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GYMNASTIC

EXERCISES

BY

J. H. COOPER

NEW YORK

1880



Edgar F. Lyman

MACLAREN



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A  
MILITARY SYSTEM  
OF  
GYMNASTIC EXERCISES  
FOR THE USE OF INSTRUCTORS.

BY  
ARCHIBALD MACLAREN.

ADJUTANT-GENERAL'S OFFICE, HORSE GUARDS,  
*February 1862.*



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MILITARY SYSTEM

GYMNASTIC EXERCISES

FOR THE USE OF INSTRUCTORS

ARCHIBALD MACLAREN

[178.—1,000.—4/62.]

ADJUTANT-GENERAL'S OFFICE, HORSE GUARDS,  
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GENERAL ORDER.

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HORSE GUARDS, S.W.

*February 1862.*

THE "Military System of Gymnastic Exercises," compiled by Mr. Archibald Maclaren, has been approved by the General Commanding in Chief, and is to be adopted at all Stations where the means of carrying it out may be provided.

By Command of His Royal Highness,

The General Commanding in Chief,

JAMES YORK SCARLETT,

Adjutant General.

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GENERAL ORDER

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## INTRODUCTION.

EVERY exercise comprised in the present system has been selected for its value in one of two aspects ; the first, or elementary aspect, being the manner and degree in which it tends to cultivate the physical resources of the body by increasing its dexterity and rapidity of action, its strength in overcoming resistance, and its power of enduring protracted fatigue ; while the second, or practical aspect, is the manner and degree in which its practice may be brought to aid directly in the professional duties of the soldier. It is of course understood that whatever tends to strengthen the soldier's frame, tends also directly to aid him in the performance of his professional duties, and whatever tends to aid him in these duties will also in return tend to strengthen his frame, so that between them an absolute line of demarcation cannot be drawn. But while this system affords an extended series of exercises which have for object the cultivation of the physical powers without reference to any professional application of the exercises themselves, it furnishes also an extended series which have for direct object the acquirement of the power of overcoming, in the most rapid and efficient manner, those material obstacles which are likely to be encountered by the soldier on active service, and this without any reference to their effects in physical culture.

In a military code, the practical aspect must ever be regarded as the leading one, to which all the varied power of the elementary should be made subservient ; and thus may the whole resources of the gymnasium be brought to bear advantageously upon the condition of the soldier, by giving agility and dexterity to his movements, hardiness to his constitution, and energy and strength to his frame, enabling him to undergo fatigue, exposure, and privation, and also be made directly to aid him in the performance of his professional duties, by systematically teaching him how to overcome their principal obstacles, difficulties, and dangers.

The exercises forming the courses of this system are arranged progressively, commencing with the most simple and initiatory, and terminating with the most arduous and severe ; the former



being such as will not overtask the powers of the weakest and most inexpert recruit, and the latter such as will test and increase those of the most practised athlete; the effort required for the performance of the exercises thus gradually increasing with the advancing capacity of the learners. The entire range of exercises is performed with apparatus either moveable or fixed; all exercises of mere position or posture have been avoided, for in no way do they furnish adequate exercise to the healthy adult, the recognized normal condition of the soldier; they are, in fact, to his great requirements and capacity for physical exertion, but a tantalization: moreover they are quite incompetent to maintain in their practice the pleasure and interest which are essential to the beneficial results of all exercise. And to secure these in the present system, the exercises are given in such great variety, that while every part of the complex structure of the human body may receive ample and suitable employment, the form of such employment may be varied almost daily.

In the sections or groups, the different apparatus are arranged in their natural order of classification; the separate exercises on each machine are arranged in progressive order, terminating with the most difficult; and if the nature of the machine will admit of it, with a practical application of the culminating exercises; and the concluding section is composed of those machines whose exercises are essentially and wholly practical.

Thus Section I. embraces the moveable apparatus, which give light and uniform employment to the entire body. (For this reason they are made to constitute the first course in the system.)

Section II. embraces all arrangements for the practice of exercises of progression, such as walking, leaping, and vaulting, which employ chiefly the lower limbs and lower regions of the trunk.

Section III. embraces all apparatus for exercises of rotation and oscillation, as the trapezium and parallel bars, giving employment to the whole of the trunk and upper limbs.

Section IV. embraces all climbing apparatus, as the ropes and poles, vertical and inclined, giving employment to the entire body, especially to the upper limbs and upper portion of the trunk.

Section V. consists of the apparatus for the practical application of all the foregoing, in the form of escalading.

From these sections are formed the six progressive courses which make up the system. Each of these (save the first) extends over the principal apparatus of each section. Thus the second is formed of the initiatory exercises on each machine, all of a simple and general character; the third embraces the medium exercises on the same machines, requiring more energetic and dexterous action than the preceding; the fourth embraces the advanced exercises on the principal machines, calling for powerful



local effort and endurance by repetition; the fifth consists of the most arduous exercises on the same machines; and the sixth consists of exercises showing the purely practical application of all the exercises of the preceding courses. To these is added a supplementary course of defensive exercises consisting of fencing, sword exercise, and bayonet exercise.

With the view of making the work fulfil as completely as possible its object as a guide and reference for the Instructors on all occasions, every separate machine is prefaced by a note exponent of the nature and object of its exercises, the parts of the body which they employ, and the purpose of such employment. In these notes are carefully pointed out the duties of the Instructor in every situation, his position with regard to the learner, the peculiar risks to be guarded against in the different exercises, and the errors most likely to be inadvertently committed in their practice, the modes in which the more complicated or difficult exercises may be gradually approached, and the different ways in which the learner may rest for a time on the machine itself, if overcome with fatigue at a distance from the ground; with other information which he may be likely to find serviceable.

In the text describing the position and action of the exercises, the use of technicalities has been, as far as possible, discarded, such only being retained as were found essential to clearness, and the avoidance of repetitions; and the words of command have been chosen for their simplicity, brevity, and susceptibility of clear articulation.

A. M.

The Gymnasium, Oxford,  
October 1861.



## RULES

### FOR CONDUCTING THE LESSON.

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IN the introduction explaining the principles upon which the system is founded, it is shown that each course consists of a selection of exercises all as nearly as possible of a uniform degree of difficulty, and demanding in their performance an equal amount of muscular effort. By this arrangement the youngest beginner has as wide a range of exercises, as extended a use of the gymnasium, as the most advanced learner; for the limitations of the courses are decided by the degree of difficulty of the exercises themselves, and not by the apparatus on which they are performed; and every machine, with very few exceptions, presents exercises suited to the capacity of learners of every grade of physical power. Each course, and in a great measure each exercise in each course, leads direct to that in advance of it, so that the learner in his first efforts in his first lesson is really practising that which will aid him in mastering the most difficult exercises in the terminating course. This essentially progressive character, this gradual, uniform, onward-march of the entire range of exercises from the first to the last, must never be lost sight of by the instructor, but must always be viewed by him as being the fundamental principle of the system, the main source of its value, and the chief guarantee for its safety, while it also constitutes a most powerful agent in sustaining the interest of the learner during his practice.

To give variety to the lesson, each course is made to consist of a much greater number of exercises than can be performed by the learner at any single attendance, so that the instructor is provided with ample scope for selection, by means of which he may vary the lesson almost daily, while still ranging within the prescribed limits of the course.

But there is another form of variety which it is most desirable to secure, and which, as it could not be provided for by any arrangement of section or course, must be in a great measure intrusted to the intelligence and care of the instructor. As explained in the introduction, each article of apparatus in the gymnasium is designed to give special employment to special parts of the body, in accordance with the principle that all muscular power is intermittent, and is most effectively cultivated and sustained by brief and recurring efforts. It will, therefore, be the object of the instructor to secure, by a judicious selection of the various machines during the lesson, a fair share of exertion to the several parts of the body, and to pass his squad from machine to machine in such order that each succes-



sive one will call into action a new part of the body, and at the same time give rest to those employed by its predecessor.

For example, the squad may begin the lesson with the exercises on the apparatus of the second section, such as the running leap, height or distance; or the running vault, right and left, on the vaulting horse; for these exercises, though chiefly employing the lower limbs, require no great or strictly localized exertion, and they gradually quicken the circulation, supple the joints, and put into light and free play a great number of muscles, and thus prepare the body for more arduous efforts. To these, the frame being now at its greatest pitch of power, suppld and as yet unfatigued, may aptly succeed the exercises on the elementary apparatus, such as the bridge ladder, giving strong and concentrated employment to the chest and upper limbs; to this may succeed the parallel bars, fixed or moveable, or the pair of rings, or the trapezium: for these all afford abundant employment to the trunk of the body through the medium of the upper limbs. From this point the exercises may be repeated in character, although in other forms, on different apparatus, chiefly on the vertical machines for climbing and escalading; and the lesson may conclude with those of a less arduous nature, where balance and dexterity and facility of movement are the points cultivated, to be executed on machines, horizontal and inclined, restricted to no particular section.

The lesson will always be strictly confined to the exercises of the course, and no advance into a second and higher course will be made until all the exercises in the preceding one can be executed with accuracy and precision.

Each squad should consist of not less than 10 or more than 15 men. At its original formation the men should be sized and numbered, and this order, which is for the sake of convenience only, will be preserved during the subsequent practice of the men forming the squad. At the commencement of every lesson the men will "fall in" in this order, and proceed to the machine on which the lesson is to begin, and in the same order will pass to the succeeding ones. It is not desirable otherwise to preserve any formal or strictly military attitude during the lesson, while at the same time it will be readily perceived that the due observance of certain rules and regulations is necessary, not only for the sake of preserving propriety, and of securing the good government of the gymnasium, but also for the sake of the advantage to be derived from the careful performance of the exercises, and for the safety of the learners during their practice.

Under ordinary circumstances the instructor will set (*i.e.*, perform in its perfect manner) each exercise, followed by the assistant instructor or monitor, when one is attached to the squad. The learners will then follow in succession in numerical order. Each learner will hold himself ready in his proper time to step up to the machine the instant his predecessor has quitted it, and on the completion of the exercise he will quietly step aside to give place to his successor, previously steadying or readjusting the machine when required, and take his place as indicated by the instructor, either by returning to the side of the machine from which he started, to be in readiness to follow in the next exercise, or by remaining on the side



where the exercise terminated, as may be most suitable for the effective working of the machine and for watching the performance of each succeeding learner.

The instructor will repress all laughing at the mishaps or unsuccessful efforts of beginners calculated to discourage or annoy or distract attention; and will strictly forbid the slightest attempt to baulk, hinder, or otherwise interfere with anyone during the performance of an exercise; but this need not be allowed to mar the full enjoyment and free expression of interest felt in witnessing each other's performance, successful or unsuccessful.

The men in one squad must on no account be allowed to mix with those of another; this will require to be observed with special care when squads in different stages of practice and working separate courses are in the gymnasium at the same time. The more effectually to sustain this important regulation the instructor should select those machines, other things being suitable, which are farthest removed from those being worked by other squads.



# THE SYSTEM

## BY SECTIONS OF APPARATUS.

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SECTION I.—INTRODUCTORY COURSE . . .	Movements and Positions. The Dumb Bells. The Bar Bells.
SECTION II.—EXERCISES OF PROGRESSION	Walking. Running. Leaping. The Leaping Rope. The Leaping Pole. The Horizontal Beams. The Vaulting Bar. The Vaulting Horse.
SECTION III.—ELEMENTARY EXERCISES . . .	The Fixed Parallel Bars. The Moveable Parallel Bars. The Trapezium. The Pair of Rings. The Row of Rings. The Elastic Ladder. The Horizontal Bar. The Bridge Ladder. The Ladder Plank.
SECTION IV.—FREE CLIMBING . . . . .	The Vertical Pole. The Slanting Pole. The Turning Pole. The Mast. The Pair of Vertical Poles. The Pair of Slanting Poles. The Vertical Rope. The Slanting Rope. The Rosary or Knotted Rope.
SECTION V.—ESCALADING . . . . .	The Prepared Wall. The Inclined Ladder. The Plank. The Rope Ladder. The Vertical Pole, fixed. The Vertical Pole, suspended. The Slanting Pole. The Pair of Slanting Poles. The Vertical Rope. The Octagon. The Great Cross Beam. The Fort.

} Against a Wall.

} Structures.

# THE SYSTEM BY SECTIONS OF APPARATUS

Section I—Introductory Course . . . . . Movements and Positions.

Section II—Elements of Progression . . . . . The Round Ball.

Section III—Elementary Exercises . . . . . The Bar Ball.

Section IV—Part I—The Mast . . . . . The Mast.

Section V—Part I—The Mast . . . . . The Pair of Vertical Poles.

Section VI—Part I—The Mast . . . . . The Pair of Shanting Poles.

Section VII—Part I—The Mast . . . . . The Vertical Rope.

Section VIII—Part I—The Mast . . . . . The Shanting Rope.

Section IX—Part I—The Mast . . . . . The Hoop or Knotted Rope.

Section X—Part I—The Mast . . . . . The Prepared Wall.

Section XI—Part I—The Mast . . . . . The Inclined Ladder.

Section XII—Part I—The Mast . . . . . The Plank.

Section XIII—Part I—The Mast . . . . . The Rope Ladder.

Section XIV—Part I—The Mast . . . . . The Vertical Pole.

Section XV—Part I—The Mast . . . . . The Vertical Pole.

Section XVI—Part I—The Mast . . . . . The Vertical Pole.

Section XVII—Part I—The Mast . . . . . The Shanting Pole.

Section XVIII—Part I—The Mast . . . . . The Pair of Shanting Poles.

Section XIX—Part I—The Mast . . . . . The Vertical Rope.

Section XX—Part I—The Mast . . . . . The Octagon.

Section XXI—Part I—The Mast . . . . . The Great Cross.

Section XXII—Part I—The Mast . . . . . The Beam.

Section XXIII—Part I—The Mast . . . . . The Port.

Part I—The Mast  
 Part II—The Mast  
 Part III—The Mast  
 Part IV—The Mast  
 Part V—The Mast  
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 Part XX—The Mast  
 Part XXI—The Mast  
 Part XXII—The Mast  
 Part XXIII—The Mast



# THE SYSTEM

## BY COURSES OF EXERCISES.

### COURSE I.

#### INTRODUCTORY EXERCISES.

- FIRST PRACTICE . . . . . MOVEMENTS AND POSITIONS.  
 SECOND PRACTICE . . . . . WITH THE DUMB BELLS.  
 THIRD PRACTICE . . . . . WITH THE BAR BELLS.

### COURSE II.

#### SIMPLE EXERCISES.

EXERCISES OF PROGRESSION.	Walking . . . . .	To walk at slow time. Short distance.	
	Running . . . . .	To run at slow time. Short distance.	
	Leaping . . . . .	To leap, height, two movements .	} Standing.
	" . . . . .	To leap, height, one movement .	
	" . . . . .	To leap, height, the left leading, one movement . . . . .	
	" . . . . .	To leap, width . . . . .	} Running.
	" . . . . .	To leap, height, two movements .	
	" . . . . .	To leap, height, one movement .	
	" . . . . .	To leap, height, the left leading .	
	" . . . . .	To leap, width . . . . .	
	The Leaping Rope . . . . .	To leap, height.	
	" . . . . .	" width.	
	The Leaping Pole . . . . .	To leap, width . . . . .	Standing.
	The Horizontal Beam . . . . .	To march to the front . . . . .	} Sitting.
	" . . . . .	To march to the rear . . . . .	
	" . . . . .	To march sideways . . . . .	
	" . . . . .	To march to the front, the left leading . . . . .	} Upright.
	" . . . . .	To march to the front, right and left . . . . .	
	The Vaulting Bar . . . . .	To vault over the bar, three movements.	
	The Vaulting Horse . . . . .	To vault on the horse, two movements . . . . .	} Standing.
" . . . . .	To vault on the horse, one movement . . . . .		
" . . . . .	To vault over the horse, two movements . . . . .		
" . . . . .	To vault over the horse, one movement . . . . .		
" . . . . .	To vault on the horse . . . . .		
" . . . . .	To vault over the horse. . . . .	Running.	



ELEMENTARY EXERCISES.	{	The fixed Parallel Bars	The single march	} Forwards .	}	
		"	The double march			
		"	The single march	} Travelling.		
		"	The double march			
		"	To clear the bar by the front . . . . .	} Above.		
		"	To rest on the right bar and clear the left by the front . . . . .			
		"	To rest on the right bar in the rear, and clear it in front . . . . .	} Between.		
		The moveable Parallel Bars.	To rest on the first bar, two movements . . . . .			
		"	To rest on the second bar, two movements . . . . .	} Evolutions.		
		"	To pass from the first to the second bar . . . . .			
		"	To change front . . . . .	} Rising above.		
		"	To rest on the single bar . . . . .			
		"	To rest on the double bars . . . . .	} Forwards.		
		The Trapezium . . . . .	To rise by the single rope . . . . .			
		"	To rise by both ropes . . . . .	} Forwards.		
		"	To rise by the back lift . . . . .			
		The Pair of Rings . . . . .	The single circle . . . . .	} Forwards.		
		"	The double circle . . . . .			
		"	To turn with the feet in the rings.	} Travelling.		
		The Row of Rings . . . . .	The single step.			
The Horizontal Bar . . . . .	To march with the right hand leading . . . . .	} Backwards.				
"	To march hand over hand . . . . .		} Forwards.			
"	To rise to the bar . . . . .	} Backwards.				
"	To rise to the bar, the hands reversed . . . . .		} Forwards.			
The Bridge Ladder . . . . .	To climb with the right hand leading . . . . .	} Backwards.				
"	To climb right and left . . . . .		} Forwards.			
"	To climb with the right hand leading . . . . .	} Backwards.				
"	To climb right and left . . . . .		} Forwards.			
The Ladder Plank . . . . .	To climb with the right hand leading . . . . .	} Backwards.				
"	To climb with the right side leading . . . . .		} Backwards.			
"	To climb right and left side . . . . .	} Forwards.				
"	To climb right and left, hand and foot . . . . .		} Backwards.			
"	To climb by the centre . . . . .	} Forwards.				
"	To climb by the spars . . . . .		} Backwards.			
FREE CLIMBING.	{	The Vertical Pole . . . . .		To climb with the right hand leading . . . . .	} With hands and feet.	
		"	To climb hand over hand . . . . .	} Under the pole.		
		The Slanting Pole . . . . .	To climb with the right hand leading . . . . .		} Above the pole.	
		"	To climb hand over hand . . . . .	} Backwards.		
		"	To climb with the right hand leading . . . . .		} Forwards.	
"	To climb hand over hand . . . . .	} Backwards.				



FREE CLIMBING.

FREE CLIMBING.	The Turning Pole . . .	To climb with the right hand leading.	} With the pole firm.
		To climb hand over hand . . .	
	The Pair of Slanting Poles.	To climb with the right hand leading . . . . .	} The feet inside.
		To climb with the right hand leading . . . . .	
	"	To climb, right and left side.	
	"	To climb, right and left, hand and foot.	
	The Vertical Rope . . .	To climb with the right hand leading, the rope at the half turn.	} With hands and feet.
		To climb with the right hand leading, the rope at the full turn . . . . .	
	"	To climb with the right hand leading, the rope at the stirrup loop . . . . .	
	The Slanting Rope . . .	To climb hand over hand.	
The Rosary . . . . .	The simple climb.		

ESCALADING.

ESCALADING.	The Prepared Wall . . .	To mount with the right hand leading . . . . .	} With hands and feet.	
		"		To mount with the right side leading . . . . .
		"		To mount right and left side . . .
		"		To mount, right and left, hand and foot . . . . .
		The Inclined Ladder . .		To mount with the right hand leading.
	"	To mount with the right side leading.		
	"	To mount right and left side.		
	"	To mount right and left, hand and foot.		
	The Plank . . . . .	To mount with the right hand leading . . . . .	} With hands and feet.	
		"		To mount with the right side leading . . . . .
"		To mount, right and left side . . .		
"		To mount, right and left, hand and foot . . . . .		
The Rope Ladder . . .	To mount right and left side.			
"	To mount right and left, hand and foot.			



COURSE III.

EXERCISES OF MEDIUM DIFFICULTY.

EXERCISES OF PROGRESSION.	Walking . . . . .	To walk at half speed. Short distance.	
	Running . . . . .	To run at half speed. Short distance.	
	Leaping . . . . .	To leap to the rear. Width . . . . .	} Standing.
	" . . . . .	To leap sideways. Width . . . . .	
	" . . . . .	To leap to the front. Depth . . . . .	
	The Leaping Rope . . . . .	To leap hand over hand.	
	The Leaping Pole . . . . .	To leap height . . . . .	} Standing.
	" . . . . .	To leap width . . . . .	} Running.
	The Horizontal Beam . . . . .	To march to the front with the hands only . . . . .	} Sitting.
	" . . . . .	To march to the front with both hands at once . . . . .	
	" . . . . .	To march to the rear with both hands at once . . . . .	
	" . . . . .	To march to the front, by the side step . . . . .	} Upright.
	" . . . . .	To march to the rear with the left foot leading . . . . .	
	" . . . . .	To march to the rear, right and left . . . . .	
	The Vaulting Bar . . . . .	To vault over the bar. Two movements.	
" . . . . .	To vault over the bar. One movement.		
The Vaulting Horse . . . . .	To vault on the horse, resting on the knees . . . . .	} Standing.	
" . . . . .	To vault on the horse, resting on the feet . . . . .	} Running.	
" . . . . .	To vault to the croup . . . . .	} By the croup.	
" . . . . .	To vault to the croup, resting on the knees.		
The fixed Parallel Bars . . . . .	To rest on the right and clear the left by the rear . . . . .	} Oscillating.	
" . . . . .	To rest on the right in front and clear it by the rear . . . . .		
" . . . . .	To rest on both in front and clear the right by the rear . . . . .		
" . . . . .	To rest on both in the rear and clear the right by the front . . . . .		
" . . . . .	The single march and rest, by the front . . . . .		
" . . . . .	The double march and rest, by the front . . . . .	} Combinations.	
The moveable Parallel Bars. . . . .	To clear both bars. One movement . . . . .	} Above.	
" . . . . .	To pass from the first to the second, both hands at once . . . . .	} Under.	
" . . . . .	To rise between and rest on the right . . . . .	} Between.	
" . . . . .	To rise between and rest on both . . . . .		

ELEMENTARY EXERCISES.



ELEMENTARY EXERCISES.

- The Trapezium . . . . To rise by the front lift . . . . } By the ropes.
- "                    To turn round the ropes . . . . }
- The Pair of Rings . . . To turn with one hand.
- "                    To extend the arm right and left.
- "                    The first and fourth exercises, first series . . . . } Combinations.
- "                    The second and third . . . . }
- "                    The first, fourth, and third . . . }
- The Elastic Ladder . . . The single step.
- The Horizontal Bar . . . To march with both hands at once } Travelling.
- "                    To march, right and left . . . }
- "                    To rise above the bar, the right leg acting . . . . } Rising above.
- "                    To rise above the bar, by the fore arm . . . . }
- The Bridge Ladder . . . To climb with both hands at once, backwards.
- "                    To climb with both hands at once, forwards.
- The Ladder Plank . . . To climb with the right hand leading } With the hands only.

FREE CLIMBING.

- The Vertical Pole . . . To climb with both hands at once } With hands and feet.
- "                    To climb with both hands at once, the double step . . . . }
- The Slanting Pole . . . To climb with both hands at once } Under the pole, with hands and feet.
- "                    To climb with both hands at once, the double step . . . . }
- "                    To climb with both hands at once. } Above the pole.
- The Turning Pole . . . To climb with both hands at once. } The pole firm.
- The Pair of Vertical Poles. To climb with the right hand leading.
- The Pair of Slanting Poles. To climb with both hands at once.
- The Mast . . . . . To climb hand over hand.
- The Vertical Rope . . . To climb hand over hand . . . } With hands and feet.
- "                    To climb with both hands at once }

ESCALADING.

- The Prepared Wall . . . To mount with both hands at once } With hands and feet.
- The Inclined Ladder . . To mount with one hand.
- "                    To mount with the feet only.
- The Plank . . . . . To mount with both hands at once } With hands and feet.
- "                    To mount with the right hand leading . . . . . }
- "                    To mount with the right side leading . . . . . } With hands and knees.
- "                    To mount, right and left side . . . }
- "                    To mount, right and left, hand and knee . . . . . }
- The Rope Ladder . . . To mount with one hand.



COURSE IV.

ADVANCED EXERCISES.

EXERCISES OF PROGRESSION.	Walking . . . . .	To walk at speed. Short distance.	
	Running . . . . .	To run at speed. Short distance.	
	Leaping . . . . .	To leap to the rear. Depth . . . . .	} Standing.
	" . . . . .	To leap to the front. Width and depth combined . . . . .	
	" . . . . .	To leap to the front. Height and width combined . . . . .	} Running.
	" . . . . .	To leap to the front. Height and width combined . . . . .	
	The Leaping Rope . . . . .	The double swing.	
	The Leaping Pole . . . . .	To leap depth standing.	
	" . . . . .	To leap height running.	
	The Horizontal Beam . . . . .	To march to the front with one foot on the beam . . . . .	} Upright.
	" . . . . .	To change front. On the hands only (1) . . . . .	
	" . . . . .	To change front. On the hands only (2) . . . . .	} Sitting.
	" . . . . .	To change position.	
	" . . . . .	To rest on the beam.	
	" . . . . .	To meet and pass on the beam . . . . .	(Two men).
" . . . . .	To descend from the beam.		
The Vaulting Bar . . . . .	To vault over the bar by the back lift.		
The Vaulting Horse . . . . .	To vault on the horse, resting on the feet . . . . .	} Standing.	
" . . . . .	To vault over the horse, by the back lift . . . . .		
" . . . . .	To vault to the saddle . . . . .	} Running.	
" . . . . .	To vault to the croup, resting on the feet . . . . .		
" . . . . .	To vault to the croup, resting on the feet . . . . .	} By the croup.	
" . . . . .	To vault to the croup, resting on the feet . . . . .		
ELEMENTARY EXERCISES.	The fixed Parallel Bars . . . . .	To pass by the rear by the single swing . . . . .	} Oscillating.
	" . . . . .	To pass by the front by the double swing . . . . .	
	" . . . . .	To rest in front and pass by the front by the double swing . . . . .	
	" . . . . .	To rest in front, and pass by the rear by the single swing . . . . .	
	" . . . . .	To rest in front on both bars and pass by the front . . . . .	
	" . . . . .	To rest in front on both bars and pass by the rear . . . . .	} Above.
	The moveable Parallel Bars. . . . .	To clear the first bar by the rear and the second by the front . . . . .	
	" . . . . .	To clear both bars separately by the rear . . . . .	
	" . . . . .	To change front, both hands at once.	} Under.
	" . . . . .	To rise by the first bar and descend by the second . . . . .	
	" . . . . .	To rise by the first bar and descend by the second . . . . .	} Between.
	" . . . . .	To rise by the first bar and descend by the second . . . . .	
	The Trapezium . . . . .	To turn round the bar forwards . . . . .	} By the bar.
	" . . . . .	To turn round the bar backwards . . . . .	
	" . . . . .	To turn round the bar backwards and return . . . . .	
" . . . . .	To rise above the bar, right and left . . . . .		



ELEMEN- TARY EXERCISES.	}	The Pair of Rings . . .	To rise between the rings, right and left . . . . .	} Rising between.
		"	To rise between the rings with both hands at once . . . . .	
	}	The Horizontal Bar . . .	To turn round the bar . . . . .	} Rising above.
		"	To turn round the bar with the hands reversed . . . . .	
	}	The Bridge Ladder . . .	To climb with the right hand leading . . . . .	} Backwards by the spars.
		"	To climb right and left . . . . .	
	}	"	To climb with the right hand leading . . . . .	} Forwards by the spars.
		"	To climb right and left . . . . .	
	}	"	To climb with the right hand leading . . . . .	} Sideways by the spars.
		"	To climb with the right hand leading . . . . .	
}	The Ladder Plank . . .	To climb right and left . . . . .	} With the hands only.	
	"	To climb with both hands at once . . . . .		
FREE CLIMBING.	}	The Vertical Pole . . .	To climb with the right hand leading . . . . .	} With the hands only.
		"	To climb hand over hand . . . . .	
		"	To climb with both hands at once . . . . .	
	}	The Slanting Pole . . .	To climb with the right hand leading . . . . .	} With the hands only.
		"	To climb hand over hand . . . . .	
		"	To climb with both hands at once . . . . .	
	}	The Turning Pole . . .	To climb with the right hand leading . . . . .	} The pole turning.
		"	To climb hand over hand . . . . .	
		"	To climb with both hands at once . . . . .	
	}	The Pair of Vertical Poles.	To climb hand over hand.	}
		"	To climb with both hands at once.	
	}	The Mast . . . . .	To climb with the hands overlapped.	}
		"	To climb with the hands interlaced.	
	}	The Vertical Rope . . .	To climb with the right hand leading . . . . .	} With the hands only.
		"	To climb hand over hand . . . . .	
ESCALADING.	}	The Prepared Wall . . .	To climb with one hand.	} With hands and knees.
		The Plank . . . . .	To mount with both hands at once . . . . .	
	}	"	To mount with the right hand leading . . . . .	} With the hands only.
		"	To mount right and left . . . . .	
	}	"	To mount with the right hand leading . . . . .	} With the legs suspended.
		"	To mount right and left . . . . .	
}	The Vertical Pole, suspended.	To climb with the right hand leading.		



COURSE V.

ARDUOUS EXERCISES.

EXERCISES OF PROGRESSION.	Walking . . . . .	To walk at speed. Long distance.	
	Running . . . . .	To run at speed. Long distance.	
	Leaping . . . . .	To leap to the rear. Width and depth combined (1) . . . . .	} Standing.
	” . . . . .	To leap to the rear. Width and depth combined (2) . . . . .	
	” . . . . .	To leap sideways. Width and depth combined . . . . .	
	The Horizontal Beam . . . . .	To re-ascend the beam.	
	The Vaulting Bar . . . . .	To vault over the bar with the hands only.	
	The Vaulting Horse . . . . .	To vault on the horse with one hand . . . . .	} Standing.
	” . . . . .	To vault over the horse between the hands . . . . .	
	” . . . . .	To vault over the horse with one hand . . . . .	
” . . . . .	To vault over the horse between the hands . . . . .	} Running.	
” . . . . .	To vault over the horse with one hand . . . . .		
” . . . . .	To vault to the croup, with the legs on the left . . . . .	} By the croup.	
” . . . . .	To vault to the croup, the legs passing from left to right . . . . .		
ELEMENTARY EXERCISES.	The fixed Parallel Bars . . . . .	The single march and rest. Backwards . . . . .	} Combinations.
	” . . . . .	The double march and rest. Backwards . . . . .	
	The Trapezium . . . . .	To rise above the bar, both hands at once . . . . .	} By the bar.
	” . . . . .	To turn under the bar on one hand . . . . .	
	” . . . . .	To form the straight line . . . . .	
	” . . . . .	The first and third . . . . .	} Combinations.
	” . . . . .	The first, third, and sixth . . . . .	
	” . . . . .	The first, third, and fourth . . . . .	
	” . . . . .	The first, third, fourth (or fifth), and sixth . . . . .	
	” . . . . .	The first, third, fourth (or fifth), sixth and seventh . . . . .	
	The Pair of Rings . . . . .	To form the straight line.	
	” . . . . .	The second of first series and fourth of second . . . . .	} Combinations.
” . . . . .	The second of first, and the second (or third) and fourth of second.		
The Elastic Ladder . . . . .	The double step.		
The Horizontal Bar	To rise above the bar, right and left . . . . .	} Rising above.	
	To rise above the bar, both hands at once . . . . .		



ELEMENTARY EXERCISES.	}	The Bridge Ladder . . . . .	To climb with both hands at once . . . . .	} Backwards by the spars.	
		"	To climb with both hands at once . . . . .		} Forwards by the spars.
		"	To climb with both hands at once . . . . .	} Sideways by the spars.	
		"	To climb, with the right hand leading . . . . .		} By the sides.
		"	To climb hand over hand . . . . .		
FREE CLIMBING.	}	The Vertical Pole . . . . .	To climb with both hands at once, the double step.		
		"	To climb with one hand.		
		The Turning Pole . . . . .	To climb turning with the pole.		
		The Pair of Vertical Poles.	To climb with both hands at once, the double step.		
		"	To climb with the hands reversed.		
		"	To climb with the hands reversed, both hands at once.		
		"	To climb sitting.		
		The Mast . . . . .	To walk the mast.		
		"	To climb with the hands only.		
		The Vertical Rope . . . . .	To climb sitting.		
		"	To climb with one hand.		
		Preliminary Exercises . . . . .	To mount on a platform or floor.		
		"	To mount on a wall or beam.		
		"	To descend from a platform or floor.		
		ESCALADING.	}	"	To descend from a wall or beam.
The Prepared Wall . . . . .	To mount with the right hand leading . . . . .			} With the hands only.	
"	To mount right and left . . . . .				
The Plank . . . . .	To mount with both hands at once . . . . .			} With the hands only.	
"	To mount with both hands at once the double step . . . . .				
"	To mount with both hands at once, the legs suspended . . . . .				
The Vertical Pole suspended.	To climb right and left side.				
"	To climb right and left, hand and foot.				
The fixed Vertical Pole.	To climb with the right hand leading.				
"	To climb right and left side.				
"	To climb right and left, hand and foot.				
"	To climb with the knees.				
The Slanting Pole . . . . .	The first and third as in free climbing.				
"	To change front by the foot.				
"	To change front by the leg.				
The Vertical Rope suspended.	The first and second series as in free climbing.				
"	To climb right and left side.				
"	To climb right and left, hand and foot.				



COURSE VI.

BEING THE PRACTICAL APPLICATION OF THE PRECEDING EXERCISES.

EXERCISES OF PROGRESSION.	Walking . . . . .	To walk at speed carrying implements, &c.
	”	To walk at speed carrying arms and knapsack.
	Running . . . . .	To run at speed carrying implements, &c.
	”	To run at speed carrying arms and knapsack.
	”	To run on the course of prepared obstacles.
	”	To run on the course of prepared obstacles, carrying arms and knapsack.
	Leaping . . . . .	To leap, carrying implements, &c.
	”	To leap, carrying arms and knapsack.
	The Horizontal Beam . . . . .	To march on the beam, carrying implements, &c.
	”	To march on the beam, carrying arms and knapsack.
ESCALADING.	The Prepared Wall . . . . .	To mount, traverse, and descend the wall.
	”	To mount, traverse, and descend the wall, carrying implements, &c.
	”	To mount, traverse, and descend the wall, carrying arms.
	The Inclined Ladder . . . . .	To mount, traverse the wall, and descend.
	”	To mount, traverse the wall, and descend, carrying implements, &c.
	”	To mount, traverse the wall, and descend, carrying arms.
	The Rope Ladder . . . . .	To mount, traverse the wall, and descend.
	”	To mount, traverse the wall, and descend, carrying implements, &c.
	”	To mount, traverse the wall, and descend, carrying arms.
	The Plank . . . . .	To mount, traverse the wall, and descend.
	”	To mount, traverse the wall, and descend, carrying implements, &c.
	”	To mount, traverse the wall, and descend, carrying arms.
	The Vertical Pole, fixed.	To mount, traverse the wall, and descend.
	”	To mount, traverse the wall, and descend, carrying implements, &c.
	”	To mount, traverse the wall, and descend, carrying arms.
	The Vertical Pole, suspended.	To mount, traverse the wall, and descend.
”	To mount, traverse the wall, and descend, carrying implements, &c.	
”	To mount, traverse the wall, and descend, carrying arms.	
The Slanting Pole . . . . .	To mount, traverse the wall, and descend.	
”	To mount, traverse the wall, and descend, carrying implements, &c.	
”	To mount, traverse the wall, and descend, carrying arms.	
The Pair of Slanting Poles.	To mount, traverse the wall, and descend.	
	To mount, traverse the wall, and descend, carrying implements, &c.	



