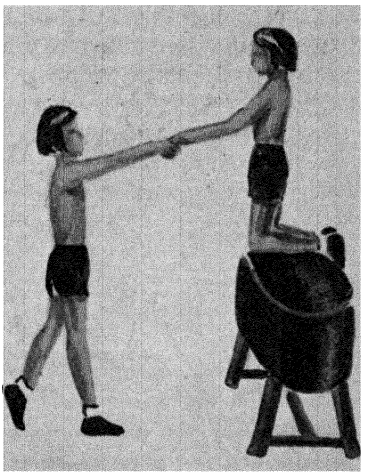


FIG. 78.—Support for landing.

After some practise the exercise may be done without support, but there must always be someone reliable standing by to prevent a fall in case the feet should catch the apparatus.

21. Standing Upspring (Outside the Hands).—Beam saddle, horse without pad, box. The exercise is performed as described in 19, but with this difference, that the feet are put outside the hands, close to the pommels. Also here, the landing can be taken with either single or double take-off; in the latter case the legs are brought together as quickly as possible when they have left the apparatus. The double take-off gives the best landing. To this arm swinging sideways or upward can be added.

22. Upspring (Outside the Hands) with a Run.—Apparatus lengthwise—box, horse with pad. After a run and a preparatory jump, the hands are placed on the apparatus and push off very strongly; the legs, with a strong bending of the hips, but, if possible, with a slight bending of the knees only, are carried outside the apparatus and the arms; the feet are then brought together and placed in front of the hands, and the erect standing position is taken up as quickly as possible by a vigorous straightening of the trunk and the legs. The exercise looks best when the feet are placed on the apparatus with almost straight knees.

To begin with the hands are placed on the near end of the apparatus, but gradually further and further forward, on the

middle of the apparatus or even still further forward. The dismounting is first done with a single take-off. When the feet are placed on the near end of the apparatus a step forward has to be taken before the landing. Later when the pupils are able to jump far forward either single or double take-off can be used. The double take-off can be done from the erect standing position, the easier form, or in continuation of the upspring. The arms are held by the sides but later arm swinging sideways or upward may be added. Performed with the dismounting as a continuation of the upspring and with arm swinging upward it is a fine but difficult exercise requiring strength and a certain amount of daring (Fig. 79).

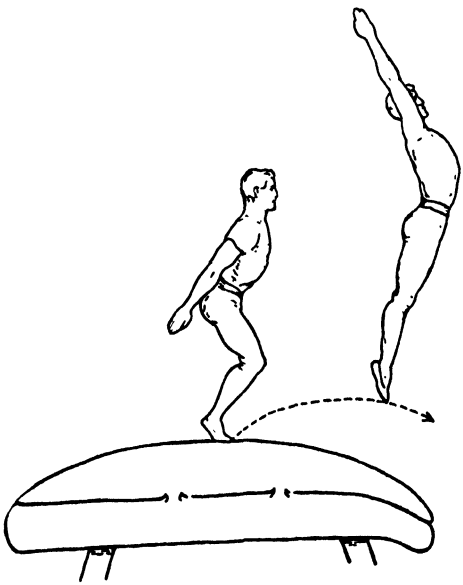


FIG. 79.

Muscle Work.—Upspring is a vault requiring good co-ordination by practically all muscles of the body. Only part of this muscle work will be discussed in the following.

As regards arms and shoulders the muscular activity at the first moment is like that in balance hanging (page 136). The *extensors of the arms* stretch the arms quickly and strongly, and the *heaving muscles* keep the trunk up to the shoulders (this part of the vault is somewhat similar to heaving exercises). But during the next stage the body has to be raised to horizontal position or even beyond (in some cases the seat raised to a higher level than the shoulders). The movement at the shoulders corresponds to the one performed when the arms are moved from the sides to reach position or even higher; it means that the *deltoideus* from its insertion on the arm, the fixed part, pulls on the shoulder-blade and rotates it as when the arm is swung upward; the shoulder-blade pulls on the body by a

contraction of the *serratus magnus.* The raising is like the first part of a balance vault or hand standing on the apparatus.

The main force required for the raising of the body is, of course, not provided by the arms but by the feet pushing off from the floor. By the quick stretching of the legs, the body is projected upward, and this movement is assisted, finished and regulated by the shoulder muscles.

As the knees are raised almost to the chest, the *flexors of the hips* bend the hip-joints strongly; furthermore, the pelvis is tilted by a rounding of the loin, and this is brought about by a strong shortening of the *abdominal muscles.*

As soon as the feet touch the apparatus the bent body is straightened like a spring released. This can be done with sufficient force to project the body forward and upward with a landing in front of the apparatus (Fig. 79).

H. Oversprings

This group consists of vaults over apparatus across or lengthwise, without more than the hands touching, these being used for support and take-off.* These vaults can be taken in stream.

23. **Between Vault.**—Apparatus crosswise. Beam saddle, horse without pad. The exercise begins as described in 19, but as the apparatus is passed the hands give a strong push-off against the pommels; by this the trunk is raised as high up as possible, and the whole body is straightened up to a good erect position. Gradually, as more skill is gained, the apparatus is put higher.

This exercise can be practised without a run (toward standing); it is then more difficult.

Especially in the case of girls, the exercise can be done in such a way that the landing is taken as far as possible from the apparatus, as the hands, which in this case remain longer on the apparatus, push the body forward while the legs are stretched, so that it approaches the horizontal position.

The exercise may be done with living support in the following manner. Number-two and number-three stand shoulder width apart and half-turned towards each other. The front foot, i.e., the one towards the place for landing, is advanced in a

* There is an exception to this in stride vault through spring standing position (catspring), where the feet also take off from the apparatus.



FIG. 80.*—Overspring, living support.

short lunging; the front hands are joined, and the rear hands are placed on the hips. Number-one vaults by placing his hands on his partners' shoulders. After some time the exercise may be done in ranks as follows. Number-twos standing a few steps in front of number-ones join hands and form a chain with the arms lowered and the left legs forwards and slightly bent, later with straight knees (Fig. 80). When number-ones have vaulted over the chain formed by number-twos, they run forward a few steps and form a chain, and so on. If the space be limited those who have to vault must move back a few steps for the run while the others take up their positions just behind the places where they landed. The vault must be taken to command, as all those who are vaulting must place their hands simultaneously on the shoulders of those supporting. During the changing, care should be taken that those standing at the ends of the ranks get an opportunity of vaulting too.

The pupils supporting, if children, may sit on a beam, on a single form, or on one form placed on the top of another, their hands supported on the apparatus, and the arms kept stiff as shown in Fig. 81.

Between vault on a beam saddle or a horse crosswise without pad can also be done with single take-off. The vault begins as an ordinary front high jump, but as the apparatus is being passed the hands are put on the pommels, and by their push-off the body is projected forward and the landing made far from the apparatus.

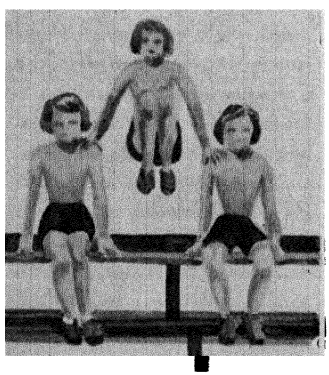


FIG. 81.

24. Stride Vault.—Apparatus crosswise. Beam saddle, horse with or without pad, buck.

* V. Balck: Gymnastik.

As described in 23, but the legs are kept stretched and brought outside the pommels (buck), and then brought together again as quickly as possible while the body is stretched.

The vault is easiest on the horse crosswise without pad, and on the buck, because the feet are not lifted up to the level at which the hands are placed.

It is most difficult when done on padded horse and box crosswise and on beam. A very strong thrust with the hands is necessary, a thrust in which the extensors of the arms and the heaving muscles have to work very hard. Well-trained gymnasts may be able to lift the body so high that the feet will be about level with the upper part of the apparatus at the moment when the straightening of the body has taken place (Fig. 82). With well-trained pupils the vault lends itself well to be taken "in stream."

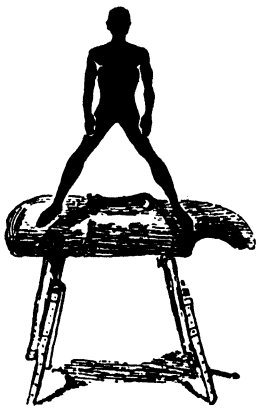


Fig. 82.*—Stride vault.

25. Vertical Stride Vault.—Apparatus lengthwise. Buck, horse with pad. Over the buck the vault is done with a bending of the hips just after the take-off and a subsequent stretching. The vault is done in this way when it has to be very high, e.g., if extra pads have to be passed.

The exercise may be made more difficult in the following way. A set of jumping stands with rope is placed on the far side of the buck. In order to pass over the rope the legs must be carried outside the arms and the knees must be lifted as high as possible. As soon as the feet have passed the rope the body is straightened quickly to vertical position. At first the rope is lower than the buck, later somewhat higher.

The vault can also be done with the hips straight immediately after the take-off, the legs carried well backward during the flight. It is a fine exercise but more difficult.

When the *horse* is used (Fig. 83) the hands are placed on the near end of the horse. By a vigorous thrust and a raising of the head the body is quickly brought into the vertical position and slightly arched from head to foot. The arms are carried swiftly and the shortest way to the sides. The legs, which are

* L. M. Törngren: Lärobok i Gymnastik.

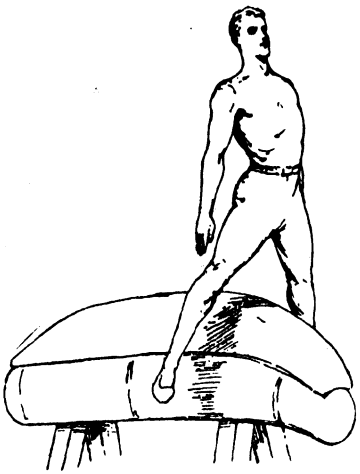


FIG. 83.—Vertical stride vault.

separated just enough to clear the apparatus, are brought together as soon as the apparatus has been passed. A speedy run is necessary.

Beginners find the vault easier when the near end of the horse is put higher than the far end.

The vault can be made more difficult by putting an extra pad or some other object, such as a boot, on the top of the horse. One or two pupils sitting astride on the horse and bending well forward may also serve as an extra obstacle.

26. Horizontal Stride Vault.—Apparatus lengthwise—horse with pad, box.

After a vigorous run the pupil jumps upward as high as possible. He reaches forward with his arms, and the body, turning round a transverse axis through the pelvis, is brought into horizontal position with the legs together and stretched, the back straight and the head lifted (Fig. 84). The hands are now placed on the far end of the apparatus, and by a vigorous thrust of the hands (and preferably without any bending of the hips) the body is brought into vertical position before the landing. The legs should be separated at the last moment

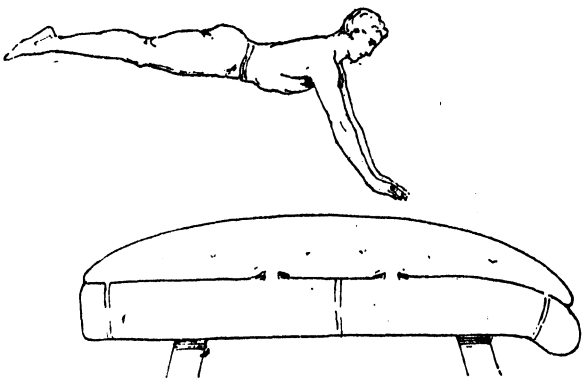


FIG. 84.—Horizontal stride vault.

and only just enough to allow them to go clear of the apparatus. The rhythm should be such that the longer pause should be between the take-off with the feet and the push-off with the hands, and then a short pause before the landing (1——2—3).

In order to make the vault high and the flight long, a set of jumping stands with rope can be placed at the apparatus just beyond the place of take-off, the rope at first a little lower than the apparatus, later somewhat higher (see Fig. 89).

For well-trained gymnasts the horse with pad can be placed crosswise in front of the box, at first at the same height as the box, later higher. This makes the flight very long and it is therefore the most difficult form. It requires a very speedy run.

Introduction.—Both vertical and horizontal stride vaults on horse are difficult. To make the former vault really vertical and the latter really horizontal, long practice is required. A vault half-way between the two is considerably easier, and one must be satisfied with that for beginners.

A low box placed crosswise in front of the horse for the take-off makes it easier for beginners to get over—and after all, that is the first aim of any keen boy. The take-off from this higher level makes it easier to project the body sufficiently forward and upward above the horse, and it will also be easier to place the hands well forward. A mat inserted between the box and the legs of the horse will prevent the box from sliding forward.

When introducing horizontal high vault, the beginners must learn first of all to place their hands well forward. The exercise can be taken as follows. The pupil jumps forward and lands on his front on the horse. Knowing that he is not to pass over the horse, he is not afraid of reaching well forward. The place of the horse he has to reach with his hands, can be marked by a gymnastic shoe, etc.

27. **Leap Frog.** The child taking the place of the vaulting apparatus, the "back," puts one leg forward with slightly bent knee, supports his hands on his thigh, and bends his head forward (Fig. 85). The arms of the one vaulting thrust down on the shoulders of the "back."

The following class arrangements in ranks can be used. Number-twos as "backs" stand a few paces in front of number-ones. When ones have vaulted they run forward and form "backs" for twos. When the floor space is limited all move back sufficiently for each turn. The pupils can also form a ring

round the hall with a few steps' distance between each. When number-ones have vaulted, each over the number-two immediately in front of him, they run forward and stand as "backs" for number-twos ; in that way it is always the same two pupils who vault over each other in turn. All must vault simultaneously ; the exercise must therefore be taken to command.

The "back" may support the hands on a stool or, standing astride the apparatus, on a form or a beam as this makes the position very steady and firm. Fig. 86 shows the position at a stool. The legs, slightly astride, are vertical, and so are the arms; the hands grip the edges of the seat. When the feet are placed too far from the stool so that the legs and the arms are sloping,

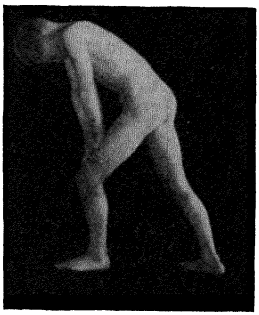


FIG. 85.—The "back".

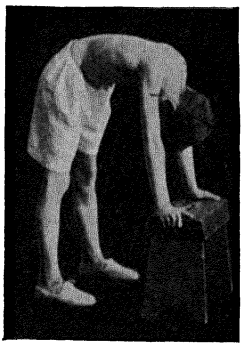


FIG. 86.—The "back" with support on a stool.

the position will be unsteady. Open order may be used, number-twos at the stools and number-ones vaulting, after which they change their relative positions. The commands are, *Ready—go ! —Change !* and so on.

It is an excellent exercise for the practice of landings. At first they land on all-fours (four sitting or crouching position), and stress is laid on lightness (refer page 118). The word *Change !* can be said while they are still in the crouching position, omitting the knee stretching and the heel lowering. These two movements should later be done to command before the changing of places. Next the landing may be taken with a second partner who stands ready to support his fellow pupil in the spring sitting position by grasping his hands. And

finally, the landing is made in time with or without counting aloud.

This vault can be taken with children as early as at the ages of 9-10 years. But at first the teacher should always take good care that there is someone in readiness to save a fall.

