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Practical Guide of Physical Education

**BY GEORGES HÉBERT
(TRANSLATED BY PILOU AND GREGG)
1912**

PILOU'S FOREWORD AND WARNING

This is an amateur translation of Georges Hébert's Guide pratique d'éducation physique, 2nd edition, 1912. The original work is over 500 pages, encompasses everything from building training grounds to muscular anatomy, and contains detailed theory and practical information. Faced with such a task, I decided to start translating things I was interested in, namely elementary exercises for building strength and flexibility and practical exercises of relevance for Parkour training. Meanwhile, Gregg started translating other parts of the book, and by encouraging each other we managed to cover almost everything. Gregg put his translations up on the APK forums, but I kept going with this booklet which has been compacted to under 100 pages. The original book comes with many photographs, and I tried to keep as many as I could in the text, although I didn't go through the hassle to reference them in the text. The translation is far from literal or complete, and thus contains some bias, although I tried to avoid interpret-

ing or modernizing any of the text. In the very few cases Hébert's work seems at odds with modern knowledge or when extra caution seems needed, I added notes mentioning the differences, but did not change the original text. I included Gregg's more literal translation with some minor smoothing, and tried to indicate who did what.

Now, here must come a warning. Georges Hébert's legacy is much richer than a few guidebooks of physical education, and there is obviously more to the natural method than this. Followers of Georges Hébert are still active in France and Belgium, and one should seek their help and teachings to fully understand the natural method. This book merely offers a first taste of the method, incomplete and imperfect in many ways, and reading it will make no one a true expert of the art. Nevertheless, I hope it will intrigue and inspire traceurs and traceuses to explore Hébert's ideas on physical education, complement their training with some of the exercises described, and seek out Hébert's followers to learn more.

<div align="right">Pilou, November 2009</div>

FOREWORD

The driving thought behind this Practical Guide of Physical Education was to compose a method, a practical system to reach full physical development through the most effective, fastest and simplest ways. This method is no theoretical essay; it is the result of more than five years of practical, daily teaching and training thousands of subjects of various ages, strengths and walks of life, from school children to French navy officers.

It is important to understand that the exercises of our method are not new: in any culture where physical prowess is valued, such exercises have been used. Progress in physical education does not come from inventing new exercises, but from understanding well the effects of the existing ones and combining them to reach more efficiently the goal of physical improvement. It is mostly a better way of working. Our approach includes: -an essential part made of eight practical exercises: walking, running, jumping, swimming, climbing, lifting, throwing, and defending. -a preparatory part made of elementary exercises which

target the different parts of the body: simple and combined movements of the arms, legs, and trunk, allowed by the normal play of joints, suspensions, planks, balancing, hopping, respiratory movements; -a complementary part made of games, sports of all kinds, and the most common manual labor.

The eight practical exercises don't have the same importance. It is evident that the exercises which develop physical endurance by augmenting the power of the heart and lungs are the most useful and practical. Running is the primary exercise in our system. Elementary education exercises develop the body, but don't overestimate their value. They produce many of the effects needed for the practical exercises, but are insufficient by themselves to reach full physical development. You don't get the coordination needed in practical situations by analyzing muscles and organs separately. Games, sports, and manual labor complete the method and provide the means to learn all the branches of physical activity.

Our method of work is very simple and practical. It is appropriate for everyone. It is applicable everywhere: it doesn't require special installations. It depends more on the manner of training, the wise use of the resources, location and terrain we have. Our physical education method includes training against the effects of cold and bad weather. It is done naturally by working bare chested as often as possible, and taking air baths in all seasons. The air bath is a powerful means of hardening the body while maintaining good health. After the excellent results we've seen, we can't recommend it too much. In summary, our method is essentially practical, and tends to form strong beings capable of executing all the practical exercises and possessing a minimum degree of aptitude in relation to their age and constitution. We define this minimum degree in a precise fashion.

One of the most important and original parts of our method is in determining physical aptitude and recording the results. It's indispensable to know at any time a subject's practical value and to have a clear idea of his physical power or absolute general force. We created a form to register the results of twelve classic tests, listed according to a determined level of aptitude. The twelve tests are combined so that together they determine in a sufficiently precise fashion, and evaluate numerically, the general physical worth or degree of physical aptitude of a particular subject. If one considers that the principle elements of

physical power, or absolute general force are: endurance, muscular strength, skill and coordination, as well as nervous and moral energy, it is very evident that such a determination or evaluation, presented in numeric form, is a difficult problem to solve. We don't claim to have the solution, nor the defining formula to evaluate the power of the human machine. But this form gives a fairly accurate measure of physical aptitude. Only long experience permits the modification or completion of this form and awards the coefficients of each test.

Examining the tests of the form shows that:

1. Force of resistance is evaluated by five tests: the 100 m run [speed], 500 m run [speed and endurance], 1500 m run [endurance]; the 100 meter swim [speed and endurance]; diving under the water [respiratory power]. As well, executing all exercises required by the series of twelve tests in the same day also engages the subject's force of resistance;

2. Muscular strength is represented by the two-handed weight lifting, the throw, and rope climbing.

3. Skill, agility, flexibility, the coordination of movements are indicated by the four types of jumps: standing high jump, running high jump, standing long jump, and running long jump, and by the running and swimming as well.

4. The energetic qualities are seen in the execution of the series of the twelve tests without failing and with, on the contrary, giving to each of them one's maximum effort. The choice of tests is made to give the force of resistance and agility priority over muscular strength. In other words, for equal muscular strength, the more resistant and the more agile of two subjects submitted to the tests obtains a superior total number of points. This is logical and corresponds to our definition of a strong and complete man; strength lives more in the heart and lungs than in the muscles.

Even though it is not a perfect evaluation formula for physical power, the form is, in all cases, a very practical way to control and observe the results. It permits to follow easily one's progress, to direct the work in the needed direction, to uncover all the weak points of one's education. Each subject can not pursue his physical education without

periodically submitting to the twelve classic tests which measure the value of his general physical state and the scope of his progress. The form is at the same time the control instrument of the work accomplished and the device to register the results obtained. It is the major guide of the instructor and the student.

In short, the form presents the following advantages:

1. It marks the physical aptitude, which has for immediate consequence to make progress tangible, an essential conditions to keep the instruction interesting.
2. It clearly states the qualities which characterize a strong and complete man, and gives a fair idea of what makes up strength. It removes all the prejudiced points of view, while having practical significance. The subject who succeeds at the series of twelve tests proves at the same time his aptitudes in the most important natural exercises: He can run (and walk), jump, swim, climb, lift and throw.
3. It provides for each test aptitude levels which give valuable indications to students and teachers. The figures given in the rating of performance are established for the average of the weakest subjects.
4. It shows, by age, the minimum degree of aptitude to be possessed to be more than a physical failure.
5. It forces to neglect nothing in the search of the qualities which make up physical development; it prevents all absolute specialization.

Having proposed this, one is all surprised to see champion specialists of all kinds asked to prove their skills through the twelve tests present a low general physical value, often even lower than subjects who only have average skills in all domains. Why be a champion jumper or a special team member in any sport, if you cannot climb or swim?

We differentiate the subjects by giving them an idea of their value, not by a simple sentimental appraisal as is done in almost all gymnastics competitions or examinations, but by executing a series of measurable tests. When several subjects receive equal ratings, from a general physical value, then we use the defense exercises, boxing and wrestling, to differentiate them. In a word, with equal general physical val-

ues, the stronger is the winner in the defense exercises. It immediately creates emulation by clearly indicating the concrete goal to achieve, in giving everyone the measure of their value and proving to the weak their uselessness, which excites their self-esteem.

Our method is designed and developed in such a way that with the concepts contained in the book, and without possessing superior physical skills or special knowledge, it is perfectly possible to teach or to conduct exercises in a very rational manner. The role of the educator is certainly difficult: it can only be fulfilled perfectly by people with a profound knowledge of anatomy, physiology, hygiene, and the science of the mechanics of movement. They must be, in addition, skillful and experienced practitioners.

This category of specialists is still extremely rare. They are evidently necessary to take education in an enlightened direction, to make progress and help form professors and instructors. But under the pretext that these are the type of educators we need, we should not assume that physical education presents insurmountable difficulties and remains the exclusive domain of such specialists. We argue, on the contrary, that those who already have care of souls: parents, teachers, professors, officers, directors of companies and so forth., may well, with our book, conduct physical exercises. It is sufficient that they go to the trouble to understand deeply the spirit of the method and that they commit firmly to exercising themselves. They will soon see that there is no need to be an exceptional subject for walking, running, jumping, swimming, etc. and correctly execute most of the exercises. They must also be persuaded that with work first, with care and precautions following, it is possible to achieve excellent results. There is no example of subjects who, having worked with perseverance during the required time, did not come to perfecting themselves, if not completely, at least sufficiently.

Physical education starts at a young age and is pursued manhood. When perfection is attained one does not rest, but trains to stay in shape and maintain health by proper hygiene and a sufficient dose of exercise. There is interest to begin methodical physical education as early as possible, because children who engage in a good time of physical exercise always become robust men. However, even up to an advanced age, one may do physical re-education with success, taking precautions a physician may recommend. The results are obviously

less good, but they are no less significant. All the genres of indispensable utility exercises may be practiced by children, as long as the work dose is intelligently regulated and a very gentle progression is consciously observed during the execution and especially during the apprenticeship. An exercise, whatever it is, is not violent if we chose to make it so. We must not show too much fear about teaching practical exercises to young children. Indeed, a child has to learn to handle all the situations his life will bring. He may need to escape from danger, to bring aid to his one of his comrades, defend himself against an aggressor his age, etc. He often even seeks, by instinct, exercises said to be violent. Although the Practical Guide to Physical Education is specially written for male subjects, most of the exercises in this book, particularly the basic educational exercises, can be practiced by girls and women. Understand that training subjects following the principles exposed here should not have infirmities or serious hereditary defects (hernias, heart problems, etc.). In the latter case, doctors should always be consulted and asked what to do.

Finally, we must add that a complete physical education is not limited solely to the teaching and practice of physical exercises of all kinds in our book. It also includes: rules of hygiene and maintenance of good health; and teachings of physical duties, constituting what might be called "natural morality". All these parts of education, important because of their influence over the entire existence, should be the teaching goals of doctors.

Complete physical education includes the development of moral or manly qualities which make true men. We have indicated these qualities throughout this book without examining in detail the best ways to acquire them. But we wish to be very precise on this subject: moral or manly education is inseparable from the purely physical education. The school of physical exercises should be at the same time the school of energy, commitment, courage, composure and daring. The teacher must be an example of these qualities; he must struggle against laziness, softness, inaction and must seed in all a love of work and a healthy competitiveness.

Seek to be strong not only physically but morally. Here is the great duty of man to himself, to his family, his homeland and to humanity. Only the strong will become useful in difficult circumstances of life, dangers, evils of all kinds, wars, etc. When you are in normal physical

condition, there is no reason, no excuse to stay feeble when reasoned and methodical work permit you to become strong. There is, as noted above, an individual and social duty to fulfill. We would be very happy if we are able to help this accomplishment in our readers.

PRACTICAL PHYSICAL EDUCATION THEORY

Activity is a law of nature. All living beings, obeying the natural need for activity that is in them, come to a complete physical development by the simple use of their organs of locomotion, their ways of work and defense. The man in the state of nature, forced to lead an active life to support himself, realizes a full physical development by doing only useful and natural exercises and executing the most common physical labor.

Development is generally adapted to the conditions and needs of the environment in which the individual is required to move. The value of this development varies depending on the original skills of the individual, his temperament, his constitution, the climate of the place where he lives, and the challenges he encounters to provide for his needs or to ensure his safety.

In civilized countries, social obligations, conventions and prejudices move man away from the natural life outdoors and often prevent the exercise of his activity. His physical development is slowed or halted by these obligations or conventions. Those who have the leisure to exercise sufficiently and regularly can reach, without any method, their complete development by simple practice of natural exercises or their derivatives and by the completion of common manual labor. In this they imitate men living in the state of nature, with the difference that

they do for pleasure what other people do out of necessity.

These subjects are obviously the exception. In general, the prejudice and habits of modern life restrain rather than encourage physical activity from childhood on. Ease of existence and comfort encourage physical laziness. We can find examples of subjects who acquired without method an almost complete development, but they generally had excellent natural dispositions and achieved such a result mostly from games and sports involving natural exercises and their derivatives.

For an average inhabitant of the civilized country to reach a complete physical development while remaining faithful to social conventions and obligations, he must subject himself to two main requirements: to devote enough time daily to the culture of the body, and to make efficient use of that time by avoiding useless activities. The ideal is to produce, within a given time and without harming the organism, a dose of activity roughly equal to a full day of outdoor life in the state of nature.

The culture of the body made in a steady, continuous and progressive manner is physical education. Without order or method, the physical development is acquired haphazard and its final value is highly uncertain. Methodical or rational education enhance accuracy, avoids guesswork, rejects everything that is unnecessary and monitors results. It allows you to walk with confidence towards the goal of full physical development, especially important when activity time is limited.

Choosing exercises according to the knowledge of their effects on the body, classifying and regulating their dose make the method of education. The uncivilized subject perfected himself, first by imitation, then by using his personal experience, mostly instinctively. The method, by contrast, helps from the

outset the civilized subject by showing him the best principles to follow. It avoids a large number of unsuccessful tests or dangerous personal experiences. It allows to save time. It aims to produce in the human machine the maximum performance or, more simply, it seeks to make strong beings, with enhanced health, an energetic character, strong resistance to fatigue and skills sufficient for any natural and practical exercises. Other types of exercises such as fencing, riding, rowing … are of secondary utility or limited to certain categories of people; games, sports or acrobatics are also not essential for all indi-

viduals, irrespective of profession or class. There is, therefore, a general type of rational method or system of human development, based on progressive training work and the consistent practice of the natural and practical exercises. We can call it the natural method.

CONSTITUTIVE ELEMENTS OF THE METHOD

Any physical education method should include two components: a learning part aimed at educating the body, improving endurance, strength and flexibility, teaching the basic techniques for elementary and practical exercises like walking, running, jumping, lifting, climbing, throwing, swimming and defending; and an application part aimed at developing to the highest degree the practical abilities, putting them to use, and providing the means to cope with many real life situations.

WORK METHOD

The combination of different exercises makes up the method of education, their classification, their order of execution, the relative time devoted to them, the expense of work required, make the method of work. In physical education, as in all other matters, the results depend not only on the amount of work but, for the most part, on the method of work.

It is not possible to define absolutely clearly and precisely what should be the method of work; one can hardly state the guidelines and general principles. Too many elements come into account to let everything be set in advance. Age, health of subjects, the activity they per-

form or they are preparing for, the circumstances of time or place are all factors that require changing the way to work. Some details are left to the discretion of the master and the student. It is an art to train how to teach and nothing can replace the value and experience of the master, or the enthusiasm and the care taken by the student.

Physical work is usually set into meetings of a fixed period during which one performs a number of exercises. The meeting is called lesson when the work is set and led by a teacher or an instructor. Giving or conducting a meeting of rational work or a correct lesson is not a juxtaposition, a gathering of exercises which are executed at random without order or method. It is a logical suite of varied and graduated exercises which interest the different parts of the body according to their relative physiological importance and which have a practical utility.

The order of relative physiological importance of the different parts of the body is:

1. lungs and heart; 2. muscles that set the shoulder back, raise the ribs and straighten the curvature of the spine (trapezius, rhomboid and back); 3. abdominal muscles; 4. muscles of the limbs.