ESCALADING.	{	The pair of Slanting Poles . . . . .	To mount, traverse the wall, and descend, carrying arms.	
		The Vertical Rope . . . . .	To mount, traverse the wall, and descend.	
		" . . . . .	To mount, traverse the wall, and descend, carrying implements, &c.	
		" . . . . .	To mount, traverse the wall, and descend, carrying arms.	
		Mutual Support . . . . .	To scale a wall from 8 to 10 ft. in height by 2 men.	
		" . . . . .	To scale a wall from 10 to 12 ft. in height by 3 men.	
		" . . . . .	To scale a wall from 12 to 16 ft. in height by 6 men.	
		" . . . . .	To ascend and descend from a wall over 10 ft. in height.	
		The Octagon . . . . .	To mount by the bars . . . . .	} The machine and exercise indicated.
		" . . . . .	To mount by the poles . . . . .	
" . . . . .	To mount by the bars . . . . .	} The machine indicated and exercise free.		
" . . . . .	To mount by the poles . . . . .			
" . . . . .	To mount by the bars or poles . . . . .	} The exercise free, the machine to be won by speed of foot.		
The Great Cross Beam . . . . .	To mount by the fixed apparatus . . . . .		} The machine and exercise indicated.	
" . . . . .	To mount by the suspended apparatus . . . . .			
" . . . . .	To mount by the fixed apparatus . . . . .	} The machine indicated and exercise free.		
" . . . . .	To mount by the suspended apparatus . . . . .			
" . . . . .	To mount by the fixed or suspended apparatus . . . . .	} The exercise free, the machine to be won by speed of foot.		
The Sham Fort . . . . .	To mount by the slanting apparatus . . . . .		} The machine and exercise indicated.	
" . . . . .	To mount by the vertical apparatus . . . . .			
" . . . . .	To mount by the slanting apparatus . . . . .	} The machine indicated, the exercise free.		
" . . . . .	To mount by the vertical apparatus . . . . .			
" . . . . .	To mount by the slanting or vertical apparatus . . . . .	} The exercise free, the machine to be won by speed of foot.		
The Race with Obstacles and Fort combined.	To run at speed, carrying arms and knapsack, the exercise on the fort free, the machine to be won by speed of foot.			

ESCALADING BY EMULATION.

SUPPLEMENTARY COURSE.

DEFENSIVE EXERCISES.

Fencing.                      Sword Exercise.                      Bayonet Exercise.



## EXPLANATION OF TECHNICAL TERMS.

*The Step* is the action, simple or compound, of which certain exercises, as climbing and escalading, are composed; every action throughout such exercises being but a repetition of the first step.

*The Position* is the attitude of body assumed previous to the initiatory step, and re-assumed on the completion of every succeeding one.

*The Reach* is the point to which the hand is raised on the full upward extension of the arm.

*The Half-Reach* is the point, opposite the face, to which the hand is raised when the fore-arm is bent nearly at a right angle with the upper arm.

*The Rest* is the point, opposite the breast, to which the hand is raised when the arm is completely bent.

*The Distance* is the space between the hands when they are placed at the width of the shoulders, as in vaulting.

*The Space* is the distance between any two regularly recurring points of a machine, as the rounds of a ladder.

*Yielding* is the action of the body performed to avoid concussion on dropping from a height, described at page 45.

*The Leading* hand, foot, or side, is the one which takes the lead in any exercise.

*The Supporting* hand, foot, or side, *follows* the leading one.

*The Reversed* grasp of the hand is when the palm is turned inwards, towards the face.

*The Inter-grasp* and *over-lap* are positions of the hands assumed in climbing an object encircled by the arms, as the mast.

The thumbs and fingers are said to be *together* when in grasping an object the thumb and forefinger do not separate; they are said to be *meeting* when they encircle an object and meet from opposite sides.



## SECTION I.

## MOVEABLE APPARATUS.

MERE movements and positions are, in themselves, of comparatively little utility; indeed, they are chiefly valuable only in as far as they faithfully represent the movements and positions of exercises yet to be learned under more difficult conditions. Thus the movements and positions preparatory to the sword exercise as practised in the British army may be instanced as most valuable; yet not so much from their intrinsic merits as because they form the fundamental positions and actual movements of the various stages of the exercise afterwards to be acquired, when the difficulty will be increased by the wielding of the weapon itself.

This principle should govern and limit all exercises of mere movement and position; they should in every instance and in all respects lead direct to a higher course of instruction; for otherwise they cease to be real, and, if divested of their reality, it is found that, at any rate with Englishmen, the earnestness of application cannot be sustained in their practice.

On this principle the introductory course of this system is based, the design having been to organize a short and simple course which should give fair and uniform employment to every part of the body, and be capable of modification to suit the strength of every learner; which should possess the reality and attractiveness of gymnastics proper, and which, like them, should admit of regular and definite advancement.

There are several forms of apparatus, which, to a certain extent, provide for these requirements. The Indian clubs can be augmented in weight, and thus a progressive effort be secured; but a small number of men only can use them at the same time, and the range of exercises which they present is limited, and these are in themselves not of the highest order, acting almost exclusively on the upper region of the body; they have also the serious drawback that if unskilfully used, and if the rearward action of the club in some of the exercises be not steadily resisted, this portion of the body will be abnormally developed by their practice; the base of the breast-bone with the lower ribs will become unduly prominent, the upper part of the chest proportionately flattened, and the back, between the shoulders, undesirably hollow.

A course of exercises of considerable value, similar to those executed with the stick, may be performed with an iron bar, but they have the important drawback of being invariably viewed as a task, disliked by weak and strong.

A third form of exercise is obtainable from an arrangement of suspended weights, which are to be raised by the flexions and extensions of the upper limbs, with the lower limbs and trunk placed in varied positions. Such exercises are valuable in an elementary



sense, and are in every way superior to either of the foregoing ; but they have their attendant drawbacks, viz., considerable expense for apparatus, limited capabilities for squad practice, and want of attractiveness in the exercises themselves.

The form of machine which has been selected for this course appears at once to fulfil all the objects desired, and to avoid all the points that seem objectionable in the others.

1st. The dumb bell is familiar to every one, and has been used in this country for centuries ; \* its weight and substance are apparent, and its exercise is real and effective.

2nd. It admits of being exactly proportioned to the individual strength of each learner.

3rd. It can be adjusted to the advancing capacity of the learner, the weight of the bar and bell being augmented as his strength increases.

4th. Its exercises give fair employment to all parts of the body, and to both sides equally.

5th. They are capable of being executed not only by an entire squad at one time, and by the same word of command, but by many squads, or by the entire number of men which may at one time be present in the gymnasium.

6th. The positions and movements are of the highest order, and are directly and powerfully conducive to erectness of carriage and freedom of limb, and for these reasons they may be advantageously added to the setting up and position drill of recruits, or rather they should follow these, thus forming a connecting link between them and the exercises on the fixed apparatus.

Mention has been made of the excellence of the positions of the sword exercise ; the same positions constitute the fundamental ones of fencing, and two of the same (the first and third) have been selected to form the principal positions of the exercises of this course, the bell and bar being substituted for the sword or foil.

The course is divided into three parts ; the first consists simply of the principal *movements and positions* of the second and third practices ; the object in thus giving them separately being to prepare the learners for the others, for in these exercises accuracy of position is essential not only to their value, but to safety. This practice is again subdivided into two lessons,—the first consisting of the movements and positions of the second practice, the second of the movements and positions of the third practice.

The second practice, *with the bells*, takes up the movements and positions of the first lesson ; it is given in one unbroken series, although it will be seen that the first four are all simple exercises, that in the fifth a complete change in the action and position takes

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\* "John Northbroke, in a treatise written in the time of Queen Elizabeth, advises young men, by way of amusement, to 'labor with poises of lead or other metal ;' this notable pastime, I apprehend, bore some resemblance to the *skiomachia*, or fighting with a man's own shadow, mentioned in one of the *Spectators*. 'It consisted,' says the author, 'in brandishing two sticks, grasped in each hand and loaden with plugs of lead at either end ; this pastime opens the chest, exercises the limbs, and gives a man all the pleasure of boxing without the blows.' It is sometimes practised in the present day, and called 'ringing of the dumb bells.'"—Strutt's *Sports and Pastimes of the People of England*.



place, and that the succeeding ones consist of repetitions of the simple ones, rising in difficulty to the closing exercise of the practice.

The third practice, *with the bars*,\* reproduces the principal movements of the second lesson, and, as in the second practice, a change of action and position takes place after the simple exercises, those which follow consisting of movements in repetition, rising in difficulty to the closing exercises of the practice.

The first practice is never repeated after the learner has entered upon the second and third, but these last may, with great advantage, form a part of every subsequent course, and it is an excellent custom to close each day's lesson on the fixed apparatus with one or other of them, thus uniting in a final exercise the entire body of men at that time working in the gymnasium.

A register should be kept of the weights of the bells and bar used by each learner, the original weight for each, and all subsequent increase, should be determined by the instructor.

The position of the instructor should be opposite the centre, facing the squad. Better time will be kept and the spirit of the practice will be better sustained, if the instructor executes every movement himself while giving the word of command.

No. of Exercise.	Word of Command.	Action and Position.
1	<i>Attention.</i>	Position of attention, the toes at the target.
2	<i>Step to the rear.</i>	Make a full step to the rear with the left foot, the right following.
3	<i>Step to the front.</i>	Resume the first position.
4	<i>Step to the rear.</i>	As before.
5	<i>Left foot forward.</i>	<p>Move the hands to the rear, the left grasping the right arm just above the elbow, and the right supporting the left arm under the elbow.</p> <p>(2.) Make a half face to the right, turning on the heels, so that the back of the left touches the inside of the right.</p> <p>(3.) Make a full step to the front with the left foot, the right remaining firm and flat on the ground, the knee well braced back, the hips pressed forward, the head upright, the breast advanced, the shoulders flat, the eyes directed to the front.</p>

\* This is a two-handed dumb-bell. It is a French adaptation, of considerable value, as are also its special exercises.



	No. of Exercise.	Word of Command.	Action and Position.
FIRST PRACTICE. FIRST LESSON.	6	<i>Recover.</i>	Bring the left foot up to the right.
	7	<i>Right foot forward.</i>	Face to the left. (2.) Step out as with the left foot forward.
	8	<i>Recover.</i>	As before.
	9	<i>Step to the front.</i>	Make a half face to the right, and bring the hands down by the sides to the full extension of the arms. (2.) Resume the first position
		<i>Stand at ease.</i>	As usual.
FIRST PRACTICE.—SECOND LESSON.	1	<i>Attention.</i>	Position of attention, behind the target, the toes touching it.
	2	<i>Astride.</i>	Place the left foot 10 inches on the left of the target, the toes pointed to the front, the right following at the same distance on the right.
	3	<i>Ready.</i>	Bend the knees until they jut over the toes, keeping the heels on the ground, at the same time stoop from the waist and bring both hands to the centre of the target, the hands closed and together, the thumbs together, the knuckles to the ground.
		<i>Up.</i>	Straighten the back (keeping the knees bent); at the same time bring the hands close up by the sides, and carry them to the full extension of the arms above the shoulders. This exercise to be repeated six times, the learner counting the numbers, and the instructor giving the time and pitch of voice by the word "down" at each descent. The word to be given and the numbers to be counted in a clear and full tone, the sound to be prolonged over the time occupied in the ascent from the waist to the full extension of the arms.
	4	<i>Halt.</i>	Lower the hands to the sides, and come to the position of attention behind the target.
	5	<i>Step to the rear.</i>	As in first lesson.
6	<i>Step to the right.</i>	Make a full step to the right front (at the angle at which the toes are pointed from the position of attention), the left following.	



	No. of Exercise.	Word of Command.	Action and Position.
FIRST PRACTICE.—SECOND LESSON.	7	<i>Step to the left.</i>	Make a half face to the left, turning on the heels, the left in a line with the right.
			(2.) Make a full step to the left with the left foot, the right remaining flat and firm on the ground, the knee braced back, and at the instant that the foot meets the ground, let the left hand grasp the thigh just above the knee, the fingers and thumbs meeting, the thumb inside, the fingers outside, the lower part of the leg and the left arm forming a straight and continuous line from foot to shoulder, the right arm remaining extended in the line of the right leg.
	8	<i>Face to the right.</i>	Turn on the heels, facing to the right, reversing the position of both lower and upper limbs.
	9	<i>Attention.</i> <i>Stand at ease.</i>	As in first exercise. As usual.
SECOND PRACTICE.	1	<i>Attention.</i> <i>Step to the rear.</i> <i>Left foot forward.</i>  <i>Right hand.</i> <i>Up.</i>  <i>Down.</i> <i>Right foot forward.</i> <i>Left foot forward.</i>	As in first practice, the bells together on the target, the toes at the bells. As in first practice. Make a half face to the right. (2.) Step to the front with the left foot as in first practice, the left hand grasping the thigh just above the knee, as the foot comes to the ground, the right arm extended in the line of the right leg. Seize the bell with the right hand, the lower limbs remaining in position. Raise the bell above the shoulder to the full extension of the arm, leaning strongly on the left knee and pressing the breast to the front during the ascent of the bell; in this position, the lower limbs to the knee and the left arm should form one continuous line from foot to shoulder. Lower the bell, replace it on the target, and recover (as in first practice). As with the left foot forward. As before.



No. of Exercise.	Word of Command.	Action and Position.
SECOND PRACTICE.	<i>Both hands.</i>	Seize a bell in each hand, the arms passing on either side of the knee, the right on the right, the left on the left side.
	<i>Up.</i>	Raise the bells above the shoulders to the full extension of the arms, bending the left knee and pressing the breast to the front during the ascent of the bells.
	<i>Down.</i>	Bring the bells straight down by the sides, replace them on the target, and recover.
	<i>Right foot forward.</i>	As with the left foot forward.
	3 <i>Left foot forward.</i>	As before.
	<i>Right hand.</i>	Seize the bell with the right hand.
	<i>Up.</i>	Recover, at the same time elevate the bell above the shoulder to the full extension of the arm.
	<i>Left foot forward.</i>	As before, retaining the bell at the elevation above the shoulder and pressing the breast to the front.
	<i>Down.</i>	As before.
	<i>Right foot forward.</i>	As with the left foot forward.
4 <i>Left foot forward.</i>	As before.	
<i>Both hands.</i>	As in second exercise.	
<i>Up.</i>	Recover, and at the same time raise both bells above the shoulders to the full extension of the arms.	
<i>Left foot forward.</i>	As before, retaining the bells at the elevation.	
<i>Down.</i>	As in third exercise.	
<i>Right foot forward.</i>	As with the left foot forward.	
5 <i>Step to the front.</i>	As in first practice.	
<i>Astride.</i>	As in first practice.	
<i>Ready (6 times).</i>	As in first practice, bend the knees and stoop from the loins, and seize the bells, one in each hand.	
<i>Up.</i>	The action and position of the ascent as in first practice, carrying the bells (directed front and rear) above the shoulders.	
<i>Down.</i>	Lower the bells, letting them swing to the rear between the legs, the instructor giving the word, the learners counting the numbers, as directed in first practice.	



No. of Exercise.	Word of Command.	Action and Position.
SECOND PRACTICE.	<i>Halt.</i>	Replace the bells on the target, and resume the position of attention.
	<i>Step to the rear.</i>	As before.
	6 <i>Left foot forward.</i> <i>Right hand (6 times).</i>	As before. Seize the bell with the right hand, as in preceding exercise.
	<i>Up.</i>	Raise the bell as in first exercise, the instructor giving the word, the learners counting the numbers, as directed in first practice.
	<i>Halt.</i>	Replace the bells on the target and recover.
	<i>Right foot forward.</i>	As with the left foot forward.
	7 <i>Left foot forward.</i> <i>Both hands (6 times).</i>	As before. Seize the bells, one in each hand, as in second exercise.
	<i>Up.</i>	Raise the bells as in second exercise, the instructor giving the word, the learners counting the numbers, as directed in first practice.
<i>Halt.</i>	As in preceding exercise.	
<i>Right foot forward.</i>	As with the left foot forward.	
8 <i>Left foot forward.</i> <i>Both hands (6 times).</i>	As before. Seize the bells as in preceding exercise.	
<i>Up.</i>	Recover as in third exercise, the instructor giving the word, the learners counting the numbers, as directed in first practice.	
<i>Down.</i>	As in third exercise, making the step with the bells retained at the extension of the arms, and lowering them to the target on its completion.	
<i>Right foot forward.</i>	As with the left foot forward.	
<i>Halt.</i>	At the recover.	
<i>Places.</i>	Carry the bells (the arms at the extension) and place them in the racks.	
THIRD PRACTICE.	1 <i>Attention.</i> <i>Step to the rear.</i> <i>Left foot forward.</i> <i>Ready.</i>	As in first practice, the bar along the centre of the target, right and left. As in first practice. As in first practice. Seize the bar at the distance with both hands.



	No. of Exercise.	Word of Command.	Action and Position.
THIRD PRACTICE.		<i>Up.</i>	Raise the bar above the head to the full extension of the arms, pressing the breast to the front, with the head erect, the eyes directed to the front, leaning strongly on the advanced leg, and the rear leg held straight and firmly braced back.
	2	<i>Down.</i> <i>Right foot forward.</i> <i>Left foot forward.</i> <i>Ready.</i> <i>Up.</i>	Lower the bar with the arms bent, replace it on the floor and recover As with the left foot forward. As before. As in preceding exercise. Recover. At the same time elevate the bar above the head to the full extension of the arms.
	3	<i>Left foot forward.</i> <i>Down.</i> <i>Right foot forward.</i> <i>Step to the right.</i>	As before, retaining the arms at the extension above the head. As in preceding exercise. As with the left foot forward. As in first practice, bringing the toes of the right foot just within the bell, the left following, the heels touching each other.
		<i>Step to the left.</i>	Make a half face to the left, step out the length of the bar, and with the left hand grasp the left thigh above the knee, as in first practice.
		<i>Ready.</i>	Seize the bar at the centre mark with the right hand.
		<i>Up.</i>	Raise the bar above the head and hold it in a horizontal line at the full extension of the arm.
		<i>Down.</i>	Lower the bar with the arm bent, and replace it on the ground.
		<i>Face to the right.</i>	Face to the right, turning on the heels, and grasp the right thigh with the right hand, as in first practice.
		<i>Ready.</i>	Seize the bar at the centre mark with the left hand.
		<i>Up.</i>	As with the right.
		<i>Down.</i>	As with the right, and come to the position of attention at the target.
		<i>Step to the rear.</i>	As before.
	4	<i>Left foot forward.</i> <i>Ready.</i>	As before. Seize the bar at the distance with both hands.
		<i>Up.</i>	As in first exercise.



No. of Exercise.	Word of Command.	Action and Position.
	<p><i>On the shoulders</i> (6 times).</p> <p><i>Up.</i></p> <p><i>Down.</i></p> <p><i>Right foot forward.</i></p>	<p>Lower the bar by the rear until it descends upon the shoulders, pressing the breast to the front, and leaning strongly on the left knee.</p> <p>Again elevate the bar to the extension of the arms; the instructor giving the word, the learners counting the numbers, as directed in first practice.</p> <p>Lower the bar by the front at the full extension of the arms, replace it on the ground, and recover.</p> <p>As with the left foot forward.</p>
5	<p><i>Left foot forward.</i> <i>The hands reversed.</i> <i>Ready.</i> <i>Up.</i></p> <p><i>On the breast</i> (6 times).</p> <p><i>Up.</i></p> <p><i>Down.</i> <i>Right foot forward.</i></p>	<p>As before.</p> <p>With the palms of the hands upwards. Seize the bar at the distance. Raise the bar above and slightly in front of the head, to the full extension of the arms.</p> <p>Lower the bar by the front until it descends upon the breast, pressing the breast to the front, and leaning strongly on the left knee, the head slightly held back, the eyes directed to the front.</p> <p>Again elevate the bar to the extension of the arms; the instructor giving the word, the learners counting the numbers, as directed in first practice.</p> <p>As in preceding exercise.</p> <p>As with the left foot forward.</p>
6	<p><i>Left foot forward.</i> (6 times). <i>Ready.</i> <i>Up.</i></p> <p><i>Halt.</i></p> <p><i>Right foot forward.</i></p>	<p>As before.</p> <p>Seize the bar at the distance. Raise the bar to the full extension of the arms, as in first exercise, the instructor giving the word, the learners counting the numbers, as directed in first practice.</p> <p>Replace the bar on the ground, and recover.</p> <p>As with the left foot forward.</p>
7	<p><i>Left foot forward.</i> <i>Ready</i> (6 times). <i>Up.</i></p>	<p>As before.</p> <p>As before.</p> <p>Recover as in third exercise, the instructor giving the word, the learners counting the numbers, as in preceding exercise.</p>

THIRD PRACTICE.



No. of Exercise.	Word of Command.	Action and Position.
THIRD PRACTICE.	<i>Down.</i>	As in third exercise, making the step with the bar retained at the extension of the arms, and lowering it to the target on its completion.
	<i>Right foot forward.</i>	As with the left foot forward.
	<i>Halt.</i>	At the recover.
	<i>Places.</i>	Carry the bars to the rack as directed in second practice.



## SECTION II.

## EXERCISES OF PROGRESSION.

THE exercises of this section are for the purpose of giving accuracy and precision to the movements of the body, rather than of endowing it with great muscular strength; and have for their object the enabling it to preserve its equilibrium under special difficulties of position, and to pass with ease and rapidity from one locality to another, rather than to overcome great resistance.

If the learner were to ask, "Why do I find it more difficult to stand upright than to sit, and more difficult to sit than to lie flat on my back?" the answer might be, "Because in the first named position, there is considerable difficulty in preserving the equilibrium of the body, in the second, very little, and in the last, none at all." If the question were carried further, "What is meant by preserving the equilibrium of the body, and why is it more difficult in the first-named position than in the second, and why in either of these more difficult than in the third?" the answer is equally ready though not so concise. By the universal law of attraction, every material object has a tendency to attract to its centre every other such object. But as this attractive force is in relation to the size of the object, and as the earth is incomparably larger than any object on its surface, it has the power of neutralizing the individual attractive force of any such objects, to draw them towards its own centre, and thus to hold them on its surface. To enable any object thus attracted to retain its position, it is not necessary that its entire surface should be brought in contact with that of the earth, because a principle by which this force is governed is, that it is directed from centre to centre,—from the centre of the object attracting to the centre of the object attracted—not the actual centre of its bulk, but that of its weight, the spot around which all the remainder is, as it were, grouped equally on every side. It is, therefore, only necessary that one point should adhere to the ground, but it is necessary that this point should be in a direct line below the central spot. This spot is called the *centre of gravity*, and that part of the surface coming in contact with the ground is called the *basis of support*.

Everything, therefore, on the earth's surface, animate or inanimate, is held by this central grasp, and whenever the centre of any object is changed, whether by its own action or by extraneous influence, the line of attractive force is also changed, and the process is to pull that part towards the ground which has now become the centre.

To meet the demands of this inevitable law, animated creatures, with whom locomotion, implying a constant shifting of the centre of gravity, is a necessity to existence, are endowed with other forces,



the chief of which is muscular contraction. But this muscular power is itself subject to, and governed by certain fixed laws, and one of the most important of these is that it shall be exerted but for a limited continuous space; and thus, unless the relaxation of the muscles shortly follows upon their contraction, fatigue will arise as readily and to as great an extent from want of this necessary interruption to contraction as from amount of effort.

The answer to the opening question is thus virtually given in these remarks:—When lying on the back the basis of support is equal to the entire body; it is, therefore, impossible to disturb its equilibrium, not a single fibre of any muscle is called into action to preserve this position, it is one of perfect repose. When sitting, the basis of support is still large, being equal to the width of the hips. But as the trunk itself is held in an upright position by muscular effort, and as the head and neck can only be sustained in the line of the trunk by muscular effort, and as in this position there is little or no alternation of contraction and relaxation, a certain amount of fatigue is experienced in maintaining it; it is a position of semi-repose only.

When standing, the basis of support is reduced to the space enclosed by the feet, while the line of the centre of gravity must pass through the elongated body, the heaviest portions being the farthest removed from the supporting basis; and thus the preservation of the equilibrium becomes a matter of muscular contraction; every finger lifted, every breath inspired and expired, changes the centre of gravity and necessitates muscular contraction to re-adjust and re-establish it.

The perfectly erect attitude of the soldier in the position of "Attention" is, therefore, difficult to retain for any length of time; first, because the basis of support is the smallest possible, being merely the area enclosed by the feet with the heels together; second, because the column of the body is elongated to its greatest height, and the difficulty of preserving the equilibrium must be in relation to the distance to which the weight is removed from the basis of support; and, third, because the position being essentially formal and precise, the muscular effort to preserve it is continuous; and, as has been stated, it is the very essence of muscular power that the effort shall be intermittent, contraction alternating with relaxation.

The well chosen position of "Stand at ease" gives instant relief from that of "Attention," the basis of support is enlarged, the centre of gravity changed, and the muscles engaged in preserving the erect position are relaxed.

The yet more emphatic "Stand easy," still more completely illustrates this principle, by allowing the soldier to change and re-change his attitude at will, thus widening or circumscribing the basis of support, changing the centre of gravity with every change of position, and permitting easy and effortless alternation of action to the muscles which have been engaged in a single and rigid mode of action.

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## WALKING.

Near the gymnasium, a short course for walking and running should be formed, 100 yards long, and if possible 16 yards wide. There should be a permanent wooden barrier at each end, and a permanent mark to "toe" at starting.

A clear distinction must, at the outset, be drawn between walking and marching. The latter must ever be regarded as a purely military exercise, in which the soldier, from professional considerations, is taught to preserve, during locomotion, the same attitude of body which he assumes when standing still. The former has but one object, facility of progression; and every point of position and action is made subservient to this end.

In walking the whole column of the body is inclined to the front, the inclination being in proportion to the rate of speed; the lower limbs are lightly lifted upward and forward, with every extensor muscle relaxed and every joint mobile and free, and with a slight lateral oscillation of the body, marking the advance and rest of the foot, right and left, which is perceptible in the jostle and separation of two men walking at close order, without keeping step. The foot is not placed flat, or all at once, upon the ground; indeed, in rapid walking, the whole of the foot is never on the ground at the same time. The heel first meets the ground, and the contact gradually extends from it to the toes, the heel being lifted by the time this act is accomplished. The arms are allowed to swing to front and rear in alternated action with the lower limbs.

The remarkable mechanism of the organ of progression itself emphatically teaches the manner of its use. The heel, which first comes in contact with the ground and receives the whole superimposed weight, is composed of a single solid bone, capped with the most powerful tendon in the body, with a cutaneous covering many times thicker than is to be found on any other part of the body, the whole presenting a smooth and rounded surface, firm but elastic, yielding to strong pressure, but instantly recovering its rounded form on the pressure being removed. Immediately in front of the heel springs the arch of the instep, over which the burden of the body is transferred to the front of the foot. Here the structure entirely changes to meet the change in the duty to be performed; there is no shock to be encountered, so the strong single bone overlaid with firm muscle and thick cuticle gives place to a different mode of construction,—to many bones of different sizes, also protected with muscles and ligaments and cuticle, but softer and more sensitive, spread upon a broader surface, and with many prominences and indentations to take advantage of every inequality of ground, for the requirement here on the poise of the body is stability rather than strength; and to complete this security,



the whole line of the front edge of the foot is divided into five separate parts of different lengths, dimensions, and degrees of strength, allowing each separate part, while acting in concert with all the others, to take its individual grasp of the ground, according to the nature of the surface on which it rests. This terminating act in the compound movement composing the step is so important that a large portion of the leg also is fashioned and placed to aid in its performance; the mass of muscle forming the calf of the leg has for primary object to raise or lift the heel, while the toes yet have the ground for fulcrum, anticipatory of the forward act of propulsion of the next step; and it is this gradual, springy action, which at once gives development to the limb, and in return receives from it elasticity and spring in proportion to its development.

The action and position in walking are the same for all degrees of speed, except that as the speed is increased all the features of the position become more distinct and prominent, and all the points of the action are intensified; the step will be wider, yet never so wide as to cause additional effort; the forward inclination of the body will be greater, in order that the centre of gravity may be preserved on the wider and more rapidly shifting basis of support; a stronger effort of propulsion will come from the rear foot, a more distinct transition from heel to toe will take place on the advanced one; and the natural oscillation of the upper limbs to front and rear, alternating with the action of the lower ones, will become more energetic, and in a great measure regulated by the muscular contraction of the limbs themselves.

The position preceding the exercise of walking is the same as with every other exercise in the system—that of “attention.”

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  FREE.	No. 1	Slow time.—Short distance.	<i>Ready.</i>	Advance the left foot a free step, at the same time incline the column of the body to the front; the head, neck, trunk, and right leg forming a line slanting from rear to front the width of the step; the right heel raised from the ground, the lower limbs supple, the left knee bent, the right nearly straight; the arms hanging naturally by the sides; the palms open, but not spread, and turned inwards towards the thighs, but not touching them; the fingers together but not extended; the whole column of the body unconstrained; the head and neck perfectly free,



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Off.</i>	Press lightly from the right foot, quit the ground and let the limb swing to the front, the body retaining its forward inclination; when the right foot has swung as far to the front of the left as it came from the rear, softly place it on the ground, the heel first, the toes last, and as these descend, raise the heel of the left, now relieved of the weight of the body, which will have been transferred to the right.
N° III.		No. 2			Half Speed.—Short distance.
N° IV.	FREE.	No. 3			Speed.—Short distance.
N° V.		No. 4			Speed.—Long distance.
N° VI.		No. 2	No. 1	As in sixth column.	As in preceding Exercise.
N° VI.	WITH A BURDEN.	No. 2	Walking, carrying arms and knapsack.		

RUNNING.

The exercise of running is, in both action and position, different from that of walking. In the former there is but one foot on the ground at one time, and immediately after the completion of each step both feet are removed from the ground. There is no gradual descent and rise, no marked transfer of superimposed weight, no distinct point of change of the centre of gravity. At first, and before the full rate of speed is attained, the body is inclined to the front as in walking, but the speed being attained, and the proper momentum



acquired, the column of the body is brought towards the vertical line by the rapid and sustained advance of the lower limbs. The action is not intermittent, but continuous, both limbs are always bent, less or more, the descent is always upon, and the ascent always from, the entire sole of the foot. In walking, progression is accomplished by a succession of separate steps, each step beginning only at the termination of the preceding one, each successive step requiring a re-adjustment of equilibrium, and a distinct renewal of propulsive effort. Running is more like a succession of leaps, every bound possessing part of the forward momentum of its predecessor, this momentum being sustained or augmented by the energy of the flexions and extensions of the lower limbs.

The same course or practice ground will do for both walking and running, and the same manner and amount of instruction for the one, will in most instances be found suitable for the other. In all cases, as stated above, there should be a measured course of 100 yards, and when practicable a measured quarter, half, and whole mile. The first should be sufficiently broad for a squad of ten or fifteen men to walk or run abreast at open order, the second should be the breadth of an ordinary path. The initiatory practice in walking should be on the first of these, and should be performed quite irrespective of time, correct action and position being the sole points to be aimed at; these acquired, the longer courses should be used. The mile has been walked in seven minutes.

The same rules will apply to running; a correct action and position, quite irrespective of time, should first be obtained on the first course; these should then be practised at half speed, and ultimately at the highest rate of speed.

*The race at half speed* should be at the rate of about 25 seconds to the 100 yards. It would be difficult to over-estimate the practical value of running at half speed, as by it any number of men may be taught to run, preserving as perfect a cadence and as regular and rhythmical a step as in marching. When in addition to the proper action and position the proper and uniform rate of speed has been acquired, the race may be extended to the quarter, half, and whole mile.

*The race at speed* should be restricted to the 100 yards, except in the free practice, which, after the necessary instruction, it is desirable to encourage. The 100 yards has been run in nine and a half seconds, and the mile in four minutes twenty-one and a half seconds. Long distances, such as ten, twenty, or thirty miles, should also be practised, with emulation, but systematically, and above all, progressively, both as regards distance and speed; there is much art in husbanding and profitably spending the physical resources in both modes of progression, and there is no exercise in which men can be engaged where fatigue so soon and so distressingly supervenes, if unskilfully performed.

*The race with obstacles* is another exercise, capable of being greatly varied. The course may be long or short and the obstacles natural or artificial; it may be either a course of one or two hundred yards



with such obstacles as might be encountered in assaulting a fort or field work, as ditches, embankments, palisades, walls, and ultimately a small sham fort with embrasures, and furnished with the different apparatus for escalading, or it may be a mile course with hedges and ditches, such as might be found in a cross-country race. This race is only to be undertaken after all the other modes have been practised, and after the mode of overcoming each separate obstacle has been practised by itself.

*The race carrying weights or implements* may be on any course, short or long, with or without obstacles; but in every case it must be undertaken carefully and thoughtfully, and only after practice of all the preceding. The distance and difficulty of the course, and the nature and weight of the burden must be left to the discretion of the instructor, but both course and burden should at first be easy, and should be very slowly augmented. The nature, size, and shape of the burden ought to determine the manner in which it should be carried, whether in the right or left hand alternately, or in both at once, on the shoulder, or held across the body in front, in several, or in all of these in succession; for, as a general rule, relief will be obtained by every change of position, the chief points to be observed being not to confine or cramp the upper region of the body so as to interfere with the full freedom of respiration, or the lower region so as to retard the free action of the limbs. But it should never be forgotten that as this is essentially a practical exercise, the burden should be or should represent as closely as possible an object likely to be used in the actual occupations of the soldier, such as a ladder, plank, pole, gabion, fascine, coil of rope, bag of sand, round or other shot; and when fairly practised in these, men should be taught to carry each other short distances in the manner and positions causing the least fatigue and hindrance to progression.

*The race carrying arms and knapsack* may be over a course of any length, and presenting obstacles of any kind, natural or artificial; in fact it should be practised over every course, and at all rates of speed, and should be looked upon as the culminating exercise in walking and running, for in it may be represented the results of all previous practice and training. In the short or long walk or race on the level surface, the weapon should be borne at the "trail," and frequently changed from right to left; in ascending an inclined ladder, in the right hand at the "carry;" and in vaulting it should, previous to the vault, be carefully deposited beyond the barrier, resting on the butt. The knapsack should never be moved from the back, but, in the long flat race, where its motion of rising and falling with the action of the body becomes oppressive, the hand not employed in carrying the weapon may be passed back under it to arrest this motion, or the sling of the rifle may be passed round the upper part of it, the butt upwards and the stock diagonally crossing it, the barrel near the muzzle grasped by the hand. As in the race carrying weights, every change of position is a relief.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  FREE.	No. 1	Slow time—Short distance.	<i>Ready.</i>	The position the same as in walking, except that the arms are bent at the elbows; the fore-arm is held in a horizontal line, the hands to the front and closed, the thumbs inwards.
				<i>Off.</i>	The step also the same as in walking, except that the left foot is lifted before the right reaches the ground; also that the entire sole of the right is placed at once upon the ground, and on every step succeeding the first, the rise from the rear foot is from the entire sole; the knees are more bent than in walking, the foot is lifted farther from the ground, and the column of the body pressed more strongly to the front.
N° III.	No. 1	No. 2	As in sixth column.	As in first exercise.	Half speed. Short distance.
N° IV.		No. 3			Speed. Short distance.
N° V.	FREE.	No. 4			Speed. Long distance.
N° VI.		No. 5			Running on the course with obstacles.
N° VI.	No. 2	No. 1			Running, carrying weights and implements, &c.
N° VI.	WITH A BURDEN.	No. 2			Running, carrying arms and knapsack.