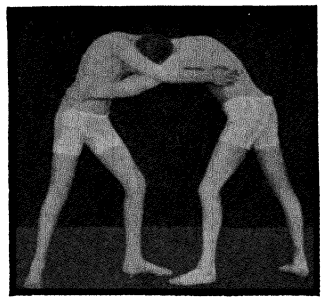


FIG. 87.

The obstacle can also be formed by two pupils of equal height as shown in Fig. 87. The vaulting may be done crosswise or lengthwise.

Leap frog is a useful and fine exercise, not only for children but also for adults as shown in Fig. 88. With well-trained gymnasts the "back" can stand almost erect with folded arms and head bent forward, one foot placed slightly forward.



FIG. 88.*

28. **Stride Vault through Spring Standing Position. ("Cat-spring").**— Buck or box, jumping stands with rope, and horse with pad. The apparatus is arranged as shown in Fig. 89.

After a very vigorous run to secure speed forward, the pupil vaults to spring sitting position on the buck; without any pause the legs are stretched in a new take-off and the body is projected forward across the rope, the body horizontal or the feet even slightly higher than the head. The hands are placed on the far end of the horse and push off so vigorously that the body passes the vertical position and is inclined slightly backward in the landing.

In this vault, because of the long flight, speed and agility are needed, but also a certain nerve; but it is fairly easy. The different stages of the vault must merge one into the other without any pause, and in this lies the main difficulty. The flight over the rope must be high and the body straight with the legs, stretched and together, raised as high as possible. The end of the vault looks best when the body is swung round from the horizontal and through the vertical position without any bend-

* V. Balck: Gymnastik.

ing of the hips. This, however, requires a very strong thrust of the arms.

Introduction.—The best arrangement of the apparatus for beginners is: Buck, box, and horse, all lengthwise and in line; the buck put up to chest height, the box a bit lower, and the horse—preferably a short one—as low as possible. In the first stage of the vault the feet are not put on the buck but on the near end of the box (like a stride vault with a landing on the box). The pupil then steps forward one pace on the box, performs a preparatory jump and vaults over the horse. The exercise is thus divided by the insertion of this jump between the first and the second stages of the vault, and in this way the most difficult part of the vault has been omitted. But as soon as the pupils have gained confidence, this preliminary

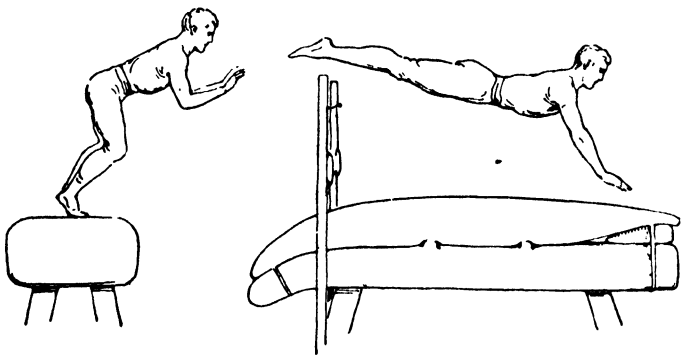


FIG. 89.—"Cat-spring."

form should be left and the vault proper taken up—otherwise this intermediate jump may become a habit, often difficult to get rid of.

When the proper form of the vault is introduced, it will be made somewhat easier for beginners when a box, a little lower than the horse, is placed crosswise at the near end of the horse.

To begin with the pupils must concentrate on a quick transition from the first to the second stage of the vault.

When this transition has been mastered a buck is placed in front of the box and the horse. The box is at first placed crosswise so as not to make the vault too long; it should be lower than the buck so that the take-off after the landing on the box may be easy and without any pause.

As the pupils become more practised the aim is to make the vault even higher and longer. The box will now be placed lengthwise and it, as well as the buck, made higher, the buck, however, always higher than the box. The horse too is put up. A rope crosswise above the horse helps to make the vault high.

29. Horizontal Vault, Feet Closed.—Apparatus lengthwise ; buck, box, horse with pad.

When the vault is performed on the buck the knees are raised high up between the arms while the hands push-off strongly ; feet and knees are kept closed. As soon as the buck is passed the body is fully stretched.

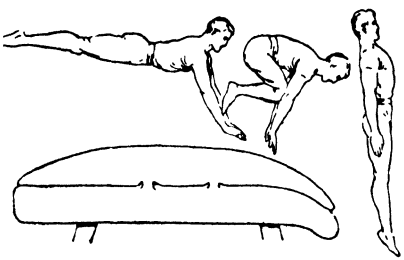


FIG. 90.—Horizontal vault, feet closed

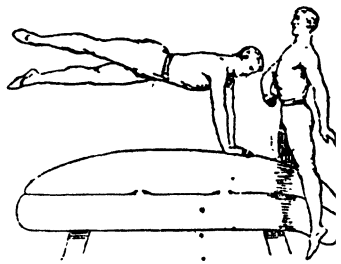


FIG 91 —Stride vault backward (horse).

When done on horse or box the body is thrown into horizontal position as in 26, and not till then are the knees and feet carried forward between the arms (Fig. 90). The vault is easier when the hands are placed on the near end of the horse and when it is otherwise performed as on the buck, but the other form looks finer.

Free front hand lying, foot throwing to back lying position (Vol. I, page 299) is a good preparatory exercise for this vault.

30. Stride Vault Backward.— Buck, horse with pad. When the buck is used the hands are placed on its near end after the take-off, a quick turn is made to the left (right) about and the body, fully erect, is carried backward over the buck. The landing is done in front of the apparatus without any support by the hands.

When done on the horse the body is thrown into the horizontal position, as in 26 and 29, before the turning is made (Fig. 91). It is easier to do the vault in the same manner as on the buck, i.e., with the body vertical, but the horizontal form looks better.

Introduction.—This exercise may be introduced by a vault with *turning about to sitting position*, an easy exercise, which

may also be used as an independent vault both by men and women long before stride vault backward is taken up. At first it is taken from toward standing position at buck, box, or horse crosswise ; the apparatus at hip height or above. The hands are placed on the apparatus and the pupil performs an upspring as to balance hanging but with a quick turning about to sitting position with reversed front. The turning about should be complete. The dismounting is done by a swinging forward of the legs and a strong thrust of the arms.

In comparison with a vault over the apparatus this exercise takes time. Consequently only a few pupils should be working, at each apparatus. On a box two pupils can practise together one on each half, and from each side if the box be placed crosswise, or one at each end if it be placed lengthwise. After some practise from toward standing position, the exercise should be done with a run and on a higher apparatus.

Well-trained pupils can use the beam with the flat edge uppermost. There is now the advantage that half the class can practise at one time, one on each side of the beam, and alternately vaulting and standing by for support ; but the support must be careful and prevent a fall backward. The dismounting can be done as before, or it may be done backward, in which case the pupil goes down to knee hanging position and from there makes a landing through hand standing position. The one standing-by must support firmly by placing a hand on his partner's shoulder while he is moving back to the knee hanging position.

When vault to sitting position has been learnt, vault to ride sitting can be taken. Here the horse lengthwise with pad is the proper apparatus ; box lengthwise is not quite so good but can be used. The vault is taken with a run. In this exercise, too, the turning about must be complete and the ride sitting position should be taken up further and further forward on the apparatus. Any placing of the hands on the apparatus after the turning about should be avoided ; the trunk should be erect and the arms by the sides at the moment the ride sitting position is taken up ; the legs should be pressed against the sides of the apparatus so that one does not sit down too heavily. The dismounting is done to one side, either by swinging the legs forward and pushing off with the hands behind the body, or by a leg swinging backward and a thrust of the hands in front.

I. Side Vaults

Side vaults are one-sided vaults in which the body is brought crosswise over a piece of apparatus, the legs being swung out to one side. "Front" and "back" denote that the body is facing or back towards the apparatus during the vault.

31. Front Turned Side Vault with Knee Raising.—This vault can be used by pupils of all ages and by both sexes. It is a good training in carrying the body on the arms, and it teaches one to make the arms and the legs work properly together in vaulting, the arms continuing the lifting of the body started by the thrust of the legs in the take-off. In many vaults it is important for the correct performance that the centre of gravity, by a pull of the arms, is brought straight above the hands with the arms sloping in under the trunk and the shoulders in front of the hands. Beginners commonly make the fault of pushing the body away from the hands instead of pulling it in over the hands. In that case the arms and the legs will not be working together in raising the body.

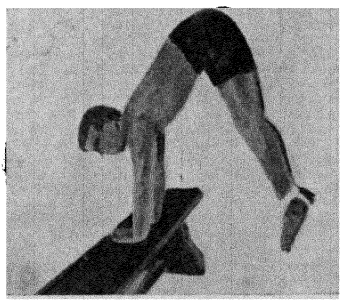


FIG. 92.

Well-developed arm extensors and shoulder muscles and good co-ordination are necessary.

Introduction.—As this exercise is important as regards the development of the arm and shoulder muscles many forms have been invented, from easy ones for infants to difficult ones for well-trained gymnasts. Some of them are described below.

(*a*) Some of the preparatory exercises here are more or less identical with the preparatory exercises for hand standing; for example the first one, *four standing, introduction to hand standing with double take-off, hands on floor.* The exercise is described on p. 180.

(*b*) *Four standing, introduction to hand standing with double take-off, hands on form.* The children place their hands on the form and practise the take-off by raising the seats as high as possible. At first the legs are kept straight and pointed down-

wards as in Fig. 92 ; later the knees may be pulled up towards the chest (see Fig. 94b). There should be a deep knee bending in the landing. The children may practise freely, but the exercise can also be taken in joint-time to the teacher's command, the time not too quick. Stools and low beam can be used as apparatus too ; the stool is placed crosswise so that the child can grip its edges. When the form is used the children may stand astride the form and alternately jump on to and off the form. The trunk must be raised high up, especially during the vault off the form.

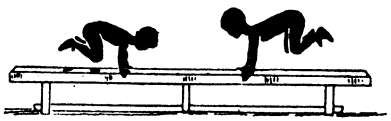
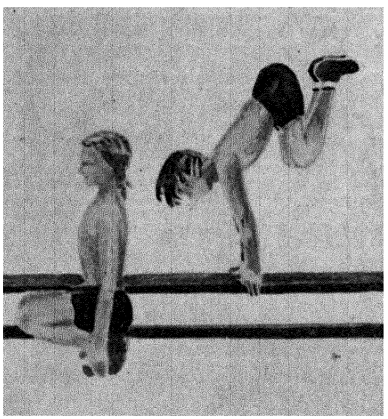


FIG. 93.*

(*c*) *Spring sitting, front turned side vault with knee raising over form.* The children, in spring sitting position and with the left side towards the form, grasp each edge of it with the hands straight opposite one another. By a quick stretching of the knees they take-off and lift the body as high as possible across the form (Fig. 93) to a landing on the other side and exactly opposite the starting place ; the left arm is brought down to the side and the right hand is shifted to the nearer edge of the form (Fig. 94). Care should be taken that the landing is exactly beside the place where the hands grip. When the child lands further back it is a sign that the arms have not pulled the body forward above the hands and in that case the body has been raised too little.



A B

FIG. 94.

Instead of vaulting over the form the children may land on it in four sitting (crouching) position and after a new take-off land on the opposite side.

After some practice the children may perform a continuous series of vaults keeping the grip on the form the whole time

* L. M. Törngren : Lärobok i Gymnastik.

and landing on alternate sides with full knee bending. A similar vault can be done advancing forward, in which case the hands are advanced a little for each vault.

When there are not enough forms at disposal, stools may be used, two for each child. The first stool, placed crosswise against the other, is grasped at each end by the child, who vaults over the second.

A variation may be had by placing a form in a sloping position against the wall bars or the beam. The children can perform the vault facing towards the higher end of the form or towards the lower end (Fig. 95).

(*d*) *Standing front turned side vault with knee raising over beam.* Performed as the previous exercise on forms, but here there is the advantage that the beam can be put up to a higher level as the children become trained. One generally begins with the beam at knee level; the hands are placed close together, thumbs pointing opposite ways; right hand in front when vaulting from the left, and vice versa. The exercise may be done on the spot or advancing.

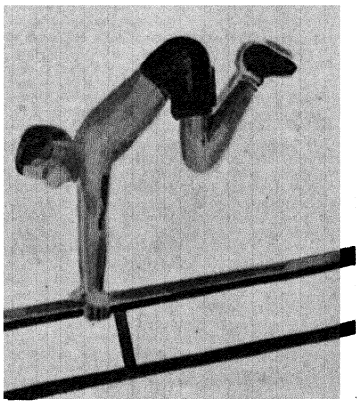


FIG. 95.

All the vaults described under (*a*)-(*d*) are easy. The arrangement of the class should be such that all, or at least half the class, are working together at the same time. It is worth remembering that they are all good exercises for the practice of landings.

(*e*) *Standing front turned side vault with knee raising.*—*Apparatus crosswise.* Horse without pad, beam saddle. There are two forms.

(1) The pupil standing facing the apparatus grasps the pommels. By a vigorous double take-off, the body is raised up on straight arms, the knees together and pulled up towards the chest, and swung to the left across the apparatus. During this swinging the hands change places, and as soon as the turning is completed the legs are stretched vertically downward and the landing is performed facing the apparatus exactly opposite

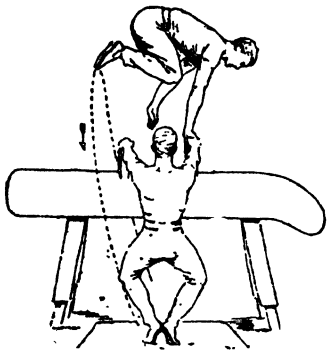


FIG. 96.—Front turned side vault with knee raising.

the place of starting (Fig. 96).

At first the vault can be taken with an intermediate pause. The pupil jumps up, places both feet on one pommel while shifting the hand over on to the other pommel; he is now sitting in a crouching position with the knees between the arms, both feet on one pommel and both hands on the other. He dismounts by shifting the stationary hand over on the pommel vacated by the feet and lands as before.

(2) The pupil, standing with his side towards the apparatus, grasps the rear pommel with both hands. Without quitting the grip he vaults over to the other side and is now ready for the return vault. The vault is more difficult when the front pommel is grasped as now the feet must be lifted high enough to clear the other pommel. Well-trained gymnasts may perform a series of vaults without pause.

(*f*) *Front turned side vault with knee raising.*—Horse without pad, box, beam saddle with or without pad, beam. The vault over horse without pad or over beam saddle is executed as (*e*) (1), but with a run so that a higher apparatus can be used. In a vault to the left side the take-off should be somewhat to the right of the hands so as to get the body straight above the arms during the vaulting. When the body is highest up both hands should be grasping the right pommel and the body should be straight above it. It is a common fault to take off to the left of the hands but in that case the body cannot be lifted as its centre of gravity is too far behind the support for the hands. A stool placed beside the place of take-off helps the pupils to jump up from the right place. A stool laid on its side on the apparatus will also encourage them to make the vault high.

When the vault is done on a horse with pad, a beam saddle with pad, or a box, the hands are placed obliquely on the apparatus, in a vault to the left the left hand slightly further forward than the right, and vice versa.

The landing may be done either with the side towards the apparatus or facing it; in the former case the nearer hand

takes support on the apparatus, in the latter case both hands take support. Here, as in (*e*) (1), an intermediate pause can be introduced. This is particularly suitable to women.