The exercises that have practical use are: walking, running, jumping, swimming, climbing, lifting, throwing and defending. The most important of all is running, both from the practical (development of the ability to move fast or for a long time) and physiological (intense development of the lungs and heart, activation almost complete of the muscular system) points of view. It is the basic or fundamental exercise of physical education by the natural method.

A work meeting or a lesson is considered complete when the execution of the various exercises that comprise it ultimately produce the following effects: hygienic, aesthetic and utilitarian. The hygienic effect is produced, especially by exercises that activate the respiration and circulation, and, in general, the activity during the meeting or lesson. The aesthetic effect is produced by the exercises that develop the muscular system and also by those who address the bad posture of the shoulders, raise the ribs and get rid of the abnormal curvature of the spine. Finally, the utility effect is the result of doing the practical utilitarian exercises.

As a general rule a complete meeting or lesson is a summary, i.e. it must represent all the elements that contribute to physical develop-

ment. Practically, the ideal and complete meeting consists of all possible types of exercises, educational and practical. If it is not possible, do the minimum as follows:

1. stretching of the limbs and trunk;
2. development of the muscular system, especially the abdominal and back muscles;
3. suspensions and planks;
4. running;
5. jumping;
6. respiratory exercises.

Even in the most unfavorable situations: lack of time, space, material, etc., a session or lesson must never consist of exercises which focus only on parts of the body. For example, a meeting of only suspension exercises would only work the upper trunk. Only swimming, which brings together all the effects of the complete session, is an exception to the rule. Long walks, long distance runs, and some games may also constitute meetings with a sufficiently complete value, in some cases.

The order in which you perform the exercises is not random, but based on the expenditure of work and the violence of successive efforts demanded of the body. The meeting always begins with moderate exercises which warm the body, then goes through exercises that require an increasing expenditure of effort and finally ends with exercises to restore calm in the body. Fatigue resulting from the lesson must come from the general work of the whole body, not only the work of one part.

There is not an absolute order; It all depends on the importance that we decide to give different exercises, even beyond their violence. Some, such as the basic movements of the legs, arms and trunk only produce a low output of work regardless of the energy spent to do them. Their place is at the start of the meeting, or in the course of the meeting as derivatives, to provide a rest after more violent drills. Others, however, such as hopping, racing, jumping, etc. put the important parts of the body into action. Their logical place is therefore after less violent exercises when the "organic machine" is sufficiently "heated". The general rule of work is as follows: gradually increase the effort to

produce and stop without abruptness.

The total duration of a meeting or lesson varies depending on circumstances. In principle, working daily for an hour is sufficient for the education of the body, if this time is used wisely. The relative duration of different exercises is necessarily very variable. It depends: on the total duration of the "lesson", on the violence of the exercises or the fatigue caused to the students, on the importance that you want to give some exercises to produce a particular effect. A meeting or lesson, complete or not, must truly represent a sustained and continuous work. The resting part in the course of the meeting should be kept to an essential minimum. In a perfectly conducted meeting, the sequence of exercises is set so that the rest period is reduced to a few seconds. Often, no rest is required. Only the change from one exercise to another must get the body the rest and relaxation essential to continue the work.

MODEL TRAINING SESSION

To well educate the body, the exercises must be incorporated into training sessions planned to logically and gradually combine the different types of exercises. An ideal session should include the following exercises, in successive groups:

Group 1
1. Walks of all sorts
2. Posture-correcting movements
3. Movements to increase flexibility in the legs, arms and core

Group 2
1. Elementary exercises of the legs and arms, simple or combined, freehand or with equipment
2. Lifting exercises
3. Throwing exercises
4. Defense exercises: boxing and wrestling

Group 3

1. Suspensions
2. Planks
3. Climbs of all sorts
4. Balancing exercises

Group 4
1. Hopping exercises
2. Speed races
3. Endurance races on small distances

Group 5
1. Core exercises

Group 6
1. Jumping and vaulting
2. Races, as in group 4
3. Swimming
4. Games

Group 7
1. Breathing exercises
2. Walks

In the following pages, we present multiple exercises for all the elementary and practical types of exercises. Exercises are roughly ordered in terms of increasing complexity and difficulty within each group.

MEASUREMENT OF THE RESULTS

The periodic observation of the results is essential to have precise indications of the value of the work accomplished, and the efficiency of the method used. This observation is effective for comparison. The difference in value of performances or exercises accomplished in two different times practically gives the value of the results acquired.

The general physical aptitude can be measured by a number of

tests set on a scale and that involve, together or separately, muscular strength, skill, and force of resistance. The tests needed to determine this measure of general physical aptitude should at least include the following exercises: 1—Jumps (giving the measure of agility, flexibility, and the power of the lower limbs); 2—Speed and endurance runs (organic resistance); 3—Climbing the smooth rope (muscular strength of the upper trunk, arms and abdomen); 4—Throwing a weight (dexterity, coordination of movements) 5—Lifting a weight with two hands (general muscular strength); 6—Swimming (muscular strength, force of resistance, dexterity and flexibility).

The larger the number of tests, the better is the measure of physical aptitude. To mark this measure, performances for each test are given in points on a scale established in the following fashion: performance corresponding to a number of points, zero indicates a minimum that every adult at least 18 years old of average health should reach to be considered . It is essential that the practice of application exercises lets one attain the minimum as rapidly as possible. Performances corresponding to 3 points characterize subjects developed and trained in a superior fashion. Performances corresponding to 5 points characterize subjects with exceptional aptitudes or specialists who have practiced physical exercises for a long time. Finally, by continuing the indicated scale, the performances of 12 to 15 points correspond approximately with records established by elite subjects, approaching the limits of human power.

To keep the measure of a subject's aptitude and to follow his progress, one needs to make a form for him recording the tests and his scores. The ideal form is made of 12 tests, however a sufficiently accurate indication of one's aptitudes can be obtained with fewer tests. The following table shows the 12 tests and the number of points attributed to each level of performance (this system of measurable tests and the form that we have personally established and put in practice at the School of Marine Riflemen has been officially approved and made regulatory in the French Navy).

Aptitude is given by the total number of points obtained in each test, computed to the hundredth of point. One can give negative points to performances lower than 0, or points higher than 5, by extrapolating the gradation given for each test. The physical aptitude is called: insufficient or null, when the total number of points is less than

0; inferior when it is at least equal to 0; average when it is at least equal to 18; superior when it is at least equal to 36; exceptional when it is at least equal to 60.

By definition, a complete and perfect athlete excels in all the exercises; he must possess an exceptional aptitude in each of the tests of the form. Thus, the number of 60 points must not be attained by the accomplishment of a couple extraordinary performances which compensate for other very inferior ones., but by reaching 5 points in every and all of the tests.

Series of the tests and their ratings

[*See spreadsheets*]

Notes on the tests:

1. Any height is considered as not passed if any part of the body has touched the indicating rope or bar. Before a standing jump, it is prohibited to move the feet.
2. Distances are measured from the jump line to the heel closest to this line, assuming the jumper does not fall backwards after landing.
3. Departure takes place seated on the ground and the climb is done without help from the legs.
4. Any run-up is done inside a square 2 meters each side; it is prohibited to exit the square. The throw distance is measured from the line marking the square to the center of the print made by the fall of the weight. Take the average of the right and left hand throws.
5. The test counts successive lifts in proper "clean and press", with the legs stiff. Resting time of one second at the shoulders, the arms vertically straight and the trunk slightly forward. The negative scale corresponds to lifting less than 40 kg at the rate of one point per 5 kg difference.
6. The swim must be done without appreciable current.
7. The body must be entirely immersed. The negative scale is established at one point per each two seconds less than 10 seconds.

GOAL OF PHYSICAL EDUCATION

The final goal of physical education is to make strong beings, not specialists who excels in a single type of exercises or extraordinary subjects of acrobatic prowess, but beings developed physically in a complete and useful manner. The value of physical development varies between individuals, depending on their initial potential. There is for everyone a personal level of vitality and a maximum physical power that is impossible to exceed. An easy work for some is a superhuman effort to accomplish for others. The strong being is he, who by methodical work, has arrived to take his power to a degree near his maximum.

A subject gifted by heredity with a vigorous constitution may be relatively weak if, by laziness or for any other cause, the physical power which he possesses has an inferior value to that which his constitution would be able to permit him to attain. On the other hand, a subject with an average constitution, or even weak, is able to be strong if, by work and perseverance, he can attain the degree of improvement corresponding to his constitution. A subject of average constitution, of small size or low weight, without any special natural aptitude, but who is physically perfect, is practically superior in existence to a much better gifted subject, who possesses a more vigorous constitution, but not fully using his natural force and wasting it.

Methodical physical education is not the only way to physical perfection. Certain subjects profit from that which has been passed on through heredity. Without needing physical education, and with very little work, one may arrive to possess an absolute force much superior than the average. But these subjects make up a tiny exception. Many are content to rest on their natural superiority and do not seek to push forward their improvement. Complete physical improvement, resulting from the methodical physical education, translates finally for the acquisition of a certain number of qualities: 1-The force of resistance or the faculty to do a considerable amount of work without fatigue and wrestle against sickness. This force, the most important of all to possess, depends entirely on the state of the organs and of the regular accomplishment of their functions; 2—Muscular strength or the faculty to produce muscular efforts of a certain intensity, but of short duration. It depends directly on the development of the muscles (not of their absolute size) and also of the force of the will; 3—Skill or the ju-

dicious and economic use of strength in all exercises; 4—Manly qualities: will, energy, courage, boldness, coolness, perseverance, tenacity, firmness, etc. 5—Knowledge and sufficient practice of all the natural and useful exercises; 6—Complete muscular development, in rapport with the bone structure, with a very apparent modeling of the muscles.

One may also add to this list: resistance to cold and bad weather; knowledge of the best ways to care for oneself, feed oneself, etc. When the same subject has all the previous qualities developed to an exceptional degree, he is an athlete. Unfortunately we cannot develop all individuals to the highest degree in order to make them athletes. Two things are opposed; on the one hand, the initial constitution of many subjects; on the other hand, the demands of today's society, which leaves a very limited time for physical education.

HYGIENIC CONSIDERATIONS

Physical exercises must take place in fresh air. Working in the open air is the characteristic of any rational method. Complete physical education cannot be done in your room or in a closed gym. There are circumstances such as: beating rain, snow, impassable terrain, extreme cold, very violent winds, etc., where the exercises are forced inside, but this kind of work must still be regarded as an exception. In this case, always be careful to ensure ventilation of the premises as complete as possible, or, preferably working under simple shelters: sheds, covered playgrounds, etc.

Physical exercise should not be done immediately after eating. In the case of moderate work, an interval of one hour is enough for children, but for adults it is better to wait longer. Each time one wants to engage in violent exercise or produce great efforts, it is preferable to wait until digestion has finished, say 3 or 4 hours. One must not do considerably much work in the early morning.

Before work it is essential to remove all unnecessary or cumbersome clothing. The air bath (head, torso and legs bare) is a wonderful training in weather resistance along with the best care of the skin. The best clothes are: bare torso, simple boxer shorts, short or long canvas

pants with an elastic belt if needed, light shoes or simply barefoot. Depending on the weather circumstances, the personal aptitude at the moment or the type of exercise to perform, add a knitted wool or cotton shirt. Particularly with regard to basic learning exercises, the clothes are not allowed in order to control the correctness of the movements. The work performed bare torso is essential to learn the movement mechanics; it allows to judge the appearance of the body, to see what parts are weak or poorly developed, to find defects or deformities In group teaching this kind of work lets the subjects study each other, to see progress in their exterior development and watch on the body itself the role of the different muscles. When one only does basic education exercises, there is interest in working in front of a large enough mirror to be able to control oneself.

It is important to avoid the cold after working out, so we must remove clothes that would otherwise become wet with sweat. Clothing wet from sweat is not only the leading cause of colds and bronchitis, but they give the body a very unpleasant feeling. Anyone who has experienced that feeling naturally searches to avoid it, if he must be too dressed, by working with less effort. Light clothing avoids this inconvenience and stimulates the body to produce more work.

Training against the cold is made: by air, light and sun baths in in every season, having at least the torso bare; by cold baths; by washing of all sorts, local or general, and equally by the following procedure which is very effective: walking barefoot in cold water, dew, humid terrain, etc. Resistance to cold is as part of physical education as the gymnastic exercises. It is why the bare torso must be the rule all the time when the atmospheric circumstances are not too unfavorable. One obtains in this fashion a very rapid endurance of the skin, and an extraordinary ability to adapt to all the brusque changes of temperature. It is not necessary to keep the torso bare during an entire training session; during winter air baths of short duration are sufficient.

Never stay inactive during sessions where one keeps the torso bare. As long as the organism works, there is no need to fear the cold, but a chill of the body before or after a workout presents a danger. During the bad season, if the cold is too biting, start the session by warming up the body hopping in place or with runs of short duration.

The skin must be maintained in a perfect state of cleanliness by washing, ablutions, dry or humid rubs, great baths, etc. It is an essen-

tial condition of hygiene. The effects of exercise are greatly augment-
ed, from the hygienic point of view, if one finishes each session of
work with a shower, ablution, a quick swim, dry rub, humid rub, etc.
The work done bare torso and in open air makes less necessary the
treatment of the skin after the exercise, but after a work during which
one stays dressed, particularly when one has perspired a lot, a cold ab-
lution is essential.

No work can be sustained beyond certain limits. When one feels a
certain difficulty to continue a certain work, it is because the body is
suffering the attacks of fatigue. Rest is needed to put the body in a
state to start again. We must consider local fatigue; general fatigue;
breathlessness. Local fatigue comes from exaggerated work of one
part of the muscular system. It produces muscle aches characterized
by a certain stiffness in the muscles or a vivid pain during contraction.
Experience shows that simple aches usually disappear in forty-eight
hours, if one cares to rest the tired muscles about this long. Properly
executed massage reduces the duration of the aches. Local ache pre-
sents no serious problem; It should be considered as an indication to
cease work for a time. It always appears after a new exercise which
works muscles that have remained inactive for some time.

General fatigue is felt throughout the body. It has three main stag-
es: weariness, overwork and forcing. Weariness or light fatigue usually
disappears after a good meal, a few hours of sleep or ordinary rest.
Sometimes there is a low-grade fever, insomnia or loss of appetite. In
this case, an extra rest will return the body to perfect condition. Over-
work occurs when one starts to work again, while still weary. The
body has not had the time needed to return to a satisfactory state and
to repair itself. Troubles a bit more serious than fatigue can occur, es-
pecially if overwork continues for some time. The body becomes im-
poverished day by day and offers less resistance to disease. Forcing, the
last degree of fatigue, is the result of a final effort of will to perform
excessive work, while the body is already in a state of overwork. The
muscles are stiff and can no longer obey the action of the will. It gen-
erally produces fainting and in some cases the consequences can be le-
thal.

Breathlessness is a special disorder of the circulation and respira-
tion produced by the expenditure of excessive work in a very short
time. In this state, breathing is constricted, the heart beats very fast;

there can even be choking with complete inability to breathe. The lungs are saturated with carbonic acid, which they are unable to eliminate. This occurs especially in racing. The runner suffers choking, a beginning of asphyxiation. As soon as the first signs of shortness of breath occur, stop work and restore calm by breathing exercises or walking slowly, preferably on the points of the feet.