## LEAPING.

The machine for jumping *on* should be made so that it may be raised or lowered at pleasure, 2 feet 6 inches being the lowest point. The length should be not less than 6 feet. The top may be formed of a deal plank, 12 inches wide and 3 inches thick, with round edges, and supported at each end by an oak standard, 9 inches by 9 inches, and 2 feet 6 inches high from the floor, and running 2 or 3 feet below the floor into the ground. The centre of these standards must be hollow, to allow smaller standards, 6 inches by 6 inches, to work up and down in them. To these smaller standards the top must be fixed, so that when it is required to raise the top beyond 2 feet 6 inches, the inner standards must be pulled up, and an iron pin run through one of the holes to rest on the top of the large standards, and thus sustain the top of the machine at the height required.

For a barrier to jump on out of doors a stone or brick wall may be built of different heights in different parts, varying from 3 feet to 4 feet 6 inches. The top should be an oak curb, rounded at the edges.

For jumping *over*, a machine should be formed with two circular posts, 3 inches in diameter and 6 feet high, fixed about 5 feet apart, into wooden sockets in the floor, so that the posts may be removed when required. Between these a strong string, with a small flag in the centre, should be strained, looped round one of the posts, and lightly fastened to small iron pins, fixed at a distance of 1 inch apart, up the back of the other. The heights from the floor should be marked in inches up each of the posts.

The machine for jumping *depth* should be formed with a strongly constructed ordinary ladder, about 20 feet long and 20 inches wide, inclined against a wall, and firmly fixed at the foot. A triangular shaped box, of 1½ inch deal, should be constructed to slide up and down the sides of the ladder, and made and fixed so as to give a level platform on the top, 20 inches wide and projecting 18 inches from the ladder. This platform should be connected with the ladder by strong iron clasps, and kept in its required position by means of iron pins, running into holes in the ladder.

For outdoor purposes, a ditch of varied depth may be substituted for the above machine, the bottom being formed with 3 or 4 feet of saw-dust or sand.

When it is required to combine *width and depth* in jumping, the machine last described for jumping depth will be found available in the gymnasium; but for outdoor purposes a ditch should be formed, wider at one end than the other, say 10 feet



at the narrow end, and 20 feet at the widest point, and varying also in depth. Planks should be thrown across here and there, from bank to bank, by which to return, and the bank may be cut through in places for the convenience of getting out from the bottom of the ditch.

Running has been characterized as a succession of leaps, because, as in the leap, both feet are at each step, for a space, removed from the ground; and for the same reason, and in a similar sense, the leap may be viewed as a modified step, because, when preceded by the run it forms but the terminating step in the course; the whole momentum acquired by the preliminary run being here employed in a final effort, either on the plane of the course itself, or on one more or less vertical to it.

The simplest form of leaping is the *standing leap*, which embraces a very extended series of exercises, valuable in an elementary sense, and especially so in a practical one. Of these, the simple upward spring is the first; it is accomplished by the flexions and extensions of the trunk and lower limbs combined, the first act being to depress the trunk upon the thighs, pressing the hips to the rear and the knees prominently to the front, while by the same act the heels are raised from the ground, and the whole weight of the body is brought upon the fore part of the foot. At the same time, and in unison with this combined action, the upper limbs are brought down to their full extent. This is as it were the bending of the bow, the compression of the spring. The next act is to set it free, and this is done suddenly and at once. The powerful extensor muscles forming the greater portion of the thigh and lower part of the trunk, straighten by one act every joint, the feet spurn the ground, and the upper limbs are forcibly elevated.

This is the leap, and its height will be in relation to the force of the reaction from the preliminary depression.

The *forward*, *rearward*, and *sideward* leaps are but special modes of employing the same force, obtained by similar if not identical means. The action and position of the upper limbs in these special modes of leaping, however, are not so much for augmentation of force as for the preservation of the equilibrium of the body, and for protection from injury when this has been lost.

The leap *carrying weights or implements* may extend over the various modes of leaping; the manner of supporting the burden depending upon its shape, size, and weight. As in running, the principal point to be observed is, that the weight should be elevated and advanced rhythmically with the action of the body, and that it should be held as steady as possible, consistent with the freedom of the limbs, and sufficiently free from the body to prevent any part from coming in contact with it during the ascent or the descent.

The leap *carrying arms and knapsack*, like the preceding, applies to all the varieties of leaping, and should be practised in connexion with all. The knapsack should be fastened as tight as possible, short of giving absolute obstruction to the upper part of the body.



The weap should be carried in the right hand, grasped by the small of the butt; and in all the exercises in the first series, carried upwards, the butt downwards. In the second series, the barrel should be carried slanting to the left above the head. Care should be taken in the descent to let no part of it touch the ground.

There is scarcely any exercise in which men improve so rapidly and to so great an extent as in the various modes of leaping, and there is scarcely any exercise which so powerfully contributes to the development of the lower limbs. The action is precisely that which the nature of the muscles themselves demands for their healthful growth and full development, namely, rapid contraction and expansion, with progressive and accumulative effort; while the power of concentrating the energies, of selecting the precise spot from which to make the spring, of governing the action of the limbs, and of alighting on the spot and in the position desired, becomes, by practice of these various forms of leaping, completely under control.

The instructor must be careful to confine the learner to the simpler modes of leaping until he has acquired the power of making the limbs and trunk act harmoniously together, and of preserving the equilibrium of the body in every situation and position. When practising leaping *depth*, the initiatory practice should be at a very slight depth, gradually increasing, but never under any circumstances should it be increased, or its difficulty otherwise augmented, until the action and position be correct. In leaping *height* the learner must never be allowed to leap at a stiff barrier; it in no way tests the power of the leaper better than a fragile one, or affords greater advantages in the practice, and there is no merit in doing anything dangerous when there is no equivalent to be gained for the risk undergone. Rails and palisades should be attempted only by well trained and experienced leapers, and even with them it is advisable to fasten a fascine on the top, for a slip of the foot may and does happen with the best leapers, and such a mishap ought never to entail serious injury. In leaping *width*, over a ditch, the ditch should be shallow, and the sand or saw-dust at the bottom should be frequently stirred or softened. It is part of the instructor's duty to see that the banks are firm and equal before his squad begins its practice.

Every form of leap terminates in a position of body similar to that taken up in the preliminary movements of the first leap, namely, the depression of the trunk upon the limbs, and the bending of the joints. This is done, strictly speaking, neither before nor after the descent is made, but, as it were, in detail, as the different parts of the body successively arrive; the feet first, with the heels raised; the lower limbs next, with the knees bent; the trunk following, pressing the hips to the rear; the whole *yielding* to the encounter with the resisting ground, and thus dispersing the shock or concussion.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  STANDING.	No. 4	Front, width.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, the toes at the edge of the mark.  (1.) Bring the arms slowly upward and forward to the line of the shoulder, the hands closed; bring them again downward and rearward to their full extension, at the same time depressing the lower limbs as in first exercise; repeat these movements three times.  (2.) Spring from the feet with the entire force of propulsion of the lower limbs and at the same instant throw the upper limbs to the front; descend yielding, except that the entire sole of the foot meets the ground.
N° IV.	No. 1  STANDING.	No. 5	Front, height and width combined.	<i>Ready.</i>  <i>Leap.</i>	As in first exercise.  (1.) The preliminary movements as in first exercise.  (2.) Spring from the feet; clear the barrier and the space.  If the barrier be the first part of the obstacle, throw the arms and incline the body to the front on clearing it; if the second part, bend the back inwards and throw the hands to the extension of the arms, to the front upwards; descend yielding.
N° III.	No. 1  STANDING.	No. 6	Rear, width.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, the heels at the edge of the mark.  (1.) The preliminary movements as in first exercise, except that the downward extension of the arms should be carried farther to the rear.  (2.) Spring from the feet, throwing the arms energetically to the rear, the hands open, the palms downwards; descend yielding.



Course in System.	Series on Mach. no.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1	No. 7		<i>Ready.</i>	Position of attention, the mark in profile on the right, the edge of the right foot touching it.
	STANDING.		Sideways, width.	<i>Leap.</i>	<p>(1.) Slightly bend the knees, letting them jut over, but not beyond, the toes; swing the arms across the body in front until the left reaches a horizontal line with the shoulder, the distance (width of the shoulders) between them remaining the same; on the return of the third swing or oscillation to the left, bend the knees steadily downward, the right lower than the left, raising the heels and resting on the fore part of the feet.</p> <p>(2.) As the hands attain the culminating point, throw them rapidly and energetically to the right; at the same time spring from the feet with their entire concentrated force of propulsion, and descend yielding. This exercise to be repeated on the left.</p>
N° III.	No. 1	No. 8		<i>Ready.</i>	Position of attention, the toes at the edge of the platform or ditch.
	STANDING.		Front, depth.	<i>Leap.</i>	<p>(1.) Bend the knees until they jut over the toes, and above the space, raising the heels and resting on the fore part of the foot; during the depression of the lower limbs, extend the arms to the front, the hands open, the palms downwards, the column of the body inclined to the front, but held close and compact.</p> <p>(2.) Press lightly from the feet, and spring to the front with sufficient force only to bring the back clear of the edge of the platform or ditch, and descend yielding.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 1  STANDING.	No. 9	Rear, depth.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, the heels at the edge of the platform or ditch. (1.) The preliminary movements as in sixth exercise. (2.) Spring lightly to the rear, throwing the hands upwards to the full extension of the arms, and descend yielding. If the equilibrium be lost, and the body fall to the front, extend the arms as in preceding exercise; if to the rear, as in sixth exercise.
N° IV.	No. 1  STANDING.	No. 10	Front, width and depth combined.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, the toes at the edge of the platform or ditch. (1.) (Look steadily at the spot desired to be reached.) The preliminary movements as in eighth exercise. (2.) Spring from the feet, and at the same instant throw the hands to the front, the palms open and turned towards the ground, descend yielding.
N° V.	No. 1  STANDING.	No. 11	Rear, width and depth combined.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, the heels at the edge of the platform or ditch. (1.) (Glance to the rear and determine on the spot to be reached in the leap); the preliminary movements as in sixth exercise. (2.) Spring from the feet, at the same time throw the hands to the rear, open, with the palms downwards, and descend yielding.
N° V.	No. 1  STANDING.	No. 12	Rear, width and depth combined.—A second method.	<i>Ready.</i>  <i>Leap.</i>	As in preceding exercise. (1.) Stoop down and grasp the ledge of the platform with both hands, the fingers and thumbs meeting, the fingers above; if at the edge of a ditch, the fingers and thumbs together, the palm on its surface. (2.) Spring from the feet, shooting them to the rear, and at the same instant press strongly from the hands; retain them in the front, the palms open; descend yielding.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° V.	No. 1 STANDING.	No. 13	Sideways, width and depth combined.	<i>Ready.</i> <i>Leap.</i>	Position of attention, the ditch in profile on the right.  (1.) The preliminary movements as in seventh exercise.  (2.) Spring from the feet, throwing the hands to the right front, open, the palms downwards; descend yielding.
N° II.	No. 2 RUNNING.	No. 1	Height.—Two movements.	<i>Ready.</i> <i>Leap.</i>	Position of attention, 20 or 30 paces from the barrier.  (1.) Begin the preliminary run, with short, well-measured steps, quickening the pace on the advance, and when within a few feet of the barrier (according to its height), spring from the foot making the last step, bring both knees close up in front, the hands being elevated at the instant of the spring as in first exercise, first series, and alight upon the barrier, bringing the hands instantly down by the sides.  (2.) Descend as in first exercise, first series.
N° II.	No. 2 RUNNING.	No. 2	Height.—One movement.	<i>Ready.</i> <i>Leap.</i>	As in first exercise.  As in first exercise to the spring, clear the barrier, bending the back inwards, and descend yielding.
N° II.	No. 2 RUNNING.	No. 3	Height.—The left side leading.	<i>Ready.</i> <i>Leap.</i>	As in first exercise.  The preliminary run as in first exercise; swerve slightly to the left in the last few steps, inclining the left shoulder forward, spring from the left foot, clear the barrier, the left foot leading to the ground; descend yielding.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 2  RUNNING.	No. 4	Width.	<i>Ready Leap.</i>	As in first exercise. The preliminary run as in first exercise, spring from the foot making the last step, the whole act of propulsion of the spring and the momentum acquired in the run being directed to the front, the lower limbs closely bent up, the trunk of the body compact and firm, the hands closed and thrown to the front; descend yielding, resting on the entire sole of the foot.
N° IV.	No. 2  RUNNING.	No. 5	Height and width combined.	<i>Ready Leap.</i>	As in first exercise. The preliminary run as in first exercise. The spring as in first exercise. The effort should be to divide the momentum of the run, and that given by the propulsion of the spring, so that the obstacle in both aspects, height and width, shall be cleared. Descend yielding.
N° VI.	No. 3  WITH A BURDEN.	No. 1	As in sixth column.	As in preceding exercises.	Leaping, carrying weights, implements, &c.
N° VI.	No. 2				Leaping, carrying arms and knapsack.

### THE LEAPING ROPE.

This machine is a strong rope suspended from a tie-beam or other point of attachment over the centre of the string and posts already described for height jumping. The rope should be firmly secured above, and should reach to within 4 feet of the ground. It should be looped up and fastened at the side when not in use.

The exercises with the leaping rope, and also those with the leaping pole, differ in certain features from all other modes of leaping; they



employ a machine to aid the leaper in clearing the barrier, and they give employment to both the upper and the lower limbs, thus forming the connecting link between leaping and vaulting. The practice of these exercises is very good in an elementary sense, giving much action in a beneficial form to the trunk as well as to the limbs.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	Single series.	No. 1	Height.	<i>Ready.</i> <i>Leap.</i>	Position of attention in front of the barrier. Raise both hands to the reach and grasp the rope, spring from the feet, bringing them straight up in front of the face, letting the head and shoulders incline to the rear. Clear the barrier, bend the back inwards, again bringing the head and shoulders to the front, quit the grasp of the hands and descend yielding.
N <sup>o</sup> III.	Single series.	No. 2	Hand over hand.	<i>Ready.</i> <i>Leap.</i>	As in first exercise. Raise the right hand to the reach, spring from the feet, during the rise bring the left hand over the right, and again the right over the left, clear the barrier as in first exercise, and descend yielding.
N <sup>o</sup> II.	Single series.	No. 3	Width.	<i>Ready.</i> <i>Leap.</i>	As in first exercise. Raise the right hand and grasp the rope at the half reach, the left following, rapidly step to the rear, spring upward and backward from the foot making the last step, bringing both feet together in front on quitting the ground, and letting them rise as high as the face, the arms bent, the elbows close in by the sides. When approaching the terminating point of the forward swing, quit the grasp of the hands, incline the head and shoulders to the front, and descend yielding.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	Single series.	No. 4	The double swing.	<i>Ready.</i> <i>Leap.</i>	As in first exercise. As in first exercise to the terminating point of the forward swing; advance the right shoulder, wheel round, bringing the back upwards, throw the lower limbs high and free to the rear (thereby greatly increasing the momentum), govern the forward return oscillation, and at its culminating point, quit the grasp, and descend yielding.

THE LEAPING POLE.

This should be of ash, about two inches in diameter and from 8 feet to 10 feet long, perfectly smooth, and shod with iron at the butt or lower end.

The exercises with the leaping pole may almost be viewed as belonging to recreative rather than systematized exercise, being essentially for the open air, and among the few which may be left for free practice, after the learner has acquired a knowledge of the action and position of the different exercises. They are valuable as giving precision to the eye and hand, the power of calculating distance, and of rapidly determining the moment for executing a complicated movement, with the presence of mind to execute it, in addition to the physical exercise of the run and leap, the balance and descent.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	STANDING.	No. 1	Width.	<i>Ready.</i>	Position of attention, one pace from the mark, with the pole at the balance, <i>i.e.</i> held horizontally across the body with the arms bent, the butt of the pole held slanting to the right front, the hands at the distance, with the palms upwards, the fingers and thumbs meeting; or with the palm of the right hand downwards.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Leap.</i>	<p>(1.) Advance the right foot to the edge of the mark, advance the butt of the pole to the utmost reach, and fix it in the ground without displacing the feet or changing the grasp of the hands.</p> <p>(2.) Spring from the feet and pass by the left of the pole, the whole body with the lower limbs straight and extended in a horizontal line when passing the pole; descend yielding, and as the feet meet the ground raise the pole to the balance.</p> <p>This exercise to be repeated, advancing the left foot and passing by the right of the pole.</p>
N° III.	No. 1 STANDING.	No. 2		<i>Ready.</i> <i>Leap.</i>	<p>As in first exercise, at a distance from the barrier, in proportion to its height.</p> <p>(1.) As in first exercise, advancing the butt of the pole to within a few feet of the barrier, in proportion to its height.</p> <p>(2.) Spring from the feet and clear the barrier passing by the left of the pole, the body in position as in first exercise when passing the barrier, and descend yielding.</p> <p>This exercise to be repeated, advancing the left foot and passing by the right of the pole.</p>
N° IV.	No. 1 STANDING.	No. 3		<i>Ready.</i> <i>Leap.</i>	<p>As in first exercise, the toes at the edge of the ditch or platform.</p> <p>(1.) Advance the pole and firmly plant the butt on the ground.</p> <p>(2.) Press lightly from the feet, and on passing the vertical line of the pole, quit the grasp and descend yielding, letting the pole fall against the side of the ditch or platform.</p> <p>This exercise to be repeated, advancing the left foot and passing by the right of the pole.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2  RUNNING.	No. 1	Width.	<i>Ready.</i>  <i>Leap.</i>	Position of attention, 20 or 30 paces from the edge of the ditch, the pole at the balance.  Begin the advance with a short, light, and well measured step, fixing the eye on the ditch and regarding it steadily, quicken the pace when nearing it, select the spot and plant the pole without halt, springing by the left, descend yielding, bringing the pole to the balance.  This exercise to be repeated, advancing the left foot and passing by the right of the pole.
N° IV.	No. 2  RUNNING.	No. 2	Height.	<i>Ready.</i> <i>Leap.</i>	As in first exercise. As in first exercise to the spring, quit the grasp of the pole at the commencement of the descent, letting it fall to the rear without touching the barrier, descend yielding.

### THE HORIZONTAL BEAM.

This machine is a round wooden beam, not less than 20 feet long, 9 inches in diameter at one end, and 6 inches at the other, fixed at a height of 6 or 8 feet from the floor to a strong oak standard, at each end 12 inches by 6 inches, firmly built in the ground. The beam to be rubbed smooth.

The *moveable* beam should be exactly similar in size and length to the fixed beam, but made to move up and down between oak standards, arranged in the same way as those for the moveable parallel bars, the ends of the beam to be cut square.

The *oscillating* beam should be similar to the others, but should be suspended at a distance of not more than 18 inches from the ground, by means of strong ropes at each end. These should be arranged in the shape of a V, that is, the centre of a rope should be firmly secured to the beam, and the two ends carried up to the points of attachment and there fixed at a distance of 4 feet or 5 feet apart, so as to give only a front and rear oscillation to the beam. But there should also be provided at one end of the beam, a single suspended rope, which may be



substituted for the other, when it is required to obtain both a longitudinal and lateral oscillation.

At each extremity of the beams there should be a small portion with its surface perfectly flat. When the beam is much and permanently elevated, there should be a small platform on which the men can rest without effort, preparatory to the exercises, and on which they can take up the initiatory position.

The exercises on this machine follow in natural order the preceding simple exercises of progression. They do but carry such exercises one step farther, by increasing the difficulties of their execution.

In reality the physical difficulty of walking on a beam raised a foot above the floor is no greater than that of walking on one of the planks of the floor itself, provided the former is as firm as the latter, and its surface as level and secure to the foot; and to walk on a beam 100 feet above the ground is physically no more difficult than either. Therefore the difficulty to be overcome in walking along an elevated beam presenting a surface sufficiently broad to admit of the complete placing of the foot, and free from all oscillation and vibration, is entirely mental, arising it may be from many and conflicting causes, in which actual fear has no share. It is most important that both instructor and learner should be aware of this, because from the latter it will remove an imaginary difficulty, while the former will from it see the propriety and necessity of patience and forbearance with the defects of beginners in the simplest exercises on this essentially rudimentary machine. The preservation of the equilibrium is the very essence of these exercises, and the acquirement of the power of maintaining it under difficulties is their avowed purpose and object.

The first series, *sitting*, is of the simplest description, and as shown in the note introductory to the section, its exercises are executed in the position in which the equilibrium is maintained with the least effort.

The second series, *walking upright*, is of much greater difficulty than the first, but is still composed of exercises of a simple character.

In the march along the beam *carrying weights or implements*, as in the walk, run, and leap, the manner of carrying the burden must depend upon its nature, size, and shape, but whatever this may be, ladder, fascine, shot, or disabled companion, the point to be aimed at is to carry the centre of its weight in the line of the beam. When long and light, it should be carried across the body and used after the manner of a balance pole; when short or heavy, requiring the use of both hands, it should be held low down in a line with the beam, in such a manner that it may be rested on its surface without causing disarrangement of position. When not too heavy to be transported in one hand, the other should be set free to aid in preserving the equilibrium. When the weight is too heavy to be carried in the hands, yet capable of being adjusted and dragged along the beam, then the "Rear march, sitting," No. 2, First Series, may be used, the body being inclined forward after the completion of every step, to drag the burden forward.



It must never be forgotten also, that however ably these exercises may be executed by individual effort, there yet remains a second stage, wherein the burden, too great for one man by any mode of progression, is transported by the united efforts of two, one behind and one in front of it.

In the march along the beam *carrying arms and knapsack*, the rifle may be carried in the right hand, the butt downwards, the muzzle inclined to the front, the left hand free; or in both hands held across the body as a balance. If carried in connexion with a burden, it should be slung at the back.

All the exercises on the horizontal beam should, as a second stage of practice, be performed on the *inclined* beam, the inclination being at first slight, and gradually increased with the advancement of the learners.

A third stage of practice should be on the horizontal beam *suspended*, oscillating to front and rear, and also at one extremity to right and left; this form of beam should never be more than 18 inches from the ground.

It should never be omitted in the advanced practice, for the sake of the direct practical application of the exercises on this machine, to substitute the horizontal *plank* for the beam; the spring and movement of the plank being altogether different from the oscillation of the beam, and thus presenting a special difficulty to be overcome, and one which is frequently encountered by the soldier. Every exercise on the beam should therefore be practised on the plank.

Other exercises, such as the second series on the horizontal bar, and the third and second series on the slanting pole, may also be performed on the beam, but they properly belong to the machines in connexion with which they are described.

The instructor should walk by the side of the learner, to explain the action and position of the different exercises, and to give assistance when required.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1	No. 1	Front March.	<i>Ready.</i>	Position of attention, facing the line of the beam.
	SITTING.			<i>March.</i>	(1.) Stoop down and place the hands on the beam, rest on the hands, and come to the seat astride of the beam, the head erect, the breast advanced, the column of the body upright, the legs pendent on either side of the beam. (2.) Incline the head and trunk to the front, advance the hands, rest upon them, lift the body from the beam, and bring it up again to the hands.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i> <i>Down.</i>	Complete the step. Pass the right leg by the rear over to the left, press lightly from the hands, and descend yielding.
N° II.	No. 1  SITTING.	No. 2	Rear march.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, the back to the line of the beam. (1.) As in first exercise. (2.) Rest on the hands, elevate the feet in front as high as the beam, throw them to the rear to the reach of the arms, resting on the inner side of the thighs, the body lying strongly inclined to the front, bring both hands up to the thighs. Complete the step. As in first exercise.
N° III.	No. 1  SITTING.	No. 3	Front. Hands only.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Rest on the hands, rising from the seat, incline the body to the right front, advance the left hand, incline the body to the left front, advance the right hand. Complete the step. As in first exercise.
N° III.	No. 1  SITTING.	No. 4	Front. Both hands at once.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Rest on the hands, spring to the front, inclining the body slightly to the front, the lower limbs compact, but free. Complete the step. As in first exercise.
N° III.	No. 1  SITTING.	No. 5	Rear. Both hands at once.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, the back to the line of the beam. (1.) As in first exercise. (2.) Rest on the hands, spring to the rear, inclining the body slightly to the front. Complete the step. As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  SITTING.	No. 6	Sideways march.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Come to the seat astride of the beam, as in first exercise; pass the left hand to the rear, pass the right leg over to the left side by the front, close beside the left. (2.) Bring the left hand close up to the thigh, and advance the right to the reach, lift the body up to the right. Complete the step. Press lightly from the hands, spring to the ground, and descend yielding.
N° II.	No. 2  UPRIGHT.	No. 1	Front. The left foot leading.	<i>Ready.</i> <i>March.</i>	Position of attention, facing the line of the beam. (1.) Advance the left foot, the toes pointed to the front, the hollow of the right at the heel of the left. (2.) Advance the left foot a short pace along the beam, incline the body to the front, and bring up the right foot; the arms hanging free by the sides, to be elevated or depressed as required, the eyes directed to the end of the beam. This exercise to be repeated with the right foot leading.
N° II.	No. 2  UPRIGHT.	No. 2	Front. Right and Left.	<i>Ready.</i> <i>March.</i>	As in preceding exercise. (1.) As in preceding exercise. (2.) Advance the left foot a short step, incline the body to the front, rest on the left foot, bring the right to the front The arms as in preceding exercise.
N° III.	No. 2  UPRIGHT.	No. 3	Side step.	<i>Ready.</i> <i>March.</i>	As in preceding exercises. Face to the right, rest on the right foot, advance the left, incline the body to the left, rest on the left foot, bring up the right This exercise to be repeated with the right foot leading.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2 UPRIGHT.	N <sup>o</sup> . 4	Rear. Left foot leading.	<i>Ready.</i> <i>March.</i>	Position of attention, the back to the line of the beam. Rest on the right foot, pass the left a short pace to the rear, incline the body to the rear, rest on the left foot, bring up the right. This exercise to be repeated with the right foot leading.
N° III.	No. 2 UPRIGHT.	No. 5	Rear. Right and Left.	<i>Ready.</i> <i>March.</i>	As in preceding exercise. Rest on the right foot, pass the left a short pace to the rear, incline the body to the rear, rest on the left foot, and pass the right to the rear.
N° IV.	No. 2 UPRIGHT.	No. 6	One foot on the beam.	<i>Ready.</i> <i>March.</i>	As in first exercise. Bend the knees until they jut over the toes, incline the body slightly to the right, remove the left foot from the beam, let the leg fall straight by the side of the beam, advance it, elevate and replace the foot on the beam, incline the body to the front, resting on the left foot.
N° IV.	No. 3 CHANGES OF POSITION.	No. 1	To change front.	<i>Halt.</i> <i>Change.</i>	(From the front march, 1st, 3rd, or 4th exercises, 1st series.) Complete the step, placing the hands on the thighs. Pass the right leg by the front to the left over the beam, change the seat, facing the left, pass the left leg over the beam, turning to the left, adjust the seat, coming square to the front.
N° IV.	No. 3 CHANGES OF POSITION.	No. 2	A second method.	<i>Halt.</i> <i>Change.</i>	(From the front march, 1st, 3rd, or 4th exercises, 1st series.) Complete the step. Pass the right leg over the beam by the rear, at the same time changing the position of the left hand, throw the left leg over the beam, at the same time bringing the right hand opposite the left, and come square to the front.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 3 CHANGES OF POSITION.	No. 4	To change position.	<i>Halt.</i> <i>Change.</i>	(From the front march, 1st, 3rd, or 4th exercises, 2nd series.) Complete the step. (1.) Bend the knees, keeping the feet on the beam, advance the hands, the palms downwards, the fingers to the front, place them on the beam, the fingers and thumbs together and pointed to the right and left front, the arms extended and straight; rest on the hands, lift and separate the feet, and sink to the seat on the beam. (2.) Incline the body to the front, rest on the hands, lift the feet by the rear and place them on the beam, incline the body to the rear, pass from the rest on the palms to the tips of the fingers, rest entirely on the feet and rise upright.
N° IV.	No. 3 CHANGES OF POSITION.	No. 5	To rest on the beam.	<i>Halt.</i> <i>Rest.</i>	(From the front march, 1st, 3rd, and 4th exercises, 2nd series.) Complete the step. (1.) Descend to the beam, as in preceding exercise, incline to the front, pass the right leg over the beam by the rear, lean forward, resting the waist on the beam, let the right arm fall pendent over the beam, the left following. (2.) Reverse the order of the movements on rising from the rest.
N° IV.	No. 3 CHANGES OF POSITION.	No. 6	To pass on the beam. (Two men meeting.)	<i>Pass.</i>	(From the front march, 1st, 3rd, or 4th exercises, 2nd series.) Let each man advance the right foot, place them together, the toes slightly turned outwards, advance the right hand and clasp the outside of the left arm near the shoulder, advance the left hand and with the palm press against the side, under the arm. Slowly incline to the front, resting on the right foot, advance the left, rest on it, slowly pivot on the front part of the right, withdraw it, slowly detach the grasp of the hand, bring the right up to the left, and resume the march.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> IV.	No. 3  CHANGES OF POSITION.	No. 7	To descend from the beam.	<i>Down.</i>	(From the seat astride of the beam.)  Lean forward until the breast touches the beam, pass both hands under the beam, and take the intergrasp beneath, pass both legs around the beam and cross the ankles, the left in front of the right, slowly incline to the right, and pass the body under the beam, the hands and feet ascending to the surface as the trunk descends beneath it, untwine the feet and lower them to the vertical line, quit the grasp, and descend yielding.
N <sup>o</sup> V.	No. 3  CHANGES OF POSITION.	No. 8	To re-ascend the beam.	<i>Up.</i>	(From the position, under the beam, of preceding exercise.)  Slowly detach the hands from their intergrasp above the beam, taking instead a strong clasp with the open palm, slowly relinquish the clasp of the left, and rapidly pass it under the beam by the front to the right side, raising the head and shoulders on the same side at the same time. Hold strongly by the clasp of the hands, pass the right leg over the beam until the thigh is on its surface, bring the left arm on the surface of the beam, elevate the trunk, and rise, seated on the beam.  All the exercises on the underside of the slanting pole may be executed on the beam. If the beam be square, grasp the ledge, the fingers on the surface, the palms in front. If round, advance the whole hand as far as the wrist on its surface.  Also, the exercises in <i>rising above</i> the horizontal bar, the open clasp of the palm being substituted for the grasp of the closed hand.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° VI.	WITH A BURDEN.	No. 1	As in sixth column.	Words of command as in separate Exercises.	To march on the beam, carrying weights, implements, &c.
		0. 2			To march on the beam, carrying arms and knapsack.

### THE VAULTING BAR.

This machine may be formed by the removal of one of the moveable parallel bars to be hereafter described, the remaining bar being used for vaulting, and raised or lowered as required. Or a similar bar and standards may be erected expressly for vaulting.

Nothing could more distinctly show the nature and importance of progressive exercise than the apparatus of this section, each succeeding machine presenting in a more difficult form the exercises of its predecessor. Thus, as running naturally followed walking, and leaping followed the race at speed, so the modified leap with the rope and pole is introductory to vaulting, where, from playing a secondary part, the upper limbs pass to one of equal importance with the lower ones.

The bar, of which the girth will admit of its being grasped by the hand, and which can be elevated and depressed to suit the capacity of the learner, is the most simple form of the vaulting machine; and as will be seen by the description in the text of the action and position preparatory to the rise, and accompanying the descent, it is identical with the first standing leap; with this distinguishing difference, that the hands grasp the barrier, and the upper limbs take up the effort after the lower limbs have completed the spring.

In the first form of vaulting the body is carried over the barrier in a horizontal line, being from head to foot, when above the bar, in the exact line of the bar itself. In the second form, the lower half of the body is lifted by the action of the loins, elongated and elevated vertically above the hand, and thrown to the right or left front, according to the side on which the vault is to be made. Both forms of vaulting require special care on the part of the instructor, who should impress upon the learner at every opportunity the necessity for keeping the lower limbs in position and close together.

The position of the instructor should be in front of the vaulter, with one hand grasping the wrist nearest to him, and the other held in readiness to give assistance, if required.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	Single series.	No. 1	To vault over the bar in three movements.	<i>Ready.</i> <i>Vault.</i>	<p>Position of attention, facing the bar.</p> <p>(1.) Raise the hands and grasp the bar ; the hands at the distance, the fingers and thumbs meeting ; lift the feet from the ground, rising to the full extension of the arms, the head erect, the column of the body upright, the legs straight and together, the feet together, with the toes pointed to the ground.</p> <p>(2.) Raise the right foot and place it on the bar, the hollow of the foot resting on it, the left leg straight.</p> <p>(3.) Raise the left foot, and bring it up to the right, press from the hands and the right foot, clear the bar, quit the grasp, and descend yielding.</p> <p style="text-align: center;">This exercise to be repeated on the left.</p>
N° III.	Single series.	No. 2	To vault over the bar in two movements.	<i>Ready.</i> <i>Vault.</i>	<p>As in first exercise.</p> <p>(1.) As in first exercise.</p> <p>(2.) Throw both feet with the legs in position to the right, clear the bar, quit the grasp of the hands, and descend yielding.</p> <p style="text-align: center;">This exercise to be repeated on the left.</p>
N° III.	Single series.	No. 3	To vault over the bar in one movement.	<i>Ready.</i> <i>Vault.</i>	<p>As in first exercise.</p> <p>Raise both hands and grasp the bar, press from both hands and feet simultaneously, throw both feet with the lower limbs in position to the right, clear the bar, and descend yielding.</p> <p style="text-align: center;">This exercise to be repeated on the left.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	Single series.	No. 4	To vault over the bar by the back lift.	<p><i>Ready.</i></p> <p><i>Vault.</i></p>	<p>As in first exercise.</p> <p>(1.) As in first exercise.</p> <p>(2.) Grasp strongly with the hands, press the elbows close in by the sides, incline the head and shoulders to the front, and at the same time elevate the lower limbs, hips and loins, until they rise straight above the bar over the grasp of the right hand; press strongly from both hands, throw the feet to the front, and descend yielding.</p>
N° V.	Single series.	No. 5	To vault over the bar with the hands only.	<p><i>Ready.</i></p> <p><i>Vault.</i></p>	<p>As in first exercise.</p> <p>Raise the hands and grasp the bar at the distance, lift both feet from the ground, and sink to the full extension of the arms. In lifting the feet from the ground press slightly to the rear, causing a slight oscillation of the body to the front, and on its rearward return, rapidly bend the arms, throw the lower limbs to the right, clear the bar and descend yielding.</p> <p>This exercise to be repeated on the left.</p>

THE VAULTING HORSE.

This machine should be formed from a block of yellow deal about 5 feet 3 inches long, 14 inches broad and 11 inches deep, the top being rounded off to a semi-circular shape and the section of the ends worked off to a semi-circle. The sides and top should both be hollowed out towards the centre, where a section



would be a flattened semi-circle, 12 inches by 9 inches. The object is to make the body of such a shape, by carefully rounding every possible angle and projection, that whether the horse be used from the sides or from the croup, nothing but the most convenient surfaces for the hands shall be presented. The body should be rubbed smooth with sand paper, and the top and sides should be covered with strong leather, the upper portion being slightly stuffed with horsehair. The supports or legs may be formed with two deal standards at each end,  $3\frac{1}{2}$  inches by 2 inches, and 10 inches apart from out to out at the top, under the end of the horse, spreading to 2 feet 4 inches at the bottom, and resting upon a plate 5 inches by 3 inches and 3 feet long, firmly screwed to the floor. The standards should also spread longitudinally beyond the ends of the body.

There should be at least two of these machines in a gymnasium, one 5 feet, and the other 5 feet 6 inches, to the highest point of the top.

This is a machine of a much higher order than the bar, and presenting a much wider range of exercises, second to none in value and number.

The three series into which the exercises divide themselves are very distinctly marked, and admit of progressive practice long after the correct action and position have been attained, by increasing the elevation of the machine.

These exercises can scarcely be too frequently practised, as they give valuable and widely varied employment to both upper and lower limbs, and also to the trunk; and this machine is always found an excellent one with which to begin the lesson, because it affords much and rapid movement. The first series is clearly introductory to the second. The third series is very artistic and effective, and cultivates to the highest attainable point that precision and security of grasp and spring which are so valuable in all exercises when practically applied.