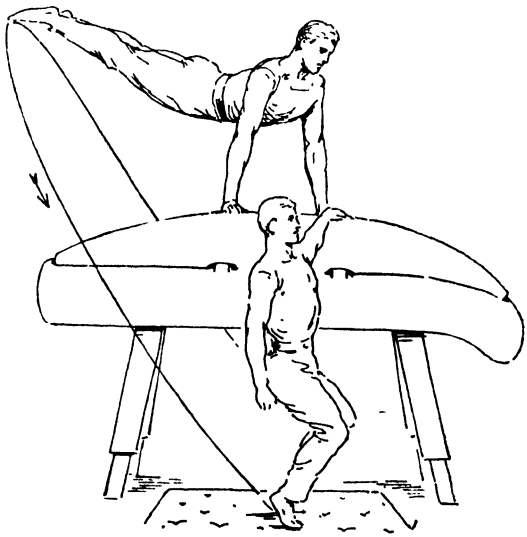
Common Faults.—(*a*) In a vault to the left the take-off is taken to the left of the hands.

(*b*) The knees are parted and the left knee is carried outside the left arm.

(*c*) The legs are stretched too soon.

(*d*) The take-off and the landing too far from the apparatus.

(*e*) The head pokes forward.



a b

FIG. 97.—Front turned side vault with stretching

32. Front Turned Side Vault with Stretching. Apparatus crosswise.—Beam, box, horse with pad. After a short run and a take-off the body is raised high up on straight arms, the knees are kept together and pulled up towards the chest (as in 31 (*f*)). But as soon as the body is above the apparatus it is straightened out vigorously by a quick stretching of the legs, a raising of the head, and a slight arching of the trunk. The body now lies horizontally, forming a slight arch from head to foot; the arms straight (Fig. 97a). Here it is even more important than in 31 (*f*) to make the take-off a little to the right of the hands in a vault to the left, because as the body is stretched

the centre of gravity is moved further away from the shoulders, which consequently have to be brought further forward above the hands.

The landing is made as in Fig. 97b with the side towards and one hand resting on the apparatus. During the downward movement the hips are kept straight till the toes touch the floor in the landing. In order to ensure this the head must be kept well lifted during the downward swing of the body. After sufficient practice the vault may be done with straight knees from the moment of the take-off and with only a slight bending at the hips during the first part of the movement.

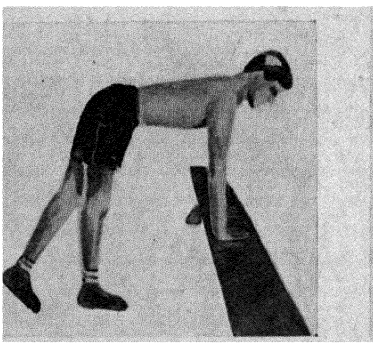


FIG. 98.

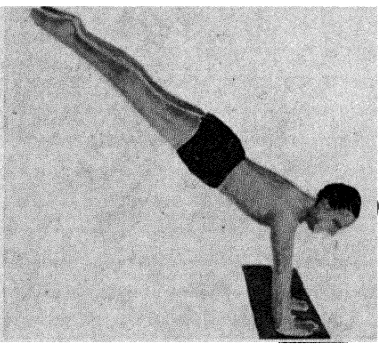


FIG. 99.

Common Faults.—(*a*) The arms are kept bent.

(*b*) The legs parted in the stretching.

(*c*) The seat highest because of a rounded back and insufficient swinging upward of the legs.

(*d*) In the downward movement the hips and the knees are bent and the trunk falls forward.

(*e*) The landing takes place behind the supporting hand, which shows that the body has not been brought enough forward over the hands.

Introduction.—The form of the vault just described is a typical exercise for men. But several preparatory exercises may be used as independent vaults for children and women too.

(*a*) *Hand support lean standing, l.g swinging backward-upward.* The pupil leans forward and places both hands on a form or a low beam. One leg is swung vigorously backward-upward and immediately afterwards the other leg, after a smart take-

off, is swung up so that both legs are closed, straight and in line with the trunk (Figs. 98 and 99). The pupil will not succeed unless he carries his body well forward above the hands. The movements are similar to those performed in leg swinging upward to hand standing with divided take-off. In the return movement the hips should be bent so that the feet can be brought down on the place for the take-off; if they are placed on the floor too far backward there is a danger that the pupil may fall down on his knees.

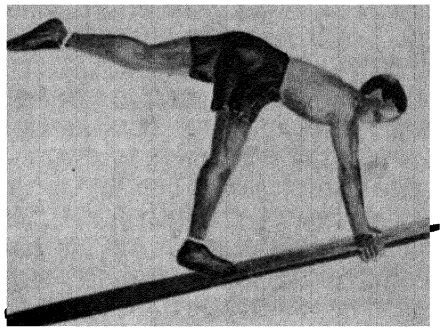


FIG. 100.

(*b*) *Running up a sloping ladder, dismounting sideways by leg swinging upward with hand support.* A sloping form is supported at one end in the wall bars or on the beam. The pupil runs up it two-three paces, bends down, grasps the edges of the form with both hands, pushes off with the left foot, swings the right leg, stretched, backward-upward as for hand standing, carries the left leg up to the other leg, and finally lands in spring sitting position on the right side of the form, left hand placed on it for support (Figs. 100 and 101).

(*c*) *Side standing front turned side vault with stretching and single take-off.*—Beam. The pupils stand with their left sides towards the beam, which at first is put at knee level; each pupil grasps the beam with both hands close together, the right one in front.

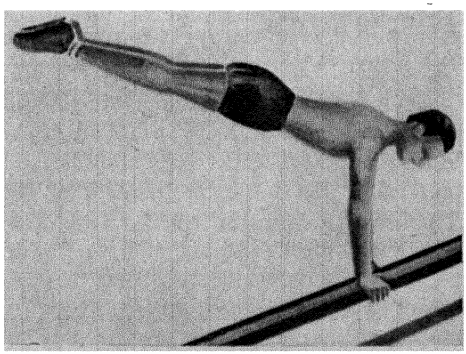


FIG. 101.

The left leg, which is carried a little forward, is swung

quickly backward in over the beam without any bending of the knee ; at the same time the right foot pushes off and the right leg too is swung over the beam. The landing is made on the left foot while the right leg swings forward ready for the return vault, which at first is taken after a slight pause, later without any pause so that movements are merged into each other.

The feet can also be brought together above the beam and the landing made with closed feet. The end of the vault is then similar to that of (*b*).

(*d*) *Front turned side vault, dismounting with stretching from crouching position on the apparatus.*—Box, beam saddle with pad, horse with pad.

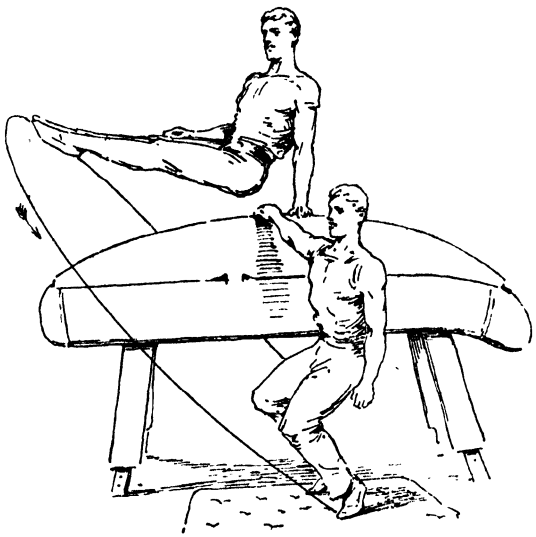


FIG. 102.—Back turned side vault to the right.

After a short run the pupil vaults to four sitting (crouching) position on the apparatus. Double take-off as for hand standing is then made, the legs and the body are stretched obliquely upward, the head well raised. The position is like those depicted in Figs. 99 and 101. The arms now carry the body a little towards one side, and the pupil lands beside the one hand that remains supported on the apparatus. At first careful support by teacher or partner is necessary in the landing.

(*e*) *Front turned side vault with stretching over sloping form.*—The form is arranged as in (*b*). The run is at right angles to the

form. The pupil grasps the edges of the form with both hands and at a suitable height; he vaults over the form, stretching the body as in Fig. 101.

33. Back Turned Side Vault.—Apparatus crosswise. Beam, horse with pad, box. The hands are placed on the apparatus shoulder-width apart. When vaulting to the left the take-off is made a little to the right of the hands. The legs, straight and closed, are swung to the left. During a strong bending of the hips the body is turned a quarter-turn to the left so that the seat is turned towards the apparatus, the legs are raised to horizontal position or higher, the trunk vertical or inclined a little backward. The left hand presses away from the apparatus and is passed over the body and again placed on the apparatus as the right hand quits; the left hand remains on the apparatus for support in the landing, which is made at arm's length distance from the apparatus. (Fig. 102 shows the vault to the right.) Beginners may divide the vault by first vaulting to long sitting position on horse or—still better—on box, and then dismounting.

Common Faults.—The body is not raised high enough; it sinks down between the shoulders.

34. Side Vault without Turning.—Double beam. The upper beam is placed a little below stretch height, the lower somewhat below hip height; later both beams higher but with the same distance between them. A short run is made at right angles to the beam. After a double take-off a vault to the right is done in the following manner. The left hand with the thumb forward grasps the lower beam in front of the body; at the same time the right hand grasps the upper beam with overgrip vertically above the left. The body is then swung horizontally to the right with stretched legs and straight back and as near the upper beam as possible; the lower arm straight and the upper arm strongly bent. When the body has passed the beams, first the upper and then the lower hand quit their grip and the body is brought into vertical position for the landing, which is made with the back towards the beam opposite the place of the take-off.

Common Faults.—(*a*) The one hand is not placed vertically above the other, the right hand too far to the right of the body and the left too far to the left. In that case it will be difficult to swing the body up into the horizontal position.

(*b*) The hips are bent and the head pokes forward as the body passes the beams.

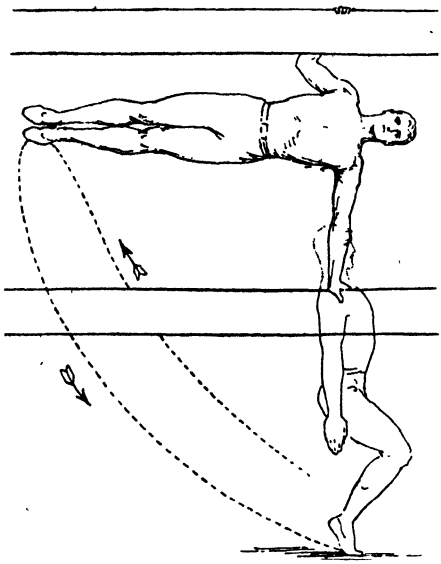


FIG. 103.—Side vault with a turning towards the lower hand.

35. Side Vault with a Turning towards the Lower Hand—Double beam. Executed as 34, but when the body has passed the beams only the upper hand quits the grip and the body is turned so that the landing is made with the side towards the beam opposite the lower hand, which keeps its grip (Fig. 103).

Faults as stated under 34.

36. Side Vault with a Turning towards the Upper Hand.—Double beam. Executed as 34, but as the body passes the beams it is turned towards the upper hand; the lower hand quits its grip and the upper hand is then shifted on to the lower beam. The landing is made opposite this hand and with the side towards the beam (Fig. 104).

Faults as stated under 34.

37. Side Vault without Turning.—Apparatus crosswise. Horse with or without pad, box, single beam. The take-off is made close to the apparatus. The hands are placed on the pommels or shoulder width apart. The body is raised up on the straight arms, resting mostly on the left, and swung out to the right with the legs straight and closed and with a slight bending

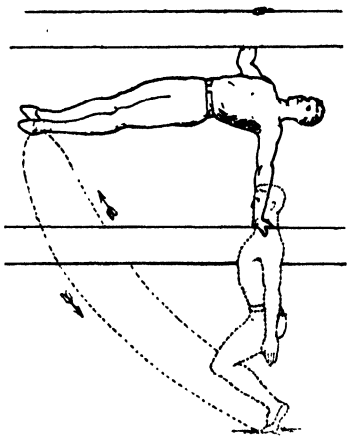


FIG. 104.—Side vault with turning towards the upper hand.

at the hips. As the right hand pushes off the body is straightened into horizontal position, left side facing downwards, after which the right arm is brought smartly to the side as in erect position. A definite moving backward of the head makes the stretching of the body easier (Fig. 105). The landing is made with the back towards the apparatus and opposite the place of the take-off.

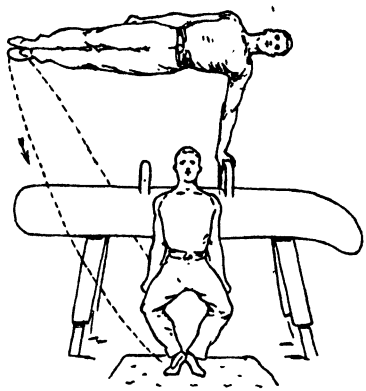


FIG. 105.—Side vault without turning.

Common Faults.—(*a*) The take-off is made to the right of the hands in a vault to the right, and vice versa.

(*b*) The legs are parted and not raised high enough; hips and knees bent throughout the vault.

(*c*) Head not moved backward.

(*d*) Chest facing a little downward because the right hand has not pushed off sufficiently strongly.

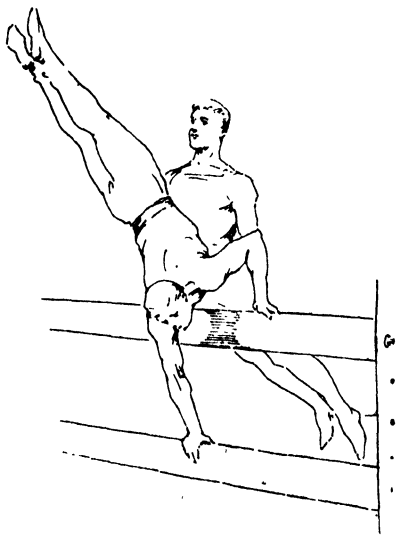


FIG. 106.—"Gate vault."

38. **Divided Side Vault over Top Beam ("Gate Vault").**—Double beam. The beams hardly arm's length apart*; top beam at shoulder height, later somewhat higher. After a run and take-off, the pupil vaults to balance hanging on the top beam. Immediately afterwards the trunk is bent strongly forward-downward, the left hand is moved down to the lower beam, with thumb behind, just underneath the right, which is turned so that

* The distance between the beams is reckoned from top edge to top edge.

the thumb is in front; the left arm is stretched, the right bent. At once after this the legs are swung to the left up over the beam to about vertical position, so that the body rests for a moment on the arms (Fig. 106). The body is now swung downward quite stretched, at the same time being turned so that the right side is turned toward the apparatus; during this movement the left hand pushes off and lets go its grip, and the right is moved down on the lower beam to support the balance in the landing, which is taken with the side to the beam. Fig. 106 shows the vault to the right.

As long as the pupils cannot reach the balance hanging position in the upward spring a low box may be placed in front of the beams, and the take-off made from it. In that case a single take-off is preferable.

K. Oblique Vaults

Oblique vaults are those which are taken obliquely over an apparatus. They are taken with single take-off; the landing is taken on one or both feet.