The rules on alternating work and rest concern the whole day and not only the special time devoted to physical exercises. The rest periods should be adjusted so that at each return to work all traces of fatigue have disappeared in the body. The general signs one recognizes if one has exceeded the limit of forces are: fever, insomnia or restless sleep, irritation, lack of appetite, digestive disorders, fatigue on awakening, pronounced aches, weakness in the legs, etc. The particular signs, during the work itself, indicating that it is time to stop are: general stiffness, trembling limbs, pallor of the face or extreme redness, repeated shortness of breath. After a day of busy work one should feel a very light sense of fatigue that should disappear entirely after a regular night's rest. General signs that indicate the amount of work is well-regulated are: a good appetite, a deep sleep, a feeling of well-being on awakening and no aches.

Each subject has a personal level of resistance. One must learn to monitor himself, to know his strength so as not to exceed or waste it in vain. The limits of fatigue such as breathlessness are significantly pushed back by training, work habits, regularity of breathing movements, well regulated eating, well-distributed rest, appropriate pace of work. For the same subject, the resistance differs according to circumstances, for instance fasting, vigils, temperature, or even emotions.

ELEMENTARY EXERCISES

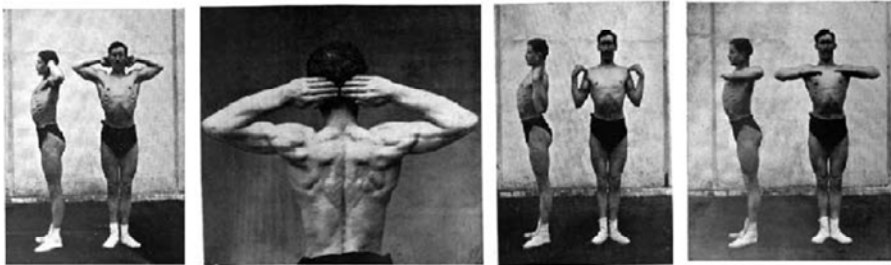### 1. The straight posture and the fundamental arm positions

Straight posture: the neck is vertical; the chin is drawn back to force the neck backward; the shoulders are low and thrown back; the core is tight; the hips go forward; arms are loose, hands extended; legs are joined, feet at 60 degrees (first two pictures).

To get there: rotate shoulders backwards, straighten the neck and
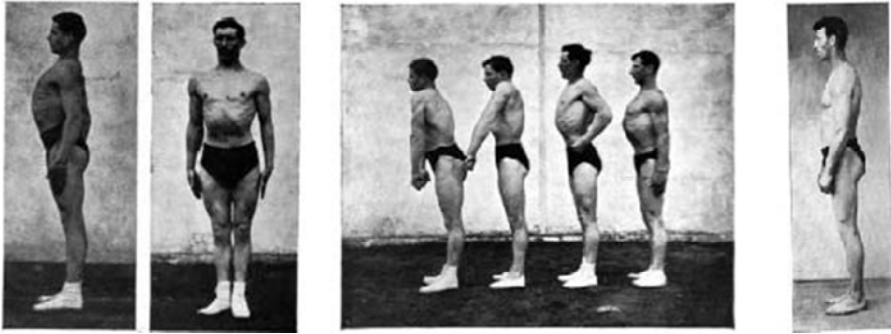
move the chin back, tighten the belly, straighten the legs, extend the arms and hands down (third picture).

A poor posture is presented in the last picture.

The four fundamental arm positions: 1. hands to the hips; 2. hands to the back of the neck; 3. hands to the shoulders; 4. hands to the chest.

1. Hands to the hips: from the straight posture, bring the palms on top of the hips, fingers facing forward and thumbs back.
2. Hands to the back of the neck (first and second picture): from the straight posture, move arms laterally to bring hands to the back of the neck, palms flat. Bring elbows and chin back to maintain the straight posture.
3. Hands to the shoulders (third picture): from the straight posture, bend forearms without moving arms or shoulders. Hands should curve slightly to touch the shoulders, elbows are back and aligned with the body.
4. Hands to the chest (last picture): from the straight posture, move arms laterally, elbows back, forearms bent, hands flat facing down, thumbs touching the chest. To get there: the arms position derive from the straight posture: rotate the shoulders

back and put the hands to the correct position, straighten neck and chin, core and legs, bring shoulders and elbows as far back as possible.

Straight posture, wider stance: some moves require starting with the legs separated. Start with any of the four fundamental arm positions, then move left leg further to the side while bending slightly the right leg. Center the body, which should keep the straight posture all along.
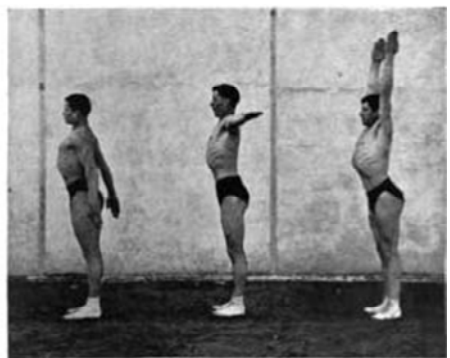
2. Arm exercises

Unless stated otherwise, all moves start from the straight posture.

1. Raising the arms vertically: *Both arms:* raise both arms forward at the same time, keeping them straight. Arms are parallel, palms facing each other, slightly forced beyond vertical toward the back. Go back to initial pose. *One arm at a time:* raise one arm as before, keeping the other one as far back as possible, palm facing back. Go back to initial pose.
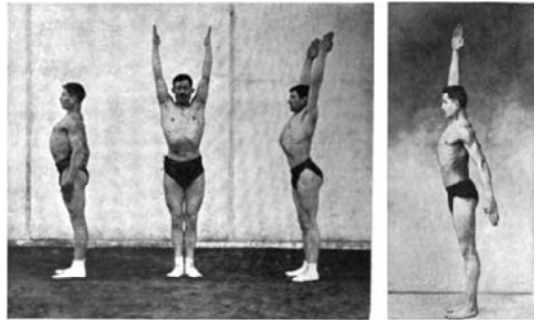
2. Raising the arms laterally: raise both arms laterally while rotating the shoulders back to bring the palms up. Continue all the way to vertical position, and then back to horizontal arms. Rotate the shoul-

ders to get back to the initial pose. The lateral position of the arms should be slightly forced beyond the line of the shoulders.
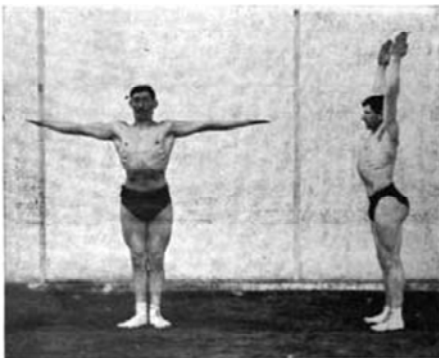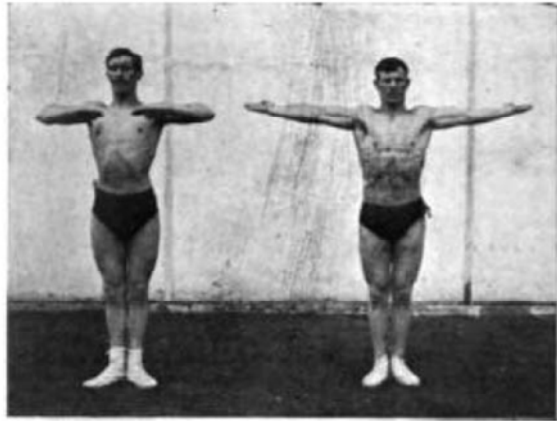
3. Raising vertically and lowering laterally the arms: bring the arms up as in first movement; bring them down as in second, including the rotation of the shoulders.

4. Raising the arms back, laterally and vertically: bring the arms up and back as far as possible, palms facing each other, move then laterally to a horizontal position while rotating the shoulders to bring the palms up, take the arms straight to vertical, palms facing each other, go back to initial pose bringing the arms down in front.

5. Vertical extension of the arms: from the hands to the shoulders posture, *simultaneously* or *alternatively* raise the arms straight and toward the back, then go back to initial pose.

6. Lateral extension of forearms with outside rotation: from the hands to the chest posture, extend the arms laterally, palms facing down, as far back from the line of the shoulders as possible, and then rotate the arms to bring the palms up, then go back to initial pose.

The arm movements can be done with the
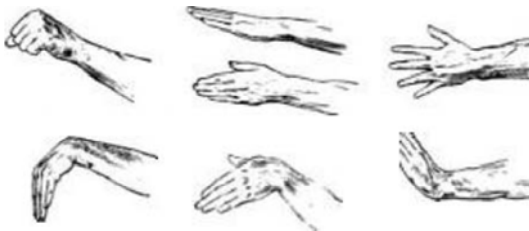
hands following the arms, open with joined fingers, but also with open hands, spread fingers, closed hands, thumb on top, hand flexed or extended.

3. Leg exercises

Leg exercises are done with the arms in various positions, by default we are assuming the hands to the hips position.

1. Heel raises: raise the body as high as possible keeping the legs straight, going on the toes.

2. Lifting the leg straight forward: lift the leg straight in front, with extended foot, bringing the rest of the body slightly back, but keeping the straight posture.

3. Lifting the leg laterally: lift the leg laterally, with extended foot, bringing the rest of the body slightly to the other side, still straight.

4. Lifting the leg backward: lift the leg straight to the back as far as possible, keeping the rest of the body straight and slightly forward.

5. Lifting the leg forward, laterally and back: lift the straight leg forward, bring it laterally, then back.

6. Lifting the thigh and extending the leg: lift the thigh with bent leg, extended foot, then extend leg, then go straight back or bend the leg again.
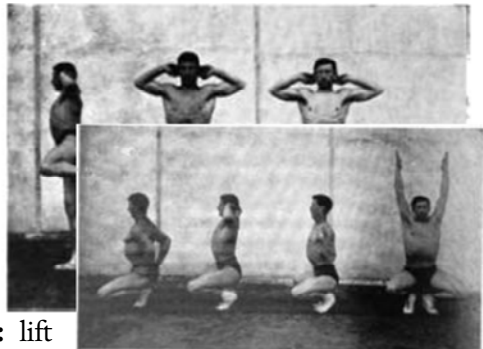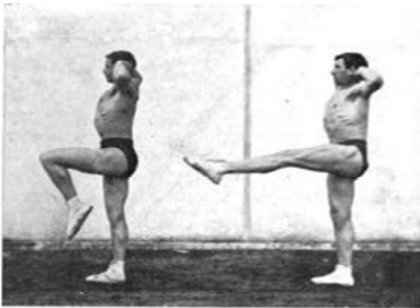
7. Lifting the thigh laterally: lift the thigh with bent leg, then extend leg to straight, then go back.

8. Squatting, feet together: going

on the toes, squat down opening the knees, keeping the rest of the body straight, then back up.

9. Squatting, feet apart: going on the toes, squat down opening the knees, keeping the rest of the body straight, then back up.

[*Translator's note: these squatting postures are very different from modern squats with the weight on the heels, feet separated, butt back, and the knees never bending beyond the toes. These squats work different muscles, and may strain more the knees*.]
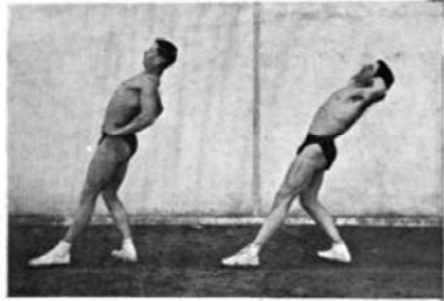
10. Leaning forward: bring left leg in front, both feet facing out, bend left knee forward keeping the right leg straight, bending the whole body forward. Back leg, torso and head make a straight line. Go back and switch legs. The left leg can go obliquely to the left, but shoulders must stay straight.
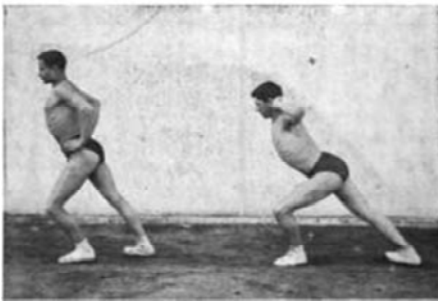
11. Leaning backward: bring left foot behind, both feet facing out, bend left knee backward, leaning backward and keeping the right leg and rest of the body in straight line. Same to the right; the back leg can go obliquely.

12. Leaning laterally: bring left foot further left, heels on the same line, feet facing out, then lean laterally by flexing the left leg and keeping the right leg and upper body straight. Same to the right, but no oblique variant.

All the leg exercises can be done with the arms in any of the four arm positions, alternating arm and leg exercises in a single repetition or combining arm and leg exercises simultaneously.

[*Translator's note: in these moves, be careful to keep the knee straight above the toes, and no further.*]

4. Suspension exercises

Suspension exercises are done on various objects: bars, beams, tree branches, horizontal ropes, etc. In all cases, the arms must be further than shoulder width apart; hands can be facing in, out, or one in and one out. In straight suspensions, the arms are fully extended, legs are joined, feet and neck are extended.

1. Jumping to suspension: jump up into a straight suspension, breathe a few times, then jump down with a good landing.

2. Widening the grip: in suspension, do a half pull-up to widen the grip as much as possible, then another one to go back to normal, both hands at the same time or one after the other.

3. Pull-up: in suspension, do a pull-up to bring the head above the bar, keeping the elbows aligned with the body. Go down by slowly extending the arms. This can be scaled down by using a low bar, feet touching the ground in front of the bar.

4. L-sit: in suspension, bring the thighs up, legs bent, feet extended, then extend the legs straight into L-sit, then back.

5. L-sit up: in suspension, bring the straight legs up from L-sit into a vertical position, then back.

6. L-sit with wide legs: in suspension, bring the legs straight into a L-sit, then spread them as much as possible while staying horizontal, then back.

Suspension exercises can also be done moving forward or backward on a long bar or parallel bars. These can be done with extended arms, bent arms, straight legs, or in L-sit position.
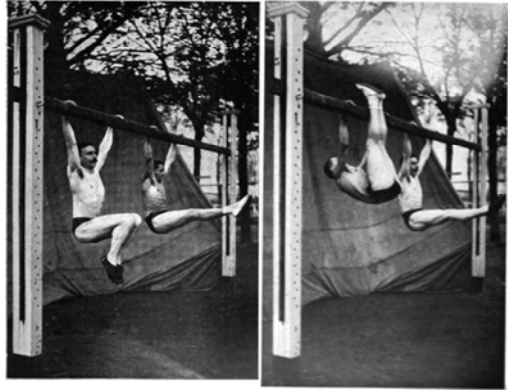
5. Plank exercises

In plank, the hands are flat on the ground, slightly beyond shoulder width, fingers pointing forward, arms straight. The legs are extended, toes touching the ground, the entire body straight. Planks can be made easier by resting the hands on an elevated object, or harder on resting the feet on an elevated object.

1. From standing to plank: three different methods: a) bend the legs and put both hands on the ground in front of the knees, shoot feet back, shoot feet back in, stand up; b) bend the legs and put both hands on the ground in front of the knees, shoot hands forward keeping the feet at the same place, bend arms and push back, stand up; c) put hands forward and fall straight into plank position, go back using one of the previous methods.
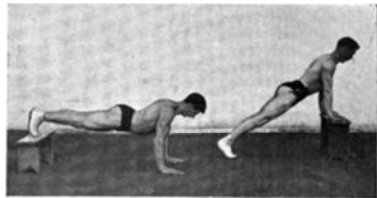
2. Wide arm plank: from plank, push up and send the arms as wide as possible, then push up and send them back in. This move can be made harder by sending the arms as far forward as possible.

3. One arm plank: from plank, spread out both legs, bring all the weight of the body on one arm, hold the other one to the side of the body or straight above the head.