There is one kind of risk greater with this machine than with any other; namely, that of the hand slipping from the surface during the elevation of the lower limbs in the exercises of the second and third series, by which a heavy headlong fall is entailed; and even with the greatest vigilance it requires both presence of mind and strength of limb to catch and support a falling man. The position of the instructor must, therefore, be close to the machine in front of the learner, directing every motion, and in the early stages of his practice counting the time of his movements, and pointing out to him the features of the position in the ascent, rest, and descent. The instructor should also repeatedly execute the exercise himself in the manner most likely to make the learner comprehend its peculiarities, at the same time encouraging him, if timid or hesitating, and losing no opportunity of obtaining his entire confidence and trust in every situation however critical, remembering always that nothing will so readily make a man fall as the fear of falling.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> III.	No. 1  STANDING.	No. 3	To vault on the horse, resting on the knees.	<i>Ready.</i> <i>Vault.</i> <i>Down.</i>	As in first exercise. As in first exercise to the extension of the arms, except that the lower limbs should be brought straight up between the arms, resting on the saddle, on the front of the legs and knees. Elevate and advance the hands to the horizontal line, at the same time springing upward and forward with the lower limbs, and descend yielding.
N <sup>o</sup> IV.	No. 1  STANDING.	No. 4	To vault on the horse, resting on the feet.	<i>Ready.</i> <i>Vault.</i> <i>Down.</i>	As in first exercise. As in preceding exercise to the elevation of the lower limbs, except that the feet instead of the knees, are brought to the rest on the saddle. Spring straight to the front, and descend yielding.
N <sup>o</sup> V.	No. 1  STANDING.	No. 5	To vault on the horse with one hand.	<i>Ready.</i> <i>Vault.</i> <i>Down.</i>	As in first exercise. Raise the left hand and place it on the horse, as in first exercise. Bend the knees as in first exercise, and on the return extension, elevate the right leg, and pass it over the horse, at the same time rapidly elevating the right arm, the hand closed, and come to the seat in the saddle, as in second exercise. Incline the head and shoulders to the front, press strongly from the left hand, and descend as in second exercise.  This exercise to be repeated with the right hand.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  STANDING.	No. 6	To vault over the horse in two movements.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise.  (1.) As in first exercise to the extension of the arms.  (2.) Elevate both limbs in position to the right, pass them over the horse; advance the right hand; press from both hands, and descend yielding. This exercise to be repeated passing by the left.
N° II.	No. 1  STANDING.	No. 7	To vault over the horse in one movement.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise. As in first exercise to the extension of the arms, except that both limbs from the commencement of the return extension should ascend and clear the horse; after the advance of the right hand, press strongly from both, and descend yielding. This exercise to be repeated passing by the left.
N° V.	No. 1  STANDING.	No. 8	To vault over the horse between the hands.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise. As in third exercise to the elevation of the lower limbs, except that the feet should be shot through the space between the hands; descend yielding.
N° V.	No. 1  STANDING.	No. 9	To vault over the horse with one hand.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise. As in fifth exercise to the spring; retain the knees bent; press strongly with the left hand; elevate the right, and clear the horse; descend yielding, the back to the horse. This exercise to be repeated with the right hand.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 2  RUNNING.	No. 1	To vault on the horse.	<i>Ready.</i>	Position of attention, 15 or 20 paces from the horse.
				<i>Vault.</i>	Slowly begin the run, quickening the pace on the advance, and when within 2 or 3 feet of the horse spring from both feet, striking them full and flat upon the ground, the hands taking their place on the back of the horse immediately after the spring, and come to the seat in the saddle in one movement.
				<i>Down.</i>	As in first exercise, first series.  This exercise to be repeated on the left.
N° III.	No. 2  RUNNING.	No. 2	To vault on the horse, resting on the feet.	<i>Ready.</i>	As in first exercise.
				<i>Vault.</i>	As in first exercise to the spring; bring up both legs with the knees close bent up between the arms, and place the feet on the saddle (as in fourth exercise, first series), rising on the hands from the rest on the palms to the tips of the fingers; straighten the knees and stand upright in the saddle.
				<i>Down.</i>	Re-bend the knees, extend the arms to the front, spring from the saddle, and descend yielding, the back to the horse.
N° II.	No. 2  RUNNING.	No. 3	To vault over the horse.	<i>Ready.</i>	As in first exercise.
				<i>Vault.</i>	As in first exercise, quickening the space to the utmost speed before the spring; the action and position as in seventh exercise, first series.  This exercise to be repeated on the left.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2 RUNNING.	No. 4	To vault over the horse, by the back lift.	<i>Ready.</i> <i>Vault.</i>	As in first exercise. As in preceding exercise to the spring ; as the lower limbs ascend, depress the head and shoulders until the latter are as low as the hands, and let the lower limbs and column of the body rise perpendicularly over the right hand, as placed on the horse, the right side fronting ; press from the hands, and descend yielding, the left side to the horse.
N° V.	No. 2 RUNNING.	No. 5	To vault over the horse, between the hands.	<i>Ready.</i> <i>Vault.</i>	As in first exercise. As in second exercise, except that the knees are still more closely bent up, and the feet, instead of resting on the saddle, are shot through between the hands ; bending the back inwards, and pressing from the hands, as the feet clear the horse ; descend yielding.
N° V.	No. 2 RUNNING.	No. 6	To vault over the horse, with one hand.	<i>Ready.</i> <i>Vault.</i>	As in first exercise. As in first exercise to the spring, except that on approaching the horse, swerve slightly to the left, place the left hand on the horse, elevate the right, clear the horse, descend yielding.  This exercise to be repeated with the right hand.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position
N° III.	No. 3  BY THE CROUP.	No. 1	To vault to the croup.	<i>Ready.</i> <i>Vault.</i>  <i>Down.</i>	Position of attention, 15 or 20 paces from the horse. Slowly begin the run, quickening the pace on the advance, and when within 2 or 3 feet of the croup of the horse spring from both feet, immediately placing the hands at the distance, and advance 6 or 8 inches along the back of the horse; the lower limbs should be fully separated the instant after the spring, and slightly bent at the knees, the toes pointed to the front. On completing the rise, lightly sink to the rest on the croup. Incline the head and trunk to the horizontal line of the horse, elevate the lower limbs, shoot them straight to the rear, at the same time pressing from the hands, and descend yielding, facing the horse.
N° IV.	No. 3  BY THE CROUP.	No. 2	To vault to the saddle.	<i>Ready.</i> <i>Vault.</i>  <i>Down.</i>	As in first exercise. As in first exercise to the rise above the croup, immediately and still continuing the momentum of the spring, advance both hands to the saddle, and sink to the seat; placing the hands on the thighs, the head erect, the breast advanced. Place the hands and descend as in first exercise.
N° III.	No. 3  BY THE CROUP.	No. 3	To vault to the croup, resting on the knees.	<i>Ready.</i> <i>Vault.</i>  <i>Down.</i>	As in first exercise. As in preceding exercise to the spring; bend both knees well up, keep them together, and rise above the croup, resting on the front of the leg and knee. Incline the head and shoulders to the front; slowly elevate the lower limbs, and shoot them suddenly to the rear; springing from an angle of 45 degrees to the line of the horse, and descend yielding.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> IV.	No. 3  BY THE CROUP.	No. 4	To vault to the croup, resting on the feet.	<i>Ready.</i>  <i>Vault.</i>  <i>Down.</i>	As in first exercise.  As in first exercise to the spring; bend up both knees still more closely than in last exercise, and place the soles of the feet on the horse; rising from the palms to the tips of the fingers; straighten the knees, and stand upright on the croup.  Re-bend the knees; spring backwards, and descend yielding.
N <sup>o</sup> V.	No. 3  BY THE CROUP.	No. 5	To vault to the croup, the legs on the left.	<i>Ready.</i>  <i>Vault.</i>  <i>Down.</i>	As in first exercise.  As in first exercise to the spring; keep the knees slightly bent, but instead of separating them, throw them to the left during the rise to the croup; slowly sink to the seat on the croup.  Incline the head and shoulders to the front; elevate the lower limbs; pass them over the horse, extended and together, to the right side; press from the hands, and descend yielding.  This exercise to be repeated facing the right, descend on the left.
N <sup>o</sup> V.	No. 3  BY THE CROUP.	No. 6	To vault to the croup, the legs passing from the left to the right.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise.  As in preceding exercise to the rise above the croup, but, immediately on the advance of the right thigh to the left hand, lift the latter, and let the momentum of the forward spring carry the limbs forward and upward over the horse in front, descend yielding, on the right, facing the line of the horse.  This exercise to be repeated, descending on the left.



## SECTION III.

## ELEMENTARY EXERCISES.

As was stated in the introductory note explanatory of the system, there are two senses in which every exercise may be viewed; 1st, in its elementary sense, or the manner in which it tends to cultivate the body by increasing its dexterity and rapidity of action, its strength in the overcoming of resistance, and its power of enduring protracted exertion; 2nd, in its practical sense, or in the power to be acquired through its practice of overcoming obstacles similar in nature to the machine on which it is practised, which may be encountered in the performance of the active duties of the soldier.

It was in the same place pointed out that whatever tends to strengthen the soldier's frame, also tends directly to aid him in his professional duties, and that the performance of these duties will also in return tend to strengthen his frame, so that an absolute line of distinction between these two features cannot be drawn; but at the same time there is an extended series of exercises, which have for immediate object the culture of the physical powers, without direct reference to any professional application of the exercises themselves.

The section upon which we are entering is of this class; its exercises are essentially elementary; its object being to place in the hands of the instructor an ample range of exercises by which he will be able, in accordance with the law that the physical development of any part of the body shall be in relation to its activity, to reach any part that may be in special need, and bring it to the standard of the rest of the body, and also to cultivate the entire physical resources of the learner to their highest attainable point; and specially to give a full share of employment to the trunk and upper limbs. In a large portion of the exercises of this section the lower limbs act but a secondary part, the effort required being made chiefly by the trunk and the arms.

The apparatus of this section is the very heart of the gymnasium proper, indeed more than one of the machines (as the fixed parallel bars, the trapezium, &c.) is virtually a gymnasium in itself when in the hands of a skilful instructor; for there is scarcely a part of the body which its exercises do not reach; while there is scarcely any exercise in its extended range which may not be modified to meet the first essay of the weakest or most timid beginner, and yet, when executed in its perfect manner, is not capable of testing and increasing the strength and dexterity of the most practised gymnast. From their great variety and peculiarly interesting nature they are invariably favourites with learners in every stage of advancement.



## THE FIXED PARALLEL BARS.

This machine consists of two wooden bars, fixed parallel to each other at a height of three feet eight inches from the floor, and twenty inches apart inside, supported by wooden standards. The ordinary length of the bars is 10 feet, and the size 4 inches deep by 3 inches wide. The standards, two to each bar, should be 4 inches by 3 inches, and placed 6 feet 4 inches apart, so as to leave 18 inches of the bar projecting beyond them; they should run down about 2 feet into the ground, each pair resting on a transverse plate 5 inches by 5 inches, and 6 feet long, running along the bottom, with diagonal struts from it to the standards, to render the whole firm. The bars should be of the best yellow deal, planed smooth, and rubbed with sand paper, the top rounded to fit the hands, and the ends rounded. All the other wood should be oak, planed, and all the sharp edges above the ground taken off.

All exercises on this machine are performed between the bars, and all are virtually executed by the trunk and upper limbs, especially the former. They all begin with the body in the position given in the first exercise, with the feet lifted clear from the ground.

The exercises naturally divide themselves into three series:—The first comprises those which consist of *travelling* along the bars, following the natural shape and construction of the machine, to front or rear, single or double handed; the second, those of *oscillation* between the bars, in which the exercises may be said to consist of an evolution, more or less complicated, passing from front to rear, or vice versâ, between two points, of which the hand-grasp forms, as it were, the pivot or centre. This is a most valuable and attractive series, giving abundant and varied exercise to the entire column of the body, and to the arms whether bent or extended. The third series is a *combination* of these two, also valuable, as strongly addressing the trunk of the body.

Every exercise is here given in its perfect form, but with beginners of ordinary physical capacity, they may and should be approached through several stages of less difficulty. Thus, in those of the first series, the perfectly upright position of body, advanced breast, straight limbs, and erect head, may be departed from in the earlier stages of practice. Also, a free lateral inclination from hand to hand, and, in the front and rear exercises with both hands at once, a more energetic upright lift of the lower limbs, may be allowed.

The second series may be approached, first, by beginning with the feet between the uprights near the entrance to the bars, with or



without a spring as may be required; second, from the centre of the bars under the hands and from the ground direct, with or without a spring; third, as given in the text with the feet free from the ground, in position, the action coming from the loins, resting entirely on the hands. This machine is invaluable in a gymnasium civil or military, the exercises being not only numerous, but varied, interesting, and in themselves pleasurable, capable of much artistic effect, and showing equally muscular power and dexterity of action in trunk and limb. Again, there is no single exercise on this machine which requires violent or sudden effort; all the movements flow from one point to another, and the skill displayed in their execution and the advantage obtained from their practice lie in the certainty, steadiness, and regularity with which the complex action of the step is performed.

But in proportion to the value of this machine is the necessity for care and vigilance in its supervision. This is the case with all exercises where accuracy of movement is essential to completeness, but peculiarly so with the parallel bars, because the exercises of oscillation necessitate that the momentum shall be of the precise amount and in the precise direction required, for if less than that, the exercise is incomplete, and if more, the miscalculation almost necessitates a fall with the head or back downwards, and probably on the bars themselves. For this reason, this machine requires two instructors, one at each bar, with his hands grasping and meeting round the upper arm of the learner, and then injury from a fall is actually impossible, for the eye and hand of the instructor become so sure by practice that he perceives a loss of balance on the instant of its occurrence, and almost without an act of will his hand is advanced in the manner to prevent any evil consequence.

Another point demanding very careful observance is, that the learner shall never separate his legs while executing the exercises of the second series; they must be kept rigidly in position, and this principle must be firmly inculcated from the first day's lesson.

In the first series, the men should follow each other rapidly. There should never be less than three on the bars at once; but in the second and third series care must be taken that no one passes between the bars until the exercise of his predecessor is completed, and his hand has quitted the grasp of the bar; a kick from the foot during the oscillations of these exercises would be severe. With these precautions accidents should be impossible; without them it will be impossible to avoid them.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  TRAVELLING.	No. 1	The single march.	<i>Ready.</i> <i>March.</i>	Position of attention at the entrance to the bars. (1.) Raise the hands and place them on the bars, the thumbs inside, the fingers outside, extended, together, and pointed downwards. Press from the hands until the arms are completely extended, the head upright, the eyes directed to the front, the chest advanced, the shoulders square to the front, the column of the body upright and firm, the lower limbs straight and together, the feet together, and pointed to the ground. (2.) Rest on the left hand, advance the right 6 inches beyond it along the bar, advance the left 6 inches beyond the right.
N° II.	No. 1  TRAVELLING.	No. 2	The double march.	<i>Ready.</i> <i>March.</i>	As in first exercise. (1.) As in first exercise, except that the lower limbs are bent at the knee, and well drawn up under the body. (2.) Spring forward with both hands the distance of the step in first exercise.
N° II.	No. 1  TRAVELLING.	No. 3	The single march backwards.	<i>Ready.</i> <i>March.</i>	Position of attention, the back to the bars. (1.) As in first exercise. (2.) Advance the right hand, the left following on the left, as in first exercise.
N° II.	No. 1  TRAVELLING.	No. 4	The double march backwards.	<i>Ready.</i> <i>March.</i>	As in preceding exercise. (1.) As in second exercise. (2.) Spring backwards with both hands the distance of the step in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 2 OSCILLATING.	No. 1	To clear the bar by the front.	<i>Ready.</i>  <i>Up.</i>	<p>Position of attention at the centre of the bars.</p> <p>(1.) Raise the hands and place them on the bars opposite each other, the thumbs inside, the fingers outside, extended and pointed downwards. Press from the hands until the arms are completely extended, the feet together, the legs together, the trunk of the body upright, the chest advanced, the shoulders square to the front, the eyes directed to the front.</p> <p>(2.) Elevate the lower limbs in position, the toes pointed to the front, until they rise above the level of the bars, and pass them over the right bar; when clear of the bar, relax the extension of the limbs, press strongly from the left hand, spring to the ground, and descend yielding.</p> <p>This exercise to be repeated on the left.</p>
N <sup>o</sup> IV.	No. 2 OSCILLATING.	No. 2	To clear the bar by the rear.	<i>Ready.</i>  <i>Up.</i>	<p>As in preceding exercise.</p> <p>(1.) As in first exercise.</p> <p>(2.) Slowly incline the head and shoulders to the front, bending the arms; elevate the lower limbs, the toes pointed to the rear, until they rise above the level of the bars, and pass them over the right bar. (At this point the lower limbs, trunk, and head are in the horizontal line of the bars.) Press strongly from the left hand, spring to the ground, and descend yielding.</p> <p>This exercise to be repeated on the left.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 2  OSCILLATING.	No. 3	To rest on the right bar and clear the left in front.	<i>Ready.</i>  <i>Up.</i>	As in first exercise. (1.) As in first exercise. (2.) Press from the hands until the arms are completely extended, and at the same time elevate the lower limbs in position to the front to the level of the bars; relax the extension, and let them rest on the right bar. (3.) Press strongly with the hands, elevate the lower limbs in position above the bar, sweep them across both bars to the left front, and descend yielding. This exercise to be repeated on the left bar.
N <sup>o</sup> III.	No. 2  OSCILLATING.	No. 4	To rest on the right bar and clear the left by the rear.	<i>Ready.</i>  <i>Up.</i>	As in first exercise. (1.) As in first exercise. (2.) As in second exercise to the elevation above the bars; at this point relax the extension and rest on the right bar, the knees bent, the lower legs pendent. (3.) Incline the head and shoulders to the front, bend the arms until the shoulders are as low as the bars, the head between them, and at the same time elevate the lower limbs in position, sweep them across both bars to the left rear, and descend yielding. This exercise to be repeated on the left bar.
N <sup>o</sup> III.	No. 2  OSCILLATING.	No. 5	To rest on the right bar in front and clear it by the rear.	<i>Ready.</i>  <i>Up.</i>	As in first exercise. (1.) As in first exercise. (2.) As in third exercise to the elevation from the rest on the bar, but as the feet pass in their sweep to the rear, bring the column of the body with the lower limbs to the horizontal line of the bars, clear the right bar and descend yielding. This exercise to be repeated on the left bar.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 2  OSCILLATING.	No. 6	To rest on the right bar in the rear, and clear it in front.	<i>Read</i> .  <i>Up</i> .	As in first exercise.  (1.) As in first exercise.  (2.) As in second exercise to the elevation above the bars, relax the extension and come to the rest on the bar. Incline the head and shoulders to the front, re-elevate the lower limbs in position, clear the bar, and let them sweep to the front and clear the bar on the right, and descend yielding.  This exercise to be repeated on the left bar.  The same exercise also to be repeated with the following variations :—  (1.) In the sweep from the rear to the front from the rest on the right bar, clear the left in front; and  (2.) From the rest on the left bar, clear the right in front.
N° III.	No. 2  OSCILLATING.	No. 7	To rest on both bars in front, and clear the right in the rear.	<i>Ready</i> .  <i>Up</i> .	As in first exercise.  (1.) As in first exercise.  (2.) As in first exercise to the elevation above the bars; at this point, separate the lower limbs and let them fall to the rest on the bars, re-elevate them above the bars, coming to the position at the elevation, let them sweep to the rear and clear the right bar, and descend yielding.  This exercise to be repeated on the left bar.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2  OSCILLATING.	No. 8	To rest on both bars in the rear, and clear the right bar in front.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise.  (2.) As in second exercise to the elevation above the bars, separate the lower limbs, and let them fall to the rest on the bars. Incline the head and shoulders to the front, re-elevate the lower limbs and, as they sweep to the front in position, let them clear the right bar, and descend yielding.  This exercise to be repeated on the left bar.
N° IV.	No. 2  OSCILLATING.	No. 9	To pass by the rear by the single swing.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise.  (2.) Elevate the lower limbs in position until the feet are as high as the face; from this let them fall in a full sweep, and passing between the bars, rise to the rear until they are immediately above the head; during the latter half of this oscillation, let the arms slowly bend until the shoulders are as low as the bars, the head between them, slowly let the lower limbs with the entire column of the body in position incline, and gradually descend to the right until the feet come to the ground.  This exercise to be repeated on the left.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  OSCILLATING.	No. 10	To pass by the front by the double swing.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise.  (2.) As in preceding exercise to the elevation in front. Let the limbs fall in position, and, passing between the bars, ascend to the rear until they are above the head, the arms straight, the column of the body and the lower limbs slightly curved throughout their length; from this point return on the second oscillation and clear the right bar in front, and descend yielding.  This exercise to be repeated on the left bar.
N° IV.	No. 2  OSCILLATING.	No. 11	To rest in front and clear the bar in the rear by the single swing.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise to the elevation above the bars. Pass the lower limbs over the right bar, relax the extension, and let them rest on the bar, the knees bent, the fore-legs pendent.  (2.) Elevate the lower limbs in position above the bar, and, as in ninth exercise, complete the rearward oscillation, descending to the ground over the right bar.  This exercise to be repeated on the left bar.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  OSCILLATING.	No. 12	To rest on both bars, and clear the single bar in front with the double swing.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise.  (2.) As in preceding exercise to the rest on the bar; continue the rearward oscillation to its culminating point, the column of the body and the lower limbs in the position of tenth exercise. Complete the double oscillation, clear the right bar, and descend yielding.  This exercise to be repeated on the left bar.
N° IV.	No. 2  OSCILLATING.	No. 13	To rest on both bars in front, and clear the single bar in the rear with the single swing.	<i>Ready.</i>  <i>Up.</i>	As in first exercise.  (1.) As in first exercise.  (2.) As in preceding exercise to the elevation above the bars; separate the lower limbs and come to the rest, one on each bar. Press strongly with the hands, re-elevate the lower limbs above the bars, and as they sweep to the rear incline the head and shoulders to the front, bending the arms as in second exercise; clear the right bar, and descend yielding.  This exercise to be repeated, clearing the left bar.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 3  COMBINATIONS.	No. 12	The double march forwards and rest on both bars.	<i>Ready. Up.</i>	As in first exercise. (1.) As in second exercise, first series. (2.) Elevate the lower limbs above the bars, separate them, and let them fall to the rest on the bars, incline the head and trunk to the front, re-grasp the bars in advance of the thighs, re-elevate the lower limbs, let them sweep to the front and again come to the rest on both bars. On the last sweep, clear the right bar and descend yielding.
N° V.	No. 3  COMBINATIONS.	No. 3	The single march backwards and rest on the single bar.	<i>Ready. Up.</i>	As in first exercise. (1.) As in third exercise, first series. (2.) As in fourth exercise, second series, to the rest on the bar, pass both hands behind the thighs, and re-grasp the bars, re-elevate the lower limbs, and as they pass to the rear, incline the head and trunk to the front and come to the rest on the bars. On the last step, clear the bar and descend yielding.
N° V.	No. 3  COMBINATIONS.	No. 4	The double march backwards and rest on the double bars.	<i>Ready. Up.</i>	As in first exercise. (1.) As in fourth exercise, first series. (2.) As in eighth exercise, second series, to the rest on the bars, pass both hands behind the thighs, and re-grasp the bars, re-elevate the lower limbs, and as they pass to the rear, incline the head and trunk to the front, the arms bent until the shoulders touch the bars, the head between them, the lower limbs together and straight, rising in a perpendicular line above the head, and the toes pointed upwards; slowly separate them, relax the extension and come to the rest on the bars. On the last step, clear the right bar and descend yielding.



## THE MOVEABLE PARALLEL BARS.

This machine should be constructed in the following manner. Each of the four standards required must be formed with two pieces of oak, 6 inches by 3 inches, fixed so as to leave a space of  $1\frac{3}{4}$  inches between them for the ends of the bar to run in, each standard measuring, when fixed, 6 inches by  $7\frac{3}{4}$  inches. Longitudinally the standards require to be about 7 feet 3 inches apart, and transversely 15 inches apart, which latter will give a distance of 22 inches from centre to centre of the bars. The height of the standards should be about 6 feet 6 inches, and they should penetrate 3 feet or 4 feet into the ground, and be well bedded round with brickwork or concrete, to render them firm. Circular holes,  $\frac{3}{4}$ -inch in diameter and 3 inches apart, must be bored through the standards for the pins, commencing at 2 feet from the ground and reaching to the top, care being taken to have them on exactly the same level in all the standards. The bars should be of ash (selected particularly for its straightness and toughness), worked perfectly round between the standards,  $2\frac{1}{4}$  inches in diameter, but brought to a square 3 inches by  $2\frac{1}{2}$  inches just before reaching them, which is again reduced to 3 inches by  $1\frac{1}{2}$  inches for the part working up and down in the standards. A strong iron pin is required at each end of each bar (to fit into the holes in the standards) for the bar to rest on at any elevation that may be required. The bars should be brought to the smoothest possible surface, and all the sharp edges of the standards should be rounded.

The exercises on this machine are as numerous as those on the fixed bars, but of a somewhat inferior order, although useful and interesting. They address themselves much more directly to the upper limbs, giving power and security to the grasp, and certainty and facility of action to the hand and arm. They divide themselves into three series, the first consisting of exercises executed *above the bars*, when low; the second, of those *under the bars*, when elevated to the reach of the hands, with or without oscillation; and the third, of those *rising between* the bars. The first is chiefly directed to the lower limbs; the second to the upper limbs alone; and the third to both. The first series may be performed also on the fixed bars, but as its exercises can be intensified or modified by the elevation or depression of the bars, they properly belong to this machine.

The position of the instructor should be on the right or left front of the learner.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No. II.	No. 1 OVER THE BARS.	No. 4	To clear the bars, resting on the first.	<i>Ready.</i> <i>Vault.</i>	Position of attention facing the bars.  (1.) Raise both hands and grasp the first bar, the hands together, the fingers and thumbs together, the feet immediately under the hands.  (2.) Spring from the ground and rest with both feet on the first bar.  (3.) Press strongly from both hands and feet, clear the second bar, and descend yielding.  This exercise to be repeated on the left.
N° II.	No. 1 OVER THE BARS.	No. 2	To clear the bars, resting on the second.	<i>Ready.</i> <i>Vault.</i>	As in first exercise.  (1.) As in first exercise.  (2.) Spring from the ground, clear the first bar, with the lower limbs in position, and rest with both feet on the second bar.  (3.) Press strongly from both hands and feet and descend yielding.  This exercise to be repeated on the left.
N° III.	No. 1 OVER THE BARS.	No. 3	To clear the bars in one movement.	<i>Ready.</i> <i>Vault.</i>	As in first exercise.  (1.) As in first exercise. (2.) Press from both hands and feet simultaneously, throw the lower limbs to the right, clear both bars and descend yielding.  This exercise to be repeated on the left.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 1  OVER THE BARS.	No. 4	To clear the first bar by the rear and the second by the front.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise.  (1.) As in first exercise.  (2.) Spring from the ground, throw the lower limbs to the right, and clear the first bar, and at the instant of their elevation above the first bar, pass the right hand over to the second; let the lower limbs continue their fall between the bars and ascend in front, clear the second bar and descend yielding. This exercise to be repeated on the left.
N° IV.	No. 1  OVER THE BARS.	No. 5	To clear both bars separately by the rear.	<i>Ready.</i>  <i>Vault.</i>	As in first exercise.  (1.) As in first exercise.  (2.) As in preceding exercise to the front elevation; from this point, let the lower limbs fall between the bars, return to the rear, clear the second bar and descend yielding.  This exercise to be repeated on the left.
N° II.	No. 2  UNDER THE BARS.	No. 1	To pass from the first to the second bar, the right hand leading	<i>Ready.</i>  <i>Change.</i>	Position of attention facing the bars.  (1.) Raise both hands and grasp the first bar, sink to the full extension of the arms, bend the lower limbs, the knees in a line with the body, the feet behind, the head bent back, the eyes directed to the reach of the hands.  (2.) Sustain the body in position, advance the right hand and grasp the second bar, the left following; retake the grasp of the first bar with the left hand, the right following, replace the feet on the ground and rise to the first position. This exercise to be repeated with the left hand leading.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 2  UNDER THE BARS.	No. 2	To pass from the first to the second bar, changing front.	<i>Ready.</i> <i>Change.</i>	As in first exercise. (1.) As in first exercise. (2.) As in preceding exercise to the step with the left hand, quit the grasp with the right, swing on the left, pass under the bar, advance the right hand the distance beyond the left and grasp the bar, changing front; change front with the left, re-taking the grasp at the same part of the bar, advance the right hand again to the first bar, the left following, re-change the front, replace the feet on the ground and rise to the first position.
N° III.	No. 2  UNDER THE BARS.	No. 3	To pass from the first to the second bar, both hands at once.	<i>Ready.</i> <i>Change.</i>	As in first exercise. (1.) As in first exercise. (2.) As in first exercise, except that in lifting the feet from the ground, press slightly from the rear, causing a forward oscillation; augment the rearward return by the action of the loins, and on the forward return, as the feet come under the bar, quit the grasp with both hands and spring to the second bar; govern the forward oscillation and on the rearward return spring backwards to the first bar, replace the feet on the ground and rise to the first position.
N° IV.	No. 2  UNDER THE BARS.	No. 4	To pass from the first to the second bar, both hands at once, changing front.	<i>Ready.</i> <i>Change.</i>	As in first exercise. (1.) As in first exercise. (2.) As in preceding exercise to the spring to the second bar; govern the forward and rearward oscillation, and on the return forward, change front with both hands at once; renew the oscillation by the action of the loins, spring again to the first bar, again change front, replace the feet on the ground, and rise to the first position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 3	No. 1		<i>Ready.</i>	Position of attention at the centre of the bars.
	TO RISE BETWEEN THE BARS.		To rest on the single bar.	<i>Up.</i>	(1.) Raise both hands and grasp the bars, the thumbs and fingers meeting.  (2.) Lift both feet from the ground, and pass them over the left bar, resting on it under the knees, the head and shoulders bent back, the trunk of the body sustained; quit the grasp of the left hand, re-take it above the bar on the inside, at the same time elevating the elbow, the fore arm resting on the bar, press from both hands to the full extension of the arms, and rise seated on the bar.
				<i>Down.</i>	Reverse the grasp of the left hand, pass the right over to the left bar, grasping it near to, but beyond the left; rest strongly upon both hands, bring the face fronting the bar, slowly descend until the feet reach the ground, and quit the grasp of the hands.  This exercise to be repeated on the right.
N° II.	No. 3	No. 2		<i>Ready.</i>	As in first exercise.
	TO RISE BETWEEN THE BARS.		To rest on the double bars.	<i>Up.</i>	(1.) As in first exercise.  (2.) Lift both feet from the ground and pass them by the front over the bars, right and left. Change and retake the grasp of the hands as in first exercise, and rise seated on the bars.
				<i>Down.</i>	Pass the right leg over to the left bar, coming to the rest as in first exercise. The other movements of the descent as in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 3 TO RISE BETWEEN THE BARS.	No. 3	To rise between the bars and rest on the single bar.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Spring from the ground until the shoulders are above the bars; bring the closed hands up to the breasts, spreading out the folded arms horizontally, and by these rest on the bars. (3.) Elevate the lower limbs and pass them over the left bar, as in first exercise. Re-take the grasp of the hands, and complete the movements of the descent as in first exercise. This exercise to be repeated resting on the right bar.
N° III.	No. 3 TO RISE BETWEEN THE BARS.	No. 4	To rise between the bars and rest on both.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Lift the lower limbs and pass them over the bars as in second exercise, re-take the grasp of the hands, and rise seated on the bars. Rest strongly on the hands, raise the lower limbs to the front, pass them over the bars, and bring them slowly to the vertical line between the bars, the knees straight, the feet together and pointed to the ground, the column of the body upright, the head erect, the eyes directed to the front; quit the grasp of the hands, bring the arms closely by the side, descend yielding.
N° IV.	No. 3 TO RISE BETWEEN THE BARS.	No. 5	To rise by the first bar and descend by the second.	<i>Ready.</i> <i>Up.</i>	Position of attention facing the bars. (1.) Raise both hands and grasp the first bar, the fingers and thumbs together. (2.) Lift both feet from the ground, and pass them over the second bar, resting on it under the knees, the fore-legs pendent, the trunk of the body sustained, the head bent back; quit the grasp of the right hand, bring the arm between the bars and stretch it along the surface of the right bar; grasp it with the hand, the fingers spread and meeting with the thumb, at the same time passing the



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	head and shoulders under and rearing them above the bar, the left hand following. Gradually bring the hands together behind the back, extending the arms, and rise, seated on the second bar. Pass the righthand over to the second bar, reverse the grasp of both hands, elongate the trunk and lower limbs, setting the body free from the bar and resting, sustained by the grasp of the hands, in a vertical line in front of the bar. Gradually contract the arms, sink beneath the bar, and lower the feet to the ground.

### THE TRAPEZIUM.

The trapezium consists of a turned ash bar,  $1\frac{1}{2}$  inches in diameter, perfectly smooth, and suspended by a rope at each end from a tie-beam or other convenient point of attachment. It should be 4 feet 6 inches from the floor, the ropes passing round the bar, and spliced immediately above it; a knob should be turned on each end of the bar to keep the ropes in position, and a small rim on the inside of the space occupied by the rope for the same purpose. The distance apart on the bar of the points of suspension should be about 2 feet 2 inches, while the upper points should be placed rather nearer together.

In importance this machine ranks with the fixed parallel bars, not so much on account of the number of its exercises as from their artistic character, and the power which they possess of testing and increasing the capacity of the learner as regards the trunk and upper limbs.

Every exercise on this machine consists of one or more evolutions of less or greater difficulty, of which the hand-grasp on the rope or the bar, or on both, forms the centre, the entire weight and force of the body being sustained by it. They all terminate on the spot and in the position in which they begin.

The exercises on this machine divide themselves into two series,—in those of the first, the *ropes* are grasped by either one or both hands; in those of the second, the ropes are carefully avoided and the grasp of the hands is on the *bar* alone.

From these two series a third is formed, consisting of certain of the exercises of each executed in *combination*; in one of these



combinations, the entire second series can be executed without pause.

The whole of the exercises of the first series may be called double exercises, consisting of one evolution in ascending, and another in descending; those of the second series, with the exception of the last, are all complete circles in given positions.

All these exercises may be practised by beginners, the form of each, given in the text, being the perfect one, but capable of modification for initiatory practice. Thus, in introducing a beginner to the first exercise, instead of grasping the rope a hand's breadth above the bar, he may grasp it a foot or even more above the bar, the left hand following close under the right, and then day by day the space between the hands and the bar should be reduced, until these are placed as directed in the text. The same course may be followed literally in the second exercise. In the third and fourth, the initiatory practice may be accompanied by a spring from the ground, which should be gradually lessened until the effort falls entirely upon the upper limbs, as indicated in the text. In the fifth the limbs should be supported and guided by the instructor, this support being gradually withdrawn, until the learner can execute the movements without help.

The exercises of the second series are all arduous, but also admit of gradual approach. In the first, a slight spring may be taken, and both arms and legs allowed to remain bent; the spring may then be dispensed with; next, the legs may remain bent at the commencement, and be extended during the rise; to be followed by the straight leg and bent arm, leading direct to the perfect exercise. In the second exercise the gradations by which it may be approached are less marked; it may be viewed as commencing where the second exercise in the first series terminates, and there is no intermediate practice; nothing but perseverance against repeated failures will overcome the difficulty, for the position is not such as will admit of direct help from the instructor, and all that can be given in this exercise must be but the steadying of the limbs, enabling the learner to hold his own. The fourth and fifth exercises have no gradations on this machine, but may be approached here by practice on others, where, on account of such machines being fixed and firm, they are less difficult. The sixth may be approached by practice on a machine that turns with the hand, such as the Pair of Rings. The seventh is always found to be one of the most difficult on this machine, and requires the greatest care in its execution; the pause in the horizontal line should never exceed a few seconds. The variation of this exercise sometimes performed of passing from the horizontal line over the bar, in position, should never be allowed, as it is in the highest degree dangerous, and likely to cause internal injury.