39. Side Standing, Back Turned Oblique Vault in Double Beam.—At first the top beam is a little under stretch height, the lower beam a little under hip height; later both higher, with the same distance between. The pupil stands with left side toward the apparatus, puts the left hand on the lower beam, and moves the left leg well backward. As he swings this leg forward-upward, keeping it stretched, he takes off with the right leg and grasps the top beam with the right hand. The right leg is then swung forward upward in the same way, passing the left as the latter is swinging down (see Fig. 108); the left hand quits its grip. The body is lifted as high up towards the top beam as possible by a strong pull of the upper arm; at the same time the head is pressed back. The landing is taken on the left foot, while the right hand is moved down on to the lower beam, and the right leg is swung backward to the starting

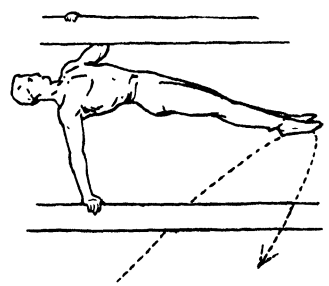


FIG. 107.—Side standing, back turned oblique vault in double beam.

position, with the right leg toward the apparatus. Without any pause a new vault is now taken to the right, then again to the left, and so on, along the beam, as in each vault the pupil comes forward and always takes care to land on the foot which is farther from the beam.

The vault can also be done with a double take-off. In that case the legs are kept together the whole time and the body is fully straightened and brought as close up to the upper beam as possible (Fig. 107). In this exercise a greater strain is put on the upper arm.

Common Faults.—(*a*) The foot which is last swung up is first put on the ground.

(*b*) The knees are bent in the vault.

(*c*) The upper hand lets go too late, so that the body is half turned with the back toward the beam in the landing.

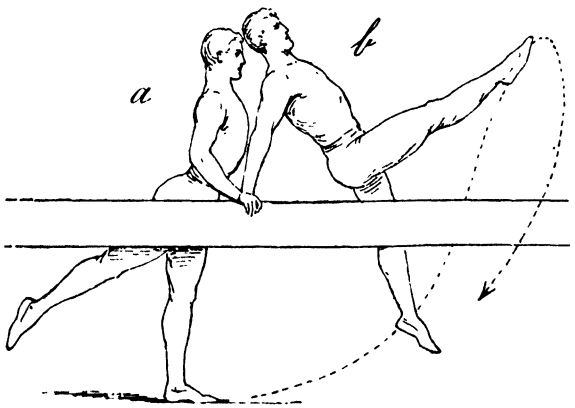


FIG. 108.—Side standing, back turned oblique vault in single beam.

40. Side Standing, Back Turned Oblique Vault in Single Beam.—At first the beam is somewhat below hip height, later a little above. The exercise is performed as described in 39, but in the vault the body is borne by one arm only, and therefore in the take-off must be moved well in over this arm. When the body has passed the beam, the hands are changed (Fig. 108).

Common Faults.—As given in 39 (*a*) and (*b*).

41. Back Turned Oblique Vault.—Horse with pad, box, single beam. After a short run obliquely in toward the side of the apparatus the left hand is placed on the rear part of the apparatus, and at the same time there is a take-off on the right foot about in line with the left hand. While the body is lifted up over the apparatus by means of the take-off and a strong stretching of the left arm, first the left and then the right leg is swung forward-upward with stretched knee and brought together just over the middle of the apparatus (Fig. 109); the left hand pushes off and the right hand is put on the apparatus a little further forward; the landing is taken with the side towards the apparatus and with the right hand on it.

Attention can be given either to the height or length of the jump. In the first case the speed from the run must not be too strong; the head must be pressed well back and the pelvis forward, so that the legs can come high up, as by bending in the hip joints alone they can only be brought up to right angles with the body. In the second case the run must be made stronger; the body is held nearer the vertical, the legs are not raised so high, and the landing is taken as far forward as possible.

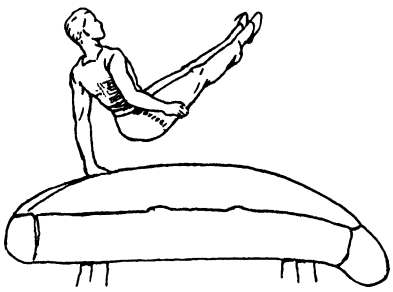


FIG. 109.—Back turned oblique vault.

Introduction.—To begin with, one leg only is swung over the apparatus, so that the ride sitting position is taken. To land, the legs are swung forward, the hands are put on the apparatus just behind the body to lift it.

L. Circular Vaults

In circular vaults the body is raised up above the apparatus and the legs are swung in a continuous circular movement across the apparatus, describing almost a complete circle.

42. Back Turned Circular Vault.—Apparatus lengthwise. Horse with pad, box. In a vault to the left, the take-off is made a little to the right of the apparatus; the hands are placed on the near end of it; the legs, stretched and together and with a

bending at the hips, are swung to the left and forward-upward over the apparatus with the seat turned towards it, the legs raised to horizontal or a little higher, the trunk vertical or inclined slightly backward. The left hand is raised, moved quickly across the body and again placed on the apparatus as far forward as possible. In the vault the body is moved well forward by a strong thrust of the hands.

The landing is made with the left side towards the apparatus and opposite the left hand, which remains resting on the apparatus till it is finally brought down to the side together with the heel lowering in the landing.

The exercise may be introduced as follows. The pupil vaults to ride sitting position. After a short pause he dismounts by swinging his legs forward. Later the pause is taken in the long sitting position so as to teach the pupil to keep the feet together.

43. **Front Turned Circular Vault with Stretching.** – Apparatus lengthwise. Horse with pad, box. In a vault to the left the take-off is made a little to the right of the apparatus, and the hands are placed on the near end of it. The legs, stretched and together and with a slight bending at the hips, are swung to the left and forward-upward over the apparatus. The body is turned about to the right, so that the chest comes to face downward, and is fully stretched; at the same time the hands are turned and change places, the head lifted and the face turned towards the place of the take-off (Fig. 110). The body takes up the same position above the apparatus as the one described in 32, page 155. The pupil lands at the near end of the apparatus with the right side towards it, the right hand resting on it, and facing the place from which the run was taken.

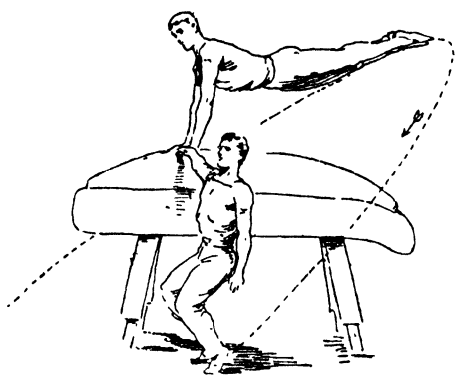


FIG. 110.—Front turned circular vault.

Introduction.—It is a fine but difficult vault requiring agility rather than strength. It may be introduced as *front turned circular vault with knee raising.* As the body is doubled

up in this vault, it is easy to keep it over the arms and to carry it round. It can be practised in two stages by pausing in four standing position on the apparatus before dismounting. The run should be short as great speed forward makes the body slip forward away from the support of the arms, and, consequently, the arms will not be able to guide the body in the last part of the circular swing.

When this vault has been mastered the exercise is taken with a stretching of the body, but in two stages, as follows. After the upward spring with bent kness, the pupil stretches the whole body and lands in front hand lying position on the apparatus. After a short pause he dismounts. In this exercise, too, the speed forward must not be great, as the shoulders must be kept well over the hands. (Fig. 110 shows the position of the shoulders incorrectly, as they are not above but slightly behind the hands.)

M. Overswings on Apparatus

Overswings are vaults in which the hands are supported on the apparatus, while the legs are swung in a curve vertically over the head, then downward.

On a low piece of apparatus the exercise—*low overswing*—is executed quickly and without any pause. On a high apparatus—*high overswing*—the exercise is done slower and often with a pause in which the pupil is balancing in the hand standing position. Overswing with turning (balance vault) is one-sided and should be practised to both sides.

Overswing prepares the way for agility exercises on floor or mat. As the hands are placed on an apparatus more or less raised above the floor the swinging of the legs and the thrust of the hands require less vigour here than in agility exercises to bring the body into the erect position in the landing, the less the higher the apparatus.

The arms, however, have a considerable work to do in overswing. In other vaults the work as regards the shoulders and the shoulder joints is similar to the work in heaving exercises (refer pp. 136-137). Overswings are more like arm exercises, the work is only far greater (note the muscular action in an arm stretching upward, Vol. I, pp. 176 and following). At the shoulders the outward rotators of the shoulder-blades have

to work with their full strength. The whole weight of the body falling from a greater or a smaller height presses on the arms in stretch position and through the arms on the outwardly rotated shoulder blades. These muscles—especially trapezius IIa, the lower part of serratus magnus, and the middle part of deltoideus —must be well developed before a proper overswing can be done. The trapezius is working in a shortened condition, and owing to that, the exercise has a beneficial effect on the carriage of the shoulders. Vaults in which the arms are directed downward, are apt to detract from rather than to improve the carriage of the shoulders owing to the forward pull of the pectoralis major and minor.

44. Low Overswing.—Box crosswise, rather over knee height, later lower. This exercise can be done with *hip bending* or with *straight body.*

(*a*) *With hip bending.* After the take-off, which should be taken one and-a-half to two steps away from the box, the pupil tries to jump upward in order to come down on the hands from above, the hands being put on the middle of the box, shoulder-breadth apart. The legs are kept stretched and together, the hips bent to about right angles, the back straight, the head bent backward so that the face is turned towards the box. As the hands meet the apparatus, the arms yield like a spring by a slight bending. When the body has passed the vertical position, the legs are swung upward and forward in the direction of the movement; at the same time the hands push-off strongly by a stretching of the arms; the upper part of the body is in this way swung up and brought to vertical position for the landing, which is taken as

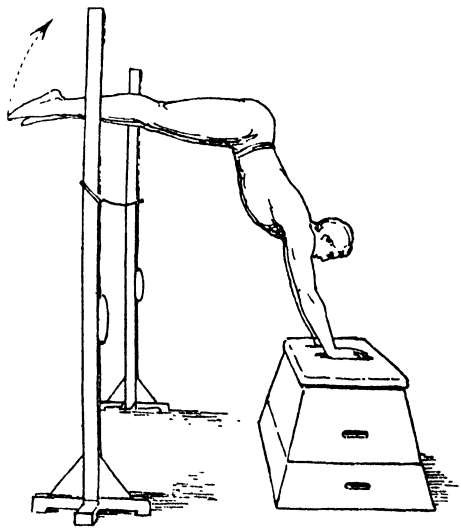


FIG. 111.—Low overswing with hip bending.

far from the box as possible with the feet apart; the feet are brought together by a little jump on the spot as the knees are stretched. After sufficient practice the legs can be kept together in the landing, also two pupils can perform the vault at the same time, each on his half of the box.

In order to get the vault high, a rope can be placed on the side of the box from which the jump is taken. This is at first put a little higher than the box, gradually higher still, and somewhat further away from the box (Fig. 111).

(*b*) *With straight body.* After the take-off, which is taken about three steps away from the box, the pupil jumps upward and forward, describing a curve longer than in (*a*). Immediately after the take-off the body is fully stretched with the head bent well backward and the arms stretched upward almost in line with the body. This position is kept during the whole vault, right to the landing. When the hands are placed on the box the arms yield like a spring by a slight bending, after which the hands push off strongly by a stretching of the arms.

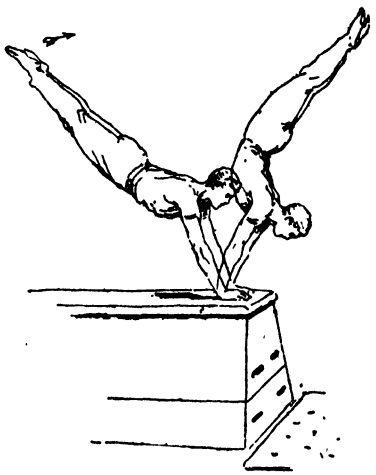


FIG. 112.—Low overswing with straight body.

The vault will be still longer when the box is placed lengthwise. The hands must be placed well forward on the box (Fig. 112). The teacher or a reliable pupil must stand by in readiness to save a fall.

Common Faults.—(*a*) The vault is made too flat; this makes the shoulders come too far forward in relation to the hands, and the head sinks down on the side (the end) of the box.

(*b*) The arms are bent too much.

(*c*) The head is bent forward with the chin against the chest and the back is rounded.

(*d*) The knees are bent just before the landing, so that the feet come too far in under the body, which falls forward.

(*e*) The legs are parted too early.

45. High Overswing with Bent Arms.—Beam saddle, horse without pad, beam. After the pupil has taken off about a step away from the apparatus and put the hands on the apparatus, the body is swung up over it, borne on the arms, which, at any rate, must not be bent to more than right angles in the elbow joints; the legs are stretched and together, the hip joints somewhat bent, the head pressed back, so that the face is towards the apparatus, the back straight (Fig. 113). When the body has come a little past the vertical position the legs are swung forward and down towards the ground; at the same time the hands push off and the body is brought into the vertical position for the landing; this is taken with feet apart; in the knee stretching the feet are brought together by a little jump on the spot.

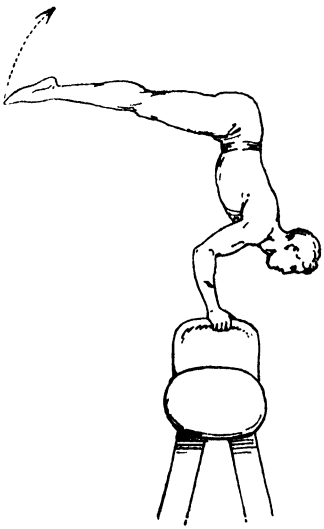


FIG. 113.—High overswing with bent arms.

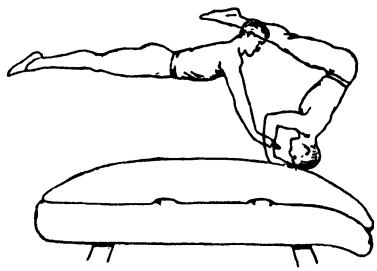


FIG. 114.—High overswing with bent arms.

The teacher, later a reliable pupil, stands by to assist. He puts his one hand between the pupil's arms and on to his chest; the other hand he places on the pupil's back or at the root of his neck. In this way he can help to carry his body so that it does not sink down too far between the arms, a common fault in beginners. In the landing the hand on the chest should slide forward and support the shoulder or the upper arm to prevent the pupil from falling forward.

Faults as in 44 (*b*), (*c*), (*d*) and (*e*).

46. High Overswing with Bent Arms.—Apparatus lengthwise. Horse with pad. After the take-off the pupil

jumps so far forward that he is able to place his hands above or slightly in front of the farther pommel. The vault is otherwise executed as in 45. The one "standing by" must take care to assist the one vaulting in case he has not placed his hands so far forward that his back will get clear of the horse. He places one hand under his shoulder and the other one against the small of his back or just below. The pupil will find the vault easier when he is allowed to support his head lightly on the pad just in front of the hands (Fig. 114).

Faults as in 44 (*b*), (*c*), (*d*) and (*e*).



FIG. 115. Hand standing position on horse; teacher supporting.

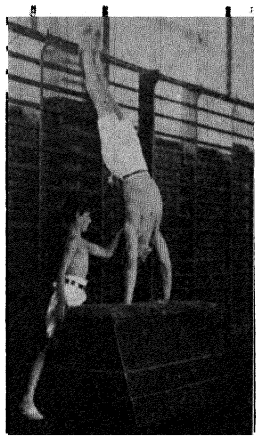


FIG. 116.—Hand standing position against wall; fellow pupil supporting.