4. Push-up: from plank, push down to get as close to the ground as possible without touching, then push back up.
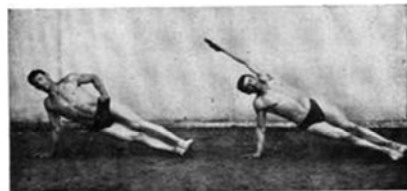
5. Side plank: from plank, lift

left arm while rotating the body, put left hand in one of the fundamental positions or perform one of the arm exercises. The rest of the body keeps the straight posture. Same on the right side.

   6. Side plank with leg up: from side plank position above, lift the left leg up on the side, then down.

   Plank exercises can include quadrupedal motion exercises as well.

6. Balance exercises

Like the leg exercises, balance exercises can be done with the arms in any arm positions. By default we assume the hands to the hips.

   1. Balancing the leg forward: from straight posture, extend left leg in front, leaning back and bending the other leg as much as possible, then go back. The left leg, torso and head must stay in a straight line. Same on the right side.
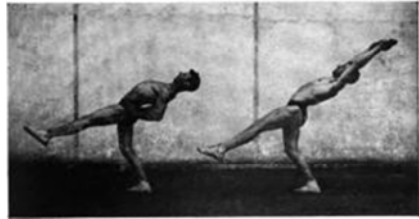
   2. Balancing the leg backward: from straight posture, extend the left leg backward, leaning forward to maintain a straight line and bending the right leg, then go back. Same on right side.

   3. Balancing the leg to the side: from straight posture, extend the left leg to the side, leaning to the right with the rest of the body and bending the right leg, then go back. Same on right side.

   As with the leg exercises, the balancing exercises can be done with arm exercises, simultaneously or one after the other.
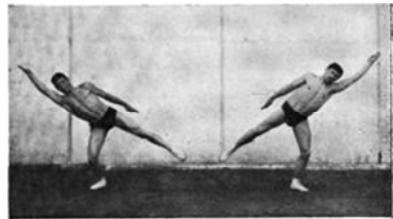
   [Translator's note: like the legs exercises, balancing can be more strenuous on the knees than it appears. Be mindful of keeping the supporting leg as straight as possible, and never force a movement past your balance point.]

7. Hopping exercises

Hopping exercises are done hands on the hips, jumping mostly in place, feet landing on the toes, open. The rest of the body keeps the

straight posture.

1. Hopping on joined legs: bend the legs slightly to jump up, extending the feet, land on the toes and jump right back up, bending the legs as little as possible and keeping a continuous pace. Work on jumping higher and faster.

2. Hopping and spreading the legs to the side: when hopping up, spread the legs slightly while in the air and land with legs apart, then join them back at the next hop.

3. Hopping and spreading the legs front and back: when hopping up, bring right leg forward and left leg back before landing, then switch the legs at the next hop.

4. Hopping with crossed legs: when hopping up, cross the legs, bent, before landing, then switch at the next hop.

5. Squatting hops: go into a squat, then hop while keeping the squat form.

6. Tuck jumps: when hopping up, tuck the knees up as far as possible, then shoot the legs back down before landing.

8. Core exercises

Like leg exercises, core exercises can be done with the arms in a variety of poses. We assume straight posture, hands to the hips by default.

1. Bending forward: bend the torso forward at the hips, back straight, legs straight.

2. Bending backward: bend the torso back, keeping it straight.
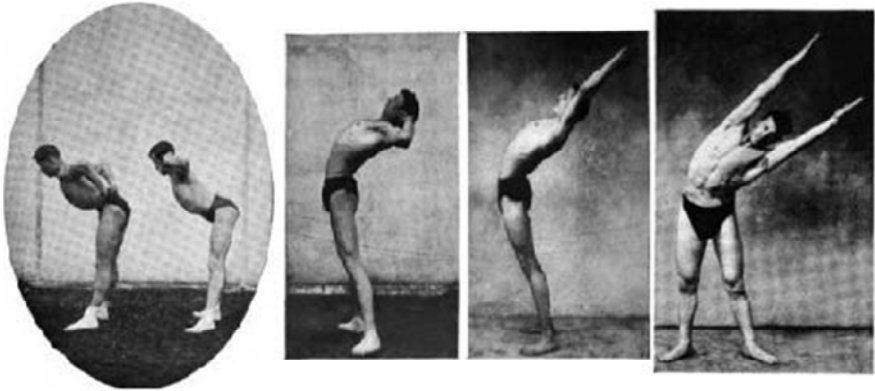
3. Bending to the side: with spread legs, bend the torso to the side, keeping everything straight and in the same plane.

4. Bending forward and back: with spread legs, bend the torso forward, then all the way back, then straight.

5. Torsion with bending: with spread legs, rotate the torso to the left and bend forward, then back straight, then to the other side.

6. Full rotation: with spread legs, take the side bending position, then move directly to the backward bending position, then to the other side, then forward. The line of the shoulders should stay parallel to the line of the hips.
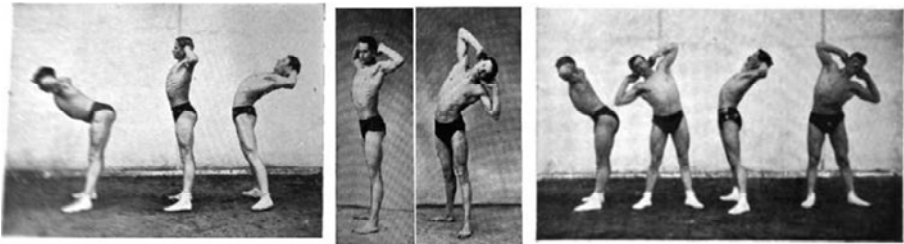
Core exercises can also be done with all sorts of arm exercises, but also with varying leg postures, or with the body horizontal in any orientation.

Core exercises can also be combined with head movements: bending forward, backward, to the side . . .

9. Breathing exercises

Breathing exercises are done like arm movements, but at a slower pace, breathing in while bringing the arms up and out while lowering them.

1. Breathing with forward arm motion: breathe in and out while bringing the arms up and down in front.

2. Breathing with lateral arm motion: breathe in and out while brining the arms up and down laterally.

3. Breathing with forward and lateral motion: breathe in and out while bringing the arms up in front and down laterally.

4. Breathing with backward and lateral motion: breathe in and out while bringing the arms as far back as possible, then laterally up, then down in front.

5. Breathing with vertical motion: from hands to the shoulders, breathe in and out while bringing the arms up and down vertically.

6. Breathing with horizontal motion: from hands to the chest, breathe in and out while extending the arms out and in horizontally.

Breathing exercises are improved by going on the toes when breathing in and back on the flat of the foot when breathing out.

10. Exercises done with special equipment

Movements of the arms, legs and core can be done with special equipment such as weights, dumbbells, elastic bands, clubs, benches, bars, etc. Although these are not necessary, and ample muscular development comes from executing the above motions freehand and to the fullest, they can be useful to bring variety to the exercises, they enhance muscular development in the arms and shoulders (weights), various muscle groups (elastic bands), or the forearms (clubs). Static structures like benches, bars, provide an anchor to fix parts of the body while providing more amplitude or more localization for a given exercise. Using large weights is however not recommended, as it results in an excessive muscle growth not matched by the development of the rest of the body. Weights are not recommended or useful for children.
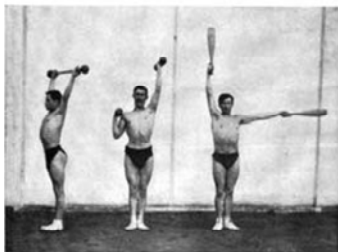
PRACTICAL EXERCISES

1. *Walking*

Walking is the most natural means of locomotion, the most economical, improves endurance, leg strength, and promotes good breathing and blood circulation.

Walking is done by moving the legs alternatively, pushing with the foot and extending the leg, one leg after the other. When walking, the body stays in constant contact with the ground with one foot, and with both feet at transition times.

A walk is a succession of steps, the length and the cadence of step determine its speed. At low speed, length of step increases naturally with an increase of cadence, but stops and even decreases when the cadence is too high. Experience

shows that the pace where the length of step is the highest corresponds to a cadence of about 140 steps a minute in the adult. The fastest walk is not done at this longest step but at the slightly faster cadence of 170 steps a minute. On the other hand, a pace of 110 to 130 steps a minute is more economical, allowing for more efficient long distance walks.

To improve speed in walking, it is better to work on increasing the length of step rather than the cadence. The mechanics of walking are acquired from natural practice and don't need to be taught. The muscles used in walks can be strengthened by: walks on the toes or the heels, walks with very long steps, very fast walks on short distances, slow walks with elevation of the thigh to horizontal and extension of the leg forward. Posture is improved by maintaining one of the fundamental arm positions while walking. Breathing is made regular by aligning it with a fixed number of steps, usually 5 or 6, and can be amplified by breathing exercises and songs. Walking should be done on all types of terrain, in cities and on the countryside, over hills, into fields, etc.

Endurance walks: long walks will require a slow pace, under 130 or 140 steps a minute. The walking posture should be as follows: the chest is slightly tilting forward; the foot touches the ground without shock, almost flat, heel first; the front leg is slightly bent when the foot reaches the ground; the contact point on the foot travels from the heel

all the way to the toes; the rear leg is straight, the upper body straight with the chest open; the arms are slightly bent and swinging lightly, opposite to the legs.

Speed walks: faster walks are limited to short distances. Any walking pace about or beyond 170 steps a minute is pointless, as running will then become more efficient, or running and walking in turn. There are two possible ways of walking at a fast pace. The first is the previously described posture, but increasing the forward tilt of the body and the bending of the front leg with the increased cadence. At high speed, a powerful push off the toes of the back leg reduces the time of two feet contact with the ground, making a move closer to running, the body being very forward, as if falling with each step. The second method is to stay as vertical as possible, with straight legs. The speed is gained from a faster movement of the leg from back to front. The fast motion of the legs and the shock of the foot hitting the ground makes this method very tiring. The first method is practical in all occasions, in particular when carrying something. The second method is very unpractical, and only to be used in races.
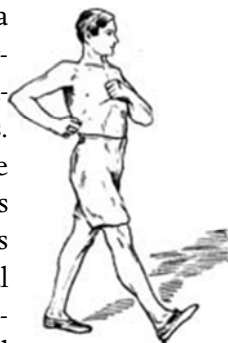
2. Running

Running is the fastest means of locomotion, and the most important of physical exercises. Running involves many muscles of the body, improves breathing and endurance, and develops strength and agility of the lower limbs. When running, the body is projected forward, each foot touching the ground in turn. There is only one foot on the ground at most, and the body is suspended between steps. Indeed, like a walk is a series of steps, a run is a series of jumps, from one foot to the other one. The running speed is the product of the length of the jump by the cadence. The faster the cadence, the longer the jumps; unlike in walking there is no decrease of the jump length with very fast paces. Like in walking, there are more efficient cadences in running: about 170 to 200 jumps a minute for a sustained endurance pace, up to 230 for a faster run, and no more than around 350 for very short sprints. Cadences lower than 170 jumps a minute are particularly bad,

as the body uses a lot of energy to cover a rather short distance, and the slow pace induces a wasteful vertical jumping motion.

The length of the jump depends on the strength and direction of the impulsion from the leg in contact with the ground, exactly like a one-legged length jump. To improve the length of jump, it is important to limit the amount of vertical momentum while reaching further forward, which is done by pushing the leg back as far as possible. The foot of the leg reaching forward should land flat, with the leg bent, so as to be faster past the vertical position, able to propel the body. By throwing the front leg forward, one could also make a longer jump, but the leg is further from vertical and the heel hits the ground, inducing repetitive shocks. Touching the ground with just the toes reduces the stride and make the calves work harder. A flat contact brings the leg directly to the vertical position while absorbing the shock of the jump.

[Translator's note: there is no usual distinction made in French between the toe area and the ball of the feet; instructions to land on the toes in running and jumping are likely to mean to land on the ball of the feet or on the toes and ball of the feet.]

The work of the legs is only secondary in running, the value of a runner depends first on his breathing. A run should be a long succession of deep cyclic breathing movements. At the fastest paces, such breathing is impossible, this is why races at maximum speed cannot last more than 20 seconds, corresponding to about 100 to 150 meters.

Running is a great way to increase endurance, but one must be careful of adapting the exercise to the fitness of the runners, especially limiting the length of faster runs. Like walking, running is a natural movement acquired by practice. The muscles can be trained further by running on the toes, or by running slowly with long jumps. The

breathing is made regular by aligning it with a fixed number of jumps, always the same (about 5 to 8).

Endurance runs: runs of medium cadence at 170 to 200 jumps a minute are best for long distances or when it is unnecessary to rush and tire oneself much. The best posture is as follows: the body slightly tilted forward; the foot reaching the ground flat, without shock; the leading leg is bent and vertical; the back leg is fully extended; the arms are bent and swinging smoothly; arms and front leg bending more with increased speed. Breathing is aligned with the cadence, with deep, long breaths. Avoid any vertical hopping motion, overextending the front leg, contacting the ground with the heel, rotating the body, breathing fast or irregularly. In long runs, start and finish always slower, finishing up with walking, core and breathing exercises.

Speed runs: faster runs go beyond 200 jumps a minute, and can become sustained only with training. Maximum speed runs can reach 350 jumps, and must be trained on short distances of 30 to 150 meters. The most efficient posture is as follows: the body starts bent forward but go back to vertical after a few steps and stays vertical, even bending backward at the end to slow down the pace; the impulse of the back leg is as strong as possible; the front leg is bent lower, foot still reaching the ground flat; the arms are swinging more vigorously. A great exercise to improve the body's ability for sudden, violent effort is the start of speed races. Races can be done with prepared or unprepared start. For unprepared starts, one can stand straight, sitting or lying down, facing any direction. At the signal, jump to face the correct direction and start the run In prepared runs, the body is bent forward, legs apart and ready, weight on the front or back leg. Speed runs are the most practical to train as a quick means of transportation or a rescue exercise.
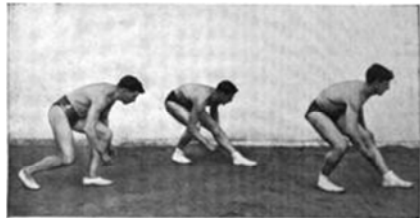
3. Jumping

Jumping consists in giving an impulse of the body to go over a space or an obstacle in one jump. Jumps strengthen the lower limbs and the core, train the legs to absorb impact, improve agility and balance. Ap-

plied jumps over an obstacle also work on fear, improving confidence, focus and readiness.

Jumping can be decomposed into four parts: the preparation, the impulse, the suspension and the fall. The preparation consists in bending and loading the legs while sending the arms back; the impulse is the explosive extension of the legs while bringing the arms up and forward; the suspension starts when the feet leave the ground, the legs are brought to the best position to overcome the obstacle, while the arms go down; the fall consists in absorbing the impact from the jump, when touching the ground, feet reaching and legs bending to absorb, arms used to maintain balance. The movement of the arms is very important in the jump and help get a greater impulsion and regain balance during the fall. Training should start with long jumps and high jumps, first without and then with a run-up. Follow this with a very slow progression into deep jumps, and make sure to work on a soft surface. Applied jumps with real obstacles should only occur when the legs are strong enough and the fall sufficiently trained to be safe.
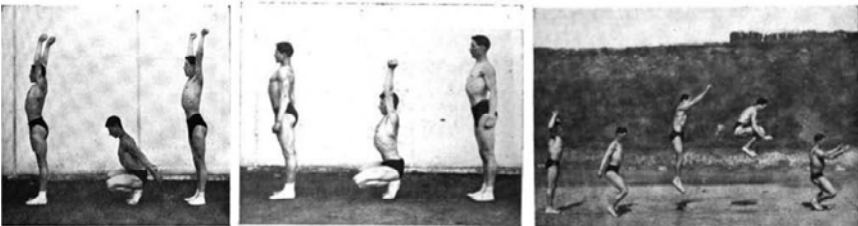
Unlike walking and running, learning to jump can be decomposed, as in these three preparatory exercises:

1. Preparation and impulse: with the arms up and vertical, hands into fists, bend the legs while going on the toes, knees, toes and heels joined, lowering the arms straight to bring them behind. Then explode up (staying on the ground) while bringing the arms back to vertical.