The best grasp for the instructor in directing the evolutions on the trapezium is a strong hold of the wrist with the left hand, the right firmly grasping the leg of the trousers at the ankle.

The position of the instructor should be on the right or left of the machine, facing the learner.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  BY THE ROPES.	No. 1	To rise above the bar by the single rope.	<i>Ready.</i>  <i>Up.</i>  <i>Down.</i>	Position of attention, the trapezium in profile on the left.  (1.) Raise the right hand and grasp the rope, a hand's breadth above the bar, the left following in the interspace.  (2.) Lift both feet from the ground, and passing them over the bar elevate the body until the hip rests on its surface; press the hands downwards and rise seated on the bar, retaining the grasp of the rope.  Lean slowly backwards until the head and trunk are on a level with the bar, remove from it the lower limbs and come to the first position.  This exercise to be repeated with the trapezium on the right.
N° II.	No. 1  BY THE ROPES.	No. 2	To rise above the bar by both ropes.	<i>Ready.</i>  <i>Up.</i>  <i>Down.</i>	Position of attention facing the trapezium.  (1.) Raise both hands and grasp the ropes, one in each hand, close to the bar.  (2.) Lift both feet from the ground, pass them under the bar between the hands, and by a continuous movement arch the back inwards and extend the lower limbs upwards until the hips are as high as the bar; slowly let the feet descend to the front and at the same time and at the same pace let the head, shoulders, and trunk ascend, and come to the seat on the bar; during this last movement let the chin be elevated, the shoulders pressed back, and the breast advanced square to the front.  Reverse the action of the first movement, let the lower limbs fall to the rear, repass them under the bar, and come to the first position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  BY THE ROPES.	No. 3	To rise above the bar by the back lift.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in preceding exercise. (1.) Raise the right hand to the reach and grasp the rope, raise the left hand and grasp the bar at its centre. (2.) Lift both feet from the ground, and by the flexion of the right arm and the extension of the left, rise until the face is as high as the right hand, the left arm straight above the hand grasping the bar. Turn the back to the bar and sit in the space between the left hand and the right rope. Return the face to the bar and lower the feet to the ground. This exercise to be repeated with the left hand on the rope.
N° III.	No. 1  BY THE ROPES.	No. 4	To rise above the bar by the front lift.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in second exercise. (1.) As in preceding exercise. (2.) Lift the feet from the ground and rise by the flexion and extension of the arms, as in preceding exercise; raise the lower limbs and pass them over the bar through the space between the left hand and right rope and come to the seat on the bar. Withdraw the feet through the interspace and lower them to the ground. This exercise to be repeated with the left hand on the rope.
N° III.	No. 1  BY THE ROPES.	No. 5	To turn round the ropes right and left.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in second exercise. (1.) As in preceding exercise to the seat on the bar. (2.) Raise the left hand and grasp the rope close above the right, slip the right down to the bar and grasp it, the thumb to the front, the fingers to the rear. By the extension of the right arm and the flexion of the left, rise from the bar, pass round the rope, and return to the seat. (3.) Repeat the movement on the left, reversing the respective positions of the hands. As in preceding exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  BY THE BAR.	No. 1	To turn round the bar, forwards.	<i>Ready.</i>  <i>Up.</i>	Position of attention facing the trapezium. (1.) Raise both hands and grasp the bar, the hands at the distance, the backs of the hands upwards, the thumbs and fingers meeting; extend the lower limbs to the front under the bar, the knees straight and together, the feet together with the toes pointed to the front, and at the same time sink to the reach of the hands. (2.) Lift the feet from the ground, the arms remaining at the reach of the hands until the feet are as high as the bar; bend the arms, and at the same time elevate the body until the waist is as high the bar; complete the circle, revolving on the waist round the bar, and come to the first position.
N° IV.	No. 2  BY THE BAR.	No. 2	To turn round the bar, backwards.	<i>Ready.</i> <i>Up.</i>	As in first exercise. (1.) As in first exercise. (2.) Lift the feet from the ground and pass them under the bar between the hands, straighten the lower limbs and elongate the trunk until the waist is as high as the bar; let the lower half of the body slowly fall to the front, and as it descends, let the upper half ascend; lower the feet to the ground and relinquish the grasp of the hands.
N° IV.	No. 2  BY THE BAR.	No. 3	To turn round the bar, backwards, and return.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) As in preceding exercise until the feet touch the ground, but instead of relinquishing the grasp, press from the hands, bending the back inwards, and rise to the seat on the bar. Slowly let the head and shoulders fall to the rear, repass the feet under the bar and return to the first position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2 BY THE BAR.	No. 4	To rise above the bar, right and left.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Lift both feet from the ground, bend the arms until the breast is as high as the bar, press strongly with the right hand upon the bar and raise the forearm vertically above it; repeat the movement with the left hand, complete the extension of both, and come to the upright position, resting on the bar. Re-bend the right arm, the left following, descend below the bar, and come to the first position.
N° V.	No. 2 BY THE BAR.	No. 5	To rise above the bar, both hands at once.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Lift both feet from the ground, bend the arms until the hands are as high as the bar, press strongly upon the bar with both hands at once and rise above it, complete the extension of the arms, and come to the upright position, resting on the bar. This series of movements to be executed without pause. Re-bend the arms, descend below the bar, and come to the first position.
N° V.	No. 2 BY THE BAR.	No. 6	To turn under the bar, on one hand.	<i>Ready.</i> <i>Up.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the feet between the hands under the bar, and let them descend close to the ground, but without touching it; quit the grasp of the left hand, at the same time fold the lower limbs under the body, and, swinging by the right, make a complete turn laterally and come to the front; re-grasp the bar with the left hand, re-pass the feet under it, quit the grasp of the right hand, swinging round on the left, again grasp the bar, and come to the first position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° V.	No. 2 BY THE BAR.	No. 7.	To form the straight line under the bar.	<i>Ready.</i> <i>Up.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass both feet under the bar between the hands, shoot them straight to the rear, and pause, forming a perfectly horizontal line from head to foot, suspended by the arms under the bar. Relax the extension, re-pass the feet under the bar, and come to the first position.
N° V.	No. 3	No. 1	The titles as in separate exercises.	The words of command as in separate exercises.	The first and third exercises of the second series.
N° V	No. 2	The first, third, and sixth exercises of the second series.			
N° V	No. 3	The first, third, and fourth or fifth exercises of the second series.			
N° V.	No. 4	The first, third, fourth or fifth, and sixth exercises of the second series.			
N° V.	No. 5	The first, third, fourth or fifth, sixth, and seventh exercises of the second series.			



## THE PAIR OF RINGS.

This machine consists of a pair of iron rings, 5 inches in internal diameter, suspended by ropes at a height of 5 feet 9 inches from the floor, and 18 inches apart; the rings should be covered with buckskin leather, and the ropes neatly spliced round them.

This machine is similar in character to the trapezium, giving a wide course of exercises, passing from the most simple to the most arduous. Like the exercises of the trapezium, they powerfully address themselves to the trunk, especially its upper region, and to the arms. They all terminate on the spot, and in the position in which they begin. They also may be divided into two series, although these are not so clearly defined as those of the first-named machine; the first series comprises all exercises of *evolution*, single or double, with arms bent or straight; the second, all those *rising to, or above* the rings.

With this machine also, the exercises are all given in the text in their perfect form, and allow of gradual approach through less difficult movements and positions. The first and second may be begun not only while standing upright and with the arms bent, but a spring may be taken with the feet to assist in the elevation of the lower limbs, and the knees may remain bent both in the ascent and descent, to front and rear; these modifications of the exercise being gradually relinquished as the body acquires strength, until it can be executed in its perfect form. The first part of the third exercise may be similarly modified, but its distinguishing feature, that of turning the body while the feet remain in the rings, must always be executed slowly, the back sinking gradually, with every joint of the spine sharing equally in the depression, and the chest gradually rounding and expanding under the same influence.

In the second series, the first, second, and third exercises lead direct to each other, and these may be modified, first, by being begun from the erect standing position, and next, from the kneeling position.

The last exercise is very difficult, and the same care and restrictions which are directed for the corresponding one on the trapezium are necessary here.

In all evolutions on this machine the instructor should grasp the right wrist of the learner with his right hand, and as soon as the feet have passed the rings, he should with his left govern the lower limbs in their descent. While the body is turning with the feet in the rings, the instructor should pass his left arm under the waist of the learner to limit the extent of its descent, always retaining his grasp of the wrist with his right. In the turn with the hands (right and left) the instructor should grasp the right wrist of the learner, and gradually lower him until his entire weight is on the left, and *vice versá*, always grasping the hand that is to relinquish the hold of the ring.

The position of the instructor should be the same as with the trapezium.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1 EVOLUTIONS.	No. 1	The single circle.	<i>Ready. Up.</i>	Position of attention between the rings. (1.) Raise both hands and grasp the rings, one in each hand, pass both feet to the front, and lower the body to the reach of the hands, the legs together, the knees straight, the feet together and pointed to the front. (2.) Lift both feet from the ground, and pass them between the rings, the arms and legs straight throughout; slowly descend to the ground, completing the circle, and relinquish the grasp.
N° II.	No. 1 EVOLUTIONS.	No. 2	The double circle.	<i>Ready. Up.</i>	As in first exercise. As in first exercise to its completion, but instead of relinquishing the grasp of the hands, return between the rings, and come to the first position.
N° II.	No. 1 EVOLUTIONS.	No. 3	To turn with the feet in the rings.	<i>Ready. Up.</i>	As in first exercise. (1.) As in first exercise to the half circle (the feet as high as the rings), separate the feet, right and left, and insert each in its respective ring. (2.) Resume the action of the circle, slowly separating the knees, lowering the back, and raising the head. (3.) Re-raise the trunk to its vertical position at the half circle, remove the feet from the rings, let them gradually descend to the front, and come to the first position.
N° III.	No. 1 EVOLUTIONS.	No. 4	To turn with one hand, right and left.	<i>Ready. Up.</i>	As in first exercise. (1.) As in first exercise to its completion, but instead of relinquishing the grasp with both hands, retain the grasp of the right, at the same time folding the lower limbs under the body. (2.) Make a complete turn laterally, re-take the grasp with the left hand, again extend the limbs to the front and again pass them between the rings; repeat the turn, retaining the grasp of the left hand, re-grasp the ring with the right, and come to the position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2 RISING BETWEEN THE RINGS.	No. 1	To extend the arms, right and left.	<i>Ready.</i> <i>Up.</i>	Position of attention between the rings. (1.) Raise both hands and grasp the rings, pass both feet to the front, and lower the body to the reach of the hands. (2.) Bend the arms until the hands are at the rest, sustain the body on the left hand, and extend the right, holding the ring to the full length of the arm; return it to the rest, repeat the extension with the left hand, return it to the rest, and come to the position.
N° IV.	No. 2 RISING BETWEEN THE RINGS.	No. 2	To rise above the rings, right and left.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise until the hands are at the rest. (2.) Press strongly on the ring with the right hand, and raise the fore-arm vertically above the ring, repeat the movement on the left, straighten the arms completely and pause above the rings. Re-bend the right arm, the left following, repass the right below the ring, the left following, and come to the position.
N° IV.	No. 2 RISING BETWEEN THE RINGS.	No. 3	To rise between the rings, both hands at once.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. As in first exercise until the hands are at the rest, instantly press strongly on the rings with both hands, and rise above the rings to the full extension of the arms, the transition from the bent to the extended position of the arms taking place without pause. Re-bend the arms and come to the position.
N° V.	No. 2 RISING BETWEEN THE RINGS.	No. 4	To form the straight line between the rings.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in first exercise. As in first exercise, first series, to the half circle, but, instead of lowering the feet to the ground, rapidly extend them, to the rear until the lower limbs and trunk form one perfect horizontal line. Relax the extension, let the feet descend to the rear, and come to the position.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 3.	No. 1	The titles as in separate exercises.	The words of command as in separate exercises.	The first and fourth exercises of first series.
N° III.		No. 2			The second and third exercises of first series.
N° III.	COMBINATIONS.	No. 3			The first, fourth, and third exercises of first series.
N° V.		No. 4			The second exercise of first series and the fourth of second series.
N° V.		No. 5			The second exercise of first series, the second or third, and fourth of second series.

### THE ROW OF RINGS.

This apparatus consists of a row of single rings, prepared and fixed in every way in the manner described for the pair of rings, but suspended 6 feet 3 inches from the floor, at intervals of not less than 7 feet and not more than 8 feet 6 inches, the distance depending to some extent on the points of attachment which can be obtained. There should not be less than 5 or 6 of these rings, and there may, with advantage, be a greater number, if the length of the gymnasium will admit of it. They are most conveniently arranged at the side of the horizontal ladder elsewhere described, at a distance of about two feet from it.

The single exercise on this machine is a very simple one, and if the proper elevation of the rings from the floor be preserved, it may be safely practised without supervision, or at most with that of a monitor. It is not the less valuable on this account, but, on the contrary, it has a special object which it shares with the exercises of the next machine, viz., the equalization in strength and development of the two sides of the upper half of the body, and of the arms; for it necessitates that only one side can work at a time, and



that the amount of exertion will be the same for each side, and that therefore the weaker side will actually do more, being the weaker, and consequently, by the unerring law of development being in relation to activity, it will in time overtake and rank with its fellow in development and capacity.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	Single series.	Single exercise.		<p><i>Ready.</i></p> <p><i>Swing.</i></p> <p><i>Halt.</i></p> <p><i>Down.</i></p>	<p>Position of attention, facing the first ring, the back to the row.</p> <p>Raise the right hand and grasp the ring, advance three short and rapid steps, and, springing from the ground from the left foot, turn to the right; on approaching the second ring extend the left hand and grasp it, and, while retaining it lightly in the hand, return to the farthest point of the backward oscillation on the ring grasped by the right; at this point, quit the grasp of the right, withdrawing the hand lightly and leaving the ring perfectly motionless, turn to the left and bring the right hand in full sweep round by the thigh (describing a half-circle in the sweep), and, extending it to the front, grasp the next ring.</p> <p>During the whole of this exercise the head should be erect, the breast advanced, the column of the body upright, and the legs bent at the knee.</p> <p>Complete the step, retaining a ring in each hand.</p> <p>Softly place the feet on the ground, relinquish the grasp of the hands, leaving the rings motionless.</p>

THE ELASTIC LADDER.

This machine is a ladder formed with rope sides (of the sort known as "hard laid") and wooden spars, fixed horizontally at a height of 8 feet 6 inches from the floor; its length depending on the size of the gymnasium. The ladder should terminate about 5 feet from the end walls, and the best method of fastening it and straining and adjusting it from time to time is by pulleys and ropes, running from the termination of the ladder to a very strong iron hook built into the wall. The



pulleys should be of gun metal, and should be made specially strong for the purpose. Wrought-iron stays, formed of bar iron,  $1\frac{1}{2}$  inches by  $\frac{3}{8}$ ths of an inch, should be placed over the ladder at intervals of about 10 feet, crossed in the shape of an X, the width of the ladder apart at the bottom, and not less than 3 feet at the top, according to the height of the tie-beam or other point to which they are attached, the lower ends finishing in hooks, clasping the rope sides, but at the same time allowing them to play when the ladder is being strained. The width of the ladder between the ropes should be 15 inches; the rounds or spars should be of rent ash, turned  $1\frac{1}{8}$ th inches in diameter, projecting about  $1\frac{1}{4}$  inches beyond the rope on each side and 9 inches apart. They should be laid on the top of the ropes (the portion of spar immediately over them being cut square), and bound down very strongly by means of string and small cast-iron clips, made to fit over the square part of the spars and running a short distance along the rope, on each side of the spar.

Instead of the hempen rope the sides of the ladder may be of Newall's patent galvanized iron rope,  $\frac{7}{8}$ th inch diameter or more, according to the length of the ladder. This has the advantage of not stretching so much as the hemp, and therefore requires less frequent straining. It also admits of a simpler method of fixing the ladders, viz., by a  $1\frac{1}{2}$  inch diameter iron rod, with a strong hook at one end, clasping the last round of the ladder (which should in any case be of iron) in the centre, and running from thence through the end wall, and terminating in a large nut and screw and strong S irons on the wall. The ladder may then be easily adjusted and strained when required, from the outside, by turning the nut-head with a spanner.

The exercises on this machine resemble in character that on the row of rings, and have the same object, *i.e.*, the equalization of the arms and upper part of the body; they are two in number, the second being but a more advanced and dexterous mode of performing the first. They are several degrees more difficult than that on the row of rings, the machine being firm, and the whole weight of the fall in the oscillation coming upon the sustaining hand; and as the arm is retained perfectly straight, the shoulder, with the connecting muscular and ligamentary attachments, are strongly tried at this extension, especially in the early stages of the practice, when the oscillation is less perfectly regulated. They are, however, always favourites, and when the ladder is well arranged and perfectly secure in its vertical straps and horizontal fastenings, and a squad of men pass along it, each taking the spar as it is relinquished by his predecessor, there is no more effective exercise in the gymnasium.

Short distances, consisting of a few spars only, should be attempted at first, and with beginners only one should be passed along the ladder at a time, the instructor walking by his side, giving directions and explanations as each step is made.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise	Word of Command.	Action and Position.
N° III.	Single Series.	No. 1	The single step.	<p><i>Ready.</i></p> <p><i>March.</i></p> <p><i>Halt.</i></p> <p><i>Down.</i></p>	<p>Position of attention under the ladder, facing the upright.</p> <p>(1.) Ascend by the upright and with the right hand grasp the first spar, the fingers and thumb meeting, the palm facing the range of the ladder; face to the left, lean forward, advance the left hand to the reach and grasp the nearest spar.</p> <p>(2.) Lift both feet from the upright, and in their fall let them swing as far as the advanced hand, the head erect, the whole column of the body upright, the legs straight and together, with the toes pointed to the ground. On the return oscillation (and as the feet approach the upright) quit the grasp with the right hand and bring it in full sweep round by the thigh, extend it to the reach and grasp the nearest spar.</p> <p>Complete the step.</p> <p>Point the toes to the ground, relinquish the grasp of the hands, and descend yielding.</p>
N° V.	Single Series.	No. 2.	The double step.	<p><i>Ready.</i></p> <p><i>March.</i></p> <p><i>Halt.</i></p> <p><i>Down.</i></p>	<p>As in preceding exercise.</p> <p>(1.) As in preceding exercise.</p> <p>(2.) As in preceding exercise to the forward oscillation, but, instead of retaining the grasp of the left hand while the right passes to another spar, quit the grasp with the left, thus allowing the forward oscillation to enable the right hand to grasp a spar in advance of that which it could have grasped had the left retained its hold; the exercise thus consisting of a succession of leaps without pause, only one hand being on the ladder at one time, and towards the terminating movement of each step, both hands being free.</p> <p>Retain the grasp with both hands.</p> <p>As in preceding exercise.</p>



## THE HORIZONTAL BAR.

This machine is a round iron rod or bar,  $1\frac{1}{2}$  inches in diameter, and it may be hollow for the sake of lightness. It should be suspended at a height of about 8 feet from the ground by iron rods, with eyes at the ends, encircling the bar and holding it perfectly firm. The upper ends of the supporting rods should be spread out, or otherwise prepared, according to the nature of the attachment, to guard against any lateral oscillation of the bar; this may be accomplished also, where circumstances render it convenient, by the supporting rods being double, clasping the bar and spreading out towards the top in the shape of a V. The bar should finish, where practicable, by running through a wall with a nut and screw at each end.

The exercises on this machine are very valuable, for two distinct reasons; first, from their own intrinsic value; second, from the circumstance that they are capable of being executed by an entire squad of men at the same time, all obeying the same word of command. They naturally divide themselves into two series, the first consisting of all those *on* the bar in its natural form, ranking in character and value with those of the two last-mentioned machines; the second, of all those in which the body is elevated *up to* and *above* the bar, by the flexion and extension of the arms; the learner rising either on the side on which he began the exercise, or passing round the bar by the action of the trunk, and resting on its surface. These resemble in nature and purpose certain exercises of the second series on the trapezium.

As is always the case with exercises performed by a number of men at the same time, a stricter discipline must be preserved, with a close observance of time. The more complex exercises should all be practised by the learners separately.

The position of the instructor should vary. In the first series it should be as with the two last machines; in the second series, as with the corresponding exercises on the trapezium, except when executed by a squad, when it should be to the front, and opposite the centre of the bar.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1 TRAVELLING.	No. 1	The right hand leading.	<i>Ready.</i> <i>March.</i>	Position of attention facing the bar. (1.) Raise both hands and grasp the bar, the hands at the distance, the fingers and thumbs together, the arms at the half reach, the trunk of the body upright, the legs straight and together, the feet together and pointed to the ground.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i> <i>Down.</i>	(2.) Advance the left hand to the right, advance the right to the distance. Complete the step. Sink to the extension of the arms, lower the feet to the ground. This exercise to be repeated with the left hand leading.
N° II.	No. 1  TRAVELLING.	Hand over hand.		<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, facing the line of the bar. (1.) Raise both hands and grasp the bar, the hands meeting, the right in advance. Bend the arms until the head rises above the bar, the left shoulder immediately under it, the left breast at the left hand, the column of the body and lower limbs as in preceding exercise. (2.) Pass the left hand over the right, advancing the body until the right breast is at the right hand. Complete the step. As in first exercise.
N° III	No. 1  TRAVELLING.	No. 3	Both hands at once.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	As in preceding exercise. (1.) As in preceding exercise, except that the lower limbs are bent at the knee, the feet to the rear. (2.) Shoot both hands to the front the distance of the step. Complete the step. As in first exercise.
N° III.	No. 1  TRAVELLING.	No. 4	Right and left.	<i>Ready.</i> <i>March.</i>  <i>Halt.</i> <i>Down.</i>	As in second exercise. (1.) Ascend and grasp the bar with the right hand, the fingers and thumb meeting, lean forward and grasp the bar at the reach with the left. (2.) Lift the feet from the steps, augment their fall to the front, govern their rearward oscillation, and, at its culminating point, quit the grasp of the right hand, let it sweep round by the thigh in a half circle, and retake the bar at the reach. Complete the step. As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2	No. 1		<i>Ready. Up.</i>	Position of attention, facing the line of the bar. (1.) Spring from the ground and grasp the bar with both hands, the hands meeting, the fingers and thumbs together. (2.) Lift the feet, separate them as they rise, and clasp them round the bar, the left resting on it under the knee, the right overlapping the left, the ankles crossed, the head bent back, the trunk sustained. Quit the grasp of the right hand, pass it to the opposite side of the bar next the body, elevate the elbow over the bar and extend the arm along it, grasping it with the hand, detach the right leg, draw it rapidly inward and upward, at the same time press from the hands and rise above the bar, the right arm extended, advance the left leg, and rest seated on the bar.
	RISING TO AND ABOVE THE BAR.		The right leg acting.	<i>Down.</i>	Re-bend the right arm, draw back the left leg until the calf rests on the bar, as in the ascent; sink under the bar with the body sustained, remove the left leg, replace the feet on the ground. This exercise to be repeated with the left leg acting.
N° IV.	No. 2	No. 2		<i>Ready. Up.</i>	Position of attention facing the bar. (1.) Spring from the ground and grasp the bar, the hands at the distance, the fingers and thumbs together, the trunk of the body upright, and at the full extension of the arms, the legs straight and together, the feet also together, the toes pointed to the ground. (2.) Lift both feet from the ground, elevate them in front, carry them over the bar, letting the upper part of the body pass under, up the front, and over the surface of the bar, while the lower part ascends, passes its surface, and descends to the rear, until the whole body has cleared the bar, and rests in a perfectly vertical line on the hands with the arms extended.
	RISING TO AND ABOVE THE BAR.		To turn round the bar.		



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	Press slightly from the hands, set the body free from the bar, slowly lower the feet to the ground.
N° IV.	No. 2	No. 3	To turn round the bar, the hands reversed.	<i>Ready.</i>	As in preceding exercise.
	RISING TO AND ABOVE THE BAR.			<i>Up.</i>	(1.) Spring from the ground and grasp the bar, with the hands reversed. (2.) As in preceding exercise, retaining the grasp of the hands reversed.
				<i>Down.</i>	Bring the elbows close in by the sides, tighten the grasp of the hands, slowly incline the head and shoulders to the front, elevate the lower limbs, re-turn over the bar, and bring the feet to the ground.
N° II.	No. 2	No. 4	To rise to the bar.	<i>Ready.</i>	As in second exercise.
	RISING TO AND ABOVE THE BAR.			<i>Up.</i>	(1.) Spring from the ground and grasp the bar, the hands at the distance, the fingers and thumbs together, the arms straight, the legs straight and together, and the toes pointed to the ground, the head upright, the trunk of the body free and unconstrained. (2.) Bend the arms, raising the body until the chin rises above the bar, sink again to the full extension of the arms, and place the feet on the ground.
N° II.		No. 2	No. 5	To rise to the bar, the hands reversed.	<i>Ready.</i>
			<i>Up.</i>		(1.) Spring from the ground and grasp the bar at the distance with the hands reversed; the rest of the body as in preceding exercise. (2.) As in preceding exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 2 RISING TO AND ABOVE THE BAR.	No. 6	To rise above the bar by the fore-arm.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in second exercise. (1.) As in first exercise. (2.) As in fourth exercise to the elevation to the bar; raise the right elbow horizontally above the bar, extend the fore-arm along its surface, the left following, straighten both arms to their full extension, and remain sustained by the hands in the vertical line, above the bar. Let the left arm return to the bar, the right following, pass the left beneath the bar, the right following, and replace the feet on the ground.
N° V.	No. 2 RISING TO AND ABOVE THE BAR.	No. 7	Right and left.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in second exercise. (1.) As in first exercise. (2.) As in fourth exercise to the elevation to the bar. Raise the right elbow vertically above the bar, the left following, straighten both arms to their full extension, and rise above the bar in the vertical line, as in preceding exercise. Re-bend the left arm, the right following, let the left sink below the bar, the right following, and lower the feet to the ground.
N° V.	No. 2 RISING TO AND ABOVE THE BAR.	No. 8	Both hands at once.	<i>Ready.</i> <i>Up.</i>  <i>Down.</i>	As in second exercise. (1.) As in first exercise. (2.) As in fourth exercise to the elevation to the bar, and without pause, continue the upward movement until its completion, and the body is sustained in the vertical line, resting on the hands, with the arms extended, the transition from the bent to the straight position of the arms being instantaneous. Slowly re-bend the arms, sink beneath the bar, and lower the feet to the ground.



## THE BRIDGE LADDER.

This machine may be described as consisting of four ladders; two vertical ones, fixed at a distance of 30 feet, 40 feet, or 50 feet from each other, and 8 feet high; and two inclined ones running from the tops of the others, and made to meet in the centre of the span. Each of these inclined ladders must be from 2 to 3 feet longer than half the span, which will throw their point of junction (the centre of the span) considerably higher than the top of the vertical ladders, viz., 12 feet, 15 feet, or 20 feet from the floor.

The sides of all the ladders should be of the best yellow deal, and not less than 5 inches by 2 inches, carefully rounded to fit the hands. The vertical ladders should be firmly built in the ground. The width of the ladders between the sides should be 14 inches; the spars or rounds made of ash,  $1\frac{1}{8}$  inch in diameter, and  $8\frac{1}{2}$  inches apart, rubbed perfectly smooth, and securely let into the sides. The junctions of the sides of the vertical and inclined ladders should be mortised and tenoned, and have strong angle irons. Iron straps, crossed in the shape of the letter X, should be put from the point of junction of the inclined ladders to the roof, arranged in the best manner, according to circumstances, to prevent oscillation.

The exercises on this machine must be regarded as elementary, although with one or two exceptions they may all be practically performed on the ordinary wooden ladder, as given for escalading in the 5th section.

For elementary purposes this form of ladder is very superior to any other; 1st, because on it the movements of both the ascent and descent in each exercise may be performed in one continuous effort; 2nd, it admits of the free practice of the most difficult exercises with perfect safety, which is not the case with the exercises of the second series on a ladder of any other form; and 3rd, an entire squad of men may practise on it at the same time, while the ordinary inclined ladder admits of but one. The range of exercises which it presents is of the widest, and extends over all the courses of the system.

The first series, *by the supports*, is valuable to beginners, whether its exercises are performed with the arms retained at the reach, as should be the case in the initiatory lessons, or with them bent at the half reach, as should be the case when the muscular power of the learner has been so far increased as to enable him to execute them in their perfect form, as given in the text. In the very first exercise of this series the upper region of the trunk receives exercise of the highest order, and every valuable quality is heightened as the series advances; the lower limbs and column of the body being held straight and compact, while the upper portion of the trunk is urged to energetic employment in the best position; for the same action which lifts the breast upwards and forwards, also flattens the back and sustains the shoulders square to the front; and the grip of the hands at the width of the ladder, slightly exceeding the natural width of the shoulders, tends at every movement to promote the expansion of this part of the body.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1 BY THE SUPPORTS.	No. 2	Right and left, backwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Advance the right hand the distance of the space, but on the advance of the left, and at every succeeding step, advance the hand a double space.  Complete the step. As in first exercise.
N° III.	No. 1 BY THE SUPPORTS.	No. 3	Both hands at once, backwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Spring upward and rearward with both hands the distance of the space, retaining the column of the body and lower limbs in position.  Complete the step. As in first exercise.
N° II.	No. 1 BY THE SUPPORTS.	No. 4	Right hand leading, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, under the ladder, the back to the upright. (1.) Spring from the ground and grasp the supports with the arms bent as at the half reach, the head bent back, the breast strongly lifted upwards and forwards, the lower portion of the trunk and legs held firm and straight, the knees together, the feet together, with the toes pointed to the ground. (2.) As in first exercise. Complete the step. As in first exercise.  This exercise to be repeated with the left hand leading.
N° II.	No. 1 BY THE SUPPORTS.	No. 5	Right and left, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in preceding exercise. (1.) As in preceding exercise. (2.) Advance the right hand the distance of the space, but on the advance of the left, and at every succeeding step, advance the hand a double space.  Complete the step. As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1  BY THE SUPPORTS.	No. 6	Both hands at once, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in fourth exercise. (1.) As in fourth exercise. (2.) Spring upward and forward with both hands the distance of the space, retaining the column of the body and the lower limbs in position. Complete the step. As in first exercise.
N° IV.	No. 2  BY THE SPARS.	No. 1	Right hand leading, backwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, under the ladder, facing the upright. (1.) Spring from the ground, and with both hands grasp the first spar, the arms bent as at the half reach, the fingers and thumbs together, the palms to the front, the head bent back, the eyes directed to the spar beyond that grasped by the hands, the whole column of the body held firm and upright, the legs straight and together, the feet together, with the toes pointed to the ground. (2.) Advance the right hand to the next spar, the left following. Complete the step. Point the toes to the ground, hold the body perfectly steady, quit the grasp, and descend yielding. This exercise to be repeated with the left hand leading.
N° IV.	No. 2  BY THE SPARS.	No. 2	Right and left, backwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Advance the right hand to the next spar, advance the left, and, passing the spar grasped by the right, grasp the spar beyond it, the body held square to the front. Complete the step. As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° V.	No. 2  BY THE SPARS.	No. 3	Both hands at once, backwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Spring to the second spar with both hands, and without pause spring to the third, retaining the arms bent, and the trunk and lower limbs in position. and avoiding all front and rear oscillation. Complete the step. As in first exercise.
N° IV.	No. 2  BY THE SPARS.	No. 4	Right hand leading, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, under the ladder, the back to the upright. (1.) As in first exercise. (2.) Advance the right hand to the next spar, the left following. Complete the step. As in first exercise. This exercise to be repeated with the left hand leading.
N° IV.	No. 2  BY THE SPARS.	No. 5	Right and left, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in preceding exercise. (1.) As in first exercise. (2.) Advance the right hand to the next spar, advance the left, and passing the spar grasped by the right, grasp the spar beyond it, the body held square to the front. Complete the step. As in first exercise.
N° V.	No. 2  BY THE SPARS.	No. 6	Both hands at once, forwards.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in fourth exercise. (1.) As in first exercise. (2.) Spring to the second spar, and without pause spring to the third, retaining the arms bent, and the trunk and lower limbs in position. Complete the step. As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2 BY THE SPARS.	No. 7	Right hand leading, sideways.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	Position of attention, under the ladder, the upright on the left. (1.) Spring from the ground and grasp the first and second spars, the arms bent as at the half reach, the palms of both hands facing inwards, the fingers and thumbs together, the head held back, the breast advanced, the lower half of the column of the body firm and straight, the legs straight and together, the feet together, with the toes pointed to the ground. (2.) Advance the right hand to the third spar, advance the left hand to the second. Complete the step. As in first exercise.
N° V.	No. 2 BY THE SPARS.	No. 8	Both hands at once, sideways.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in preceding exercise. (1.) As in preceding exercise. (2.) Spring from both hands, and with the right hand grasp the third spar, and at the same time with the left hand grasp the second spar. Complete the step. As in first exercise.
N° V.	No. 3 BY THE SIDE.	No. 1	Right hand leading.	<i>Ready.</i> <i>Climb.</i>	Position of attention, the upright of the ladder in profile on the left front. (1.) Spring from the ground and grasp the supports with the hands at the distance; immediately bend the arms until the hands are at the rest, the chin above the ladder, the head erect, the trunk of the body held firm and compact, the legs straight and together, and extended under the ladder in a horizontal line, at a right angle to the trunk, the feet together, with the toes pointed to the front. (2.) Advance the right hand to the reach, the left following at the distance.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i> <i>Down.</i>	Complete the step. Lower the feet to the vertical line under the body, point the toes to the ground, lower the body to the reach of the hands, and descend yielding.
N° V.	No. 3 BY THE SIDES.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand over the right, withdraw the right, and advance it to the reach. Complete the step. As in first exercise.
N° V.	No. 3 BY THE SIDES.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Spring with both hands to the right the distance of the space, and immediately without pause repeat the step. Complete the step. As in first exercise.

### THE LADDER PLANK.

This machine admits of different forms of construction, and this variety of construction greatly extends its range of exercises, and their adaptability to meet the requirements of individuals of different degrees of strength. It is found that the effort required to perform some of the exercises is in direct relation to the thickness of the machine. In every gymnasium, therefore, there should be several of these machines, varying in thickness from  $1\frac{1}{4}$  inch to 6 inches, as hereafter described. Its simplest form is a deal plank  $1\frac{1}{4}$  inch thick and 18 inches wide, with wooden spars  $1\frac{1}{4}$  inch square, screwed across the back, and projecting from each side of the plank 6 inches, the projecting parts to be in all cases round. The others should vary in thickness from 2 inches to 6 inches, the extra thickness being obtained by adding 1 inch thick deal sides, the required depth, to the plank, the back being left open; the spars to be fastened as before on the back edges of the sides. The width of those with planks 6 inches thick should not exceed 12 inches, those of intermediate thickness to be of medium width.



The exercises on this machine, as on the preceding one, are purely elementary, although the machine itself is a union of two of the most strictly practical ones in the system. They address themselves to the entire body, though not equally, the upper region of the trunk being the part most directly affected by them, and that so favourably that there is no machine in the gymnasium which so rapidly or so powerfully aids in the expansion and development of this all-important part of the body. And as the exercises are all of a simple and safe nature, the recruit and young soldier cannot practise them too frequently.