47. **High Overswing with Straight Arms.** Apparatus crosswise. High box, beam saddle, horse with or without pad, buck, beam. The vault begins as described in 45, but the legs are swung up and the arms stretched so that the body takes up a vertical position above the hands and slightly arched from head to heel (hand standing position, Fig. 115). The balance is kept for a moment, after which the body falls backward and the arms bend slightly so that the hands by a vigorous thrust

can swing the body round to the vertical position for the landing which is made as described in 45. The hips may be bent slightly together with the arms. This hip bending will make it easier to swing the legs strongly so as to bring the body into the vertical position.

Very agile pupils may perform the exercise on a high box placed lengthwise. They vault to hand standing position on the near end of the box, walk on their hands to the far end and finish the overswing from there.

Introduction.—A low box, later a higher one or a horse without pad, is placed parallel and close up to a beam. The beam is put at such a height that a pupil in hand standing position on the box (horse) can touch the beam with his calves or the hocks. After a run and a double take-off the pupil swings his legs up against the beam; the teacher or a reliable pupil stands by to give the necessary support as described in 45. After that he dismounts.

Later the box (horse) can be placed along a wall as shown in Fig. 116. The one standing by must take care that the pupil does not fall down between the apparatus and the wall.

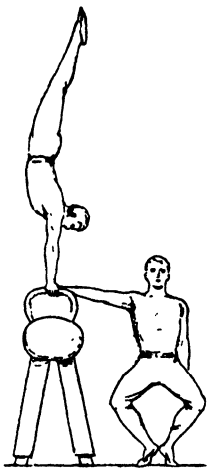


FIG. 117.

48. High Overswing with Straight Arms and Turning to the Left (Right) in the Landing (Balance Vault).—Beam saddle, horse without pad crosswise. Executed as the first part of the previous exercise, but after a short pause in the hand standing position the weight of the body is carried over on to the right (left) hand, at the same time the body is turned to the left (right). While the head is kept well back the body is swung downward without any bending at the hips. During this downward swing the left arm is carried quickly to the side as in the erect position. The landing is made opposite the right (left) hand, which is kept on the pommel (Fig. 117).

When the pupil has learnt to keep the balance well he may turn about, change hands, and land facing, the apparatus with a hand on each pommel.

Introduction.—When assistance is needed it is given as described in 45. During the upward spring the helper may

support the one vaulting by putting a hand on the back of his head and the other on his chest. A strong pressure on the back of his head will help him to swing his body upward. In the hand standing position the helper may shift his hand from the back of the head of his partner to the lower part of his back and in that way help him to find the balance. A pressure on the back of the head will be sufficient for the more agile pupils.

During the downward movement, the helper may shift his hand down on to his partner's upper arm of the side to which he is turning. By a pull on this arm and by a pressure on the back with the other hand he can guide his partner's turning.

When the swing downward is found difficult it may be practised from hand standing position on the end of a high box or on a horse without pad against which a box of the same height is placed at right angles. In both cases the upward swing to hand standing position, which requires fair strength when done from the floor, can now be done as a simple leg swinging upward with single or double take-off. In this way the downward swing can be practised several times without causing undue fatigue.

Common Faults.—(*a*) The body is turned before the hand standing position is reached.

(*b*) The arms are not fully stretched.

N. Game-like Exercises

49. Running Under and Jumping Over the Swinging Rope.—The teacher, assisted by one of the pupils, swings the rope, now slower and now quicker so as to help the pupils during the exercise. The children run under the rope if it swings with them in its descent, and jump over it if it swings toward them. In both cases the run must begin when the rope swings past the face. A child should run in each swing.

Jumping over the rope can either be a running jump or an ordinary long jump (i.e., landing on one or both feet).

50. Jumping the Swinging Rope.—A rope with a knot or a small sand-bag at one end is swung round by the teacher, who stands in the centre of a circle formed by the children. The teacher lets the rope out gradually or the children move inward until the rope passes under their feet as they jump.

They can also run round in a circle till they meet the rope and jump over it with a running jump or a long jump.

The teacher, while swinging the rope, can sit down and pass it over his head. He should take care not to swing the rope so fast that it will take the feet away from under the one who does not clear it.

51. **Skipping.**—The children grasp the end of their ropes in such a way that each rope reaches in a loop from a little above the hips to the feet. The jump or hop over the rope, as it passes the ground, can be taken forward or backward with feet together or on one foot, with or without an intermediate jump or hop on the spot, or with advancing forward. Skipping is best taken out of doors, it should never be taken in a dusty hall.

Special care must be taken that the children jump lightly on the toes with a springy yielding in the knee and ankle, and with good carriage.

Many athletes, especially runners, jumpers, and boxers, make skipping part of their training.

52. **Running Seven Jumps.**—Eight chalk lines are drawn on the floor, the second a foot-length from the first, the third two foot-lengths from the second, and so on. The eighth is thus seven foot-lengths from the seventh. One may choose two children to make the lines, the one measuring the distance with the feet, the other marking the lines. The jump consists of running steps getting longer and longer, so that each line is touched with a foot, the run becoming quicker and quicker so that there is sufficient speed forward for the last long jump. The children must be kept in teams, so that there are not more than five to six children at each set of lines.

53. **Seven Hops.** As described in 52, but on one foot, or hopping with feet together.

§ 5. Agility Exercises on the Floor

Under this group are included such agility exercises as can be taken either on the bare floor or on a mat without any other apparatus being necessary. They, like jumps and vaults, are lively and attractive exercises which are well suited to awaken the spirit of competition. Their chief aim is the training of co-ordination.

These exercises are also found in the Ling system, but they have never been practised in Sweden. In Denmark, on the other hand, they have been in use for more than a hundred years and they have been greatly developed ; one may truly say that they form a national part of the system as used in Denmark.

As already mentioned, their chief aim is the training of co-ordination (refer Vol. I, page 7), and this fine co-ordination of a great number of muscles is only learnt by long training right from childhood. Visitors to Denmark have been greatly interested in these exercises and have wanted to introduce them in their respective home-lands. When such attempts have been met with but small success the reason must be sought in the fact that the necessary tradition for these difficult exercises is lacking. They are in reality vaults, but because of their popularity and standing they are always described as a special group in all Danish textbooks of gymnastics.

As stated on page 166, overswing prepares the way for agility exercises on the floor. But in agility exercises a far quicker contraction of the active muscles of the arms, the trunk, and the legs is necessary than in overswing.

The legs are mostly working less and the arms are working more in agility exercises than in jumping and vaulting (overswing, however, excepted). The outward rotators of the shoulder-blades and the extensors of the arms work strongly, and the effect on the shoulder muscles is beneficial to the carriage of the shoulders, especially because the trapezius works in a shortened condition.

Agility exercises on the floor have this advantage over many other exercises, that they claim neither gymnasium, apparatus, nor teacher. They can be performed in a grass field or the like (a sloping grass field lends itself well to beginners), and so can be practised outside school hours.



A B

FIG. 118.—Forward rolling.

1. Forward Rolling.—Taken on a mat, grass, or the like. The children at first can practise the exercise from stride standing position with a wide distance between the feet. The hands, back of

the head, and shoulders (not the forehead or crown of the head as in head spring) are put on the ground as close in to the legs as possible (Fig. 118a); the back is rounded so that the rolling goes easily, and the legs are crossed so that they can come in under the body. The rolling finishes in crook sitting (Fig. 118b), later in cross sitting position. To stand up there is such a strong stretching of the legs that the exercise ends with a little jump.

From the cross sitting position grasping the toes, the pupil can roll forward several times in succession.

After a certain practice on the mat the rolling may be done along a low box so that the pupil finishes in sitting position with the feet on the floor (Fig. 119).

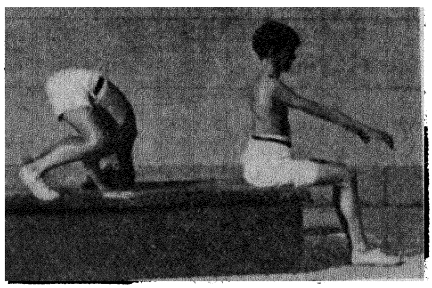


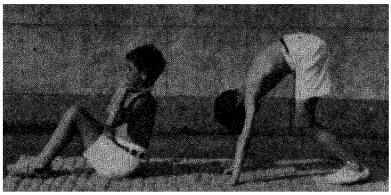
FIG. 119.—Forward rolling along box.

The exercise should also be taken on the bare floor. The children will soon find that they do not hurt themselves if they only roll evenly on their rounded backs. The exercise may now be done by the whole class together in open order or arranged in ranks.

Children (as early as at the ages 10-11) can soon learn to go down from deep front hand lying position (at wall bars) by a forward rolling. They bend their arms, place the backs of their heads on the floor, and roll backward while the feet slide down along the wall bars and the hips are strongly bent. (When done in this way the swinging of the legs will not begin too early.)

2. Backward Rolling.—The exercise is taken from crook sitting position. The back should be rounded and the head bent forward to make the rolling easy (as on a rocker). The bent legs must be drawn well up towards the chest so as not to hinder the movement by their weight. In the rolling the hands are moved up to the shoulders and bent backward (Fig. 120a) ready to be placed on the mat when the body rests on the shoulders and the back of the head. By a thrust of the arms (Fig. 120b) the body is raised to the erect standing position.

When the children have learnt to do the backward rolling from the crook sitting position they must learn to do it from the



A B

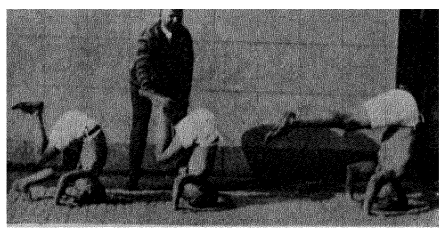
FIG. 120.—Backward rolling.

standing position. They bend their knees fully, round their backs, and put the hands on the mat in order not to sit down too heavily. Without any pause they roll backward quickly so as to get into the erect standing position lightly and smartly.

A series of backward rollings may be performed. The children now put their arms in under their knees so as to keep the body bent well forward and rounded like a wheel.

Head over heels is a child's first agility exercise. The children know it before they go to school, and it is a good exercise. For a little child it requires a certain nerve to turn head over heels and it feels very proud when it has overcome its fear of getting hurt. Physically it is an important exercise too. The cervical and lumbar spines with their forward-convex curves are in need of a strong bending forward in order to keep supple. The loin is bent forward strongly in many exercises, but as regards the neck there is hardly an exercise as effective as rolling forward and backward when a forward bending is concerned, as the whole weight of the body acts in straightening the cervical curve. If one turns a somersault after not having done it for some time one will soon realise its effect upon the neck (compare Vol. I, page 204).

3. Head Standing Position.—The hands are put on the mat one to one-and-a-half shoulder-breadth distance apart, with the fingers pointing straightforward; the front part of the crown of the head is put on the mat a little in front of the hands, so that the lines between the head and hands make about an equilateral triangle. By a push-off with the hands against the ground the trunk is drawn in over the base of support, while the hip-joints are strongly bent and the



A B C

FIG. 121.—Head standing position.

feet, with stretched ankles, pass along the ground; the legs are held together and stretched. When the trunk is so far over that the feet tend to leave the ground, the legs are raised slowly and steadily upward until they are in line with the trunk.

In the return movement the legs are lowered slowly the same way down to the ground.

Introduction.—Head standing position, like rolling, should be introduced early, i.e., at the age of 6 or 7. Little children enjoy these exercises and they are a good preparation for agility exercises proper as the children get used to exercises and positions with the head downward.

Head standing position can be introduced as follows. Long mats and other mats are placed along the wall bars so as to enable many children to practise at the same time. Each one places his head on the mat so close up to the wall bars that the back, later only the heels, will be supported against the wall bars in the head standing position. On the way up the child takes short steps forward as shown in Fig. 121a, and in the head standing position the hips and the knees are at first kept bent as this makes it easier to keep the balance.

The next stage is to make the child pull his legs, bent, but kept together, towards the hands and then raise them to the position shown in Fig. 121b. The third stage is the same movement but with straight knees (Fig. 121c).

When the children are able to keep the balance on the head the following leg movements can be added: Knee bending and stretching, leg parting, and especially leg lowering and raising. In the last exercise the legs are lowered till the toes touch the ground or, still better, till they nearly touch the ground, after which they are again raised to the vertical position.

Head standing is a valuable exercise. It makes the children used to having the head downward, and it is an excellent preparation for head spring, especially when the children have gone so far that they are able to lower their legs as in Fig. 121c and raise them again. If the children have learnt this by the age of 9 or 10 they will find head spring quite easy by the time they are old enough to take up this exercise.

Until the age of 10-11 years girls may practise these exercises as well as boys and it will be found that they enjoy them just as much as the boys do and perform them with the same ease.

By the backward bending of the neck when the front part of the crown of the head is put upon the mat, the forward curve of the cervical spine is greatly increased. In this curved position the neck must bear the main part of the weight of the body. This gives one an idea of how strong the muscles are round this most slender part of the spine. The backward bending of the cervical spine has not reached its maximum so it cannot be its ligaments that prevent a further bending ; this must be done by muscles. As the superficial muscles are quite slack it must be the deeper muscles close to the spine in front that are working, namely the *rectus capitis anterior*, the *longus capitis*, and the *longus colli*.

4. Hand Standing with Support (Support Hand Standing Position.—(*a*) *With single take-off against wall or helper.* The pupil stands facing the wall, wall bars, beam at hip height, or a comrade standing two steps away. *Left foot forward, hand standing*—1—2. On 1 the arms are raised to reach position, the palms towards the ground ; at the same time the left foot is moved a short step forward and put on the floor with only the ball of the foot touching; the weight of the body thus remains on the right foot. On 2 the trunk is moved quickly forward-downward, the hands are put on the ground pointing straight forward or turned a little outward, rather more than shoulder-breadth distance apart, and about a step away from the apparatus ; at the same time the feet push off from the ground, the rear one first, the front one last and more strongly ; the legs are swung up, brought together, and stretched ; and the feet are supported against the apparatus, the head bent a little backward, so that the floor is seen between the hands. The back is bent in a slight curve, the feet as high up on the wall as possible.

From position—up ! First the left, then the right leg is brought down by a strong bending of the hip-joints, the feet are put on the floor and brought together, while the trunk is raised up to the erect position.

Introduction.—There are several good preparatory exercises.

(1) *Four standing introduction to hand standing.* With their hands on the floor the children kick up their heels, knees well bent, and head thrown back ("kicking like a horse"). The exercise can be done either with single or double take-off ; with single take-off the feet should be used alternately. If the head be poked forward the arms may give and the child will fall down on its back.

(2) *Four standing introduction to hand standing; the hands placed on a form.* Described on page 151.

(3) *Deep and vertical front hand lying.* Described in Vol. I, pages 301-303 (see Fig. 122).

(4) *Hand standing with support from a helper.*

The pupils can help each other in pairs in the following way: The one who is to take hand standing position puts his hands on the floor and puts one leg backward, while the other is bent. The helper takes a rather short oblique lunge position, with his forward foot between his comrade's hands and his knee against the latter's shoulder; while the latter now takes off with the feet the helper grasps him round the hips and helps him up on his hands (Fig. 123).