2. Fall: bend the legs while going on the toes, heels together, knees and toes open, arms up and vertical, then go quickly back to standing, lowering the arms. In practice, the fall is not decomposed, the arms are only brought up enough to bring balance back. The legs should resist the fall to avoid landing too low, but never land with straight legs.

3. Chain all four movements: preparation, impulse, then jump up and land as in the first two exercises.

Jumps with and without a run-up

1. Standing high jumps

Going over an obstacle: start facing the obstacle, feet together, at a distance about half the height of the obstacle. Bring the arms in front, hands closed, then bend the legs going on the toes and bring the arms back (preparation). Extend the legs and bring arms up (impulse), go over the obstacle tucking the legs in, keeping the arms up. As soon as the obstacle is passed (suspension), extend the feet toward the ground and lower the arms. Touch the ground with the toes (fall), legs bent without excess, arms balancing.

Going onto an obstacle: perform the preparation and impulse as above. Land on the obstacle, legs tucked, arms up. In this type of jump, there no real suspension or fall happening, one can arrive fully squatting on the obstacle.
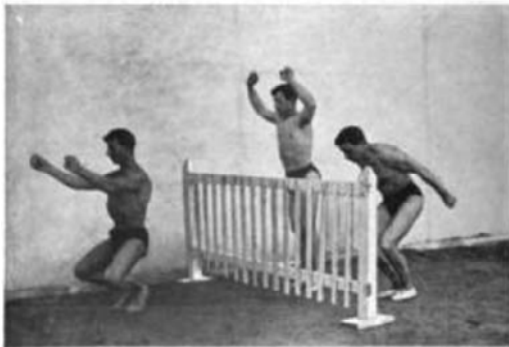
2. Standing long jump: start from the edge of the obstacle or open space to pass. Bring the arms in front, hands closed, then bend the legs going on the toes and bring the arms back (preparation). Tilt the body forward, then extend the legs and bring arms up (impulse). Give the impulse at the moment where the body starts to fall forward. The bring the arms down (suspension). The feet touch the ground together in front of the body, heels first (fall). It is not necessary to tuck the legs as much in long jumps, only the thighs must be bent. Landing on the heels is acceptable as the momentum is mostly horizontal. However, one must be careful if the ground is slippery.
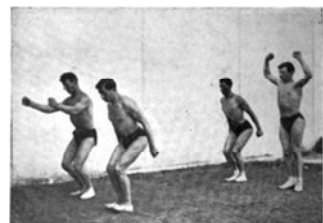
3. Depth jumps

Simple jump, facing forward: start facing forward at the edge of the obstacle, squat to lower the height of the fall and put both hands on the edge (preparation). Leave the obstacle without a jump but bringing the body forward horizontally, so as to avoid falling straight down (impulse). During the suspension, reach down with the legs, and keep the arms lowered. Touch the ground with the toes, resisting with the legs to avoid squatting too low.

Simple jump, facing backward: start at the edge of the obstacle, facing backward. Do everything as before, being careful to push away with the hands when leaving the obstacle, and to keep the body tilted forward to avoid falling on the back upon landing.

Forward jump, sitting: sit at the edge of the obstacle, legs down. Put both hands on the edge, fingers facing forward, leaning forward. Push away with the arms while throwing the legs forward. If the obstacle allows it, swing the legs a few times before jumping.

Backward jump, hands pressed: from a holding position with the hands on the obstacle, bend the arms to get on the stomach, then throw the legs backward. If the obstacle allows it, swing the legs a few times before jumping.

Vertical jump, from a suspension: if suspended by the hands to a bar, swing the legs forward, then when they go backward do a small push up with the arms and open the hands right away. Avoid dropping from a static position, as it makes it difficult to regain balance. If swinging already, the best is to let go when the legs are going backward. If jumping when the legs are going forward, send the upper body strongly forward to avoid falling on the back.

Vertical jump, from hanging to a wall: take one hand off the wall and

bring it at waist level, push strongly with hand and leg away from the wall.

Depth jumps done from a height or on hard surfaces are danger-ous for the feet, the ankles and the knees. It is necessary to train pro-gressively from lower to higher jumps. On a hard surface like stone, earth, wood floor, jumps of about 2 meters already put considerable strain on the feet. On a prepared ground like sand or well turned earth, a trained person may jump up to 4 meters without harm.

4. Running high jump

Jump over an obstacle: the jump is done on one foot, after a run-up of 5 to 10 meters. The upper body is vertical or slightly back. The arms are brought forward at the time of the jump, then the obstacle is passed either by bringing the legs bent under the hips, feet close to the thighs, or extending the feet in front, keeping the chest forward. Arms are kept up until the obstacle is passed, then lowered as the legs are ex-tended down. Land on the toes, legs bent, arms balancing.

Jump onto an obstacle: start on one foot as above, then jump onto the obstacle with the legs bent, feet close to the hips, arms up. This type of jump is useful when what is beyond the obstacle is unknown.

Jump while maintaining the run: start on one foot, jump over the ob-stacle by passing the other leg first, then the jumping leg. The first leg is very bent, knee up, the other leg to the side or under the body. The chest is leaning forward during the jump. Land on the first leg, on the

toes, then throw the jumping leg forward to keep running.

5. Running long jump

With a long run: like the running high jump, this jump is done from one foot after a run. In this case, the run must be long enough to gain maximum speed, as the speed of the run determines the length of the jump. The chest is slightly forward during the jump, the legs are joined but don't need to be tucked. During the fall, the heels touch the ground first, the arms go down and back, and then forward and up again to regain balance.

With a single step: bring the left foot forward, bend the right leg and bring the weight of the body on the right leg while throwing the arms back (preparation). Extend vigorously the right leg, then the left, while bringing the arms forward and up (impulse). Bring the legs together during the suspension and land on the heels. This jump doesn't cover more distance than the standing long jump, but is easier.

6. Side jump

Standing side jump: stand close to the obstacle on the side, feet together. Bring the arms up and forward, then bend the legs while throwing the arms back (preparation). Extend the legs vigorously while bringing the arms up and forward and leaning toward the obstacle (impulse). Raise the legs straight one after the other, the one closest to the obstacle first. The knee comes to meet the chest, still leaning toward the obstacle, arms up. After the obstacle, lower the arms (suspension). Land on both legs successively, on the toes (fall).

Standing long side jump: bring the arms to the side opposed to the jump, while leaning in the jumping direction with bent legs (preparation). Throw the arms in the jumping direction and extend the legs (impulse), land on the flat of the feet, legs slightly bent, and go back up right away, arms balancing.

Running side jump: the run is almost parallel to the obstacle, the jump uses one leg. Assuming a jump to the right side, jump from the left foot, and pass the obstacle first with the right leg extended in front, then the left, arms up. After the obstacle, lower the arms and land on the toes of the feet, first the right then the left.

Depth side jump: proceed as in the depth jump forward or backward, far enough from the obstacle pushing away with the hand.

7. Combined jumps: any combination of jumps 1-6. Make sure to always land on the toes after any jump, even a long jump, every time the landing point is lower than the starting point. Combinations may include: *high long jump, high depth jump, long depth jump, high long depth jump, long depth jump from sitting or hands pressed, long depth jump from a suspension.*

Jumps with hands on the obstacle

1. Jump onto an obstacle

from standing: put both hands on the obstacle, jump while pressing from the wrists, land on the obstacle with both feet between the arms. *from running:* run up a few steps, jump from both feet, reach to put the hands on the obstacle and proceed as before.

2. Jump over the obstacle with legs on one side of the arms

from standing: put both hands on the obstacle, jump while pressing from the wrists, swing the legs to one side, remove the hand in front of the body and land on the other side. *from running:* same move after a quick run-up, jumping from both feet *from a hand hold:* bend the body forward on the hands, arm straight, then swing the legs back and forth and then over the obstacle to the side as above.

3. Jump over the obstacle with one
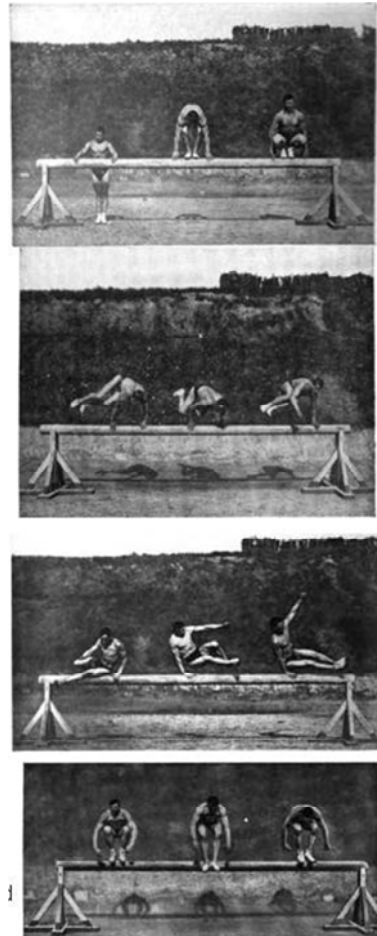
hand

From standing: stand sideways, one hand on the obstacle. Swing both legs in front as in the side jump, the leg closest to the obstacle first. *From running:* proceed as above from a run-up, jumping as in the running side jump.

4. Jump over the obstacle feet between hands

From standing: put both hands on the obstacle, jump while pressing from the wrists, bring the legs between the arms, tucked in. *From running:* proceed as above from a run-up, jumping on both feet.

When an obstacle is made of several horizontal bars arranged one above the other, proceed as follows.

1. Jump between the bars: put one hand on the lower bar, one on the higher bar. Jump between the bars, bringing the legs together in front first. Pull the body up with higher hand, push back with lower hand.

2. Vault over the higher bar: put both hands on higher bar, going on hand hold, then reach down to the lower bar with the left hand. Rotate the body toward the right above the bar, legs straight, holding and pushing with the lower hand. Let go with the hands and land.

4. Swimming

General considerations

Swimming is the most comprehensive of all exercises. A complete exercise must be hygienic, aesthetic and utilitarian; it must develop muscle strength, force of resistance, skill and moral energy. Swimming meets all these requirements:

1. The hygienic effect is intense: it activates all major body functions, especially respiration; it cleans the skin and hardens it to cold; finally it is done outdoors.
2. Its action is very effective for the opening of the chest and building of the respiratory capacity. In all the types of swim, the arms are constantly brought back beyond the head while the trunk is in extension, which produces the elevation of the ribs and expansion of the rib cage. Moreover, the discomfort produced by the liquid mass and the violence of the muscular work forces long and deep breathing.

3. It also has a very intense action on the development of the whole musculature, because it requires various muscular contractions of the arms, legs, trunk and head. In general, all these contractions, being very extensive, are wonderful exercises for loosening the joints and limbs and have an excellent effect on the spine.
4. To go further and faster requires perfect coordination of movements and an appropriate rhythm.
5. The difficult exercises of diving and lifesaving develop skill, composure, courage and self-confidence.
6. Finally, all the swimming exercises are indisputably practical.

For a swim to be beneficial, it is necessary to proceed in a certain fashion. One must enter the water knowing what he is going to do, otherwise we risk wasting time and no progress is possible. To learn something or just to improve, we must work methodically, have a goal and draw a program. The swimming session or lesson, like the gymnastic session or lesson, should consist of a number of different exercises, performed in a logical order, and be fully regulated as to expenditure of work. A complete session or lesson of swimming should include:

1. One or more brutal immersions (from any height) either head or feet-first, returning immediately to the surface;
2. A course on the stomach of ordinary breaststroke, with a very slow pace to start. This way of swimming is the best to straighten the spine and to acquire or maintain correct posture.
3. A course on the back. The backstroke is a rest after a course of some length on the stomach; this swim is the most essential to know for rescue.
4. A dive under water, starting either from a height, or from the surface of the water. The goal of this exercise is to stay as long as possible under water, the body completely submerged.
5. A motionless position or complete rest, "floating". No movement of arms or legs should be made during this exercise.
6. One or more races using the fastest swimming methods.
7. Lastly, complete the lesson with a few slow front or back

breaststrokes, enough to restore calm to the respiration and circulation before leaving the water.

Propulsion in water is the result of a series of impulses produced by the motion of the upper and lower members. Note that all the ways to progress in water are based on the same principle. The impulse is obtained: first by the sudden meeting of the legs and second by the arms acting like an oar or paddle. The sudden meeting of the legs, which produces most of the impulse effort is perfectly comparable to the closure of two branches of a pair of scissors. It can be done in two ways: first legs spread apart,

either laterally (regular breaststroke, etc..) or, in front and in back of the body (Indian breaststroke, etc..). The arm movement will also occur in two ways: in a horizontal plane (regular breaststroke, etc..) or otherwise, in a vertical plane (sidestroke, etc..). Finally, the movement of the legs and arms can be simultaneous or alternated.

Swimming may be broken up into four main phases: 1. starting position or preparation of the limbs to produce their effort; 2. impulse effort; 3. resting time, limbs extended, to let the body glide and profit from the impulse; 4. return of the limbs to the starting position. The movements performed between two consecutive returns to the starting position is a complete stroke or full motion. The cadence of swimming is the number of strokes executed in a minute. One must consider endurance swims where we seek to cover long distances with minimum fatigue and speed swims where we seek to attain the greatest possible speed over a short distance.

Breathing is of capital importance in swimming. The inhalation is done at the end of the resting time, at the beginning of the return of the members to the initial position, when the body is raised highest. It is very fast and is usually done with an open mouth. The exhalation is done with a closed mouth; it is very slow and lasts all the rest of the time. The breathing is regulated by the cadence of the stroke. In endurance swims, where the cadence is relatively slow, inhale at each stroke. In speed swims, where the cadence is very fast, inhale once every two, three, or four strokes. The most advantageous cadence for endurance swims is the cadence of normal breathing, 15 to 20 strokes per minute on average.

Swimming exercises have a double goal: teach people to get

through crises in all circumstances and to be useful to others by knowing rescue. They include three major categories: 1. the different ways to progress and to hold yourself at the surface of the water; 2. "work" on the water and under water; 3. rescue exercises.

Breaststroke. Beginning or preparation position

End of the impulse effort, after the scissor kick, or closing of the legs, the feet extended; and position of the body during the entire rest time.

Foot flexed, foot extended, showing the two main movements of the feet: flexion and extension, which have a great importance in the different ways to swim.

Impulse effort. Make extension of the legs by prolonging the thighs and pushing the water with the soles of the feet.

First part of the impulse effort. Release the lower limbs, the feet always flexed and extend the arms in front of the head.

Horizontal and lateral arm movement, the palms of the hands facing outwards. Take a deep breath during this movement.

Backstroke. Initial or preparation phase. Flex the lower members in the same way as the breaststroke, the knees spread as much as possible and the feet well flexed and turned outwards. At the same time, flex the forearms, elbows and body, the palms of the hands flat over the middle of the chest, fingertips meeting.

End of the impulse effort after the scissors kick or the brusque closing of the legs and the arrival of the arms along the body. The body keeps this position during the entire rest time.

End of the impulse effort: the head and upper body emerge. Take advantage of this instant to make a rapid and deep inhalation.