A single glance at the position and action of the body when extended on this machine will show not only what it is meant to effect, but its mode of effecting it; for while the back is forced to take absolutely the conformation of the plank upon which it is laid, the obverse side of the body is, by the very act which flattens the back, rounded and advanced to its most advantageous position and shape; this is especially the case with the exercises of the third series, where the effect of the uplifted arms is still further to depress the shoulders and advance the front and sides of the chest; the position of the neck and head contributes to the same result, and the downward pull of the hands in the ascent, with the gradual extension of the arms on the lowering of the body in the descent, increase the effort and augment the good to be derived from these exercises. The muscles of the back are also employed in the most advantageous manner.

It is most desirable to have a duplicate of this machine, which should be placed so near to the first, that having attained the top of one, the learner may descend by the other; or, which is still better, the two should incline from opposite sides of a beam or narrow platform; by this means a squad of men may perform the same exercises in succession, a feature which should be steadily held in view in the arrangement of all apparatus admitting of consecutive practice.

The position of the instructor is on the left of the plank.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1  WITH HANDS AND FEET.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>	Position of attention, facing the plank, the toes touching it. (1.) Stoop forward and with the right hand grasp the spar nearest the reach, the fingers and thumb together, the left hand following on the left; place the right foot on the lowest spar, resting on the hollow of the foot, the left following on the left, straighten the knees, and elongate the body along the surface of the plank, the head slightly bent back,







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  WITH HANDS AND FEET.	No. 4	Right and left, hand and foot.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Raise the right hand to the next spar, and at the same time lift the left foot to the second spar, straighten the left knee and elongate the trunk, and at the same time raise the left hand to the spar above that grasped by the right, and the right foot to the spar above that on which the left is placed. Complete the step. Slip the leading hand down to the spar below that grasped by the supporting hand, and the leading foot to the spar below that on which the supporting foot is placed.
N° III.	No. 2  WITH THE HANDS ONLY.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, facing the plank, the toes touching it. (1.) Stoop forward and with the right hand grasp the spar nearest the reach, the left following on the left; bend the arms and raise the body to the half reach of the hands, the column of the body carefully aligned down the centre of the plank, the head slightly bent back, the breast advanced, the legs together, the knees straight, the feet together and pointed downwards, the surface of the foot resting on the plank. (2.) Raise the right hand to the next spar, the left following on the left; draw up the body to the half reach of the hands. Complete the step. Slip the right hand down to the next spar, the left following on the left, retaining the arms bent, as at the half reach. This exercise to be repeated with the left hand leading.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  WITH THE HANDS ONLY.	No. 2	Right and left.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise.  (1.) As in first exercise. (2.) Raise the right hand to the next spar; elevate the body to the rest of the left hand, and on the instant, raise the left hand to the spar above that grasped by the right.  Complete the step. Slip the leading hand down to the spar below that grasped by the supporting hand.
N° IV.	No. 2  WITH THE HANDS ONLY.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands and grasp the spar, nearest the reach, the rest of the body as in first exercise. (2.) Shoot up both hands to the next spar, elevate the body to the half reach of the hands.  Complete the step. Slip both hands down to the next spar, retaining the arms bent as at the half reach.
N° II.	No. 3  BACKWARDS.	No. 1	By the spars.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention, the back to the plank, the heels touching it. (1.) Lean back and rest on the plank; elevate both hands and grasp the spars right and left, nearest the reach, the palms to the front, the thumbs and fingers meeting, the head resting on the plank, the eyes directed to the front, the trunk of the body aligned down the centre of the plank and resting on its surface. (2.) Raise both feet to the second spar, straighten the knees and elongate the trunk.  Complete the step. Slip both feet down to the next spar, lowering the body to the reach of the hands, slip both hands down to the next spar.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 3	No. 2	By the centre.	<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	As in first exercise.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	<p>(1.) Bring both feet to the centre of the plank, the toes pointed downwards, the heels together and resting on the plank, the knees straight and together, the whole column of the body from the heels upwards perfectly aligned down the centre of the plank; lower the body to the reach of the hands.</p> <p>(2.) Separate the feet right and left and place them on their respective spars; slip both hands down to the next spar.</p>

(1.) Bring both hands and grasp the spar, nearest the reach, the rest of the body as in first exercise.

(2.) Slip both hands down to the next spar, elevate the body to the reach of the hands.

Complete the step.

Slip both hands down to the next spar, retaining the arms bent as at the half reach.

*Down.*

Slip both hands down to the next spar, retaining the arms bent as at the half reach.

*Halt.*

Complete the step.

Slip both feet down to the next spar, lowering the body to the reach of the hands, slip both hands down to the next spar.



## SECTION IV.

## FREE CLIMBING.

An upright object presents itself as the most perfect form of machine to be ascended by climbing, and the hands are the chief agent in affecting the ascent, for they not only aid in the execution of every exercise, simple or difficult, in which the feet take a share, but there is a large series embracing the most difficult and artistic exercises, in which the body is sustained and elevated by the hands alone.

Following out this idea, a perfectly vertical object, of girth capable of being grasped by the hand, may be viewed as the typical machine for climbing. But this simple description of machine instantly takes a dual form from the nature of the material of which it is constructed; it is either hard and firm, like the wooden pole, affording unyielding fulcra to the muscles of the hands in their grasp, and to those of the feet in their clasp, or it is soft and pliable like the hempen rope, the characteristics of which are the reverse of these.

We have thus at the very outset two machines, giving origin to the two divisions of machines employed in this section, the one being the single upright pole, fixed or suspended, and the other, its companion machine, the single rope similarly placed; and all deviations from these two, either in dimensions, number, or position, are but modifications of them, designed for special purposes.

Where the single pole is retained, and its dimensions only are altered, every gradation of size may be obtained until the girth of the mast is reached, the exercises being modified or changed with the alteration in the dimensions of the machine. Where the single pole is retained, and its position changed for the inclined one, the exercises again change, taking a range both wide and varied; and when the pole, from being fixed, is made to turn on its axis, again the exercises, in action and position, in nature and purpose, change also.

The first division, springing from the slender, upright pole, branches first into the pair of poles, arranged in such a position as to present one to each hand about the width of the shoulders apart, the body to be sustained between the two, and from this arrangement springs an arduous series of exercises; next, into those poles which, being inclined, present a long series of simple exercises, the altered position of the poles altering the entire character of the exercises to be executed upon them.

The second branch, springing from the single vertical rope, also takes a very extended form. A double rope is not accepted, as yielding no exercise sufficiently removed from those on the pair of poles to justify its adoption as a separate machine. A wider range of exercises, in which the lower limbs also are employed, is afforded by



the rope than by the pole, and those in which the hands alone sustain and elevate the body are all a degree harder than the corresponding ones on its companion machine. The single rope may be inclined or horizontal, presenting exercises peculiar to each position; and it may be simple or knotted, the knots being formed in the rope itself, or superadded; and every change will to some extent enlarge the range of the exercises, qualify their difficulty, and vary the parts of the body required for their execution.

The position varies but little throughout the section with regard to the trunk of the body, because it is determined by principles which are equally important in every exercise, viz., to set the limbs free for the due execution of the movements of the step, to preserve the equilibrium, and to give full scope to respiration; but with regard to the limbs, it is varied in every exercise on each machine.

In the initiatory practice, the instructor should count the time for the learner,—one, two, three,—for the three separate movements of the step, at a pace proportionate to his ability, taking care that each step is of the same length, and executed at the same speed as the others; perfect cadence and rhythm should accompany the whole of each exercise, both in the ascent and descent.

The initiatory practice should consist of brief efforts, and the instructor should give the "halt" on the slightest indication of exhaustion or insecurity of grasp; a pause, less or more protracted, should always follow the halt, and as much care should be given to the descent as to the ascent; the last step should be as carefully completed as any in the exercise, the feet should be set leisurely upon the ground, and the grasp of the hands quietly relinquished, the movement being closed in the original position of "ready," and place immediately given to another climber.

The instructor should also carefully impress upon the learner the desirability of executing every exercise quietly and steadily, of keeping the countenance quiet even under the most severe efforts, and of never, on any occasion, speaking while executing an exercise himself, or of addressing any one else who is doing so.

On the other hand, so long as proper care and attention are given to the exercises, and full regard is paid to the directions of the instructor, an outward expression of pleasure and interest among the men is to be encouraged rather than checked; and the slips and mishaps of beginners, in certain exercises where no attendant danger is to be dreaded, are legitimate sources of amusement; its proper bounds being always a matter of calculation with the instructors.



## THE VERTICAL POLE.

This machine is a pole suspended from a tie-beam or other convenient point of attachment; it should never be less than 15 feet high, or more than 40 feet; it may be either fixed at the bottom, or hang loose; if the former, it should not be less than 3 inches in diameter, or more than 6 inches; if the latter, not less than  $1\frac{1}{2}$  inches in diameter, or more than 4 inches. It should be of the best straight-grained yellow deal, free from knots, splinters, or flaws of any kind, planed perfectly smooth, and kept well rubbed down with sand-paper.

It is characteristic of simple climbing, *i.e.*, that form of climbing in which all the resources of the body capable of aiding in the ascent are called into action, that the upper and lower limbs and trunk all receive a fair share of well-distributed employment. The first series gives the same employment in every exercise to the lower half of the body, with a different mode of employment to the upper, in each separate one. In the first exercise (which is considered the easiest mode of ascent, because neither hand is ever separated for a moment from the pole, while both are acting during the elevation of the body which completes each step,) one side of the body leads throughout the ascent, and the other throughout the descent. In an elementary sense this feature can be turned to great advantage if one side of the body be weaker than the other, by giving that side the lead, and consequently the largest share of employment; in a practical sense by making the strongest and most dexterous member the leading one, and consequently the chief agent in the ascent. In the next form, where the action is alternated right and left, the equalization of the body is preserved on the same principle as in certain exercises in the preceding section, from the fact that both sides are separately, and each for itself and by itself, doing the same amount of work, and therefore the weaker side, being the weaker, is virtually doing more, is being urged to greater activity, and reaping a proportionately greater advantage. Here each hand, during its elevation, entirely quits the pole, and the body is raised on the elevation of each. In the third exercise both hands act together, both in the ascent and descent, thus both quitting the pole at the same instant; and in the fourth, which is, strictly speaking, but a special form of the third, the action of the upper limbs is simultaneous with that of the lower.

In all these exercises the column of the body is maintained in the position most favourable to free respiration; the two last can be performed very rapidly, and are therefore practically very valuable.

The instructor should take care that the learner places his hands and feet in their proper order and position in commencing each exercise; the leading arm should be completely extended to the reach at each step, and the arms must not be bent when the feet are lifted, but only when the elongation of the legs and trunk renders it necessary in the third movement of the step. Beginners frequently try to struggle up the machine by means of the hands only, the in-



structor should therefore carefully explain to them how one part of the body assists the other in making the ascent, and how, upon the correct employment of these various parts, the facility and elegance of climbing depend. When the feet are lifted in the second movement, the upper part of the body must not be allowed to incline backwards, but the back must be bent outwards. In the third movement, the legs and trunk must be straightened without jerk, and the whole body be kept as close to the pole as possible. In the descent, the legs and trunk should be kept straight throughout, the body being sustained by the legs during the movements of the hands.

In the second exercise, the upper part of the body must not be allowed to sway too much from side to side, which is apt to result from the separate employment of the hands; and in the descent the moving hand should not be placed until the opposite arm is perfectly extended.

The second series of exercises on this machine is of a much more arduous character than the first. In the former the upper limbs take up and repeat the action of the latter, but they are entirely unaided by the lower limbs and trunk, and in some exercises the position of these is chosen for its value in an elementary sense, its object being to heighten the difficulty of the exercise, and to intensify the action of the upper part of the body, by acting strongly against it.

In the first exercise, the lower half of the body is merely held quiescent, and in the position most favourable to the ascent; in the second, it is held formally in the line of the machine; and in the third, the same formality of position is preserved with the lower half, while the upper is employed in rapid action, elevating the whole.

The elementary value of this second series is very great, developing powerfully not only the muscular energies of the arms and upper portion of the trunk, but the tenacity and security of grip of the hands, and the facility and readiness of action of the upper limbs, either in separate or combined effort. The single exercise of the third series may be viewed as the culminating one on this machine. The climb alone is here given, but when this can be accomplished with ease, the ascent should be practised carrying weights, arms, or implements in the disengaged hand.

In performing the exercises, the learner must be instructed not to allow the left side to sway round to the left side of the pole; but the hands must ascend and descend in a straight line, and the same side of the pole be retained throughout. In the second exercise, beginners are very apt to make a more complete step with the left hand than with the right, because they are better able to support themselves with the right while the left moves, and for the same reason to allow the left arm to relax while the right moves, so that special attention is required to ensure an equal step with each hand. In the fourth exercise the body must not be allowed to recede as the hands are moved, and the movement of these must therefore take place before the flexion of the arms is quite complete.



In the last exercise a strong pressure of the feet will be required to prevent the body from receding as the hand is raised to the reach, and the upper part of the body must be kept as close as possible to the pole throughout.

During the first few steps, the position of the instructor should be where he can best observe the movements of the climber; afterwards, his position should be behind him on the left, that he may be able to interpose his right hand in the event of a slip.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1	No. 1		<i>Ready.</i>	Position of attention facing the pole.
				<i>Climb.</i>	(1.) Raise the right hand to the reach and grasp the pole, the left following. Raise the right foot from the ground and place it against the left side of the pole, the knee to the right. Raise the left foot and place it in front of the pole, the ankles crossing, the outside edges of the feet together (the pole between them), the whole column of the body upright, the chest advanced, the shoulders flat, the elbows in by the sides, the hands at the half reach, the neck free, the head slightly bent back, the chin elevated, the eyes directed to the reach of the hands.
					(2.) Raise the right hand to the reach and grasp the pole, the left following. Draw up the lower limbs without relinquishing their clasp of the pole, allowing it as it were merely to slip between them, tighten their clasp when elevated, straighten the knees and elongate the trunk to the rest of the hands.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	Slip the left hand to the rest and grasp the pole, the right following. Slacken the clasp of the feet and lower the body to the reach of the hands.
					This exercise to be repeated with the left hand leading, the position of the feet reversed.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  WITH HANDS AND FEET.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach and grasp the pole, draw up the lower limbs, straighten the knees, and elongate the trunk to the rest of the right hand. Complete the step. Pass the leading hand to the rest and grasp the pole, lower the body to the reach of the supporting hand.
N° III.	No. 1  WITH HANDS AND FEET.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands to the reach and grasp the pole. Lift both feet from the ground and clasp the pole in the position of first exercise, bringing the hands to the half reach; the rest of the body as in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, straighten the knees, and elongate the trunk to the half reach of the hands. Complete the step. Slip both hands to the rest and grasp the pole, slacken the clasp of the feet, and lower the body to the reach of the hands.
N° III.	No. 1  WITH HANDS AND FEET.	No. 4	Both hands at once. The double step.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i>	As in first exercise. (1.) As in preceding exercise. (2.) As in preceding exercise, but the extension of the arms from the half reach to the reach, and the drawing up of the lower limbs should be performed simultaneously. Without pause, at the instant of the completion of one step, begin the next. Complete the step.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  WITH THE HANDS ONLY.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise the right hand to the reach and grasp the pole, the left following; lift both feet from the ground, bringing the hands to the half reach, the legs straight, the toes pointed downwards and slightly turned out (the pole lying free between them), the column of the body perfectly upright and in the line of the pole, the hands at the half reach, the head erect, the eyes directed to the reach of the hands. (2.) Pass the left hand to the reach, elevating the body to the rest of the right. Complete the step, and clasp the pole with the feet, as in first exercise. Remove the hands and extend them horizontally to the front; guide the descent by the pressure of the lower limbs.
N° IV.	No. 2  WITH THE HANDS ONLY.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in second exercise. (2.) Shoot up both hands to the reach and grasp the pole, elevate the body to the half reach of the hands. Complete the step and grasp the pole with the feet, as in first exercise. Slowly detach the lower limbs and come to the position. Slip both hands to the rest and grasp the pole, lower the body to the half reach of the hands.
N° V.	No. 2  WITH THE HANDS ONLY.	No. 4	Both hands at once. The double step.	<i>Ready.</i> <i>Climb.</i>	As in first exercise. (1.) As in second exercise. (2.) Shoot up both hands the distance of the reach, and by the same action elevate the body to the half reach of the hands; without pause, at the instant of the completion of one step, begin the next.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	Slip both hands to the rest, and at the same time lower the body to the half reach of the hands ; and without pause, at the instant of the completion of one step, begin the next.
N° V.	No. 3  WITH ONE HAND.	Single exercise.		<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	(1.) Raise the right hand to the reach and grasp the pole. Spring from the ground and clasp the pole with the feet, as in first exercise, first series, bringing the right hand to the half reach, place the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise, first series.  (2.) Tighten the clasp of the feet, raise the right hand to the reach, draw up the lower limbs, straighten the knees, and elongate the trunk.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	Slip the right hand to the rest, lower the body to the half reach of the hand.  This exercise to be repeated with the left hand.



## THE SLANTING POLE.

This machine is a pole 3 inches in diameter, and not less than 18 feet, or more than 25 feet in length. It may be laid at any angle between the horizontal and vertical line. In a first class gymnasium there should be several of these machines, fixed at different degrees of inclination, but when only one can be erected, a pole 20 feet long and 3 inches in diameter, laid at an angle of 45 degrees, presents the greatest facilities for general use. It should be selected on the same principles and prepared in the same manner as the vertical pole.

The first series of exercises on this machine, *under the pole*, are substantially the same as the corresponding series on the vertical pole, with this difference, that their difficulty is much reduced by its inclined position. The hands still follow the same modes of action as on the vertical machine, but with less difficulty, and the lower limbs bear altogether a less important part in the step, and consequently receive less benefit from it. This machine may for these reasons be made introductory to the vertical one, when, as will sometimes be the case, the simplest exercises on the latter are found too difficult for the beginner.

The second series, *above the pole*, is also essentially initiatory, but is valuable both in an elementary and practical sense. The exercises comprised in it are safe and interesting, besides giving much light and well distributed movement to both trunk and limbs; as, the reach being made and the lower limbs drawn up, the elongation of the trunk is almost entirely effected by the action of the back and loins.

The exercises in the third series, *under the pole*, are executed entirely by the upper part of the body and the upper limbs, thus corresponding with the second series on the vertical machine, but, as in the series corresponding with the first, they are of a much less arduous nature, owing to the inclined position of the machine.

It will be seen that the first and third series of exercises on this machine entirely correspond with the first and second series on the pole in its vertical position, while every exercise is lessened in difficulty by its inclination; and as this changed position presents another surface, a third and intermediate series is afforded of an entirely different character to either, in which the column of the body is supported on the pole itself. This machine, therefore, is in all respects a valuable companion to the vertical one, with all the corresponding exercises slightly reduced in difficulty for the special practice of less powerful beginners, and with an additional series practically valuable as forming a direct means of escalading.

The position of the instructor should be under the pole, because all falls from this machine will be under it; except when the climber is learning the movements of the step in the second series, when the instructor should be in front of the pole behind the climber in order to direct his efforts.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1  UNDER THE POLE.	No. 3	With hands and feet, both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands to the reach and grasp the pole. Lift both feet from the ground and clasp the pole in the position of first exercise. The rest of the body in the position of first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs and elongate the trunk to the rest of the hands. Complete the step. Slip both hands to the rest, lower the body to the reach of the hands.
N° III.	No. 1  UNDER THE POLE.	No. 4	With hands and feet, the double step.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in preceding exercise. (2.) As in preceding exercise, but the movements of the upper and lower limbs to be made simultaneously; without pause, at the instant of the completion of one step, begin the next. Complete the step. Slip both hands to the rest and grasp the pole, and at the same time lower the body to the half reach of the hands; without pause, at the instant of the completion of one step, begin the next.
N° II.	No. 2  ABOVE THE POLE.	No. 1	With hands and feet, the right hand leading.	<i>Ready.</i>  <i>Climb.</i>	Position of attention facing the pole, the toes touching it. (1.) Stoop forward and grasp the pole with the right hand, the left following, slowly extend the trunk of the body along its surface. Lift the right foot and place it against the left side of the pole, the knee on the right; lift the left foot from the ground and place it under the pole, clasping it with the back of the ankle, the trunk of the body in a straight line along its surface, the head slightly bent back, the eyes directed to the reach of the hands.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i> <i>Down.</i>	(2.) Advance the right hand to the reach, the left following, draw up the lower limbs and elongate the trunk to the rest of the hands. Complete the step. Slip the left hand to the rest, the right following, lower the body to the reach of the hands. This exercise to be repeated with the left hand leading.
N° II.	No. 2 ABOVE THE POLE.	No. 2	With hands & feet, hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach, draw up the lower limbs and elongate the trunk to the rest of the right hand. Complete the step. Pass the leading hand to the rest, lower the body to the reach of the supporting hand.
N° III.	No. 2 ABOVE THE POLE.	No. 3	With hands & feet, both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the rest of the hands. Complete the step. Slip both hands to the rest, lower the body to the reach of the hands.
N° IV.	No. 3 UNDER THE POLE.	No. 1	With the hands only, the right leading.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention under the pole. (1.) Advance the right hand to the reach and grasp the pole, the left following. Lift both feet from the ground, bringing the hands to the half reach, the legs straight, the feet together with the toes pointed downwards, the chest advanced, the shoulders square to the front, the neck free, the head slightly bent back, the eyes directed to the front, the chin elevated. (2.) Advance the right hand to the reach, the left following. Complete the step. Slip the left hand to the rest, the right following. This exercise to be repeated with the left hand leading.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 3 UNDER THE POLE.	No. 2	With the hands only, hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach, leaving the right at the half reach. Complete the step. Pass the leading hand to the rest, leaving the supporting hand at the half reach.
N° IV.	No. 3 UNDER THE POLE.	No. 3	With the hands only, both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Shoot up both hands the distance of the reach, but retaining the arms bent as at the half reach. Complete the step. Slip both hands the distance of the reach, retaining the arms bent as at the half reach.

### THE TURNING POLE.

This machine is a pole laid at an angle of 45 degrees, and not less than 3 inches or more than 5 inches in diameter; it should not be less than 15 feet or more than 25 feet in length. In the centre of each end should be fixed an iron pin,  $\frac{3}{4}$ -inch in diameter, projecting 3 or 4 inches, to work in iron sockets placed in the floor and upper point of attachment. It should be selected and prepared in the manner already recommended for the other poles.

All the exercises on this machine are of an essentially elementary character, and especially designed to accomplish two objects; first, to strengthen the hands, wrists, and fore-arms; second, to cultivate the power of preserving the equilibrium under the greatest difficulties.

No exercise on this machine requires much muscular power, nicety of movement for the preservation of balance being the chief requisite, although all the exercises forming the third series on the preceding machine can be executed here with the same advantages, heightened by the difficulty arising from the tendency of the pole to revolve. It is for this reason that these two machines are found very valuable in the gymnasium, as nothing is so desirable for recruits as a wide and varied range of exercises, interesting in



themselves, and which cultivate dexterity of action, precision and accuracy of movement, and complete command of the trunk and limbs. They are valuable to the more advanced learners, because it is found that those exercises which are almost limited to great muscular effort, or in other words, in which the resistance is at its maximum and the movement at its minimum, are not so conducive to muscular development as where these qualities are fairly balanced.

The position of the instructor should be under the pole, except when directing the climber in the movements of the step, when he should be in front of it.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1  THE POLE HELD FIRM.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention facing the pole, the toes touching it. (1.) Stoop forward and grasp the pole with the right hand, the left following, and slowly extend the body along its surface. Lift the right foot and place it against the left side of the pole, the knee on the right. Lift the left foot and place it under the pole, clasping it with the hollow of the foot, the trunk of the body in a straight line along its surface, the head bent slightly back, the eyes directed to the reach of the hands. (2.) Advance the right hand to the reach, the left following, draw up the lower limbs and elongate the trunk to the rest of the hands. Complete the step. Slip the left hand to the rest, the right following, and lower the body to the reach of the hands. This exercise to be repeated with the left hand leading.
N <sup>o</sup> II.	No. 1  THE POLE HELD FIRM.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach, draw up the lower limbs and elongate the trunk to the rest of the right hand. Complete the step. Pass the leading hand to the rest, lower the body to the reach of the supporting hand.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1 THE POLE HELD FIRM.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the half reach of the hands.  Complete the step. Slip both hands to the rest, lower the body to the half reach of the hands.
N° IV.	No. 2 THE POLE TURNING.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	Position of attention facing the pole, the toes touching it. (1.) As in first exercise, first series. (2.) Advance the right hand to the reach, the left following, draw up the lower limbs, and elongate the trunk to the half reach of the hands, and during the last movement give the pole one quarter turn from right to left.  Complete the step. Slip the left hand to the rest, the right following, lower the body to the half reach of the hands, and during the last movement give the pole one quarter turn, as on the ascent.  This exercise to be repeated with the left hand leading, and turning the pole from left to right.
N° IV.	No. 2 THE POLE TURNING.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach, draw up the lower limbs, and elongate the trunk to the half reach of the right hand, and during the last movement give the pole one quarter turn from right to left.  Complete the step. Pass the leading hand to the rest, and while lowering the body to the half reach of the supporting hand, give the pole one quarter turn, as in the ascent. To be repeated with the other hand, so that the pole will be kept continuously turning during the descent.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 2  THE POLE TURNING.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise.  (1.) As in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk to the half reach of the hands, and during the last movement give the pole one half turn from right to left.  Complete the step.  Slip both hands to the rest, lower the body to the half reach of the hands, and during the last movement give the pole one half turn from right to left, as in the ascent.  This exercise to be repeated turning the pole from left to right.
N° V.	No. 2  THE POLE TURNING.	No. 4	Turning with the pole.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise.  (1.) As in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, and elongate the trunk, and during the last movement turn the pole from left to right, allowing the body to go with it, modifying or increasing the momentum of the fall by extending or bending the arms, so that the pole shall make one complete turn, bringing the climber again to the surface.  Complete the step.  Slip both hands to the rest, lower the body to the half reach, and during the second movement make the turn as in the ascent.  This exercise to be repeated, making the turn to the left.



## THE PAIR OF VERTICAL POLES.

This machine consists of two suspended poles,  $1\frac{1}{2}$  inches in diameter, not less than 15 feet or more than 20 feet high and placed 18 inches apart. The lower ends should be 6 inches from the ground. The best wood for the purpose is ash, but well selected yellow deal may be used when ash of the required length and quality cannot be obtained.

The range of exercises on this machine is not wide, but every one is of a high class; they are all arduous, and are approached through those of the single pole. The learner should never be allowed to attempt them until he is master of the second series on the single pole.

When well executed they are very elegant, and show at a glance the power at the command of the climber, the body being sustained in perfect position between the poles by the hand-grasp alone. For these reasons this machine is always a favorite with able climbers.

The instructor must be careful to give the "halt" whenever there is any kick or struggle of the lower limbs or trunk, or whenever the full step is not made by the hands, or the elevation of the trunk after the reach is not completed, indicating local or general fatigue, and therefore insecurity of grasp. This applies most especially to the two last exercises, where the feet are removed from the vertical line.

In the fifth exercise the climber must be instructed to be careful to keep the feet between the poles and to guard against their passing to the rear with the poles clashing in front; in this exercise the knees should be kept well bent, the lifting of the lower limbs should be at the instant of the elevation of the hand, and the alternate action of the right and left sides should be rhythmical, both in the ascent and descent. Another point requiring attention in this exercise is, when the climber nears the top (supposing he is sufficiently advanced to climb the length of the poles), that the "halt" shall always be given and the climber not allowed to look upwards to ascertain his position; it would be in this act that a loss of equilibrium would most readily occur, and it is at this elevation and in this position that it would be most to be dreaded.

The instructor's place should be right or left of the poles, according as the climber shows a tendency to lose his equilibrium to front or rear, in order that he may be able to interpose his right hand in such a case. In the early practice of the third and last exercises, two instructors, or an instructor and a monitor, should be placed right and left of the machine, on occasions when it is thought desirable to let the climber do his uttermost; but, as above directed, for general practice the "halt" should be given at the slightest indication of fatigue or failing power, and while he has yet strength to accomplish the descent.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> V.	Single Series.	No. 4.	Both hands at once, the double step.	<p><i>Ready.</i> As in first exercise.</p> <p><i>Climb.</i> (1.) As in first exercise.</p> <p>(2.) Shoot up both hands the distance of the reach, and at the same time elevate the body to the half reach of the hands; without pause, at the instant of the completion of one step begin the next.</p> <p><i>Halt.</i> Complete the step.</p> <p><i>Down.</i> Slip both hands the distance of the rest, and at the same time lower the body to the half reach of the hands, and without pause, at the instant of the completion of one step, begin the next.</p>	
N <sup>o</sup> V.	Single Series.	No. 5	The hands reversed.	<p><i>Ready.</i> As in first exercise.</p> <p><i>Climb.</i> (1.) Stoop forward from the waist, bringing the head and shoulders in front of the poles, draw up the hands with the palms to the rear (the thumbs inside, the fingers out) until they are nearly as high as the arm-pits and grasp the poles. Lift both feet from the ground, the knees bent, the toes pointed to the ground.</p> <p>(2.) Slip the right hand up the pole, aiding it by the elevation of the right side and right leg, the left hand following with the corresponding side and leg.</p> <p><i>Halt.</i> Complete the step.</p> <p><i>Down.</i> Slip the right hand the distance of the half reach down the pole, and at the same time lower the right side and right leg, the left hand following with the corresponding side and leg.</p> <p>This exercise to be repeated with the left hand leading, also hand over hand, and with both hands at once.</p>	



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° V.	Single Series.	No. 6	Sitting.	<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	(1.) Raise both hands to the half reach and grasp the poles ; lift both feet until the lower limbs are at a right angle to the trunk, the knees straight and together, the feet together with the toes pointed to the front. (2.) Raise the right hand to the reach, the left following on the left pole, elevate the body to the half reach of the hands.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	Slip the right hand the distance of the half reach, the left following on the left pole, and at the same time lower the body to the half reach of the hands.  This exercise to be repeated with the left hand leading, also hand over hand, and with both hands at once.

### THE PAIR OF SLANTING POLES.

This machine consists of two poles, not less than  $2\frac{1}{2}$  inches in diameter, or more than 4 inches. Their length should not be less than 15 feet or more than 25 feet. Like the single slanting pole, this machine may be laid at any angle when there are several of them in the gymnasium, but where there is but one, that indicated for the single pole is the best also for the pair. The materials should be selected on the same principles as for the pair of vertical poles.

The exercises on this machine bear a great resemblance in character to the second series on the single slanting pole, and all are of an initiatory character. They are excellent for beginners, as giving much movement in a good position, and they yield also good practice for more advanced climbers, when the object is the attainment of speed in the step in both the ascent and descent. They are also essentially practical and lead direct to the next section. A chief point to be observed in them is, that the equipoise of the body shall be sustained by the rest, in



position, of the extremities of the limbs, upper and lower; and they are consequently very valuable for the strengthening of these parts.

In the early stages of practice these poles should be fixed at the top and bottom, but afterwards, and especially when carried into the next section, the poles should be detached and simply laid against the beam or wall, to be steadied in their place by a comrade above or below, or left entirely to the government of the climber.

With beginners the instructor will require to be strict as to position and action, as on the accuracy of these depend the ease and safety of the ascent; these correctly acquired, and the poles fixed securely, there is little or no danger from falls, and none from any other source. Every opportunity should be seized of cultivating these exercises, for the reasons stated above, and also for the reasons advanced for the practice of those on the single slanting and turning poles.

The position of the instructor should be on the left of the machine, facing it.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No. II.	Single Series.	No. 1	The right hand leading, the feet outside the poles.	<p><i>Ready.</i> Position of attention facing the poles, the toes touching them.</p> <p><i>Climb.</i> (1.) Lean forward, and, with the right hand at the half reach, grasp the right pole, the left hand following on the left pole. Place the right foot on the outside of the right pole, the knee on the inside, the left foot following on the left pole. Extend and sustain the trunk between and in the line of the poles, the head held back and the eyes directed to the reach of the hands.</p> <p>(2.) Raise the right hand to the reach, the left following on the left pole, draw up the lower limbs and elongate the trunk to the rest of the hands.</p> <p><i>Halt.</i> Complete the step.</p> <p><i>Down.</i> Slip the left hand to the rest, the right following on the right pole, and lower the body to the reach of the hands.</p> <p style="text-align: right;">This exercise to be repeated with the left hand leading.</p>	



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	Single Series.	No. 2	The right hand leading, the feet inside the poles.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Lean forward and grasp the poles as in first exercise. Place the right foot on the inside of the right pole, the knee outside, the left foot following on the left pole, the trunk of the body as in first exercise. (2.) As in first exercise. Complete the step. As in first exercise.  This exercise to be repeated with the left hand leading.
N° II.	Single Series.	No. 3	Right and left side.	<i>Ready.</i> <i>mb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise to the position. (2.) Raise the right hand to the reach, draw up the right foot and elongate the trunk to the rest of the left hand. Complete the step. Pass the leading hand to the rest, extending the corresponding leg, lowering the body to the reach of the supporting hand, and bending the corresponding leg.  This exercise to be repeated with the lower limbs as in second exercise.
N° II.	Single Series.	No. 4	Right and left, hand and foot.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise to the position. (2.) Raise the right hand to the reach, draw up the left foot and elongate the trunk to the rest of the left hand. Complete the step. Pass the leading hand to the rest, extending the opposite leg, lowering the body to the reach of the supporting hand, and bending the opposite leg.  This exercise to be repeated with the lower limbs as in second exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	Single Series.	No. 5	Both hands at once.	<i>Ready.</i>	As in first exercise.
<i>Climb.</i>				(1.) As in first exercise to the position. (2.) Shoot up both hands to the reach, draw up the lower limbs and elongate the trunk to the rest of the hands.	
<i>Halt.</i>				Complete the step.	
<i>Down.</i>				Slip both hands to the rest, and lower the body to the reach of the hands.  This exercise to be repeated with the lower limbs as in second exercise.	

### THE MAST.

This should be a Norway spar, not less than 12 inches or more than 15 inches in diameter at the base, and diminishing gradually towards the top. It should be chosen for its straightness and freedom from knot or blemish of any kind, planed smooth and scraped or rubbed with sand-paper.

All the exercises on this machine are of an arduous kind, requiring strong and combined effort from the entire frame.

The power of climbing a perfectly smooth column or pillar may be greatly increased by practice; but such practice with the young or less robust must be conducted with much care and discretion, because during part of the combined movement comprising the step, the mast presses on the front and lower region of the chest, and therefore interferes with the freedom of respiration. For this reason short distances only should be attempted in the initiatory lessons.