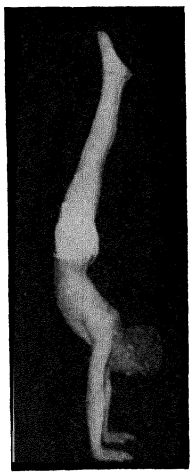
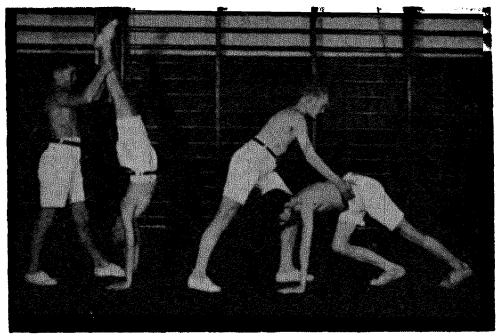


FIG. 122.



A B

Fig. 123.

If the hand standing is to be taken against a wall, two helpers may be put to support the one who is doing the exercise. The pupils then number off in threes: ones and threes turn to face each other, twos take two long steps forward and turn about. While twos take the hand standing position, ones and threes in half kneeling (Fig. 124) or standing position, grasp the nearer shoulder with the hand nearer the wall: with the other hand they help the legs if necessary. After some practice one helper is sufficient.

If the exercise is done against a helper as support, ones stand opposite twos two steps away; the teacher commands: *All, left foot forward, ones to hand stand* 1 2. On 1 and 2 the ones take the same movements as described above. The hands

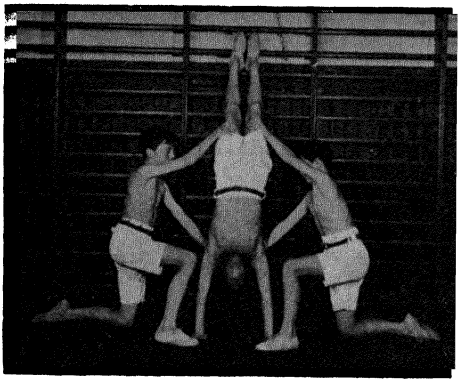


FIG. 124.

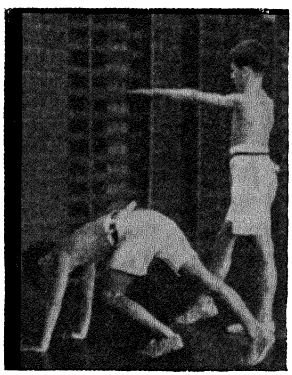
are put on the ground about in line with the feet of the twos, and to each side of them.

On 1 the twos put the left foot a short step forward, and on 2 they move their hands forward and grasp the ankles of ones (Fig. 123a).

From position—up! Twos let go the ankles of ones (if necessary with a slight push) and both take up the erect position.

When hand standing against a wall is practised without a helper the pupil places both hands on the floor before the take-off, bends one leg, and stretches the other leg backwards (Fig. 125a). The shoulders must be carried well forward above the hands. In the take-off the seat is lifted well up before the legs are swung fully up, otherwise the centre of gravity will lie too far behind the hands to allow the body to be raised above the hands. It is a help to press the back of the head against the wall before the take-off, but in that case the hands have to be placed fairly close to the wall.

(*b*) *With double take-off against wall or helper.* When hand standing with single take-off has been mastered the exercise should be practised with double take-off. In this latter exercise it is somewhat more difficult to bring the centre of gravity sufficiently forward above the hands than in the former. After the take-off, the legs are kept stretched and there is a strong bending of the hip-joints (see Fig. 113) while the seat is lifted and the body carried forward and balanced above the hands; the legs are then raised up against the wall or against the



A B

FIG. 125.

helper. The movements of body and legs should be merged steadily into each other as a sign of perfect control. If the feet be dashed heavily against the wall the execution is uncontrolled and unsatisfactory.

It is an excellent preparatory exercise for head spring and for overswing with double take-off ("flying hand spring"). It ought to be practised often and carefully.

Introduction.—The first introductory exercises are the same as (*a*)1 and (*a*)2 but with double take-off. Later the exercise is taken with one helper as in (*a*)4, the helper standing as shown in Fig. 123b; the pupil doing the exercise must have his feet together, however. When the pupil pushes off well with his feet it is easy for the helper by a pull on his hips to guide him into the hand standing position with his legs supported against the helper's shoulder. This form lends itself well to free practice. The helper, keeping the grip on his partner's hips while the latter is in the hand standing position, gives the partner's legs a slight push with his shoulder so that they may be swung down to the starting position; a new take-off and a swinging upward of the leg immediately follow, and in this way the exercise may be repeated a fair number of times within half-a-minute.

Also two helpers can be used as in Fig. 124; one hand should be placed under the shoulder of the one performing and the other at his hip during the upward movement.

When the exercise is done without a helper the best starting position at first is four standing at the wall bars as in Fig. 125a, but with the feet kept together. The untrained pupil will find the exercise easier when he puts the back of his head against the wall bars before the take-off. In that case the hands should be placed only about a foot length from the wall bars.

Common Faults.—(*a*) The hands are put on the ground too far from the front foot (if done against a wall, too close to the wall).

(*b*) The head is not bent back, which causes the arms to give way readily.

(*c*) The back hollowed too much.

(*d*) In the descent there is not sufficient bending of the hip-joints; the feet then fall heavily to the ground too far away from the hands.

Muscle Work (Fig. 126).—In hand standing position the arms are about in the same position as in stretch position, and the

muscle work also is the same, to a certain extent, as far as the arms and shoulders are concerned; but the muscles, which in stretch position only have the arms to bear, in hand standing position must bear the whole body. The *flexors and extensors of the hands and fingers* keep the body balanced over the hands. *Triceps* keeps the elbow-joint stretched; *deltoideus* keeps the

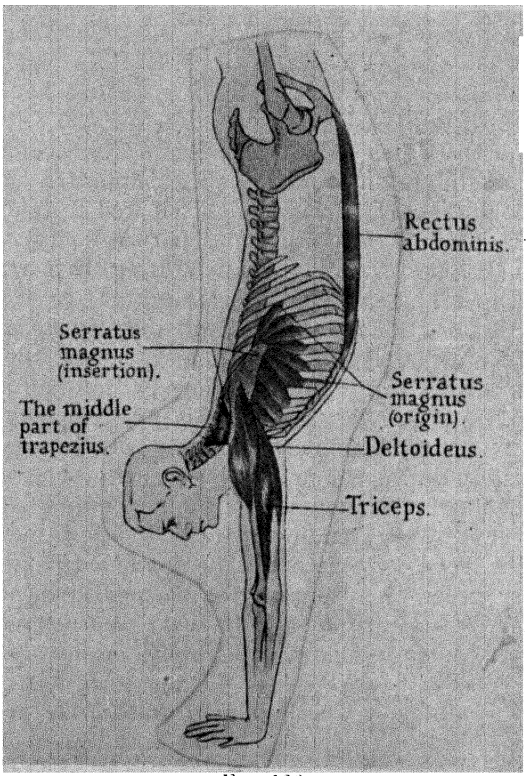


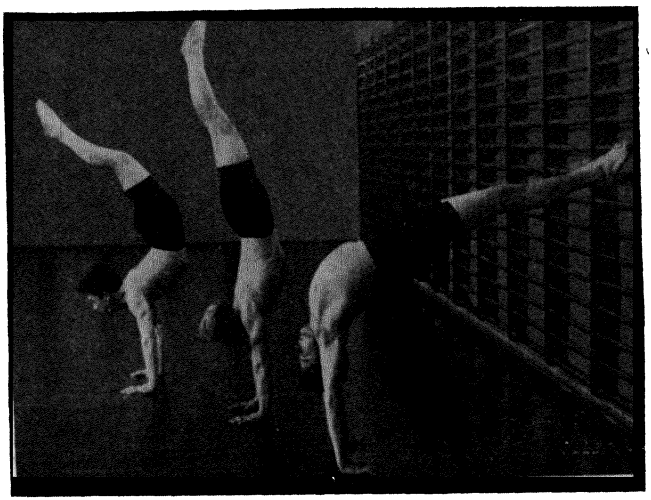
FIG. 126.

shoulder-blade fixed on the arm, so that it gives a steady origin for the muscles which keep the body in the right relation to the shoulder-blade—namely, *serratus magnus* and the middle part of *trapezius*.

The middle part of the *trapezius* (*IIa*) is in hand standing position seen as a thick, horizontal cable from the lower cervical vertebræ to the acromion; the direction of its pull is most

favourable for keeping the shoulder-blade rotated outward, and in this position a strong pull is essential as the body with its whole weight tends to rotate it inward. As *trapezius IIa and IIb* keep the shoulder raised and drawn back, it will be readily understood that hand standing positions are exercises that benefit the carriage of the shoulders ; they counteract sloping shoulders as well as round shoulders.

The *abdominal muscles*, principally *rectus abdominis*, prevent too much bending in the loin. Sideways movements of the legs and the pelvis are prevented by the *lateral parts of the abdominal muscles* and by the *extensors of the loin.*



A B C

FIG. 127.

In hanging positions we talk about short hanging and long hanging positions. Correspondingly in the hand standing position we might differentiate between *short standing* and *long standing* positions. A pupil may lower his feet or he may push them high up along the wall. One may often see the loin hollowed so much in the hand standing position that the arms in relation to the trunk are almost brought into reach position (Fig. 127a). This position is ugly, but it is easy to keep the balance in it as the centre of gravity is lowered considerably. When in such a position the shoulder-blades are rotated

outward, the back must be straightened for the sake of the balance, and this means that the feet will be pushed higher up along the wall. The former position, with the back hollowed, may therefore be called short standing and the latter, with straight back, long standing position (Fig. 127b).

When in the hanging position we change from long hanging to short hanging the movement takes place in the shoulders and the position of the rest of the body is fairly unaltered. The muscles acting here are partly the heaving muscles from trunk to arm (pectoralis major and latissimus dorsi) and partly those from trunk to shoulder-blade (trapezius III at the back and pectoralis minor and others in front) (see page 9).

The corresponding movements between short standing and long standing positions are performed principally by the antagonists of the muscles just mentioned, namely by the outward rotators of the shoulder blades: trapezius IIa and b, III, and serratus magnus, together with the middle part of deltoideus, which transmits the movements of the shoulder-blade to the arm. Trapezius, the strongest adductor of the shoulder-blades, works hard in the hand standing position, the harder the higher the body is lifted. Consequently these movements have a beneficial effect on the carriage of the shoulders.

Finally, in the hand standing position, *reverse span bending* can be done (compare reverse arch hanging, Vol. I, page 302). In the ordinary hand standing position the arms cannot be brought quite into stretch position, especially not when the exercise is done without support. But when the feet are supported against the wall bars a *shoulder stretching* can be done by pressing the chest forward between the shoulders, i.e., away from the wall. The arms now take up the same position in relation to the trunk as in span bending. And this exercise is similar to span bending not only as to outward form, but also in effect. Here the outward rotators of the shoulder-blades, the same muscles that are active in span bending, work under extreme shortening against the weight of the body. The exercise is therefore very beneficial to the carriage of the shoulders.

Fig. 127c shows reverse span bending done by an advanced gymnast. Children and less trained pupils must perform the exercise with the hands placed nearer to the wall, but even then the exercise is very effective. By turning the picture the likeness to span bending will easily be seen.

Hand standing exercises are very attractive to children as well as to adults, and their effects on the shoulders are good and ought to secure them a place not only in school and voluntary gymnastics, but in private home exercises, too, and within limits they can be used by both sexes. It is gratifying to see that they are being used more and more in gymnastics for girls and women. Although certain types of hand standing exercises may not lend themselves to gymnastic displays for women, the same exercises may probably be very valuable in the daily lesson where spectators need not be taken into consideration.

5. Knee Hanging, Down Swing through Hand Standing Position.—Square ladder or single beam, horse, box. The children sit in the square ladder on a bar at such a distance from the floor that from knee hanging position they can reach it with their hands. They go down to knee hanging position by moving the hands down the long bars of the ladder. The hands are put on the floor and down swing taken.

If the ropes are at a suitable distance from the beam, the pupils can swing the legs over the beam by their help, after which they let the hands glide down the ropes to knee hanging position.

A similar down swing through hand standing position can be taken from sitting position between the two pommels on a horse or from back lying position lengthwise on a box of suitable height or a horse with pad.

When a long mat is hung over a beam at hip level, slow backward overswing may be done from standing position ; the pupil bends backward with the back supported against the beam. This backward overswing can also be done over a partner lying on hands and knees. When the one doing the exercise swings his legs upward the partner may help him by lifting his back (see Fig. 138, which in this case may be taken to represent the last part of the backward overswing). At first there ought to be two fellow pupils standing by at these exercises in down swing and backward overswing.

6. Hand Standing, Arm Bending with Support.—The pupils are in hand standing position. On the command, *Arm bending*—1—2. The exercise is performed as follows. On 1 the arms are bent and the body lowered till the forehead touches the floor. On 2 the body is raised by a stretching of the arms. As the pupils will be of unequal strength the exercise is best practised freely at first.

Importance and Introduction.—Just as stretch hanging body raising is one of the best exercises for the training of the flexors of the arms and the heaving muscles (pectoralis major and latissimus dorsi), hand standing arm bending is one of the best exercises for the strengthening of the extensors of the arms and the outward rotators of the shoulder-blades (trapezius II and III, which are also adductors, and the lower part of serratus magnus). There is a certain balance in the development of these two sets of muscles when one is able to perform an equal number of stretch hanging body raisings and hand standing arm bendings (i.e., body lowerings), (see Vol. I, p. 331).

At first some assistance is necessary. This is best given by a partner as shown in Fig. 123a.



A B

FIG. 128.

Fig. 128 shows that by fixing his feet between two bars, the pupil can make the flexors of his knees assist him so that the bending and stretching of his arms will be done quite easily.

7. Walking on Hands.—When the pupils have learnt to be confident in the hand standing position with the feet supported, walking on hands is practised. The hands then must not be moved before the trunk has come up so far that it is beginning to fall over; for here, just as in ordinary walking, there must be a fall in the direction of the movement. If there is too much speed the fall backward over is prevented by moving the left (or right) hand in a curve of 90 degrees forward to the right (or left), so that a turn is taken, after which the feet are put on the ground as in ordinary descent from hand standing position.

Introduction.—The first practice in moving the hands should be done on the spot with the feet supported against a wall. The displacement of the body from side to side is greater here than in ordinary walking because of the comparative wide distance between the hands. By practising walking on the hands on the spot the difficulty of adjusting the balance caused by this sideways displacement will soon be mastered. Furthermore, the arm and shoulder muscles will be trained in the work involved.

The next step is (from the hand standing position with

support against a wall) to practise backward walking away from the wall, when the balance has been secured, after a light push-off with one or both feet. If one lose the balance after having gone a couple of steps from the wall, one must, when falling backward, take one or two steps forward so as to support the feet against the wall once more, or when falling forward, put the feet on the floor and start afresh.

When walking on the hands is done freely on the floor a partner may assist by watching carefully and giving the necessary support by a light touch on the feet as soon as the balance becomes insecure.

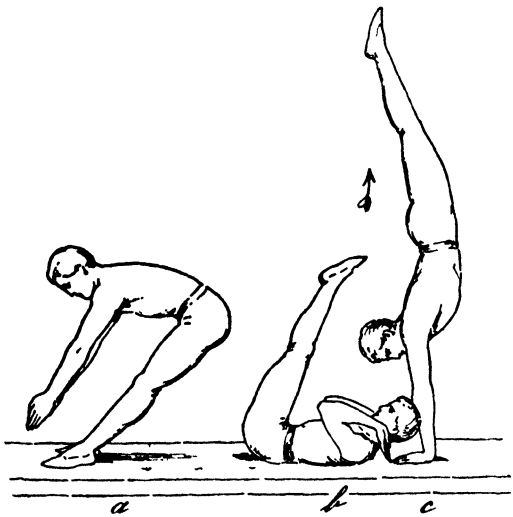


FIG. 129.—Backward rolling to hand standing position.