Treading water

Treading water consists in keeping yourself perpendicular to the surface of the water. From this position one may stay in place, advance, retreat, move laterally, or turn oneself completely. This way to swim is very useful if one wants to observe what is happening around oneself; let oneself drift with the current; attend to a rescue; maintain oneself in rough water; undress oneself in the water; keep up an object or transport an object without getting it wet; keep a tired person upright, etc.

Treading water is composed of four principal phases, like the breaststroke and backstroke previously described. The lower limbs do the ordinary movements of the breaststroke or backstroke. Movements of the upper limbs are different depending if one wants to stay in place, advance, or retreat.

To stay in place in a vertical position, the movements are as follows:

1. *Initial or preparation position.* Flex the arms, the elbows to the body, the hands flat at about chest height, palms of the hands facing down and horizontal, the fingertips joined together. Flex the lower limbs, knees spread laterally, feet flexed and turned outward.
2. *Impulse effort.* Extend the arms horizontally and lower them extended toward the thighs, palms of the hands always facing down, and horizontal. Extend the legs laterally, the feet flexed, then bring them together by extending the feet.
3. *Resting time.* Keep the arms long and extended, the palms of

the hands facing down and horizontal. Keep the lower limbs together and extended.

4. *Deep breath and return of the limbs to the initial position.* At the end of the impulse, inhale deeply at the moment where the body is lifted vertically. Lift the arms in front of the body and turn the palms of the hands vertically, then return to the initial position by returning the palms to a horizontal position. Flex the lower limbs to return them to the initial position.

The impulse effort of the upper and lower limbs is done simultaneously as in the backstroke.

To move forward, backward or sideways in a vertical position, the movement of the lower limbs does not change, but one must use different arm strokes. To go forward:

1. *Initial or preparation phase.* No change.
2. *Impulse effort.* Extend the arms in front of the body, the palms of the hands horizontal. Turn the palms vertically to face the body, and flex the wrists, the fingertips joined. Then bring back the hands to touch the chest, the palms always vertical.
3. *Resting time.* Keep the hands flat over the chest.
4. *Return to initial position.* Simply place the palms horizontal.

To go backward:

1. *Initial or preparation phase.* No change.
2. *Impulse effort.* Extend the arms in front of the body, turning the palms out as much as possible, thumb toward the bottom, fingertips together.
3. *Resting time.* Keep the arms elongated, palms out.
4. *Return to the initial position.* Place the palms horizontal and return them to the chest.

To go sideways (to the right for example):

1. *Initial position.* Right arm is extended laterally, palm flat. Left arm is in the normal position.

2. *Impulse effort.* Movement of the right arm: Turn the palm verti-
    cally and bring the hand back flat to the chest . Movement of
    the left arm: Extend the left arm to the left, palm turned out as
    much as possible, thumb underneath.
3. *Resting time.* Right hand is flat on the chest. Left arm is extend-
    ed, palm down.
4. *Return to initial position.* Place the right hand flat and extend the
    right arm laterally. Turn the left hand flat and return it to the
    chest.

To make the movement forward, backward or sideways easier, it is
necessary to lightly lean the upper body to the side one wants to move.
To move sideways, one of the two arms may be used, the other staying
constantly in initial position, palm flat.

The movement of the body results uniquely from the action of the
hands which, taking support over the liquid mass, pulls the body to-
ward them, pushes it back, or pulls with one hand and pushes with the
other for forward, backward and lateral movements. The position of
the hands is very important: for all the preparation moves or the return
to initial position, the hands, not having at that moment an active role
to fill, have to put up the least resistance possible. The opposite is true
during the impulse effort. For example, to stay in place in a vertical po-
sition, the return to initial position is done with the hands vertical. The
hands turn horizontally to push the body. Moving forward, the hands
are carried horizontally to the front; the palms turn vertically to pull
back the body. To turn in place, to the right, start by carrying the head
to the right and by advancing the left shoulder and hip. Then make the
arm movement as in the lateral progression, by carrying the right arm
to the rear of the shoulder line as much as possible and the left a bit in
front of the body. Make these movements in the opposite direction to
turn left.

Learning to tread water is simple and easy. It is enough—being in
breaststroke—to little by little reduce the angle of the body until it
reaches a vertical position. The head is kept upright or slightly leaned
to the back. Breathing is very easy, as the work of the lower limbs rais-
es the body above the water.

Position to give the body for floating. The palms of the hands
are horizontal, parallel to the surface of the water, the soles of the feet

also. The head is thrown back to make the nose and mouth emerge.

The position of equilibrium has its place under an inclination which depends on the buoyancy of the subject.

Balance position of the body in floating training. The body swings vertically. The flotation line is here above the axis of the ears. The following figure represents the same subject training the float, it is below.

Diving underwater and swimming between two waters

Diving involves immersing the body including the head, below the water surface. The swim between two waters is to travel a certain distance or reach a certain depth underwater. The body being submerged, it is obviously impossible to take in any air. The duration of immersion is consequently very limited and its value depends more or less on the tolerance of the respiratory and circulatory functions.

Diving is an exercise of paramount importance. It is particularly useful when it comes to: getting out in case of accidental drowning; maintaining oneself in rough water; rescue a drowning person or one suspended in midwater; search for a person fallen in the water; pick up an object at the bottom of the water, etc..

Diving exercises are always a danger. Follow an extremely mild progression for the duration of stay under water or the depth reached. Once one feels the slightest discomfort or dizziness, ascend to the surface as quickly as possible and leave the water immediately.

The performance scale for diving duration indicated previously ranges from 10s (0) to 60s (5). By adopting the same gradation process, a scale of depth diving performance ranges from 3 meters (0) to 8 meters (5). When one dives for a significant time, it is prudent not to exceed a depth of 3 to 4 meters.

Do not assume that because one could make a dive of so many seconds a given day, he can safely do it the next day or another day after that. Everything depends on the particular conditions under which one is located. The body's tolerance is highly variable and the slightest cause may influence it: digestion, nutrition, sleep, temperature, atmospheric conditions, etc..

Diving feet first Jump in water like in a long deep jump. Either: 1. jump in a crouched position, the trunk nearly vertical, hold the front of the legs with the hands and take care to lower the toes before reaching the surface of the water. 2. jump in vertical position, the body completely elongated, arms along the body or spread laterally or vertically.

Headfirst dive (detail of the first phase). 1. Inhale long and deep, raising the arms (left subject) 2. Drop the arms and carry them back by flexing the lower limbs at the same time, the upper body leaning forward (middle subject) 3. extend vigorously the lower limbs, quickly bringing the arms beyond the head (right subject).

Diving headfirst (detail of the later phase) l. The left subject has arrived at the precise moment where he has toppled forward, has to at that in-

Headfirst dive A correct dive produces little splashing of water, and the body penetrates the water like an arrow. To do this the direction of the

stant vigorously extend the lower limbs and quickly carry the arms beyond the head. 2. The right subject has left the ground: the lower limbs are completely elongated, and the arms are extended beyond the head. The body will enter the water at an angle of about 45°. The chin stays on the chest shortly before arriving at the water's surface.

velocity which the body is animated at the moment of entry into the liquid mass is, at this precise moment, conformed with the line formed by the body itself.

Example of a high dive The greater the height, the less the impulse given by the legs need to be strong. To not enter the water too vertically and, consequently, to avoid diving too deep, "glide" as long as possible by keeping the head higher than feet. Don't let the upper body be more than 1 or 2 meters below the surface of the water.

Another example of high dive Model of a ladder with a mobile platform for conducting dives at different heights.

Rescue exercises

From a utilitarian point of view, swimming exercises should have as their essential goal the work on water and under water, which is not possible without any rescue practice. The following exercises are cho-

sen and classified so they can gradually prepare the swimmer to get by and also to assist a person in danger of drowning. They should be done first in swimwear before we can think of doing them fully clothed.

Swim with the arms or legs only.

1. Swimming on the stomach, back, standing and side, with legs and one arm. Immobilize the other arm by placing the hand on the hip, neck, on top of the head, etc..
2. Swimming on the stomach, back, feet and side, with legs only. Immobilize the arms by placing hands on hips, neck, on top of the head, etc..
3. Swimming on the stomach, back, feet and side, with arms only. Keep legs together and extended in the line of the body.
4. Moving forward with one arm only, the other limbs held motionless in any position.
5. Moving forward with one leg, the other limbs being held motionless in any position.

Diving in every way possible.

1. Diving feet first and come to the surface as quickly as possible facing the direction of departure.
2. Dive and return immediately to the surface in the direction of departure and taking as little water as possible.
3. Dive in all the possible inclinations.
4. Diving, feet first, and as fast as possible face the point of departure. To do this turn around in the water before reappearing at the surface.
5. Dive and turn as soon as possible to face the starting point. To do this turn around in the water before reappearing at the surface.
6. Dive with momentum, feet first. Make a run beforehand and try to jump with momentum as long deep and far as possible.
7. Dive with a running start. Make a run and dive head first as far as possible. Perform the same exercise without use of both feet.
8. Dive without momentum and with momentum facing the di-

rection of departure after a full somersault in water.

9. Fall over backwards in any way, turning in the water facing forward on the belly, or to the back on the back. Never stretch the body completely when falling; instead, flex the trunk as much as possible on the legs once in the air and strongly tuck the head to the chest to avoid a painful flat-back landing.

10. Fall into the water by surprise by being given a push.

Transporting objects lighter and heavier than water.

Pick up objects by diving.

Help to carry a person who is not in immediate danger. The person needing help (left foreground) puts his hands on his rescuer's shoulders. The rescuer stays like this or tows in front of him swimming on the belly or, preferably, on the back.

Rescue carry. Seize the person to be rescued (right subject) from behind and encircle his neck with the left arm and grab his clothes with the left hand. Swim on the back or side with both legs and one arm. This way permits very easy keeping the head of the rescued person above the water.

Swimming clothed

Start by simply putting on shorts and shoes. Gradually increase bit by bit the number of clothes until entirely dressed in street clothes. Repeat the previous exercises, in particular the work on the water and under water, being fully dressed.

Swimming, fully clothed, is extremely tiring and at the same time

very slow. Firstly buoyancy is less than when swimming in bathing suits, except for a very short period immediately after immersion, when the water has not fully penetrated the clothing. This reduced buoyancy often makes it impossible to float without movement. Also, the movement of the limbs is limited by the discomfort caused by clothing. Finally, pockets of water formed by the clothes provide a significant obstacle to propulsion. Generally, the pace of the movements of swimming fully clothed must be much slower than swimming in a bathing suit if one does not want to unnecessarily tire oneself.

Being in the water fully clothed, it is possible to undress completely. This exercise is both an application of treading water, floating, diving and swimming with the legs or arms only. The removal of coat and waistcoat is the only relatively easy part of the exercise. It is enough to stay in the vertical position while treading water with the legs only. To remove the shoes, trousers and shorts, it is necessary to crouch and remain submerged long enough to cast off each of these garments. To remove the shirt or sweater, tread water and dive if necessary to pass these clothes more easily over the head.

Apart from the coat and waistcoat, the removal of additional clothing, pants, shorts, shoes and shirt is extremely painful and tiring, sometimes exhausting. Moreover, pants and shorts can stay engaged in the legs and thereby limit the use of lower limbs. A shirt or sweater can remain engaged on the head and cause drowning. In summary, while it is useful to remove some effects, it may be dangerous to undress completely in case of accidental drowning.

Accidental submersion

Getting oneself out of danger in case of accidental submersion.
After an accidental fall, ascend to the surface as quickly as possible and breath. Keep calm and judge the situation, thinking to save strength and above all not to make unnecessary movements. If a good place for rescue is near, win it as soon as possible while dressed. If it is moving away, swim with the greatest care possible and well regulate the pace to avoid being overcome by fatigue. Get rid of the clothes easier to remove, as the coat and waistcoat. Sometimes there will be interest in keeping the vest to prevent the shirt from forming pockets of water. In all cases, unless you are exceptionally strong, never try to un-

dress completely. It is often better to keep all clothes on than to expose oneself to fatigue or completely exhaust oneself.

When the current is too strong, do not waste your strength trying to beat it, try instead to land downstream from the point where you are, or wait for help. To free yourself from a vortex or the embrace of aquatic plants, do not try to resist, but remain motionless and passive by floating for a sufficient time.

Rescuing a person in danger.

The first duty of a rescuer is to act with extreme rapidity, for any loss of time can be fatal. The rescue is relatively easy if the person needing help is still floating. Just approach and seize the person using one of the methods listed earlier, then wait for help or swim to a favorable place.

In all circumstances the most practical and safest way is to approach from behind and seize the person by the arm or under the armpit without him noticing. In this way, the rescuer avoids being caught. In the case where the person to be helped turns around and tries to seize the rescuer, he should immediately escape and return from behind a few instants later. If the rescuer has been seized, he must free himself one of the ways indicated earlier. As a last resort, if he believes the situation too dangerous for himself, he should not hesitate to choke the person or make him lose consciousness.

The rescue becomes more difficult when the person has gone under, without reappearing at the surface. If he has disappeared from the rescuer's view, the rescuer must look for the air bubbles that indicate the exact location of the submersion. He then dives below or above the bubbles along the direction of the current. If there is no clear indication on the location of the disappearance, he explores

the depths by performing repetitive dives.

The rescuer has no fear of being seized by a completely submerged person, as he has completely lost consciousness or is at least suffocated because he no longer has any force.

When one is surprised fully dressed when rescue is needed, do not lose valuable time to undress completely, especially if the distance to swim is small. Get rid of just the most annoying things: shoes and overcoat. Adjust the trousers well at the belt, so as not to risk having your legs immobilized.

Performances of the able swimmer and master swimmer

These performances, which we established after many experiments at the School of Marine Riflemen were published regulations in the French Navy. By Ministerial Dispatch of April 4, 1907, a certificate of "master swimmer" is given to any sailor who meets the conditions outlined below.

To be considered an "able swimmer", a subject must perform the following minimum performances:

1. A swim of 100 meters in 3 minutes (no minimum time limit);
2. A dive underwater for 10 seconds, the body completely submerged. These performances correspond to the zero level of swimming tests in the results form.

A "master swimmer" not only knows about the different methods of swimming, but also possesses the physical skills necessary to perform a difficult rescue. The master swimmer must be above all an excellent diver. This is an essential quality to search mid-water for a person in danger of drowning and to keep the head of the person he rescues above water, if necessary by sacrificing his own breathing. Other qualities that the master swimmer should have are: speed, resistance to fatigue and cold, the courage to jump into the water, the ease to move and to recognize in mid-water, the ability to seize and tow a person in danger, and some competence to treat the drowned.

The diving performance of a master swimmer must not be less than 60 seconds to be able to count in an emergency. This performance proves the excellent condition of internal organs: lungs and heart, and a high tolerance of the circulatory and respiratory functions. It gives the certainty that the subject who has reached that at least one time can provide at any time, even if he remained long without exercise or swimming, repeated dives of 15 to 30 seconds on average, which is sufficient in practice. The performance of 60 seconds should be attained after a methodical training of several weeks. It obviously can not usually be provided by subjects in a condition of constant training. Subjects who train to become master swimmers must receive a medical exam with a careful examination of the lungs, heart and ears. One or more master swimmers are essential for monitoring

group swimming exercises.