The position of the instructor should be the same with this machine as with the vertical pole.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> III.	No. 1	No. 1			
	WITH HANDS AND FEET.		Hand over hand.		
				<i>Ready.</i>	Position of attention facing the mast.
				<i>Climb.</i>	(1.) Raise the right hand to the reach, half encircling the mast on the right side, the palm of the hand open, the fingers extended but touching each other, the left hand following, half encircling the mast on the left side. Lift the right foot from the ground and place it on the left side of the mast, the knee to the right, the front of the leg crossing the mast diagonally; lift the left foot from the ground and pass it to the opposite side of the mast, the knee to the left, the calf of the leg crossing it diagonally; the trunk of the body erect, the head bent well back. (2.) Pass the left hand to the reach, draw up the lower limbs and elongate the trunk to the rest of the right hand.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	Pass the leading hand to the rest, lower the body to the reach of the supporting hand.
N <sup>o</sup> IV.	No. 1	No. 2			
	WITH HANDS AND FEET.		The hands overlapped.		
				<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	(1.) Raise the right hand to the reach as in first exercise. Raise the left to the reach as in first exercise, but in a line with the right, the left hand overlapping the right and its fingers finding a grip on the ledge formed by the roots of the fingers and knuckles of the right. Lift the feet from the ground and clasp the mast as in first exercise. (2.) Raise the left hand to the reach, the right following and taking the overlap.
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	As in first exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 1 WITH HANDS AND FEET.	No. 3	The hands interlaced.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands to the reach, encircling the mast, separate the fingers of each hand as they approach each other and closely interlace them, the points of the fingers firmly pressing the back of the opposite hand. Lift both feet from the ground and clasp the mast as in first exercise. (2.) Shoot up both hands to the reach without relaxing the intergrasp, draw up the lower limbs and elongate the trunk to the rest of the hands. Complete the step. Slip both hands to the rest, retaining the intergrasp, lower the body to the reach of the hands.
N° V	No. 1 WITH HANDS AND FEET.	No. 4	To walk the mast.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands to the reach and grasp the mast, right and left, with the open palms. Lift the right foot and place it with the sole flat against the face of the mast, the left following; the upper and lower limbs straight, the back arched upwards, the head bent back, the eyes directed to the reach of the hands. (2.) Raise the left hand, and at the same time lift the right foot half the distance of the step; incline to the left, raise the right hand, and at the same time lift the left foot the full distance of the step. Complete the step. Slip the leading hand and leading foot down the distance of the step. This is the most rapid mode of climbing the mast; it should always be performed with the naked foot. It may also be performed on the vertical pole fixed or suspended, on the slanting pole, and on the pair of slanting poles.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No V.	No. 2	WITH THE HANDS ONLY.	Single exercise.	<p><i>Ready.</i> <i>Climb.</i></p> <p><i>Halt.</i> <i>Down.</i></p>	<p>As in first exercise.</p> <p>(1.) Raise both hands to the reach and encircle the mast as in third exercise. Lift both feet from the ground, bending the arms to the half reach, the lower limbs pendent on each side of the mast, the knees slightly bent, the rest of the body as in first exercise.</p> <p>(2.) Shoot up both hands the distance of the reach, retaining the intergrasp, and by the same action elevate the body, leaving the arms bent as at the half reach.</p> <p>Complete the step.</p> <p>Slip both hands the distance of the rest, retaining the intergrasp, and at the same time lower the body, leaving the arms bent as at the half reach.</p>
					<p style="text-align: center;">TO DESCEND RAPIDLY.</p> <p>Take the overlap or intergrasp, bring the head upright and guide the rate of speed by the pressure of the upper and lower limbs, in a continuous descent.</p>
					<p style="text-align: center;">TO REST ON THE MAST.</p> <p style="text-align: center;"><i>To rest the Lower Limbs.</i></p> <p>1st. Reverse their position on the mast.</p> <p>2nd. Take a secure grasp of the mast with the hands, and, slowly detaching the lower limbs, stretch them down by the sides of the mast.</p> <p style="text-align: center;"><i>To rest the Upper Limbs.</i></p> <p>Detach them one at a time from the mast, and, opening the fingers and palm, and relaxing every muscle of the hand and arm, let it hang by the side, or hold it in a position the reverse of that which it occupied during the ascent.</p> <p style="text-align: center;"><i>To rest the Trunk.</i></p> <p>Strongly clasp the mast with the lower limbs, slowly separate the grasp of the hands, so as to set the chest and abdomen free.</p>



## THE VERTICAL ROPE.

This machine consists merely of a suspended rope, which may be of any length. There should be at least three of these ropes in a gymnasium, of the respective diameters of  $\frac{1}{2}$  an inch, 1 inch, and 2 inches. Too much care cannot be taken in selecting them, especially for the practice of beginners, with whom the grip of the rope with either hands or feet is uncertain and insecure, and greatly affected by the condition of the rope.

It will be seen by comparing the exercises on the vertical rope with those on its companion machine, the vertical pole, that there is a marked similarity between them.

The exercises on both machines divide themselves into two series, which are marked by the same distinctions, viz., that the exercises of the first are executed by the efforts of the entire body, and those of the second by the efforts of the upper limbs alone.

The first series on the rope is larger than that on the pole, because it admits of a greater number of modes of employing the lower limbs; the "full turn" and the "stirrup" being peculiar to the rope, and each of these is an admirable mode of climbing in both an elementary and a practical sense. In the latter view, the "stirrup" is specially valuable, as the rest in this position relieves the upper limbs, and in a great measure sets one hand free to execute any purpose for which the ascent may have been made; this exercise can only be performed on a loose rope, and although a comparatively slow manner of ascending, it is generally found to be the easiest to beginners, as it affords a very firm hold to the feet; these must only be lifted sufficiently high to bring the hand to the rest when the step is completed.

The second series is in all respects identical with the corresponding one on the pole, except that it contains no exercises with both hands at once; this being possible only in the first series, where the clasp of the lower limbs holds the rope firm and straight, and thus enables the hands, without quitting the rope, to pass upwards. This series on the rope, however, admits of another exercise, in character almost identical with the sixth on the pair of poles, in which the lower limbs are held straight to the front at a right angle to the body of the climber and the machine.

The first series should be carefully practised before the learner is allowed to begin the second; and the instructor must be careful to give the "halt" when the slightest symptom of fatigue or irregularity in the step appears. The learner should be instructed to be careful in keeping the column of the body perfectly upright in the line of the rope, and held close in, with the face at the hands, when at the rest; and also in keeping the eyes steadily directed to the reach of the hands, as recommended in the text, and on no account to direct them downwards, or far above the reach, or to allow the head to fall from the perpendicular line of the body. Neglect of these rules does not merely involve the loss of the equilibrium, but it distracts and divides the attention of the climber, besides giving an appearance of timidity to his efforts.



In the event of a slip the effort must be, not, as with the pole, to slip downwards, for the rope passing through the hands of a falling man would cut it to the bone, but to re-grasp the rope. In all the exercises of the second series care must be taken that the climber has no articles of clothing hanging loose or standing prominent about the breast or waist, especially in the descent; as, after the sense of touch has been deadened by the climb, the hand may grasp these instead of the rope in passing to the rest.

It is also most desirable to accustom the climber to halt more than once during the ascent, and to change from one exercise to another on each re-commencement of it. This is useful, not only for elementary, but for practical purposes, as it enables the climber to continue his ascent far beyond the distance attainable by a single mode of climbing, and also relieves, by a change of action and position, the parts engaged.

The position of the instructor should be the same as with the vertical pole.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No II.	No. 1	No. 1	The right hand leading, the rope at the half turn.	<i>Ready.</i> <i>Climb.</i>	Position of attention facing the rope. (1.) Raise the right hand to the reach and grasp the rope, the left following. Lift the right foot from the ground and place it against the left side of the rope, the knee to the right; lift the left foot and place it in front of the rope, the ankles crossing, the outside edges of the feet together (the rope between them), the whole column of the body upright, the chest advanced, the shoulders flat, the elbows in by the sides, the hands at the half reach, the neck free, the head slightly bent back, the chin elevated, the eyes directed to the reach of the hands. (2.) Raise the right hand to the reach and grasp the rope, the left following; draw up the lower limbs without relinquishing the clasp of the rope, tighten the clasp when elevated, straighten the knees, and elongate the trunk to the rest of the hands.
				<i>Halt.</i> <i>Down.</i>	Complete the step. Pass the left hand to the rest, the right following; lower the body to the reach of the hands. This exercise to be repeated with the left hand leading.







Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1  WITH HANDS AND FEET.	No. 4	Hand over hand.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Pass the left hand to the reach and grasp the rope, draw up the lower limbs, straighten the knees, and elongate the trunk to the rest of the right hand.  Complete the step. Pass the leading hand to the rest and grasp the rope, lower the body to the reach of the supporting hand.  This exercise to be repeated with the feet in the positions of second and third exercises.
N° III.	No. 1  WITH HANDS AND FEET.	No. 5	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise both hands to the reach and grasp the rope ; lift both feet from the ground and clasp the rope in the position of first exercise, bringing the hands to the half reach : the rest of the body as in first exercise. (2.) Shoot up both hands to the reach, draw up the lower limbs, straighten the knees, and elongate the trunk.  Complete the step. Slip both hands to the rest, lower the body to the reach of the hands.
N° IV.	No. 2  WITH THE HANDS ONLY.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>	Position of attention facing the rope. (1.) Raise the right hand to the reach and grasp the rope, the left following ; lift both feet from the ground and pass them to the right side of the rope, the knees straight, the legs together and slanting to the front, the toes pointed in the same direction, the trunk of the body firm and upright, the chest advanced, the shoulders flat, the elbows in by the sides, the hands at the half reach, the head slightly bent back, the eyes directed to the reach of the hands.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Halt.</i> <i>Down.</i>	(2.) Raise the right hand to the reach and grasp the rope, the left following; elevate the body to the half reach of the hands. Complete the step and clasp the rope with the feet as in first exercise, first series. Slip the left hand to the rest, the right following, slacken the clasp of the feet, and lower the body to the reach of the hands. This exercise to be repeated with the left hand leading, the lower limbs on the left side of the rope.
N° IV.	No. 2 WITH THE HANDS ONLY.	No. 2	Hand over hand.	<i>Ready.</i> <i>Climb.</i> <i>Halt.</i> <i>Down.</i>	As in first exercise. (1.) Raise the right hand to the reach and grasp the rope, the left following; lift both feet from the ground, the legs straight, the toes pointed downwards, and slightly turned out (the rope lying between them), the column of the body perfectly upright, the hands at the half reach, the head erect, the eyes directed to the reach of the hands. (2.) Pass the left hand to the reach, elevating the body to the rest of the right. Complete the step and clasp the rope with the feet as in first exercise. Unclasp the lower limbs and come to the position; pass the leading hand to the rest and grasp the rope, lower the body to the reach of the supporting hand.
N° V.	No. 2 WITH THE HANDS ONLY.	No. 3	Sitting.	<i>Ready.</i> <i>Climb.</i>	As in first exercise. (1.) Raise the right hand to the reach and grasp the rope, the left following; lift both feet from the ground until the lower limbs are extended horizontally, the knees straight and together, the toes pointed to the front, the trunk of the body upright, the neck free, the head slightly bent back, the eyes directed to the reach of the hands.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
					<p>(2.) Raise the right hand to the reach and grasp the rope, the left following; elevate the body to the half reach of the hands.</p> <p><i>Halt.</i> Complete the step and clasp the rope with the feet as in first exercise.</p> <p><i>Down.</i> As in first exercise.</p> <p style="text-align: center;">This exercise to be repeated with the left hand leading, and hand over hand.</p>
No V.	No. 3			<i>Ready.</i>	As in first exercise.
	WITH ONE HAND.	Single exercise.		<i>Climb.</i>	<p>(1.) Raise the right hand to the reach and grasp the rope. Spring from the ground and clasp the rope with the feet as in first exercise, first series, bringing the right hand to the half reach, place the left hand on the hip joint, the fingers to the front, the thumb to the rear, the rest of the body in the position of first exercise, first series.</p> <p>(2.) Tighten the clasp of the feet, raise the right hand to the reach, draw up the lower limbs, straighten the knees, and elongate the trunk.</p>
				<i>Halt.</i>	Complete the step.
				<i>Down.</i>	<p>Slip the right hand to the rest, lower the body to the half reach of the hand.</p> <p style="text-align: center;">This exercise to be repeated with the left hand.</p>



### THE SLANTING ROPE.

This machine may be a rope of any length, and it may be fixed at any inclination, but for general purposes the angle should be about that recommended for the slanting pole. A two-inch rope of medium hardness is the best for general use.

The majority of the exercises on this machine are the same as those on the slanting pole, and are not given at full in the text, to avoid repetition. In all cases they are capable of being more fully applied practically, indeed, in this respect it is difficult to over-estimate their importance, as any altitude or distance within the capacity of the climber, and any degree of inclination between the horizontal and vertical lines may be attempted; for the rope being once fixed, the practised gymnast will traverse it as easily and as readily as if it were a bridge he chanced to encounter on the march.

When the rope is horizontally placed, all the five exercises belonging to this machine may be executed reversing the direction of the body, the feet instead of the hands leading. This mode increases the difficulty of the three first slightly, and of the last considerably. The climber should also be taught how to suspend arms and knapsack to the machine by one long open loop, into which either foot may be inserted and withdrawn at will, so that in traversing the machine these may be conveyed along it, and their weight be borne by it, the effort required to move it being limited to the inward pull of the foot as executed in the ordinary movement of the step.

The learner should be well practised in coming to the "halt," either resuming the step of the ascent, or passing to another; and, as the upper limbs, especially the hands, have the most fatiguing duty to perform, he should be taught to rest them, when necessary, in the modes directed in the text.

All these movements he should be taught to make at the "halt," on machines of varied inclination, at different points of elevation, and while executing any exercise on this machine during either the ascent or descent.

The position of the instructor should be behind the climber at starting,—walking by the side when he has attained any height.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	Single Series.	No. 1	Hand over hand, alternate feet.	<p><i>Ready.</i></p> <p><i>Climb.</i></p> <p><i>Halt.</i></p> <p><i>Down.</i></p>	<p>Position of attention, facing the upright, under the rope.</p> <p>(1.) Raise the right hand to the reach and grasp the rope, the left following. Lift both feet from the ground, throw the left leg, with the knee bent, over the rope, the right held suspended under it; the column of the body held in the line of the rope, the head bent back, the arms bent as at the half reach, the eyes directed to the reach of the hands.</p> <p>(2.) Advance the left hand to the reach, and, with a slight lateral oscillation of the trunk, remove the left leg and throw the right over the rope, as much in advance of the place vacated by the right as the reach of the left hand.</p> <p>Complete the step, and throw the suspended knee over the other.</p> <p>Pass the right hand to the rest, lower the body to the reach of the left hand.</p>
TO REST ON THE SLANTING ROPE.					<p>(1.) Press the fore-arm of the leading hand from the outside inwards, over the rope, and rest on the inside of the fore arm near the elbow.</p> <p>(2.) Press the whole arm over the rope from the inside outwards, resting on the under side of the upper arm, near the armpit.</p> <p>(3.) Press the supporting hand down on the rope, and pass the left leg over the rope until the thigh reaches it, and rest seated on the rope as in first exercise, second series, on the horizontal bar.</p>



### THE ROSARY.

This machine consists of a vertical rope, on which are strung at intervals elm beads, turned to the shape of half a ball, 4 inches in diameter, the flat side being upwards. The rope should not be less than 15 feet or more than 20 feet high, and  $\frac{3}{4}$  of an inch in diameter. Where there are several of these machines the beads may be strung at intervals ranging from 9 to 18 inches, but where there is but one machine, 12 inches is a good medium distance. The beads may be supported by oak pins about a quarter of an inch in diameter, run through the strands of the rope and bound in with twine. The practical form of this machine is the rope with knots.

The single exercise on this machine is a very valuable one for elementary practice, as it shows at a glance the perfect action of the step on all climbing apparatus; for it is on this only that the perfect rest for the foot, and the adequate fulcrum for the effort in straightening the knee and elongating the trunk, are obtained. When, therefore, it is desirable to show to a beginner the precise movements which go to make the step in climbing, and their sequence, he should be taken to the rosary and have there explained to him that these same consecutive movements compose the step on all climbing machines where both hands and feet are engaged; the firmness of the clasp of the lower limbs supplying the rest presented to the soles of the feet by the beads of the rosary.

As a purely elementary exercise it is valuable also on account of the employment which it gives to the muscles of the back.

In the initiatory instruction care must be taken that the climber preserves the position perfectly, for the tendency of the action of straightening the knees is to push the feet to the front, and with them the lower part of the rosary, thus throwing the weight of the body on the arms. A fall from this machine is always severe.

The position of the instructor should be immediately beneath and behind the climber, with the right hand disengaged, and the left steadying the machine when it is not fixed at the lower end.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	Single Series.	Single exercise.	<i>Ready. Climb.</i>	<i>Halt. Down.</i>	<p>Position of attention facing the rosary.</p> <p>(1.) Raise the right hand to the reach and grasp the rope, the left following. Lift both feet from the ground and place them on the first bead, the toes together and pointed straight to the front, the heels also together, the rope, as it were, rising from the hollow between the feet and ascending in front of the ankle joint, the knees straight, the trunk upright, the chest advanced, the shoulders flat and square to the front, the head slightly bent back, the eyes directed to the reach of the hands.</p> <p>(2.) Raise the right hand to the reach, the left following; lift both feet and place them on the second bead, straighten the knees and elongate the trunk.</p> <p>Complete the step.</p> <p>Pass the left hand to the rest, the right following, slightly separate the feet, and retaining the lower limbs perfectly straight, and the rest of the body in position, lower the feet to the next bead.</p> <p>NOTE.—This exercise may be varied and the difficulty progressively increased by the climber passing one, two, or more beads at each step, giving special care to the hand-grasp during the elongatory movement of the trunk.</p>
TO REST ON THE ROSARY.					<p>(1.) Press the chest and shoulders to the front, thereby bringing the weight almost entirely on the feet.</p> <p>(2.) Press the breast, cheek, and temple of one side against the rope, at the same instant relieving, by change of position, the corresponding hand.</p> <p>(3.) Press both feet to the front, and sit on the nearest bead. The entire descent may be made in this manner.</p>



## SECTION V.

## ESCALADING.

THIS section is essentially practical, and while presenting several new forms of apparatus, each affording many new exercises, it also reproduces in an altered form the greater number of the machines of the preceding section, and gives a direct application, in a professional aspect, of all that has been acquired since the first rudimentary lessons in the preparatory movements and positions.

The leading idea in escalading is the surmounting of a wall or other obstacle too elevated to be surmounted by leap or vault. To effect this the first thought which would naturally present itself to the soldier would be to search on its surface for such means, either in the form of projections or indentations, as would enable him to scale it; and failing in this, to bring against it other and extraneous means, either such as, resting on the ground, might be laid slanting against its face, or such as might be attached to and hang from its summit. These two means of enabling the soldier to surmount an elevated obstacle suggest the apparatus of this section.

But it must never be forgotten that although the apparatus is generally applied to the surmounting of elevated obstacles, as being best suited to the gymnasium, yet the same apparatus, when laid horizontally, and many of the exercises taught on vertical or slanting machines, would be equally effective in traversing sunken obstacles, such as ditches, canals, ravines, &c., forms of obstruction to be encountered as frequently, and presenting difficulties as great as any other, and equally capable of being overcome by the power acquired in gymnastic training.

For the first method of escalading, a wall is prepared presenting three modes of ascent, the "hole," the "projection," and the "groove," by which are afforded a considerable number of exercises of progressive difficulty.

For the second, a set of machines has been specially constructed, consisting of the inclined wooden ladder, the vertical rope, and the plank, together with special adaptations of many of the machines used in free climbing. Other apparatus belonging to other sections may also be applied in this, but incidentally only, as they present no special mode of arrangement and originate no new exercise.

These are the simple and separate machines, the materials by which escalading is effected, but their skilful combination in other constructions constitutes their ultimate and legitimate form, and in



such combination alone can be demonstrated their peculiar and important purpose. Where practicable, the walls and internal roof of the gymnasium should be utilized for this purpose.

For open air practice there are several forms of structure by which escalading apparatus may be combined, and their various exercises executed in competitive effort.

The *Octagon* is a structure of French origin, presenting in an attractive form, two modes of escalading, the one by the different modes of climbing the vertical fixed pole, and the other by several of the second series of exercises on the horizontal bar.

The *Great Cross Beam* is another structure less attractive than the former, but much more comprehensive and practically useful, as in it may be combined much of the apparatus for escalading; for not only the poles and ladders arranged at its terminating platforms, but also the various apparatus suspended from the central beam, and used primarily for purely elementary exercises, such as the trapezium and pair of rings, may all be made subservient to this end, and employed as apparatus by which to ascend to and descend from the beam or platform above.

A third structure, superior to either of these, because in it may be combined every article of apparatus capable of being applied to escalading purposes, and also because this form and manner of its application assume a semblance of reality unshared by any other, is the *Fort*. These three structures are described hereafter.

As in free climbing, each exercise in escalading consists of a position and a step, the one indicated by the figure (1), and the other by the figure (2), both being included in the word "climb"; but whereas the ascent and descent constitute the entire exercise in climbing, in escalading they form but one half of it, the other half consisting of the transferring of the body from the vertical or slanting object by which the ascent has been made, to the horizontal one in which it is to terminate, and to attain which the ascent has been made. This act of transfer to and from the horizontal object is made to form a separate series for special practice under the title of *Preliminary Exercises*, which, when mastered, are to be embodied in the exercises on the separate machines. But it is not desirable that this complete form of escalading should be practised until the fifth course, unless with the simplest kinds of apparatus, such as the inclined ladder, and even then such apparatus should reach above the wall. The practice of escalading in the earlier courses should consist merely of the ascent and descent, without the transfer to the wall or platform.



### THE PREPARED WALL.

This machine should be constructed of yellow deal boarding, nailed on a strongly braced wooden framing, strutted so as to render the whole as firm as possible. The height of the wall should be from 20 feet to 25 feet. An excellent method of constructing this wall is to have both sides of it alike, thus giving a duplicate of each kind of apparatus; by this means the learner can ascend by one side, mount on the top and descend by the other. Thus a whole squad of men are enabled to perform the exercises in rapid succession.

The apparatus for this method of escalading is as follows:—

- (1.) *Holes.* These should be cut in the boarded front of the wall; they should be 4 inches long and 3 inches high, 18 inches apart in width, and 9 inches apart in height.
- (2.) *Projecting Blocks.* These should be screwed to the face of the wall; they should be  $2\frac{1}{2}$  inches thick and 4 inches long, and arranged at the same distances apart as the holes.
- (3.) *Horizontal Grooves.* These should be 1 inch deep,  $1\frac{1}{2}$  inches wide, 9 inches apart, and about 3 feet long.

This is in reality but one machine, although its triple form and the varying difficulty of performing the same exercises on these different compartments, might justify its being given as three separate machines. The first compartment has a series of holes arranged at regular intervals into which the hand and foot may be inserted, and of sufficient depth to yield a full grasp to the hand and complete rest to the foot; the second has a series of projecting knobs, similarly arranged, yielding only partial grasp to the hand and rest to the foot; and the third has a series of shallow grooves, affording a still more reduced space for the hand and foot.

Thus it will be seen that with this machine, not only the exercises themselves regularly rise in difficulty, but its triple form itself gives threefold scope to this progressive variety.

The exercises naturally divide themselves into a first and second series, on the same principle as that which distinguishes the series in all vertical climbing apparatus; the first series comprising those exercises in which both the upper and lower limbs and trunk aid in the ascent; the second, those in which the ascent is accomplished by the action of the upper limbs alone.

Apart from the practical importance of these exercises, which is of the highest order, they possess also considerable elementary value.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No V.	PRELIMINARY EXERCISES.	No. 1	To pass from the face of the wall to a platform or floor.	Without word of command.	<p>Raise the right hand and grasp the edge of the platform, the left following on the left at the distance; advance the right fore-arm upon the platform, resting on the under side of the arm, the elbow bent, the hand closed, the left following on the left at the distance. Lean on the right arm and lift the left leg with the knee bent upon the platform, resting on the inner side of the knee and foot, at the same time straighten the left arm, open the hand and rest upon the palm only. Press strongly with the right arm and straighten it, advance the left hand to the right front in a line with the right hand, at the distance, and at the same time bring the right knee beside the left, so as to kneel on the platform, facing the right. Draw the right foot under the body, the left following, and rise upright on the platform.</p>
No V.	PRELIMINARY EXERCISES.	No. 2	To descend from a platform or floor to the face of the wall.	Without word of command.	<p>Kneel on the platform close by its ledge, resting equally on the hands and knees, incline to the right and grasp the ledge of the platform with the right hand, the thumb on the surface, the fingers over the ledge. Slip the right leg with the knee bent over the ledge, straighten the knee and rest the foot in the nearest groove. Reverse the position of the right hand, bringing the fingers to the surface of the platform; grasp the ledge with the left in the same position, bring the left leg over the ledge and extend it beside the right, the foot in the nearest groove, the rest of the body in position.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No. V.	PRELIMINARY EXERCISES.	No. 3	To pass from the face to the top of the wall.	Without word of command.	<p>Raise the right hand and grasp the ledge of the coping, the left following on the left at the distance; advance the right fore-arm with the elbow bent, and rest it on the top of the wall, or pass it to the further side of the coping, according to the facilities of reach, choosing that which presents the surest hold, the left hand following on the left at the distance. If the fore arm rest on the top of the wall, complete the movements of the ascent as in first exercise; if the hands grasp the opposite ledge, rest on the breast, lift the left leg with the knee bent and pass it over the wall; change the position of the right hand, bringing the fingers over the ledge; draw up the right leg and come to the seat astride of the wall. Incline the body to the front, raise the left leg by the rear to the top of the wall, resting on the knee, raise the right and place it beside the left, bring the left foot to the front between the knees, the right following, quit the grasp, straighten the knees, and rise upright on the top of the wall.</p>
No. V.	PRELIMINARY EXERCISES.	No. 4	To descend from the top to the face of the wall.	Without word of command.	<p>Bend the knees, and right and left grasp the ledge of the coping. Place the left knee on the top of the wall, the right following, separate the feet right and left and come to the seat astride of the wall. Incline the body to the front, grasp the further ledge of the coping with the right hand; draw up the left leg and place it on the top of the wall, resting on the inner side of the foot and knee. Extend the right leg down the face of the wall and insert the foot in the nearest groove; draw the left from the top and place it beside the right. Bring both hands to the inner ledge, and place the rest of the body in position.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1	No. 1	The right hand leading.	<i>Ready.</i>	Position of attention facing the wall, the toes touching it.
				<i>Climb.</i>	<p>(1.) Raise the right hand and grasp the ledge of the groove nearest the reach, the left following at the distance, lift the right foot from the ground and rest it in the first groove, the left following at the distance, straighten the knees and elongate the trunk to the half reach of the hands, the whole column of the body held firm and upright, the loins and hips pressed inwards, the chest advanced and held close to the wall, the shoulders flat, the head slightly bent back, the eyes directed to the reach of the hands.</p> <p>(2.) Raise the right hand to the next groove, the left following at the distance, raise the right foot and rest it in the second groove, the left following at the distance, straighten the knees and elongate the trunk.</p> <p>(3.) As in preliminary exercise.</p>
				<i>Down.</i>	<p>(1.) As in preliminary exercise.</p> <p>(2.) Slip the right foot down to the next groove, the left following at the distance ; slip the right hand down to the next groove, the left following at the distance.</p> <p style="text-align: center;">This exercise to be repeated with the left hand leading.</p>
N° II.	No. 1	No. 2	The right side leading.	<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	<p>(1.) As in first exercise.</p> <p>(2.) Raise the right hand to the next groove, and at the same time lift the right foot to the second groove, the left hand and left foot following at the distance, straighten the knees and elongate the trunk.</p> <p>(3.) As in preliminary exercise.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Slip the right hand down to the next groove, and at the same time slip the right foot down to the next groove, the left hand and left foot following at the distance.
N° II.	No. 1  WITH HANDS AND FEET.	No. 3	Right and left side.	<i>Ready.</i> <i>Climb.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Raise the right hand to the next groove, and at the same time lift the right foot to the second groove, straighten the right knee, bend the right arm and elongate the trunk, and at the same time raise the left hand to the groove above that in which the right is placed, and lift the left foot to the third groove. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the leading hand and leading foot to the grooves below those in which the supporting hand and foot are placed.
N° II.	No. 1  WITH HANDS AND FEET.	No. 4	Right and left, hand and foot.	<i>Ready.</i> <i>Climb.</i> <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Raise the right hand to the next groove, and at the same time lift the left foot to the second groove, straighten the left knee and elongate the trunk, and at the same time raise the left hand to the groove above that in which the right is placed, and lift the right foot to the third groove. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the leading hand to the groove below that in which the supporting hand is placed, and at the same time slip the leading foot to the groove below that in which the supporting foot is placed.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° III.	No. 1 WITH HANDS AND FEET.	No. 5	Both hands at once.	<i>Ready.</i> <i>Climb.</i>          <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Shoot up both hands to the next groove. Lift both feet and rest them in the second groove, straighten the knees and elongate the trunk. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip both feet down to the next groove, retaining the lower limbs in position, slip both hands to the next groove.
N° IV.	No. 1 WITH HANDS AND FEET.	No. 6	With one hand.	<i>Ready.</i> <i>Climb.</i>          <i>Down.</i>	As in first exercise. (1.) Place the left hand on the hip joint, the thumb to the rear, the fingers to the front. Raise the right hand to the groove nearest the reach, lift the left foot to the first groove, the right following at the distance; straighten the knees and elongate the trunk to the half reach of the right hand. (2.) Raise the right hand to the next groove, and at the same time raise the left foot to the second groove, the right following at the distance, straighten the knees and elongate the trunk. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the left foot down to the next groove, the right following; slip the right hand down to the next groove.
N° V.	No. 2 WITH THE HANDS ONLY.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>	Position of attention, facing the wall, the toes touching it. (1.) Raise the right hand and grasp the ledge of the groove nearest the reach, the left following at the distance; bend the arms to the half reach of the hands, lifting the feet from the ground, the toes pointed downwards, the knees straight and together, the trunk of the body held firm and upright, the head slightly bent back, and the eyes directed to the reach of the hands.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(2.) Raise the right hand to the next groove, the left following at the distance, bend the arms and raise the body to the half reach of the hands. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the right hand down to the next groove, the left following at the distance, retaining the arms bent as at the half reach.
N <sup>o</sup> V.	No. 2 WITH THE HANDS ONLY.	No. 2	Right and left.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Raise the right hand to the next groove, elevate the body to the rest of the left hand, and raise the left hand to the groove above that in which the right is placed. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the leading hand down to the groove below that in which the supporting hand is placed.
N <sup>o</sup> VI.	No. 3 WITH A BURDEN.	No. 1	As in sixth column.	As in preceding exercise.	Carrying weights, implements, &c.
N <sup>o</sup> VI.		No. 2			Carrying arms and knapsack.

### THE INCLINED LADDER

(In front of a Wall).

This machine is an ordinary ladder, but it should be carefully constructed with respect to the quality of the wood and the finish of the workmanship, and unless special care be taken in the selection of the former, the latter may be rendered useless. Spars that will warp or shrink with use or exposure, and supports that will crack or splinter, must be scrupulously avoided. The supports of the ladder should be at the base not less than 6 inches deep, and at the top not less than 3 inches, with a width



of not less than 2 inches, the length of the spars gradually diminishing from 2 feet at the base to 15 inches at the top, and the diameter  $1\frac{1}{2}$  inches throughout; but for practical application a ladder made in all respects like the scaling ladder should also be used. The inclination of the ladder should be frequently varied, passing from the horizontal to the vertical position, requiring the hand of the instructor to steady it.

It may seem unnecessary to teach by formal instructions exercises so simple as those directed in the text to be performed on this machine, but their usefulness may be readily proved. Let a dozen men be taken at hazard from the ranks, and desired to climb a ladder at any given incline, and it will be found that scarcely two will do so in the same manner, scarcely two will maintain throughout the ascent the position and action with which they began, while uncertainty, hesitation, and insecurity will more or less mark the efforts of all. The practised gymnast, on the contrary, will mount it as surely and as rapidly as if it were a staircase, in any one of a dozen different ways, on its being merely indicated by the name which it bears in his book of instructions,—will ascend with his rifle in his hand, or descend with his comrade in his arms.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  FREE.	No. 1	The right hand leading.	<i>Ready.</i>	Position of attention, at the foot of the ladder, the toes touching it.
				<i>Climb.</i>	(1.) Raise the right hand and grasp the spar nearest the reach, the left following, the fingers and thumbs together. Lift the right foot from the ground, and place it on the first spar, the left following, resting on the hollow of the foot, the toes pointed to the front, the column of the body and lower limbs straight but unconstrained, and inclined in the line of the ladder, the head erect, the eyes directed to the reach of the hands. (2.) Raise the right hand to the next spar, the left following, lift the right foot to the second spar, the left following. (3.) As in preliminary exercise.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Slip the right foot down to the next spar, the left following, slip the right hand down to the next spar, the left following.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1  FREE.	No. 2	The right side leading.	<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	(1.) Raise the right hand to the spar nearest the reach, and at the same time lift the right foot to the first spar, the left hand and left foot following on the left, straighten the knees and elongate the trunk. (2.) Raise the right hand to the next spar and at the same time lift the right foot to the second spar, the left hand and left foot following. (3.) As in preliminary exercise.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Slip the right hand down to the next spar, and at the same time slip the right foot down to the next spar, the left hand and left foot following.
N <sup>o</sup> II.	No. 1  FREE.	No. 3	Right and left side.	<i>Ready.</i>	As in first exercise.
				<i>Climb.</i>	(1.) Raise the right hand to the spar nearest the reach, and at the same time lift the right foot to the first spar; straighten the knee, bend the arm and elongate the trunk, raise the left hand to the spar above that grasped by the right, and lift the left foot to the second spar. (2.) Raise the right hand to the next spar, and at the same time lift the right foot to the third spar. (3.) As in preliminary exercise.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Pass the leading hand to the spar below that grasped by the supporting hand, and the leading foot to the spar below that on which the supporting foot is placed.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  FREE.	No. 4	Right and left, hand and foot.	<i>Ready. Climb.</i>          <i>Down.</i>	As in first exercise. (1.) Raise the right hand to the spar nearest the reach, and at the same time lift the left foot to the first spar. (2.) Straighten the left knee, bend the right arm, elongate the trunk, and at the same time raise the left hand to the spar above that grasped by the right, and lift the right foot to the second spar. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Pass the leading hand to the spar below that grasped by the supporting hand, and the leading foot to the spar below that on which the supporting foot is placed.
N° III.	No. 1  FREE.	No. 5	With one hand.	<i>Ready. Climb.</i>          <i>Down.</i>	As in first exercise. (1.) Place the left hand on the hip joint, the fingers to the front, the thumb to to the rear. Raise the right hand and grasp the spar nearest the reach, lift the left foot and place it on the first spar, the right following. (2.) Raise the right hand to the next spar, lift the left foot to the second spar, the right following. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the left foot down to the next spar, the right following, slip the right hand down to the next spar.
N° III.	No. 1  FREE.	No. 6	With the feet only.	<i>Ready. Climb.</i>	As in first exercise. (1.) Place both hands on the hip joints, lift the right foot from the ground, and place it on the first spar, the left following, the feet advanced on the spar so that the rest is nearly at the heel, and the front of the leg touching, and lightly pressing against the second spar, the column of the body inclined to the front, the head in the same line and the eyes directed to the front.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
					<p>(2.) Lift the right foot to the second spar, the left following.</p> <p>(3.) As in preliminary exercise.</p> <p><i>Down.</i> (1.) As in preliminary exercise.</p> <p>(2.) Slip the right foot down to the next spar, the left following.</p> <p>All the foregoing exercises may be executed with the hands <i>guiding</i>, <i>i.e.</i>, lightly grasping the supports of the ladder—on the surface, if the incline be slight, and under the supports, if the incline be great—with one or both hands, each step to be the distance of the space between the spars. The word “guiding” to be added to the title of the exercise when given.</p> <p>The first and second series on the bridge ladder may also be executed on this machine.</p>
N° VI.	No. 2	No. 1			Carrying weights, implements, &c.
N° VI.	WITH A BURDEN.	No. 2	As in sixth column.	As in first exercise.	Carrying arms and knapsack.
					<p style="text-align: center;">TO DESCEND RAPIDLY.</p> <p>Pass the right leg over the support, the knee bent, the fore-leg pendent, the left following on the left. Pass the right hand to the outside of the support and grasp it on the underside, the fingers and thumb together, the left following on the left. Regulate the rate of the descent by the pressure of the hands.</p>



THE PLANK

(Inclined against a Wall).

This machine represents the plank used for ordinary building purposes. Care must be taken to select one thoroughly free from flaws or splinters. A yellow deal plank, 12 inches or 14 inches wide and 2 inches thick, is the best for gymnastic practice, the edges should be slightly rounded, and the whole rubbed perfectly smooth.