8. **Backward Rolling to Hand Standing Position.**—From the erect position the pupil rolls backward in the same way as in the beginning of a back spring (Fig. 129a). When the rolling has gone so far that the pupil is resting on the shoulders and the back of the head, and the feet have come over the head, the hands are put at the sides of the head close in to the shoulders with the fingers towards the shoulders (Fig. 129b), the arms are stretched, the head bent strongly back, and the hip-joints straightened so that the pupil comes into hand standing position (Fig. 129c). After balancing for a moment in

this position the pupil comes down in the ordinary way on one or both feet.

Introduction.—With the pupil lying on his back the teacher (or two partners, one on each side) catches hold of his ankles (Fig. 130) and lifts him into the hand standing position while he puts his hands on the mat in the usual way and pushes off by stretching his arms.

When the pupil makes his first attempts at doing the exercise by himself he may start the backward rolling from the spring sitting position or from the standing position. One or two partners stand by ready to catch his feet and to help him into the hand standing position.

The most difficult point in the exercise is to find the right moment for the raising of the legs and the straightening of the body. When these two movements are done too soon one falls backward, and when they are done too late one falls forward.



Fig. 130. Introduction to backward rolling.

9. **Stretch Stride Standing, Cartwheeling.**—The pupils take stretch stride standing position, bend somewhat to the right, and then swing the trunk by a quick bending sideways to the left as far down toward the ground as possible; toward the end of this bending there is a take-off, first with the right then with the left foot, and the hands are put on the floor with the fingers pointing backward, one after the other, at one to one and a half shoulder-breadth distance straight sideways in line with the legs; the latter are at the same time swung up through vertical position, and then downward, stretched and far apart; the feet are put on the floor just like the hands, the one after the other, in line with the hands; the trunk is raised and stretch stride standing position again taken. The parted legs and arms should remind one of the spokes of a wheel, and just like the spokes, the arms and legs should come down with equal distance between them.

The exercise can also be taken with the legs brought together as they are just over the head, and parted again afterwards (Fig. 131). After sufficient practice cartwheels can be taken

from standing position ; the exercise then begins with the left foot being moved to oblique position on the toe with a half turn. It can also be taken from ordinary marching.

The exercise can be taken as a mass exercise from open order, as long as there is sufficient room between the pupils. *Feet astride, arms upward—stretch ! Cartwheel to the left*—1—2. On 1 trunk bending to the right, on 2 cartwheel to the left. As the next progression, the bending sideways can be omitted and the cartwheel is turned on 1.

If the floor space be limited one rank may do two or three cartwheels across the hall and back again after which the ranks change.

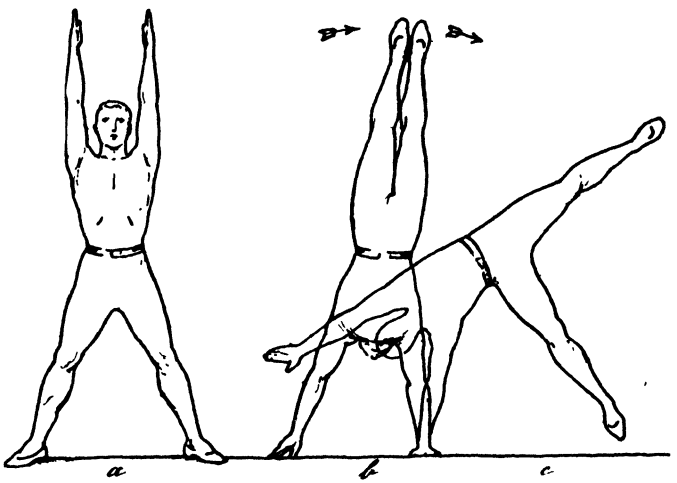


FIG. 131.

The following class arrangement can be used for cartwheeling lengthwise down the hall. The pupils are lined up in two ranks on opposite sides of the hall and with their backs to the walls. Four chalk crosses are made with equal distances on the floor at one end. The teacher uses his whistle, and on the first signal two pupils from each rank take up their places at the crosses facing a side wall. On the second signal they jump into the stretch stride standing starting position. On the third signal, all four turn a cartwheel and the next two from each rank take up their positions. On the fourth signal the first four turn another cartwheel and the second four take up the starting

position. On the further signal all eight turn cartwheel, the third lot come forward, and so on. Two cartwheels' distance between each two sets of pupils is necessary. When the exercise is repeated the pupils must face the other way so that the cartwheeling can be practised equally to both sides.

Introduction.—Cartwheeling is an excellent agility exercise and a good lateral exercise as well; it can be practised equally well indoors and out, it can be done without help, and no apparatus is required. Agility, and not strength, is needed; it is therefore suitable for girls as well as for boys.

Children can practise cartwheeling as soon as they have reached the age of 6 or 7. At first they cannot lift the legs very high, but that will soon come when they have learnt to place hands and feet on the floor in the proper sequence. They must learn to place their hands in line with their feet; the further the hands are placed behind the feet, the more difficult it is to raise the legs.

The teacher or a partner can help a child who finds the exercise particularly difficult, by standing with feet astride almost at the side of the child. He bends over towards the child, crosses his arms, and grasps it by the wasit. After the first cartwheel he stands ready (i.e., bent to the other side, arms still crossed) to help in a cartwheel back to the starting position. In this way he guides the child's movements and makes the exercise easy.

10. Cartwheeling with Turning.—In cartwheeling with a turning to the left (right), the pupil lands on both feet facing the place from which he started.

The take-off is made as in "hand spring" with a run, the body is, however, turned slightly to the right when the turning is to be done to the left. The hands are put down one after the other in line forward and as far away from the feet as possible. The legs are swung up as in ordinary cartwheeling, brought together vertically above the hands and swung down to the ground with the feet together as far from the hands as possible, while the body is turned 90 degrees so that the pupil, in landing, faces the point from which he started. When the exercise has to be followed by a "flip-flap" the feet must be placed nearer the hands in the landing.

11. Standing, Overswing with Double Take-off and Head Support ("Head Spring").—The exercise begins from the erect standing position. The pupil stands a long step

away from the place where the hands are to be put; the arms are raised to reach position with the palms downward; after a slight knee bending there is a double take-off with the feet, and the body is thrown forward on to the hands, which are put on the ground shoulder-breadth apart or a little more, the fingers pointing forward or slightly outward. The arms are bent but resist so much that the head touches gently and only has to bear a small part of the weight of the body.

Fig. 121c shows the position immediately after the take-off. The body rests chiefly on the arms, which act like springs; the front part of the crown of the head touches the mat lightly; the neck is kept stiff, the back straight, the hips strongly bent, the pelvic inclination diminished so that the loin is straightened and the erector spinæ of the lumbar region extended; the legs fully stretched and about horizontal. The legs are kept in this position for a moment while the body is carried backward over the head and the hands. When the balance is being lost and the body begins falling, the legs, fully stretched, are swung round and the arms are stretched. When the legs in the swinging have reached so far that the hips are fully stretched, the pull forward on the Y-shaped ligament tilts the pelvis and hollows the back; this again means an extension of the abdominal muscles and through them a pull on the chest. It will thus be seen that the swing of the legs together with the thrust of the arms bring the body vertically above the feet in the landing.

The landing is made on the toes in stride position and with a slight knee bending. The erect position is taken up with a small jump.

Two or more overswings can be done in succession, each landing being used as take-off for the next vault and one vault merged into the other without any pause. At each subsequent take-off the feet are brought together quickly.

The exercise can also be done with a run and a preparatory jump.

Introduction.—Head standing position with its preparatory exercises may be reckoned as a preparation for head springs (see p. 176). The difficulty in head spring is to keep the legs stretched and the hips bent in the first part of the vault, but when the children have learnt leg lowering and raising in the head standing position they will overcome this difficulty with ease.

The *head angle standing position* should be taken up quickly and with a jump in head spring, not by a slow pull as in head

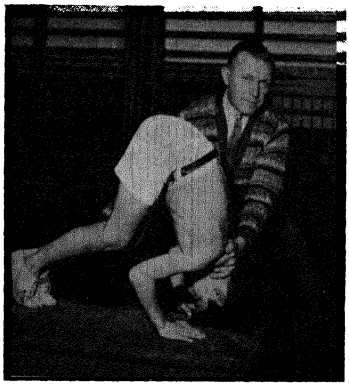


FIG. 132.—Introduction to head spring.

standing position. It can be done on a low box lengthwise. The hands, pointing forward, and the forehead are placed on the box almost in line, the knees bent, the toes on the box (Fig. 132). The feet push off by a stretching of the knees and the body takes up head angle standing position (Fig. 133). The teacher assists sitting on a stool beside the box. With one hand he supports the pupil's farther shoulder close to the neck (Fig. 132); the other hand he places under the pupil's knee. It is now easy for him to hold the pupil in the position while instructing him to keep the neck stiff, the back straight, and the knees stretched. After this the legs are lowered and the feet put down.

When the pupil has "got the feel" of this position it can be practised rhythmically several times in succession; little by little the push-off is made so vigorously that the pupil would fall backward if the teacher did not prevent this by a push on his back sending him into the starting position once more.

The next step in the progression is to perform the same exercise on the box crosswise. The push-off must now be stronger as it is taken from the floor, and also the arms have to work

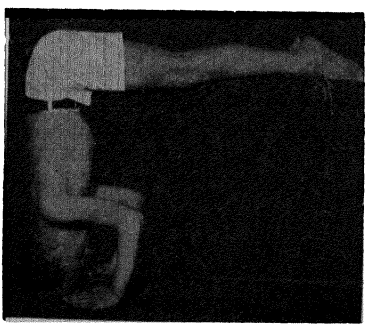


FIG. 133.

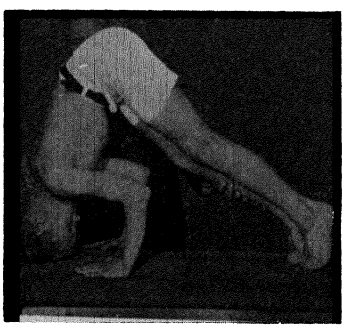


FIG. 134.

harder. The one assisting sits astride the box. Also this can be practised rhythmically.

The *swinging of the legs* has now to be learnt, and many find it difficult as the strong bending of the hips through the pull of the hamstrings will tend to bend the knees. On a low box lengthwise, the pupil takes up the starting position ; the teacher places one hand behind his head and the other under his knee (Fig. 134). When the body, after the take-off, begins falling, the legs are swung upward-backward ; the teacher can, if necessary, with a pressure below the knees make the leg swinging speedier. The arms push-off and the landing is made on the toes with a slight knee bending and with the feet astride. As the pupil lands on a lower level the leg swinging must not be too vigorous as this may cause him to fall forward, especially if he bends his knees in the swinging too. The one assisting should shift his hand from the pupil's head to his upper arm during the leg swinging so as to prevent this forward fall (Fig. 135).

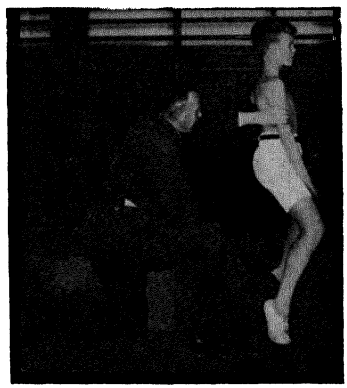


FIG. 135.

After sufficient practice the box is placed crosswise and the take-off is made from the floor.

The main thing is to swing the legs at the right moment. When the swing is made too soon, i.e., while the trunk is too near the vertical position, the body will be pulled too much upward and not sufficiently forward ; the pupil will then fall down on his head. When the swing is made too late the body will be pulled too much forward and the arms will be in such a position that they cannot push-off effectively. The vault will now be flat and heavy or the pupil will fall on his back. The next point to notice is that the legs must be fully stretched during the swinging to secure a forcible swing capable of lifting the body forward and upward. The importance of this is realised, particularly when the vault is performed with the hands, the head, and the feet on the same level .

The *stretching of the arms* at the right moment and with the right force, is also found difficult by many. A special intro-

ductory exercise is therefore not out of place. The starting position for head spring is taken up by the pupil on a very low box or on a long mat with one end folded up or with one end laid up over a pad placed crosswise. From this position the pupil swings his legs quickly upward while at the same time he stretches his arms forcibly so as to get into the hand standing position. The teacher standing by supports him under the farther shoulder and helps him up. To prevent his falling backward, the teacher slips one hand quickly behind his legs, or the teacher brings his chest forward behind the pupil so as to stop the legs in this way (Fig. 136).



FIG. 136.

These preparatory exercises should not be used more than strictly necessary; the best is to use them for short periods and to be ready to take them up again if needed for the correction of faults.

Head spring should be practised at first on a long mat, the one end of which is folded over a pad from a horse placed crosswise. Two pupils kneel down, one on each side of the high (folded) part of the mat. As the one who is vaulting places his hands and his head on the mat they support him and help him up with a hand behind each shoulder.

When the head spring is performed on the level, the one assisting sits down in the long sitting position with his legs well apart and facing the one who is going to vault; one of his legs lies parallel with the edge of the mat, the other across the mat. The one vaulting places his hands and his head close to the one assisting; this latter grips his shoulders and lifts him up as much as necessary. In this way the vault will be made high as it is performed over the shoulder of the one supporting.

By the methods described, head spring is learnt fairly easily; but many of the preparatory exercises take up so much time for the individual pupil that they must be practised in squads to avoid waste of time.

Common Faults.—(*a*) The head is put down too hard and too far in front of the hands; it is bent forward so that the back of the head and not the front part of the crown is put down.

(*b*) The hip-joints are not bent enough in the first part of the exercise.

(*c*) The knees are kept bent throughout the swing, which lessens its force.

(*d*) There is not enough speed in the swing of the legs.

(*e*) There is either no push-off with the hands or the push-off is too weak.

(*f*) During the swing the seat is lowered too much; this makes the overswing flat and heavy.

(*g*) In the landing the knees are bent too much, the head and upper part of the trunk fall forward, and the balance is lost.

(*h*) The landing is too stiff.

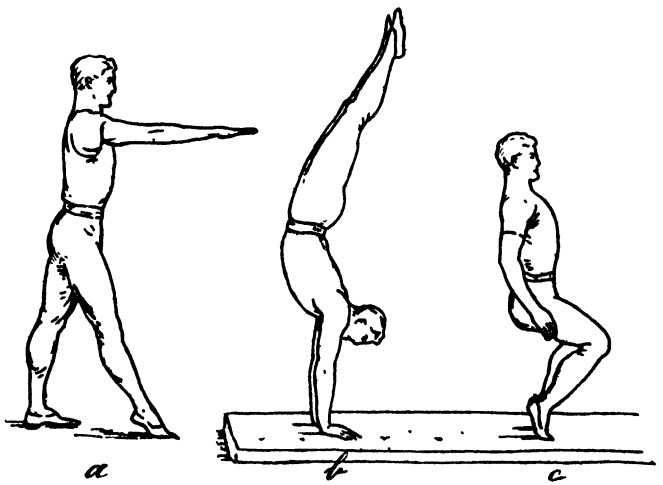


FIG. 137.—Overswing with single take-off.