The performances required of a master swimmer are the following (Water temperature is assumed 17 to 18 degrees C, 63 to 65 degrees F):

1. Speed test: 100 meters in 2 minutes.
2. Endurance test: 1000 meters in 30 minutes.
3. Dive from a height of 5 meters, preferably in shallow water (3 meters at most).
4. Stay submerged 60 seconds under water, the body entirely submerged.
5. Being clothed (sweater, shirt, jacket, pants and shoes), to pick up in 3 meters of water a stone or iron weight of 5 kg, preferably in slightly cloudy water.
6. Being dressed (as above) run, with a dummy or a specially appointed man, the rescue exercise of a person in danger of drowning and cross a 25 meter distance.
7. Demonstrate theoretical and practical knowledge of the care to the drowned.

5. Climbing

Climbing consists in raising or moving the body using the arms or the arms and legs from a suspension or a holding position. It is one of the most useful practical exercises: climbing is important in many different situations from reaching a high place to passing an elevated obstacle to fleeing from danger vertically. Climbing with the arms and legs recruits the muscles of the entire body, in particular the core and upper limbs. However, climbing can be a detrimental exercise: it requires violent efforts from muscles which physiological function is not the locomotion of the upper body; it can encourage an excessive development of upper body musculature and slow regular growth in teenagers; it requires a posture of the shoulders that compresses the thoracic cage. Climbing can also be very beneficial to the development of upper body strength, but only in moderate amounts and using the legs as much as possible to reduce the strain on upper limbs hold. Exercises to correct the posture of the shoulders should be combined with climbing whenever possible. Among the following exercises, almost none have a deforming effect. However, many of the playful exercises in gymnastics have a

deforming effect and should be avoided. Progressive training in climbing starts with simple suspension exercises and climbs on ladders, double ropes or bars where the elbows can be kept in the plane of the shoulders and the chest open. Only then comes climbing on the rope, first using the feet. Finally, train topping out. Being able to climb some distance on the rope with only the arms is a good criterion of climbing abilities: other exercises come easily when this is mastered.

Climbing vertical ropes, bars, etc. fixed or free standing

1. Climbing with arms and legs, pinching the rope: hold the rope as high as possible, put the right knee and front of the ankle behind the rope, the left calf pressing in front of it. Climb up with the arms, bend the legs bringing the knees up high. Press on the rope with the legs, bringing the arms up one after the other and continue. To go down, move the arms below one another in turn, while pressing on the rope with the legs.

2. Climbing with arms and legs, rope rolled around one leg: hold the rope as high as possible, pull up, bring the knees up. Let the rope go between the thighs, rolling it around one leg behind the calf onto the front of the ankle. Press on the rope with the sole of the other foot at the ankle. Take the hands off the rope one after the other, reaching up, straightening the legs. Pull up again, letting go of the rope with the legs or letting it slide around the leg. Bring the knees up, and roll the rope as before. When the rope is free standing, bring the legs forward rather than keeping them vertical, to provide a better grip for the feet. To go down, move the arms below one another in turn, while pressing on the rope with the legs. This climbing method requires more work from the legs, but the pose can be held for a longer time, to rest the arms or to free one or both hands; if letting go of both hands, the rope must go behind the back to avoid falling backward.

3. Climbing with the arms only: hold the rope as high as possible, reach up with one hand alternatively, keeping the legs bent up, rope between the legs or to the side. Go down in the same way. This method is useful to reach quickly a close height or to momentarily relieve the legs in a climb. It is an important exercise to practice for the climbing muscles.

4. Climbing on two ropes: grab one rope in each hand, and climb using one of the above methods, rolling one rope around the leg if needed. This method has little practical use, but is a great exercise for practicing, keeping the chest open and the shoulders out.

Climbing inclined ropes and chains

Inclined ropes are ropes fixed at both ends, having some inclination, even to be horizontal. It is useful for climbing on scaffolds, going down from a window to the ground with a rope in a fire, etc.

1. Climbing with both hands, rope under the knee: to go up or down, keep the rope between the legs, folding one or both calves on the rope, or bring the legs with calf on the rope one after the other, moving opposite arm and leg at the same time, or keep the rope on the side, one calf resting on it. Hands are moved one after the other in all cases. This climb should be practiced going up and down, head first or feet first. Keeping the head higher is the most efficient method.
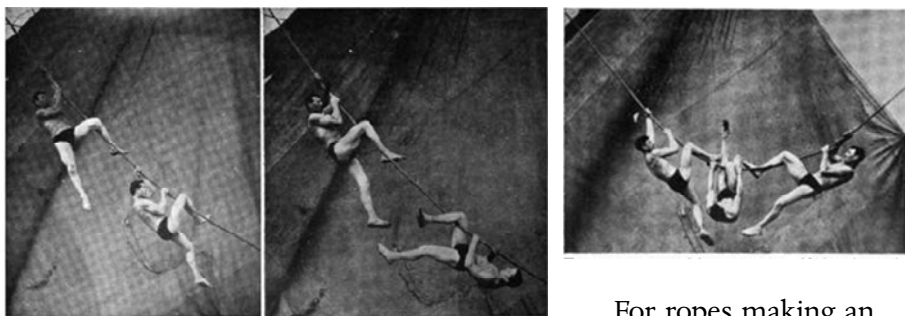
For ropes making an arc, if the head starts higher, it will become lower than the feet past the middle of the rope. To always keep the head higher, proceed as follows: at the middle, if the right leg is folded above the rope, turn the

body to the right and reach beyond the leg with the right hand, then the left while bending the leg to keep it engaged on the rope. Bring the left leg under the rope, then fold it above the rope before removing the right leg. Note that turning to the other side would make the leg go right away.

2. Climbing with both hands, one heel hooked on the rope: same method as above, using the heel rather than the folded leg.

3. Climbing above the rope: it is sometimes necessary to climb like this to reach an object or free one or both hands. Hold the rope with both hands and one leg, foot hooked on the rope, the other leg straight and balancing. This method is completely unpractical on arc-shaped ropes.

4. Climbing with the hands only: being suspended by the hands, move one hand after the other to progress up or down. This method is a good strengthening exercise, and is useful for instance if the legs were to slip from the rope.

Climbing beams, masts, columns and other vertical bars

This way of climbing can be useful to reach a ceiling from a side beam, to move around a boat, to climb trees, etc.

1. Climbing with crossed arms, leg front and back: grab the mast as high as possible with both arms crossed, hugging the mast, bend up the legs as much as possible, one with the calf around the mast, the other with the front of the foot pressing against the mast. Extend the legs and reach up with both arms, then hug the mast tightly while bending the legs up, etc. To go down, perform the same movements in opposite order. This method is the most effective unless the mast is too thick.

2. Climbing with crossed legs: here, both legs are kept around

the mast and crossed. A successive pressing of the upper and lower limbs as above allows to go up or down. This method is not very good to go up, but is efficient for going down or staying at some level, on masts of limited width.

3. Climbing with arms holding the mast, legs on both sides: this is a method for a mast that is too wide to cross arms or legs around. The lower limbs are used by strongly pressing against the sides of the mast with the feet and the knees.

4. Climbing with hands and the feet, without pressing the knees: this method is preferably used bare feet and with masts of smaller width or even a straight rope. It is a harder way, but faster than the other techniques.

All these climbing techniques have a particularly intense effect on the abductor muscles of the legs.

Climbing along a wall

Climbing up and down walls finds many applications, whether to escape a fire, go down a well, get out of the water, using a rope, a beam or the surface of the wall. The ways to climb up ropes, beams, etc, are as follows:

1. **Climbing with the hands and feet:** grab the rope, pole, beam with the hands and place it between the legs or to one side. Bring the legs up on the wall, knees as open and high as possible, feet pointing outward. Climb by moving hands and feet in succession, or moving opposite limbs together, or moving on side after the other. The most efficient method consists in keeping the rope between the legs and moving opposite limbs together. The legs provide a push upward and slightly away from the wall. The body must stay close to the wall, the knees out and open to reduce the work of the arms and climb faster.

2. **Climbing with the hands, holding the rope between thethighs, feet resting on the wall:** reach up with the arms on the rope, bend arms and legs, press the rope between the thighs, crossing the legs if needed, and use the feet to stay away from the wall. Reach up with hands and repeat. This method is useful when the wall is too slippery for the feet,

and the rope can be kept far enough from the wall.

Climbing can also be done without any device, with one of the following methods.

1. Climbing using the wall surface: if the wall has an irregular surface, holds, etc, one can climb using these to rest the hands and feet, keeping the body close to the surface of the wall.

2. Climbing with the help of someone: the helper squats facing the wall, hands resting on it. Stand and balance on his shoulders, hands on the wall. The helper then stands up with the climber. If needed, he can grab the climber's feet and extend the arms further up. Alternatively, the helper can stand back against the wall, hands crossed in front, palms up. The climber puts a foot on the hands and walk up, to go further he can put his other foot on the helper's shoulder.

3. Climbing with two helpers: the two helpers kneel sideways to the wall, facing each other, closest knee to the wall on the ground. They lock the opposite hands, palms up. The climber steps on the hands and puts his hands on the wall, then the helpers stand up, using their free hand against the wall. Alternatively, the helpers can stand facing the wall, locking the inside hand between them, and the climber steps first on their hands then on their shoulders.
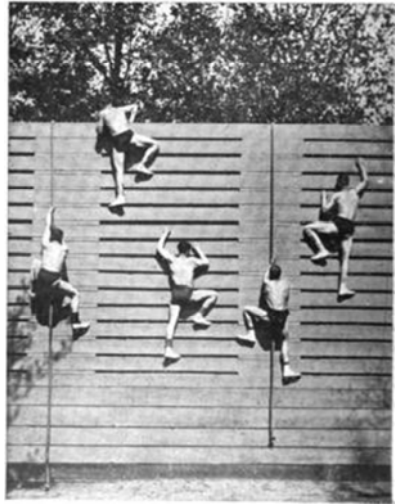
Pulling oneself up

Pulling oneself up consists in going from a suspension to a hold on the arms, or going from below to above the obstacle. Pulling up is probably the most important climbing exercise, as it is almost impossible to finish a climb without having to get on top of something.

1. Pulling up by rotating the body backward: from a suspension under the beam, pull up with the arms, bring the legs as high as possible in front of the beam, then above by bending the body backward, still pulling with the arms. Keep rotating until the stomach is above the beam, then hold straight. Go down by the opposite movement. This method has very few practical applications, as it requires a bar with leg

space and small enough to provide a good grip. However, it is a good exercise of the core muscles. To that end, it can be made harder by bringing the legs up high before doing the pull-up with the arms.

2. Pulling up on one leg and the forearms or wrists: from a suspension under the beam, pull up with the arms, bring the legs as high as possible in front of the beam, then lean the body to the right and hook the right leg, calf above the beam, on the right side of the hand. Get on top by either bringing the forearms flat on the object, then spreading apart the hands, or using the wrists, bringing the forearms straight up above the beam. In any case, swinging the other leg up and down will provide momentum for the climb just before getting on top. Once up, unhook the leg to go onto a straight hold. Go down by the opposite movement. This method is the easiest for pulling up, but requires a bar or a small beam with good grip and enough space to swing the leg.

3. Pulling up on the forearms: from a suspension with hands close, pull up with the arms while bringing the legs up high. Bring both forearms up on the beam, letting go with the hands, and swinging the legs vigorously up and down to help the tilt of the body forward above the beam. Get above the bar spreading the hands apart, and rest the stomach on the bar before going into the holding posture. Go down with the opposite movement. If climbing a wall or if there are objects behind the bar, the legs can use them to push up and away and help in the pulling motion. This method is the most practical in most circumstances.

4. Pulling up alternatively on the wrists: from a suspension, pull up with the arms while bringing the legs up in front. Bring the weight of the body on the left wrist, and make the right arm vertical. Shift the weight to the right side with a slight left torsion of the body, and pull the left forearm above the bar,

helping by moving the legs up and down. Push strongly with the arms to rest the stomach on the bar before going into the holding posture. Go down with the opposite movement. As before, if there are objects or a wall under the bar, the legs can use them to push up. This method is convenient on bars with a good grip, and does not require to let go like the previous method.

5. Pulling up simultaneously on the wrists: from a suspension, pull up with the arms while bringing the legs up in front. Engage the wrists above the object with a strong push, bringing the weight on the hands flat toward the back of the palm, turning the fingers inward if needed. As the wrists are engaged, bend the arms, then vigorously swing the legs up and down and pull over the bar, keeping the elbows close to the body. From there, reach the holding posture. Go down with the opposite movement. As before, if there are objects or a wall under the bar, the legs can use them to push up. This method is not much harder than the previous one, and depends on the good placement of the wrists and the swinging of the legs. Of all methods, it is the fastest.
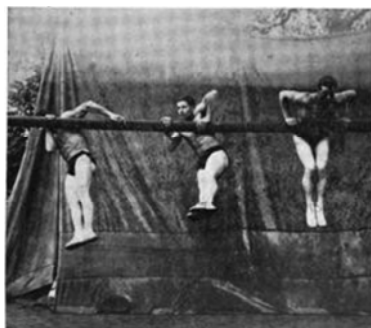
Reaching high places without vertigo

To reach a high place, one must first become insensitive to vertigo. Vertigo is a sort of stunned state where one looses will power and the proper notion of things, caused by feeling the void below or lacking confidence. One can conquer vertigo with gradual exercises meant to improve balance and reduce the fear of the void.

1. Balancing: on an elevated object, perform the following exercises: forward raise of the leg; backward raise of the leg; side raise of the leg; forward balancing of the leg; backward balancing of the leg; side balancing of the leg. The hands can follow the fundamental positions or help maintain balance.

2. Fighting the void: gradually go onto higher and higher places, first using safe and easy means: stairwells, ladders, stools, etc. Once up onto a safe location, look down toward the ground. When more assured, climb up with some of the more demanding climbing methods described above.

Reaching a hazardous spot

One may have to stay on a spot after climbing, to take a break, help someone, recover an object, etc. This is not an issue if the spot is safe, but is harder if there are dangers of loosing balance or falling. After a climb followed by a pulling up, we find ourselves holding on the arms and stomach, and we seek to leave this posture to sit, straddle or stand on the obstacle depending on the circumstances. The following exercises must be done on a low object first, before trying them on high places.

1. Sitting from a straight hold: turn around on one arm, letting go with the other hand and leaning the body forward, or bring one leg over the object, then the other. Do the opposite to go back to a hold.

2. Straddling from a straight hold: bring one leg over the object. Do the opposite to go back to a hold.

3. Standing from a straight hold: bring the knees one after the

other on top of the object, then stand up. Do the opposite to go back to a hold.

4. From standing, straddle the object and back: bring the feet together, bend the legs down, put the hands on the object, close to the feet, fingers out. Bring the weight of the body on the wrists and lean slightly forward, move the feet slowly on both sides of the object, sit. To go back up, put the hands close to the thighs on the object, swing the legs a couple of times backward and get the feet on the object, then stand up.

Passing a dangerous spot

By a dangerous spot we mean a narrow passage, beam, bar from which a fall is possible. Depending on the type of obstacle, use one of the following methods:

1. From a hold, move sideways: to go left, press the stomach and bring the right hand next to the right thigh, fingers forward. Bring the left hand out and pull the body up and toward the left hand, then go back on the stomach. Repeat the move to keep going left, or reverse to go right.

2. From sitting, move sideways: to go left, bring the right hand next to the right thigh, fingers forward. Bring the left hand out and raise the body up and toward the left hand, then sit back on the object. Repeat the move to keep going left, or reverse to go right.

3. From straddling, move forward: reach in front of the thighs with the hands, thumbs up and fingers out, raise the body with the arms, balancing with the legs and move to sit forward, hands touching the thighs.