It is desirable to vary the inclination on different days of practice, but that recommended for general use for all climbing apparatus, namely, 45 degrees, will be found to be the best for ordinary purposes. When rehearsing the different exercises, and on inspections, the plank should reach the wall, and its upper extremity rest on it, but at other times, for the sake of the practice, it should not reach within 3 feet of the top.

There is no machine more simple than this, and none which may be made more directly and practically useful. All its exercises are of a simple kind, requiring and giving in their practice suppleness rather than strength.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1  WITH HANDS AND FEET.	No. 1		<i>Ready.</i>  <i>Climb.</i>	Position of attention, facing the plank, the toes touching it. (1.) Lean forward, raise the right hand and grasp the edge of the plank at the half reach, the left following on the left, the fingers under, the thumbs above and pointed upwards. Lift the right foot from the ground, and, bending the knee, place it on the plank; incline the body to the right, resting on the right foot; lift the left foot and place it beside the right, resting on the fore part of the feet, the toes pointed up the plank, the knees bent, the back raised, the arms straight and firm, the head bent back, the eyes directed to the reach of the hands. (2.) Raise the right hand to the reach, the left following on the left; incline the body to the front, resting on the hands; draw up the right foot the distance of the step, the left following on the left. (3.) As in preliminary exercise.
			The right hand leading.		



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Rest upon the hands, slip down the right foot the distance of the step, the left following on the left; rest upon the feet, slip down the right hand as far as the rest, the left following on the left.
N° II.	No. 1  WITH HANDS AND FEET.	No. 2	The right side leading.	<i>Ready. Climb.  Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Slightly incline the body to the left front, raise the right hand to the reach, and at the same time raise the right foot the distance of the step; slightly incline the body to the right front, let the left hand follow on the left, and at the same time bring the left foot beside the right. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slightly incline the body to the left rear, slip the right hand down as far as the rest, and at the same time slip the right foot down the distance of the step; slightly incline the body to the right rear, let the left hand follow on the left, and slip the left foot down beside the right.
N° II.	No. 1  WITH HANDS AND FEET.	No. 3	Right and left side.	<i>Ready. Climb.  Down.</i>	As in first exercise. (1.) As in first exercise. (2.) As in preceding exercise to the first step; in the second slightly incline the body to the right front, raise the left hand and left foot the distance of the first step in advance of the right hand and right foot. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Strongly incline the body to the rear of the supporting side; slip the leading hand and foot the distance of the step below the supporting hand and foot.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° II.	No. 1  WITH HANDS AND FEET.	No. 4	Right and left, hand and foot.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in first exercise.  (1.) As in first exercise.  (2.) Slightly incline the body to the right front, raise the left hand and draw up the right foot a short step; on the second step strongly incline the body to the left front; advance the right hand and draw up the left foot the distance of the first step in advance of the left hand and right foot.  (3.) As in preliminary exercise.  (1.) As in preliminary exercise.  (2.) Strongly incline the body to the rear of the supporting foot, slip the leading hand and leading foot the distance of the first step below the supporting hand and foot.
N° III.	No. 1  WITH HANDS AND FEET.	No. 5	Both hands at once.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in first exercise.  (1.) Stoop forward, raise both hands and grasp the edges of the plank as in first exercise; the rest of the body as in first exercise.  (2.) Rest on the feet, shoot up both hands to the reach, incline the body to the front, resting on the hands, draw up both feet the distance of the step.  (3.) As in preliminary exercise.  (1.) As in preliminary exercise.  (2.) Rest on the hands, slip the feet down the distance of the step; incline the body to the rear, resting on the feet, bring the hands down as far as the rest.  As a second series repeat the whole of the preceding exercises, substituting the knee for the foot.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 3  WITH THE HANDS ONLY.	No. 1	The right hand leading.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	Position of attention, facing the plank, the toes touching it. (1.) Lean forward and with the right hand grasp the edge of the plank, the left following on the left, bend the arms and raise the body to the half reach of the hands, the column of the body aligned down the centre of the plank, the head slightly bent back, the breast advanced, the legs together, the knees together, the feet together and pointed downwards, the surface of the foot resting on the plank. (2.) Raise the right hand to the reach, the left following on the left, draw up the body to the half reach of the hands. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the right hand down as far as the rest, the left following on the left, lower the body to the reach of the hands.
N° IV.	No. 3  WITH THE HANDS ONLY.	No. 2	Right and left.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in first exercise. (1.) As in first exercise. (2.) Raise the right hand to the reach, at the same time elevate the body to the rest of the left; raise the left hand to the reach, at the same time elevate the body to the rest of the right. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the right hand down to the rest, lower the body to the reach of the left.
N° V.	No. 3  WITH THE HANDS ONLY.	No. 3	Both hands at once.	<i>Ready.</i> <i>Climb.</i>	As in first exercise. (1.) Lean forward, raise both hands and grasp the edges of the plank at the reach, the rest of the body as in first exercise. (2.) Shoot up both hands to the reach, draw up the body to the half reach of the hands. (3.) As in preliminary exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preliminary exercise.  (2.) Slip both hands down to the rest, lower the body to the reach of the hands.
N <sup>o</sup> V.	No. 3  WITH THE HANDS ONLY.	No. 4	Both hands at once, the double step.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in preceding exercise. (1.) As in preceding exercise. (2.) As in preceding exercise, except that the body should be raised simultaneously with the hands when they shoot to the reach, the arms remaining bent as at the half reach. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip both hands down as far as the rest, and at the same time lower the body, retaining the arms bent as at the half reach.  As a fourth series repeat the whole of the preceding exercises except the last, with the legs pendent from the knee on either side of the plank.
N <sup>o</sup> VI.	No. 5  WITH A BURDEN.	No. 1	As in sixth column.	As in first exercise.	Carrying weights, implements, &c.
N <sup>o</sup> VI.		No. 2			Carrying arms and knapsack.

THE ROPE LADDER

(Suspended in front of a Wall).

The sides of this machine, or, as they are called in the gymnasium, the supports, should be of 1½ inch hard-laid rope, and the rounds of ½ inch rope, very closely laid, and spliced at either end to the supports. Wooden rounds of rent ash should be placed at intervals of 4 or 5 feet. The rounds should be about



12 inches apart. The mode of its attachment to the ledge of the wall or platform should be the same as that of the suspended rope or pole.

The exercises on the rope ladder should be practised with the machine in two different positions; one when it is suspended from a beam and hanging free, and one when it is suspended from the top of a wall, and hanging close down its face. These two positions materially affect the nature of the difficulty of ascending and descending. When hanging free the chief difficulty lies, as in the rosary, in preserving the equilibrium, from the tendency of the feet in the downward pressure, during the straightening of the knees and the elongation of the trunk, to press the machine to the front, whereby the weight of the body is flung on the arms; and when hanging down the face of the wall, the chief difficulty lies in obtaining sufficient space on which to rest the foot. In the first case the directions given for the ascent of the rosary must be followed; and in the second, the lowest round of the ladder should be pegged to the ground, 10 or 12 inches from the wall, until the action and position of the step have been mastered; the learner should then be taught slightly to lift upwards and outwards that side of the ladder on which the foot is about to be placed.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N <sup>o</sup> II.	No. 1  FREE.	No. 1	Right and left side.	<i>Ready.</i>  <i>Climb.</i>	Position of attention, in front of the wall, the toes touching it. (1.) Raise the right hand to the reach and grasp the support, the fingers and thumb meeting, the palm of the hand inwards, the fore-arm held straight down by the side of the support; lift the right foot from the ground and place it on the first rope, resting on the hollow of the foot, the toes turned strongly outwards, the knee bent with its inner side pressed against the support, the head erect, the eyes directed to the reach of the hand, the chest advanced to the ropes, the shoulders flat, the hips pressed inwards, the whole column of the body fronting the ropes throughout the exercise. (2.) Bend the right arm, straighten the right knee, and raise the left hand to the reach, at the same time lift the left foot to the rope above that on which the right foot is placed. (3.) As in preliminary exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preliminary exercise. (2.) Slip the right foot down to the next rope, and at the same time slip the right hand down to the rest, bending the left knee, and leaving the left hand at the reach.
N° II.	No. 1  FREE.	No. 2	Right and left,—hand and foot.	<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	As in first exercise. (1.) Raise the right hand to the reach and grasp the support, and at the same time lift the left foot from the ground and place it on the first rope, the rest of the body as in preceding exercise. (2.) Straighten the left knee, bend the right arm, and at the same time raise the left hand to the reach, and lift the right foot to the rope above that on which the left is placed. (3.) As in preliminary exercise. (1.) As in preliminary exercise. (2.) Slip the right hand down to the rest, and at the same time slip the left foot down to the next rope, bending the right knee, and leaving the left hand at the reach.
N° III.	No. 1  FREE.	No. 3	With one hand.	<i>Ready.</i> <i>Climb.</i>	As in first exercise. (1.) Place the left hand on the hip joint, the thumb to the rear, the fingers to the front; raise the right hand to the reach and grasp the support; lift the left foot from the ground and place it on the first rope, bend the arm and straighten the knee, letting the right foot hang free. (2.) Raise the right hand to the reach without quitting the grasp, letting the support, as it were, slip through the hand; lift the right foot and place it with the knee bent on the rope above that on which the left is placed, straighten the knee, letting the left foot hang free. (3.) As in preliminary exercise.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preliminary exercise.  (2.) Slip the right hand down to the rest without quitting the grasp, lower the left foot to the next rope, leaving the arm at the half reach, and the left knee bent.
No VI.	No. 2	No. 1	As in sixth column.	As in first exercise.	Carrying weights, implements, &c.
No VI.	WITH BURDEN.	No. 2			Carrying arms and knapsack.

## THE VERTICAL POLE

(*Suspended in front of a Wall*).

This should be a slender pole of not more than  $1\frac{1}{2}$  or 2 inches in diameter. It should be of ash, smooth and straight. For general purposes the upper extremity of the pole should have an iron ring or loop running on a rod, arranged along the front ledge of the wall. For more advanced practice the pole should merely be surmounted with an iron hook of  $1\frac{1}{2}$  or 2 inches in depth, but in all cases and for every stage of practice it is recommended that the wall should be furnished with an iron rod along its ledge. Such an arrangement takes no merit from the climb, and goes far to render accident impossible. There should be poles of different lengths, such as would reach from the top of the wall to the ground, or not within 7 feet of it. This extends the range and varies the character of the exercises.

In the French military system of gymnastic exercises there is a mode of application of this machine to which great importance is attached. The machine itself is a long slender pole, having at its upper extremity two deep and sharp hooks. The exercise performed with it is of the simplest kind; the soldier raises the pole to the top of the wall, and while the hooks grip into the masonry, he ascends it by a hand over hand climb with the feet against the wall. The point of difficulty and danger is when nearing the top, when the downward pull on the pole is less direct, and the grip of its hooks into the masonry is rendered less secure by the more distinctly outward pressure of the feet on the face of the wall; and the situation becomes highly critical at the moment when the summit is gained, and the transfer of the weight of the climber



from the pole to the wall itself is taking place, when in fact he is neither on the one nor the other, but partly and insecurely on both. The grip of the hooks being secured, the ascent, transfer, and descent are very simple actions, but this security is not attainable with such materials, and it is contrary to the principles of gymnastics to have the risk of serious injury necessarily attending any of its exercises. It is therefore desirable that an iron rod should be fixed along the top of the wall over which the hooks may pass, and this precaution, as mentioned above, will render injury from slip or displacement of material impossible.

Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° IV.	No. 1	No. 1		<i>Ready.</i> <i>Climb.</i>  <i>Down.</i>	Position of attention, facing the wall, the toes touching it. (1.) Raise the right hand to the reach and grasp the pole, the left following. Lift the right foot from the ground, and place it against the wall, with the toes as high as the hip, the left following, bringing the arms bent as at the half reach; the head slightly bent back, the eyes directed to the reach of the hands. (2.) Raise the right hand to the reach, the left following. Lift the right foot the distance of the step, the left following, and at the same time raise the body to the half reach of the hands. (3.) As in preliminary exercise. (1.) As in preliminary exercise, except that instead of grasping the ledge of the wall, grasp the pole and bring the feet against the wall, as in the position of the ascent. (2.) Slip the right hand down to the rest, the left following; slip the right foot down the wall the distance of the step, the left following.
	WITH HANDS AND FEET.		The right hand leading.		
N° V.	No. 1	No. 2		<i>Ready.</i> <i>Climb.</i>	As in first exercise. (1.) Raise the right hand to the half reach and grasp the pole, and at the same time lift the right foot from the ground and place it against the wall as high as the knee. (2.) Incline the body to the right, pass the left hand to the reach, and lift the left foot the distance of the half step beyond the right. (3.) As in preliminary exercise.
	WITH HANDS AND FEET.		Right and left side.		



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
				<i>Down.</i>	(1.) As in preceding exercise. (2.) Incline the body to the supporting side, pass the leading hand down to the rest, and lower the leading foot the distance of the step.
N° V.	No. 1	No.		<i>Ready.</i>	As in first exercise.
	WITH HANDS AND FEET.		Right and left, hand and foot.	<i>Climb.</i>	(1.) Raise the right hand to the half reach and grasp the pole, and at the same time lift the left foot from the ground and place it against the wall.  (2.) Incline the body to the right front, pass the left hand to the reach, and at the same time lift the right foot the distance of the half step beyond the left.  (3.) As in preliminary exercise.
				<i>Down.</i>	(1.) As in first exercise.  (2.) Pass the leading hand down to the rest, at the same time lower the leading foot the distance of the step.  The first and second series as in free climbing may be executed on the vertical pole in this position.

## THE VERTICAL POLE

(Fixed close to a Wall).

This machine should not be less than 4 inches in diameter. (The ordinary spouting running down a house presents a fair illustration of what might be the aspect of this machine for practical purposes.) If a duplicate be given, one should terminate a foot from the top of the wall.

The difficulty of the exercises on this machine in this position is almost solely owing to its being placed in contact with the wall, whereby the freedom of the hand-grasp and the clasp of the lower limbs are entirely lost. All its exercises are of the most arduous description, and can only be accomplished after the hand and forearm have been strengthened by similar, but less difficult exercises.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No V.	SINGLE SERIES.	No. 1	The right hand leading.	<p><i>Ready.</i></p> <p><i>Climb.</i></p> <p><i>Down.</i></p>	<p>Position of attention facing the wall, the toes touching it.</p> <p>(1.) Raise the right hand to the reach and grasp the pole, the fingers and thumb meeting, the palm of the hand on the front of the pole, the left following close under it. Lift the right foot from the ground and place it on the wall, close to the pole, as high as the hip, the knee bent, resting on the toes, the left following on the left.</p> <p>(2.) Slightly incline the body to the left front, raise the right hand to the reach, incline the body to the right front, raise the left hand to the reach, grasp strongly with both hands, lift the right foot the distance of the step, the left following on the left.</p> <p>(3.) As in preliminary exercise.</p> <p>(1.) As in preliminary exercise.</p> <p>(2.) Slip the left hand down to the rest, the right following, lower the body to the half reach of the hands.</p>
No V.	SINGLE SERIES.	No. 2	Right and left side.	<p><i>Ready.</i></p> <p><i>Climb.</i></p> <p><i>Down.</i></p>	<p>As in first exercise.</p> <p>(1.) Raise the right hand to the half reach and grasp the pole, and at the same time lift the right foot and place it against the wall, as high as the knee, in the position of preceding exercise.</p> <p>(2.) Press strongly on the right foot, bend the right arm, and at the same time pass the left hand to the reach and lift the left foot, placing it against the wall at the distance of the half step beyond the right.</p> <p>(3.) As in preliminary exercise.</p> <p>(1.) As in preliminary exercise.</p> <p>(2.) Incline the body to the supporting side, pass the leading hand down to the rest, and at the same time slip the leading foot down the distance of the step.</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
No. V.	SINGLE SERIES.	No. 3	Right and left, hand and foot.	<p><i>Ready.</i></p> <p><i>Climb.</i></p> <p><i>Down.</i></p>	<p>As in first exercise.</p> <p>(1.) Raise the right hand to the half reach and grasp the pole, and at the same time lift the left foot from the ground and place it against the wall as in preceding exercise.</p> <p>(2.) Incline to the right front, pass the left hand to the reach, and lift the right foot the distance of the half step beyond the left.</p> <p>(3.) As in preliminary exercise.</p> <p>(1.) As in preliminary exercise.</p> <p>(2.) Lean on the supporting hand, pass the leading hand down to the rest, and slip the leading foot down the distance of the step.</p>
No. V.	SINGLE SERIES.	No. 4	With the knees.	<p><i>Ready.</i></p> <p><i>Climb.</i></p> <p><i>Down.</i></p>	<p>As in first exercise.</p> <p>(1.) Raise the right hand to the reach and grasp the pole, the left following close under it. Spring from the ground and bring both knees against the wall, the knees as high as the waist, and strongly clasping the pole.</p> <p>(2.) Incline slightly to the left front, raise the right hand to the reach, the left following, grasp strongly with the hands, and spring upwards from the knees.</p> <p>(3.) As in preliminary exercise.</p> <p>(1.) As in preliminary exercise.</p> <p>(2.) Slip both hands down to the rest, grasp strongly, and slip both knees down to the half reach of the hands.</p> <p>This exercise to be repeated with the left hand leading; it may also be executed hand over hand and with both hands at once, the action and position of the knees being the same in all.</p>



## THE SLANTING POLE

(*In front of a Wall*).

This machine should in all respects be a fac-simile of the fixed vertical pole. It should, for variety in practice, be laid at every angle between the horizontal and vertical line, and reach from within 3 feet of the top of the wall to a foot above it.

All the exercises on the slanting pole, as given for free climbing, may be executed on the pole in this position, the words of command for each exercise being in all respects the same. The rise to the surface from the first and third series may be accomplished by either of the following modes.

*By the foot.*—Detach the right leg from the pole, extend it to the rear, and place the foot against the wall, resting on the toes. Press quickly and strongly from it outwards by the left, letting the hands turn with the body round the pole, the right coming to the surface, the left passing to the under side, taking the position of the second series on the slanting pole, as given in preceding section.

*By the leg.*—Raise the left elbow above the pole and extend the fore-arm along its surface. Bring the right hand under by the side next the body and grasp the pole on its surface, the fingers and thumb together. Detach the right leg from the pole, extend it to the front, and with a rapid swing inwards and upwards, rise to the surface of the pole, letting the fingers and thumb separate as the body rises. Bring the right leg above and the left leg under the pole, and clasp it as in preceding exercise.

The initiatory movements of the hands and feet in the descent should be the same as with the vertical pole.

But the purely practical form of the ascent by the slanting pole is when the pole is brought to the spot by the men, and they are taught how to place it, the proper angle at which it should be laid, how to take advantage of all corners and projections, and all inequalities of surface, either of the ground or wall, where the pole is to be laid; and when none of these are to be found, how the hand of a comrade can best assist in holding it firm and secure. These, with the points of the ascent where the liability to displacement is the greatest, and how best to avoid and rectify accidental mishaps, can only be learned by practice with the moveable pole; and this will apply not only to the manner of surmounting elevated obstacles, but sunken ones also; great accuracy and dexterity may be acquired in the manner of placing a ladder, plank, or pole, so as to remove half the difficulty of traversing it.



## THE PAIR OF SLANTING POLES

*(In front of a Wall).*

This machine should in all respects be the same as that used for free climbing, and should be laid at the same inclination and elevation as the preceding machine.

All the exercises on this machine as given for free climbing may be practically applied in escalading, the action and position and the words of command being in all respects the same. The preliminary exercises are the same as with the single slanting pole; the initiatory movements of the hands and feet on the descent are the same as with the plank.

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## THE VERTICAL ROPE

*(In front of a Wall).*

This machine should be the same as that used for free climbing. When several ropes are given, they should be of the respective diameters of 1 inch,  $1\frac{1}{2}$  inch, and 2 inches; there should also be one of medium thickness, with knots at medium intervals.

The exercises on this machine, in this position, are in all respects the same as those on the vertical pole, suspended.

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## MUTUAL SUPPORT.

This is the final form of escalading, and should only be attempted after all the preceding ones with apparatus have been mastered. By it men may be enabled to scale the highest walls without any other assistance than can be furnished by the skilfully-disposed limbs and bodies of their own comrades.

The following exercises should not be attempted until the learners have become well accustomed to the preservation of the equilibrium, and until their muscular development is well advanced; they should then be carefully practised, each one being sufficiently mastered before the succeeding one is attempted. The exercises being the representation of men rendering to each other voluntary and mutual aid, they are all to be executed without word of command.

It is at all times desirable in scaling a wall over 10 feet in height, that the first to make the ascent should carry with him a rope, and men should be taught the most rapid and efficient means of improvising a substitute for one, when necessary, out of their own garments.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° VI.	SINGLE SERIES.	No. 1	To scale a wall from 8 feet to 10 feet in height.	Without word of command.	<p>This exercise can be executed by two men.</p> <p>No. 1, the lighter and more expert climber of the two, will place his back to the wall, the feet about 20 inches apart, the knees slightly bent; he will at the same time lower both hands to the full extension of the arms, the palms upwards, the fingers interlaced.</p> <p>No. 2 will stand close in front of No. 1, and place a hand upon each of his shoulders; he will then lift his left foot and place it in the stirrup formed by the intergrasp of No. 1, and, straightening the left knee, and at the same time shifting his right hand from the shoulder to the head, he will lift his right foot to the shoulder. (No. 1 will aid in this by lifting his hands.) The left hand will now follow the right to the head, and the left foot will follow the right to the shoulder; the hands now, right and left, will quit the head, and, pressing lightly against the face of the wall, the ledge will be reached. If required, No. 1 will straighten the knees, or by raising both hands with the palms upwards, the thumbs inside and the fingers out, will make a rest for the feet, and still further elevate No. 2. The ascent will be finished as in the preliminary exercises with apparatus. To enable No. 1 to ascend,</p> <p>No. 2 will lie flat on the wall, grasping the opposite ledge or coping with his right hand and the heel of his right foot, and lower his left hand to the full extension of the arm; No. 1 will seize the hand and climb by the arm as with the vertical rope. If No. 1 cannot reach the hand, No. 2 will detach his right heel, and, grasping the opposite ledge with both hands,</p>



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
					will rest his breast on the top of the wall, and lower his feet as far down the wall as possible. No. 1 will grasp these, or the knees, or loins, and ascend with the aid of the feet, hands, and knees, as in 4th exercise on the vertical pole.
N° VI.	SINGLE SERIES.	No. 2	Second method.	Without word of command.	No. 1 will stand with his face to the wall, leaning his forehead against his fore-arm, which will be pressed against the wall, the lower limbs separated, the knees bent as in preceding exercise. No. 2 will stand on the left rear of No. 1; he will place both hands on the shoulders, and, raising the left foot, will place it on the thigh of the limb nearest the wall, the right following on the ridge of the hip. The left hand will now pass to the head, its place being immediately taken by the left foot, the right hand following the left, and the right foot taking its place on the shoulder. The rest of the ascent as in preceding exercise.
N° VI.	SINGLE SERIES.	No. 3	To scale a wall from 10 feet to 12 feet in height.	Without word of command.	This exercise requires three men. Nos. 1 and 2 will place themselves in the position of No. 1 in preceding exercise, but the right arm of No. 1 and the left arm of No. 2 will cross, and the hands will rest on each other's (farthest) shoulder. No. 3 will mount as in preceding exercise and grasp the ledge. No. 1 will now detach himself and ascend, and No. 2 may withdraw from No. 3 and ascend as in first exercise, aided by No. 1 from above, and these again will assist No. 3 in completing the ascent.



Course in System.	Series on Machine.	Exercise in Series.	Title of Exercise.	Word of Command.	Action and Position.
N° VI.	SINGLE SERIES.	No. 4	To scale a wall from 12 feet to 15 feet in height.	Without word of command.	<p>This exercise requires at least 6 men.</p> <p>Nos. 1, 2, and 3 will form a base, No. 1 with his back to the wall, Nos. 2 and 3 on his right and left front, mutually supporting each other by the inter-rest of the hands on the shoulders. Nos. 4 and 5 will form the second stage, each resting a shoulder against the wall, one resting on Nos. 1 and 2, the other on Nos. 1 and 3; No. 6 will ascend by these as in preceding exercises.</p> <p>No. 1 will have his back against the wall, and the ascent will be made up Nos. 2 and 3, as these have to support the least weight.</p> <p>When a greater number of men are available, 4 may form the base.</p>
N° VI.	SINGLE SERIES.	No. 5	To ascend and descend from a wall over 10 feet in height.	Without word of command.	<p>The ascent of the wall to be made as in preceding exercise. On attaining the top of the wall, the bearer of the rope (which he should carry closely coiled up, and suspended at his back) will drop one end of it back to his comrades; this they will grasp, and he will then drop the other end of it down the other side of the wall, and descend by it. When below, he will search for the nearest object to which he may securely attach it, and failing to find such, he will fasten the rope round his own body, and stand close in by the wall, his shoulder pressed against it, his lower limbs slanting to the front, his feet firmly pressed against the ground. A comrade (the lightest and most expert of the party) will now ascend, traverse the wall, and descend to aid the first with his weight and strength in affording sufficient resistance to enable the rest of the party to ascend by the rope.</p>



## THE OCTAGON.

This structure consists of three octagonal platforms, raised one above another, the second one being smaller than the first, and the third smaller than the second; each supported by eight round poles or standards, one at each corner of the octagon. It should be constructed in the following manner:—A mast, similar in character to the one already described for the gymnasium, should run up the centre, the diameter at the ground line being 12 inches, and at the top 6 inches, and measuring 31 feet in height out of the ground, and running about 6 feet below it. It must be firmly bedded and strutted with oak struts so as to keep it as steady as possible. All the platforms or stages should be floored with 3-inch deals, fixed  $\frac{1}{2}$  inch apart. The first should be an octagon, measuring 13 feet across, supported at a height of 7 feet 6 inches from the ground by oak round standards 6 inches in diameter, with bearers 6 inches by 6 inches running horizontally from the tops of the standards to the centre of the mast, where they should rest on an iron collar or shoe. The bearers will form ties to keep the standards in position. The standards should penetrate the ground to the same depth as the mast, and be secured to it with braces, arranged in a similar manner to the top bearers, the object being so to strut and tie all the foundation posts together as to render any movement of them impossible. Running from centre to centre of each standard, 15 inches below the top of the platform, and taking the form of it, should be a  $1\frac{1}{4}$  inch diameter wrought-iron bar. This will be rendered most secure by having an iron collar on each standard, to receive the ends of it.

The second platform should be only 9 feet across, fixed at a height of 7 feet 6 inches from the top of the other, and therefore 15 feet from the ground, and should be similar to the first in all respects except size. The standards should be 4 inches in diameter, the bearers 6 inches by 4 inches; the former should rest on the bearers of the lower platform. The third platform is only required to be 4 feet 8 inches across, and should be also fixed 7 feet 6 inches from the top of the second. The standards in this case are better of wrought iron, 2 inches in diameter, the bearers still being of wood, 4 inches by 4 inches.

The top platform, being 22 feet 6 inches from the ground, the mast will run 8 feet 6 inches above it.

Another manner of constructing the octagon is to give but four pillars or standards to the second platform, and two to the third, while a fourth small platform, or rest, in the form of a cross-tree, is fixed at the same elevation as the other stages, and the remainder of the mast made to represent a flagstaff bearing a truck and vane.

As has been stated, this structure is of French origin, and although designed expressly for exercises of emulation, it may be used for the ordinary practice, either by separate learners or by squads of



men, of certain of the exercises of the horizontal bar and the vertical pole; it may also be used very conveniently for the "preliminary exercises" of escalading. Indeed, it is on this machine that these last exercises can be practised separately with the most advantage, being at an elevation which will leave the climber's powers unimpaired, and where he will be completely under the eye of the instructors.

The object of this structure is to present a means of testing by competitive trial the quickness of a number of men in surmounting a succession of obstacles of a given form, by exercises of a simple and effective character. It is so constructed that while eight men start in the race, only one can complete it or find standing room on the summit.

Now, while great care is required in the conducting of all practice by emulation on any form of machine whatever, it is imperatively necessary here, because the constantly diminishing space, necessitating the exclusion of half the number of climbers at each successive ascent, taxes not only the vigilance of the instructor, but also the good temper of the competitors.

In the first stage of practice the title of the exercise, as given with the machine in other sections, should be indicated; as a second stage the climber may be allowed to adopt that mode of ascent which he prefers. When this is the case he will, however, strictly adhere to that part of the structure indicated in the first word of command, "By the bars," or, "By the poles." Thus, the men having been told off, the word will be given, "Prepare for escalading,"—"By the bars." Each man will here step to the front, and each will take his place under the edge of the platform in the position of "Attention." On the word,— "Six paces to the rear,—March," each man will step six full paces to the rear. On the word, "Ready," each man will advance the left foot as in the initiatory step in running. On the word, "Assault," each man will spring to the front, and mount to the first platform; the four who first grasp the bar of the second platform will mount to it, leaving the other four behind on the first; the two who first grasp the bar of the third platform will mount to it, leaving the other two behind, and the one who first mounts the third platform will climb to the top of the mast.

On the word "Down," the first will descend to the second, these to the two on the second platform, and these to the four on the first, when all will descend to the ground, each one descending by the same compartment of the machine as that by which he made the ascent.

When the ascent is made "By the poles," after the first platform is reached, the pole must be grasped by the climber while standing in an upright position on the platform.

All struggling or disputing, or attempts to hinder another's efforts, must be strictly forbidden, and the climbers must be recalled on the slightest infringement of this rule, which is absolutely essential to safety.



## THE GREAT CROSS BEAM.

This structure consists of a beam 14 inches deep and 10 inches wide, and from 15 feet to 25 feet long, supported at a clear height of 14 feet from the ground by two square standards, 10 inches by 10 inches, and 20 feet apart, running into the ground, the ends being tied together by a plate 10 inches by 8 inches, with struts 9 inches by 6 inches, from the same to the standards. There should also be a transverse plate under the end of each standard, with side struts to prevent lateral shaking. At each end of the beam should be constructed a triangular-shaped platform, the apex of the triangle forming the end of the beam, and extending until the base becomes 7 feet long, each end of it being supported by strong horizontal bearers, and upright circular standards firmly fixed in the ground and running 2 feet higher than the platform. The flooring of platforms to be of 3 inch deals, fixed  $\frac{1}{2}$  inch apart. Two strong ladders, 20 feet long, should be placed against the base of each platform. Two poles for climbing, about 9 inches in diameter, should be fixed at each side of the platforms. They should be about 2 feet higher than the top of them, and well bedded and fixed in the ground.

The original object of this framework was simply to form a structure to which might be attached certain of the vertical apparatus usually suspended from the beams or ceiling of the gymnasium, and against which certain of the slanting apparatus might be inclined, so as to provide in favourable weather a means of practising special exercises, properly belonging to the gymnasium, in the open air. But in addition to this, it may be readily made to furnish a means of practically applying these same exercises, and also those of other and cognate machines, not contemplated in its original design. The framework itself may be made to consist of accepted forms of apparatus; the uprights might represent the butt of the mast, and the beam might represent the horizontal beam, as given for the exercises of equilibrium. For practical purposes, to each end of the beam is attached a small triangular platform (see description of machine), the base of which may form a ledge against which the inclined apparatus, such as ladder and plank, can rest. The vertical fixed poles described to be placed at the sides of each platform form additional apparatus for climbing; while the platforms themselves would form rallying points on which the men might cluster and rest after climbing the apparatus or traversing the beam.

Thus this single structure presents in itself a small gymnasium, affording a fair specimen of the apparatus used for both elementary and practical purposes. It is in this latter aspect that it is here to be considered, viz., as a structure erected for combining many of the machines already separately described, in a form admitting of rapid and effective application.

The number of men who may be made to escalate this structure is not even limited to the number of articles of apparatus which it



bears, for many of them will effectively carry two; but, except on special occasions of inspection and rehearsal, a single squad of 12 or 15 men will be the proper number. Each man should have his machine and the special exercise by which he is to ascend indicated to him when told off, previous to receiving the first word of command; and each man, having executed the exercise, should halt at the point of the beam or the platform where his machine is fixed; those on the beam sitting astride; those on the platform standing upright. By this means the exercises on the separate machines of analogous character and corresponding difficulty will be made clear to the men, and permanently fixed in their minds, to be applied as occasion may require. Every form of exercise capable of being executed on the apparatus in this position should be thus practised; but after a reasonable time, and as a second stage, each man should merely have his machine indicated, and be allowed to select his own mode of ascent, the instructor taking care that on each repetition of the exercise a fresh machine shall be allotted to him, in order that he may have equal practice on all. As a third and still higher stage the squad may simply be launched at the structure in competitive effort, each man being allowed to select his machine and mode of ascent. When this exercise is thus practised, the men must be marched to at least 30 paces from the structure, in order to allow to each the opportunity to win by speed of foot his favourite machine.

As the culminating exercises on this structure, the ascent should be made *carrying weights*, but only in the simpler modes of ascending, and not in competitive trials, man against man. The same exception does not apply to the ascent *carrying arms*, which should be practised in all the forms of the assault.

The words of command, and the precautions to prevent accidents, given for the assault of the octagon, apply equally to this structure.

### THE FORT.

The fort should embrace the following apparatus:—

- |   |   |
|---|---|
| 1. The inclined wooden ladder.              | 7. The blocks on the face of the wall.          |
| 2. The pair of slanting poles.              | 8. The vertical pole, close to the wall.        |
| 3. The vertical rope, close to the wall.    | 9. The slanting pole.                           |
| 4. The vertical pole, 2 feet from the wall. | 10. The vertical rope ladder close to the wall. |
| 5. The holes in the face of the wall.       | 11. The inclined plank.                         |
| 6. The grooves in the face of the wall.     |   |

For this purpose a wall of brickwork must be built not less than 14 inches thick, and 33 feet long, the front of it being



boarded with yellow deal boarding, nailed on studs, fastened to the brickwork. The front should be divided into spaces 3 feet wide, and alternately 17 feet and 15 feet high. The apparatus should be arranged on the front in the order given above, beginning at the left hand, each machine occupying one of the 3-foot spaces.

Where one front only of the wall is fitted with apparatus, it is convenient to form on the other a lean-to shed of wood or brickwork, with a strong framed roof covered with weather boarding. This forms an abutment to the wall; it also provides a means of descent for the men, and the inside will be found useful as a store in inclement weather for moveable out-door apparatus.

This is the ultimate form of structure for escalading, and is superior to all the others, as not only every form of machine may be here applied, but it may be applied in the manner bearing the closest resemblance to actual professional duty. Every part and point of the structure itself should be made subservient to the same end; wall and roof, front and rear, should all be constructed for practical use, to support some form of apparatus, vertical or inclined, fixed or suspended.

The description of the fort itself sufficiently indicates the manner of its use. As with the preceding structures, the men should be told off either at the foot of the wall or at a given distance from it, the words of command employed being the same as those directed for the octagon.

In the first stage of practice each man should have his machine and mode of ascent indicated. In the second stage he should be free to choose his mode of ascent, merely having the machine indicated; and after sufficient practice in this manner, the assault should be given from a distance, the favourite machine to be won by speed of foot; concluding with the practice of all the simpler exercises, carrying burdens of various kinds, as directed in the descriptions of the exercises on the separate machines, and the practice of every exercise on every machine, bearing arms. These last must ever be the culminating exercises on each separate article of apparatus in escalading, whatever may be the form and character of the structure to which it is applied.

The fort itself may be made to form only the chief obstacle, the crowning difficulty, in a course of prepared obstacles, which may embrace every form of ditch, bank, wall, or palisade, surmountable by leap, vault, or climb; to be, in fact, the goal of the race, requiring the highest physical efforts of speed, agility, dexterity, strength, and endurance, as it is of the training which has had for object the cultivation of these qualities in the soldier.



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