12. Standing, Overswing with Single Take-off ("Hand Spring").—This exercise begins exactly like hand standing, but the speed of the movement, especially as regards the swing of the legs, must be greater, and the arms are kept slightly bent, but so that the head does not touch the ground. When the legs, together and stretched, have passed the vertical position, the hands push off so that the trunk, by the combined effect of the swing of the legs and the push-off of the hands, is swung up to vertical position. The landing is taken on the toes, with the feet apart, and knees slightly bent and pressed outward. The erect position is taken with a little jump (Fig. 137).

In pupils with supple shoulders, the arms should leave the mat in the relative stretch position; at the moment the hands push-off the arms and the body should be almost in the reverse span bending position (Fig. 137b shows the position a moment before the hands leave the mat; and Fig. 144b shows the position just after they have left it). In the landing the arms are swung forward downward to the erect position.

Introduction.—Preparatory exercises are necessary for this vault. A hand spring is a continuation of leg swinging upward to hand standing position.

In order to give the children the first idea of the exercise the following game-like exercise may be taken. A long mat is rolled up and placed on two stools turned over, and lying on the side about a yard apart. The child performs an ordinary leg swinging upward to hand standing position, placing his hands so near the obstacle that his shoulders come up against the mat; but the child does not stop in the hand standing position; he continues the overswing backward and lands on the other side of the obstacle. He will find the exercise easy as his shoulders throughout the overswing are supported on the rolled up mat. The same exercise may be done over a class-mate lying on hands and knees (Fig. 138); the one lying down must raise or lower his back according to the height of the one vaulting. It is important that the pupil who is performing the exercise puts his hands close to or slightly under the one lying down on his knees so that his shoulders come up against his partner's back at once; he must not fall down on the one supporting; not that it may do him any harm but it spoils the exercise.



FIG. 138. *

Like head spring, hand spring is practised at first from a low box lengthwise as the hands now push-off from a place on a higher level than the place of the landing; it is now easy to raise the body up above the feet in the landing.

Careful assistance is necessary at first. When there is one to assist, he places one hand on the farther shoulder of the one vaulting and supports him so that he does not give too much in the arms or throw his body too far forward. If the speed forward is too great and especially if he bends his knees too much

* L. M. Törngren: Lärobok i Gymnastik.

in the landing, so that the feet are not placed sufficiently forward, the pupil may fall on his front, and the one standing-by must save him from this by gripping his arm. When two are standing by, each puts a hand on the shoulder of the one vaulting.

A hand spring should be done with a run to secure the proper speed in the leg swinging; and this run finishes with a special preparatory hop called the *forehop*. A forehop is a running change of step with a throwing forward of the free foot (different to single take-off and to preparatory jump in vaulting) (p. 108). It can be practised during marching, in which the pupils perform a hop each time the left foot is put down while the right foot is swung forward. As the arms must be swung forward in a forehop for hand spring, this arm swinging can be added here. This change of step hop is soon learnt.

Next hand standing against the wall bars is practised with a few steps' slow run and a forehop.

In a hand spring the push-off must be strong; consequently a vigorous stretching of the arms is necessary and ought to be practised. It is learnt as follows. The teacher stands in oblique standing position with one arm raised to shoulder level. The pupil runs towards him, takes a forehop, and swings the legs upward; he pushes-off strongly with his arms so as to jump upward; the teacher catches hold of him and helps to lift him as shown in Fig. 139. When the pupil has gained confidence he finds it easy to concentrate on the push-off as he has not to think of the landing.

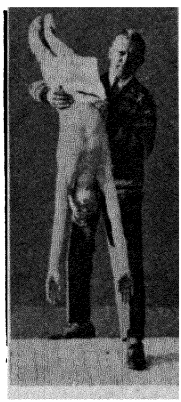


FIG. 139.

When hand spring is practised on a long mat (at first heightened slightly at the nearer end) two fellow pupils may assist, one on each side, kneeling or standing, by putting a hand on each shoulder of the one vaulting. Also one pupil can give assistance in the usual way, either kneeling or standing. The farther shoulder should be supported as otherwise the pupil will be lifted to one side. The helper can also take up the long sitting position with the legs wide apart as described on p. 194.

Hand spring requires agility more than strength. It is best practised in squads of four, two vaulting and two supporting.

A long mat can be used crosswise giving room for three-four squads at one time, and thus enabling 12-16 boys to put in a good practice in the course of a few minutes. Repeated practice is necessary in order to develop good co-ordination.

Common Faults.—As given in 11 (*c* to *g*); in addition:

(*a*) The arms are bent too much and the hands are too wide apart.

(*b*) The head is not kept back.

13. Overswing with Double Take-off ("Flying Vault").—After a run, preparatory jump, and strong take-off, the pupil jumps with slightly bent or stretched hip-joints, and with the legs stretched and together, in a curve upward-forward, so that he comes down on the hands as far as possible from the place

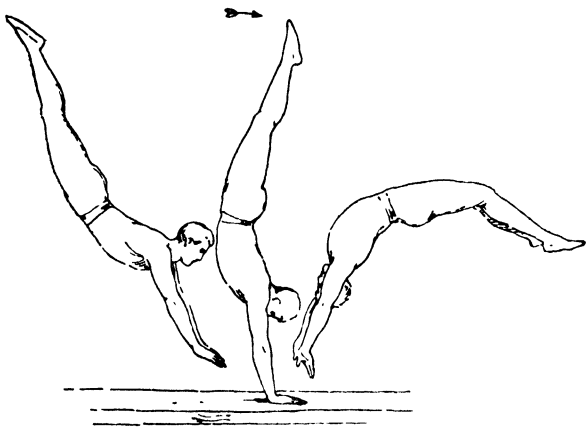


FIG. 140.—"Flying vault."

where he took off; when the hands are put on the floor the arms should be about in continuation of the trunk; the latter must be swung so far round that it does not fall too heavily on the arms; these give a springy yielding by bending slightly. The landing is taken as in head spring (Fig. 140).

At first a flying vault should be done with a short run and the actual vault should be low and short. When the speed is too great beginners forget to use their arms sufficiently strongly for the push-off. Later the speed of the run is increased and with that the height of the vault too; a rope placed at a suitable height across the mat half-way between the place of take-off and the place of landing will help to make the vault

high. The finest, but also the most difficult form is a high and long vault with straight body. The body now flies through the air (therefore the name "flying vault") with the legs swung so far round before the hands reach the mat that it looks as if they hardly touch it.

Very careful assistance (as described in hand spring and low overswing) is necessary to begin with.

Introduction.—Preparatory exercises for flying vault are hand standing with support, double take-off (p. 180), and low overswing (p. 167).

When flying vault is practised on the long mat, the mat should be folded up and made higher where the hands have to be placed.

Stretch standing deep jump from a low box and stretch hanging jump downward from wall bars (the landings from either to be used as take-off for vault to hand standing position against a helper) can also be practised as preparatory exercises for flying vault, especially for the common combination of low overswing and flying vault.

Common Faults.—(*a*) The curve which the body describes in the air is too flat; it is then more difficult to swing the trunk round.

(*b*) The arms are not brought forward enough in continuation of the trunk, before the hands are put on the ground; the trunk then slides too far forward in front of the arms.

(*c*) The head is not kept back.

14. **"Back Spring."**—From the erect position the pupil rolls backward with a strong bending in the hips (refer to Fig. 129a), so that first the seat, then the back and the back of the head, come lightly to the ground; the legs are kept stretched. In the beginning of the movement the arms are raised forward, which softens the fall. Pupils with less practice can put their hands on the floor so that they do not come down too heavily. The rolling is continued backward without a pause until the pupil rests only on shoulders and neck; the legs follow in the rolling, together and stretched up over the head, until they are nearly horizontal, the hips keeping their bending throughout the movement; the hands are put on the front of the thighs (Fig. 141). After this the legs, still fully

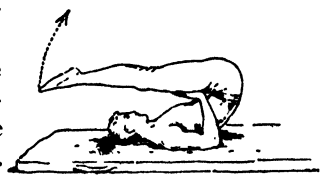


FIG. 141.—"Back spring."



FIG. 142.—Introduction to "back spring."

stretched, but not stiff, are swung quickly a little upward, but mainly forward downward; during this movement the seat is held well up. At the end of the swing there is a strong push-off with the back of the head. By the swing of the legs, which is strengthened by the pressure of the hands on the thighs and by the push-off with the head, the trunk is brought up to vertical position over the feet; the feet are moved well in under the body by a hollowing of the loin, by a further raising of the seat, and by a slight bending of the knees in the last part of the swing of the legs. The landing is otherwise taken as in head spring. To begin with, the back of the head can be put on a slightly raised surface.

Introduction. The most difficult part of back spring is the raising of the upper part of the body. But by using a pair of climbing ropes the beginner may overcome this difficulty. A long mat is placed along the line of climbing ropes. Each pupil lies down on his back so that his chest is under the ropes; he grasps a rope with each hand. By pulling on the ropes at the right moment during the swinging of the legs he will be able to raise himself up (Fig. 142). The pull by the arms should not be overdone; the swinging of the legs and the push-off with the back of the head are of main importance. If climbing ropes be not at disposal one can tie skipping ropes to a beam and place the long mat underneath. When the exercise is done with a helper he can place one hand on the small of the back of the pupil and lift him at the right moment during the leg swinging (Fig. 143).

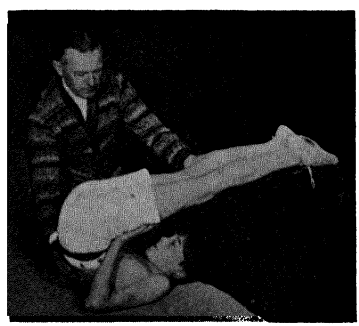


FIG. 143.

Common Faults.—(*a*) The knees are kept bent in the swing, by which the force of the swing is lessened.

(*b*) The legs are swung upward too much.

(*c*) The pupil does not remain lying on the shoulders and back of the head in the swing, but rolls forward on to the back, and thus the seat is lowered.

(*d*) The take-off of the head is not strong enough.

15. **Standing (Stride Standing) Backward Overswing ("Flip-Flap").**—From the erect standing (stride standing) position the pupil bends his knees keeping the body almost vertical. He then falls slightly backward, pushes off vigorously with his feet and jumps backward-upward at the same time throwing the head and the upper part of the trunk backward with a strong backward bending of the neck and the back, and swinging the arms forward-upward-backward. When the pupil has started from the stride standing position, he brings

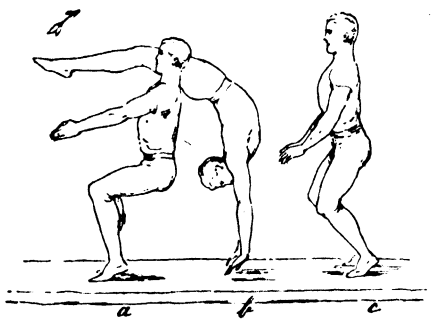


FIG. 144.—"Flip-flap."



FIG. 145.

his legs together immediately after the take-off. The body is arched strongly backward while in the air. The hands are placed on the floor as near the place of take-off as possible and the stretched legs are swung quickly up over the head and down. Towards the end of the swing the hips are bent a little, the hands push-off, and the feet, kept together, are placed on the floor with an easy bending of the knees, after which the erect standing position is resumed. In the middle of the vault the body passes through the hand standing position as in flying vault (Fig. 144).

To begin with the standing-by must be very carefully done.

After some practice the backward overswing may be taken in continuation of a cartwheel with turning or taken from hand standing position.

Introduction.—The exercises described in 5, p. 185, give the pupils a good idea of the movements in flip-flap.

The take-off, with its accompanying trunk bending backward and arm swinging forward-upward, should be practised as an independent exercise. The teacher stands behind the pupil with one hand against the small of his back ; the pupil jumps upward, at the same time bending his body well backward ; the teacher supports the pupil's back with one hand partly to carry him while he is lying in the air with his body arched backward, and partly to press him forward in the downward movement so as to prevent him from falling backward in the landing.

When the flip-flap proper has to be practised, careful assistance is of great importance, partly to enable the pupil to do the exercise, and partly to save him from fall and injury. The teacher grips firmly with one hand the back of the pupil's belt or waist band (either must be strong and secure) and lifts him, but not more than just necessary ; with his other hand he can help to increase the swing of the legs (Fig. 145).

After some practice two fellow pupils can assist by grasping the belt at each side with one hand.

If flip-flap be done in direct continuation of a cartwheel with turning, the teacher must stand ready to put a hand under the pupil's back as he turns over, because in this case it is not possible to grip his belt beforehand.

Two pieces of rope tied round the waist of the pupil and firmly held by two fellow pupils assisting may also serve. Those assisting must move with him during the run, and the free end of the ropes should be crossed so as to be uncrossed in the turning after the cartwheel.

Some of the agility exercises can be combined in series and executed in quick succession. Great quickness, springiness, and agility are now demanded.

The most common combinations are as follows :—

(*a*) A series of head springs.
(*b*) Hand spring and head spring.
(*c*) Hand spring and flying vault.
(*d*) Head spring, back spring, and head spring.
(*e*) Hand spring, back spring, and head spring.
(*f*) Hand standing position and head spring.

(*g*) Long jump, back spring, and head spring.
(*h*) Long jump, backward rolling, and head spring.
(*i*) Cartwheel with turning, backward rolling, and head spring.
(*j*) Overswing on low box and flying vault.
(*k*) Cartwheel with turning and flip-flap.

SUMMARY OF TECHNICAL TERMS USED IN GYMNASTICS

(see also Vol. I, pp. 382-384)

Bend hanging (Bd. hg.)—Body suspended from a piece of apparatus, arms bent (pp. 11-22, Figs. 6-14).

Fall hanging (Fall hg.)—Body suspended from the apparatus (beam) and resting on the heels, arms straight and at right angles to the trunk, the back slightly arched and facing the floor (p. 6).

Hand standing (Hnd. st.)—Body in about vertical position and resting on the hands, arms straight (p. 179 and following, Figs. 122 and 127B).

Head standing (Hd. st.)—Body in vertical position resting on head, legs in line with trunk, hands supporting the balance (p. 176).

Stretch balance hanging (Stch. bal. hg.)—Hands shoulder width apart, supported on apparatus; the body carried well up between the straight arms (p. 30, Fig. 20).

Stretch cross hanging (Stch. cr. hg.)—The body suspended from the beam, arms straight, one hand on each side of the beam, opposite one another (on a grooved beam) or close together; shoulder line at right angles to the beam (p. 8, Fig. 1).

Stretch hanging (Stch. hg.)—The body suspended from an apparatus, arms straight.

Stretch oblique hanging (Stch. obl. hg.)—The body suspended from the beam, arms straight, one hand on each side of the beam, hands at least shoulder width apart, body turned so that shoulder line runs obliquely to the beam (p. 11, Fig. 5).

Stretch overgrip hanging (Stch. o.g. hg.)—The body suspended from an apparatus, arms straight, hands on the nearer side of the apparatus, palms facing forward (p. 10, Figs. 2 and 3).

Stretch undergrip hanging (Stch. u.g. hg.)—The body suspended from an apparatus, arms straight, hands on the farther side of the apparatus, palms facing backward (pp. 10 and 11, Fig. 4).

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