4. From straddling, move backward: put the hands in front of the
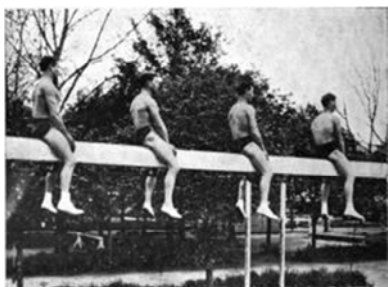
thighs, thumbs up and fingers out. Swing the legs forward then back, raise the body backward with a strong impulse from the wrists, bring the hands close to the thighs again and go on.

5. From standing, walk forward: bring one foot in front of the other, heel pointing toward the middle of the other foot, arms out for balancing, and keep going with the feet pointing out, eyes looking just in front of the feet. Smaller steps help maintain a better balance.

6. From standing, walk backward: perform the same steps as in the forward walk, with extra care.

7. From standing, walksideways: stand sideways, feet together pointing slightly out, arms loose. Bring the right foot to the right followed by the left foot, and so on. Proceed similarly to go left.

8. From standing, turn around: turn on the spot using the arms to stay balanced.

6. Lifting

Lifting consists in grasping with the hands objects of various size and shape to move them, lift them up or carry them. Often it is not only necessary to be skilled at handling large and heavy objects but also to have the required strength to carry them. In particular, it is important to be able to carry with caution a sick or injured person without a vehicle or a stretcher.

Lifting exercises have an intense effect on developing the muscles of the shoulders and the lumbar region. However, they have little or no hygienic effect, especially when the efforts are violent. It is important, when using lifting as a strengthening exercise, to carefully consider the weight of the objects to lift. Lighter objects are preferred, because the muscular development depends more on the number of repetitions than on the intensity of the effort. For instance, it is better

to lift a weight of 20 pounds 20 to 30 times than an object 4 or 5 times heavier just once.

An object is to be considered too heavy if it doesn't allow repeated lifting. To reach the ability to lift heavy weights, one must start with light objects and progressively increase the weight. As in any other exercise, only try to use maximum strength very occasionally.

One must be careful with lifting exercises. When done with weights that are too heavy, they have the following drawbacks: 1. they develop muscles very fast, which might be dangerous for persons of insufficient organic resistance; 2. they stop the growth of teenagers; 3. they stiffen the muscles and remove all their flexibility; 4. they tire the heart from the short and intense work they require; 5. they can produce accidents like hernias, forced heart, tearing of muscles and tendons, etc.

In general, the training of lifting skills is done in two ways: with objects like dumbbells, kettlebells, barbells, or stones of known weight, for a methodical gradation of the exercises; with objects of various shape and size requiring to be handled with dexterity, like bags, parcels, etc.

Lifting with two hands

1. Clean and press: place the heels on a line, feet together or slightly apart, flex the legs and bend down and forward. Grab the object with both hands and lift it in one move to shoulder height, without resting it on the chest. Pause at the shoulders, legs straight and arms bent, and then extend the arms to bring the object over the head with straight arms.

During the extension of the arms, the legs are straight, the feet stay in the same position, the core is tight and the body is not bent backward or to the side. This lifting method has little practical use, it is rather a conventional exercise for developing and measuring strength.

2. Clean and jerk: place the heels on a line, feet together or slightly apart, flex the legs and bend down and forward. Grab the object with both hands and lift it in one move to shoulder height, without resting it on the chest. Pause at the shoulders, legs straight and arms bent, then throw the object to straight arms with a sudden flexing and extension of the legs, staggering the legs front and back or keeping them in the same position. Note that the raising of the object is almost
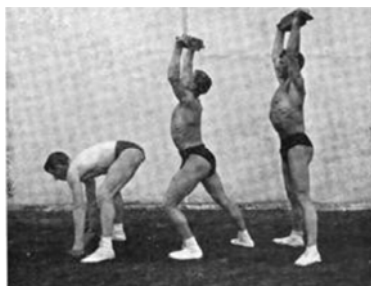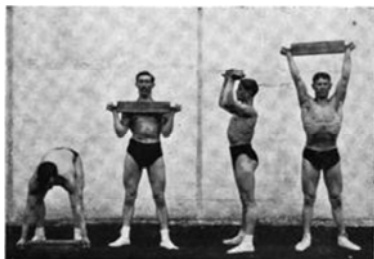
entirely done by the motion of the lower limbs; the extension of the arms must start with the extension of the legs, not their flexing. This method is the most practical to lift any heavy object.

3. Snatch: place the heels on a line, feet together or slightly apart, flex the legs and bend down and forward. Grab the object with both hands and lift it in one move all the way to straight arms, without pausing at shoulder level. Use the legs as much as possible, extending them vigorously and staggering them if needed. Pull the object vertically, as close as possible of the body. Increase its speed before reaching shoulder level, where the wrists are rotated. Straighten the arms before the end of the extension of the legs. This method is nothing more than a throw without a pause at the shoulders. It requires about the same strength as the clean and press, but is a more complete exercise. Like the throw, it has an intense effect on the muscular development of the legs.

Lifting with one hand

1. Clean and press: same procedure as in the two handed version. Grab the object with one hand, bring it to the shoulder in one move. Pause at the shoulder, then extend the arm up to raise the object above the head, keeping the legs and body straight.

2. Clean and jerk: same procedure as in the two handed version. Grab the object with one hand and bring it to the shoulder in one move. Throw it upward to full extension of the arm with a strong flexing and extension of the legs.

3. Snatch: same procedure as in the two handed version. Grab the object with one hand, and pull upward to raise it all the way to full extension of the arm in one move, with as much help as possible from the legs.

There are two other classical techniques for lifting with one hand, but with little practical interest:

4. Press pull: it is a sort of snatch with the arms kept fully extended. With feet apart, grab the object with one hand and place it between the legs, slightly behind. Raise the upper body suddenly to bring the object above the head in one move, keeping the arm straight.

5. Bend press: it is a sort of press without maintaining a correct posture. Grab the object with one hand and bring it to the shoulder in one move, then pause at the shoulder. Raise the object smoothly above the head to a full extension of the arm, bending the body at will and flexing the legs to help.

Lifting and carrying objects and charges of all sorts

The classical exercises above can only be practiced with compact objects where the hand can have a good grip. They must be complemented with handling, lifting and carrying objects and charges of all sorts, in particular with the following exercise: lifting and carrying a bag on the shoulder. Whatever the shape or size of the object, the technique to use is always similar to lifting and carrying a bag. Start learning and training the proper form first with lighter bags filled with straw, cotton, seaweed or sawdust, then progressively move on to heavier bags by adding sand or earth.

Use one of the two following methods, depending on the weight of the bag. The descriptions are made for carrying the bag on the right shoulder, but carrying on the left shoulder follows the same rules.

1. Lifting a light bag: place the bag straight and well balanced, and grab it with both hands near its head. Lift it slightly from the ground while flexing the legs, and turn it around to bring its head to rest on the right thigh, as close as possible from the abdomen. Help the move by pushing vigorously with the right knee, keeping the legs flexed. When the bag flips upside down, grab and hug the middle

with both arms. Stand up while placing the bag well balanced on the right shoulder.

2. Lifting a heavy bag: place the bag flat on the ground, head to the left and bottom to the right. Grab the head with the left hand and the corner of the bottom with the right hand, close to the feet. Flexing the legs, lifting the bag in one move to rest it on both thighs, as close as possible from the abdomen. Let go with the left hand and grab around the middle with the left arm, then let go with the right hand to grab the further corner of the bottom. Flip the bag toward the left, in order to bring the bottom up and the head to rest on the right thigh, close to the abdomen, keeping the legs flexed. Let go with the right hand and grab around the middle with the right arm, then stand up while placing the bag well balanced on the right shoulder.

Two other exercises can be useful when several persons are available: lifting and carrying a beam, branch or tree, and stand a ladder vertically.

To lift onto the shoulder a beam or a long object, the team starts at the heavier end of the object, which is the first to load. They grab it and lift it up, leaving the other end on the ground. A sufficient number of persons bring it on their shoulder, then the others go to the lighter end and load it on their shoulder. The team can finally move to share evenly the weight.

To stand a ladder vertically, start by placing the foot or base of the ladder against a wall or a fixed object. Lift the other end, each person getting under the lifted part of the ladder after one another. Raise the arms vertically to raise the ladder into a vertical position. If there is no fixed object to use, one or two persons stand between the first and second rung, holding the ladder with the arms and leaning to bring their weight back as the ladder is raised. That way, the base of the ladder is constrained by their weight, and it can be raised as described above.

Transporting sick or injured persons

The carrying techniques depend on circumstances: the weight of the person to carry, the seriousness of his state, the distance to cover, the number of available persons, etc.

1. Holding the person by the middle under the arm: grab the person to carry lying down on the ground under the armpits, from the back. Lift him and carefully place him under an arm, his head in front

and his legs back. The arm of the carrying person is placed under the belly of the carried one, to keep the chest free. This method is most practical when the rescuer is alone, the rescued man is not too heavy and the distance to cover is short, or one needs to walk up some stairs, in which case the free arm can be used to grab the handrail.

2. Carrying the person in both arms: this method conventionally used to carry children is only practical if the person to carry is light and the distance to cover is short.

3. Carrying the person on the back: the carrier holds the leg of the carried person, who crosses his arms around the carrier's chest. This method allows to carry for a long distance someone hurt at the leg or the head with enough strength to hold on with his arms.

4. Carrying the person sitting on one or both shoulders: place the person on the back, then use the arms to raise him to the shoulders, or squat to let the person sit directly on the shoulders. To move on one shoulder, say the left, bring the right leg up over the head, then the carrier grabs both legs with the left arm while providing support with the right arm. If the carried person can stand, one can start from a squat and lift him directly on the shoulder. Like the previous method, these two are useful to carry over a long distance someone with minor injuries.

5. Carrying the person on his belly over the shoulder or the neck: *on the shoulder:* with the person lying down, kneel on his left and put the left knee on the ground. Grab him by the left arm, lifting his body to bring his chest to rest on the right leg. Hold him around the waist, left arm under and right arm over. Stand up and bring the per-

son onto the left shoulder lifting him vigorously, so that his legs go over the left shoulder to the back, the upper body staying forward. Same method for the right shoulder. *On the neck:* once the person is over the left shoulder, grab his legs with the other arm to bring them on the right shoulder.

6. Two-person carry by the arms and legs: one of the carriers lifts the person under the arm pits, and the other by the legs, placing himself between the legs or to the side. Or one person grabs the right arm and right leg, and the other the left arm and left leg. This method works for a person sick, injured or dead if the distance to cover is short.

7. The simple stretcher (with two carriers): the two carriers hold hands, left hand with right hand, grasping each other by the phalanges. They squat down to let the carried person sit on their arms and place their arms around each carrier's neck. The carriers move facing forward.

8. The chair: two carriers facing each other hold hands, left with right, grasping at the phalanges, and place their free arm on each other's shoulders. The carried person sits on the arms and the carriers move sideways. This method allows to carry over a long distance a person badly injured, unconscious or dead.

9. The double stretcher: four carriers in a square hold hands two by two at the phalanges or the wrists. The carried person lies down on this sort of bed, a fifth carrier behind may hold his head and a sixth one in front may hold his legs. This method works in any circumstance, provided there are enough carriers available.

7. Throwing

Throwing consists in projecting an object of any shape or size either to a given distance or toward a given target. This exercise has many uses, for instance when defending oneself by throwing an object, helping someone in the water by throwing a life buoy or a rope, reaching a

high place by throwing a grapple, giving a tool to someone you cannot reach, etc.

Throwing exercises act on most of the muscular system, particularly on the arms and the obliques. They improve coordination, both for the power and the accuracy of the throw, and develop a good eye and a steady hand. They complement well lifting exercises, without any of the dangers of these previous exercises.

Throwing exercises are both educational and applied, and can be performed at any age, provided that the weight of the objects is limited for children. They must be done on both sides, to develop symmetry on the musculature and ambidextery.

Throwing light objects

1. Throwing by swinging of the arm: hold the object in the right hand, arm straight along the body. Split the legs front and back, the right leg backward and carrying the weight of the body. Swing the arm back and forth, releasing the object when the arm goes from back to front, while shifting your weight from the back to the front leg, extending the back leg fully and possibly raising the foot. This method is used commonly in the game of Bocce ball.

2. Throwing by extending the arm: hold the object in the right hand, split legs front and back, weight on the back leg. Bring the arm flexed toward the back, with a slight torsion of the body to the right. Extend suddenly the arm forward to release the object, while bringing the weight of the body on the front leg and twisting the body toward the left. The arm follows a semicircular trajectory, horizontal, slanted or vertical. This method is used to throw a small rock, a ball or a light object at a great distance.
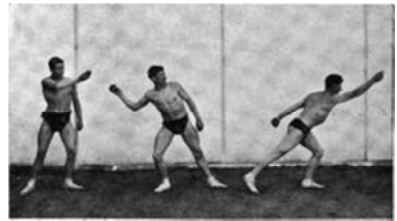
3. Throwing by torsion of the body: the difference with the previous method is that the object leaves the hand like in a slingshot. The movement of the entire body pro-

duces the throw, not the arm alone which remains straight. Split the legs front and back, bringing the weight on the back leg. Swing the extended arm front to back horizontally, twisting the torso in the same direction. Release the object when the arm comes back to the front, with a vigorous torsion of the body to the left and a shift of the weight on the front leg. This method is used to throw ropes and life buoys. It is also used in the classical throw of the disc […].

Throwing heavy or large objects

1. Throwing from the shoulder without moving the feet: hold the object in the right hand, split the legs to bring the right foot back. Bring the right hand to the right shoulder, behind the head, arm bent. Bend the body backward, bringing the weight on the right leg, flexing. Bend immediately forward, shifting the weight onto the front leg and extending the right arm to release the object. The throw is done from the motion of the entire body, not just the arm.

2. Throwing from the shoulder with a step: with the object in the right hand next to the shoulder, step back to bring the weight on the flexed right leg as above. Shuffle both feet forward, keeping the weight on the right leg, and throw the object as previously using the momentum gained in the shuffle.

3. Two-handed throw from the shoulder: bring the object to the shoulder and throw it as previously, but using two hands to carry the object.

4. Two-handed throw by swinging: take a wider stance, bend down to grasp the object, legs flexed. Swing the object back and forth between the legs, then release it forward while straightening the body and extending the legs.

5. Two-handed throw by side swinging: stand to face a direction perpendicular to the direction of the throw. Take a wide stance,

bend to grasp the object, and swing it side to side, along the throwing direction. Release the object while bringing your weight on the throwing side.

APPENDIX

Anatomical drawings

Brachialis

Triceps

Biceps

Teres major

Latissimus dorsi

Serratus anterior

External oblique

Internal oblique

Flexor carpi ulnaris

Palmans longus

Flexor carpi radialis

Rectus abdominis

Tensor fasciae latae

Iliopsoas (psoas major)

Pectineus

Adductor longus

Gracilis

Sartorius

Rectus femoris
(vastus intermedius)

Vastus lateralis

Vastus medialis

Quadriceps
femoris

Gastrocnemius

Peroneus longus

Peroneus brevis

Soleus

Extensor carpi
radialis longus

Brachio
radialis

Biceps

Sternocleidomastoid

Trapezius

Deltoid

Infra spinatus

Teres minor

Teres major

Latissimus dorsi

External oblique

Extensor carpi
radialis brevis

Extensor
digitorum

Triceps

Serratus anterior

Gluteus medius

Gluteus maximus

Tensor fasciae latae

Adductor longus

Rectus femoris

Iliotibial tract

Biceps femoris

Sartorius

Vastus medialis

Semitendinosus

Gracilis

Gastrocnemius

Soleus

Tibialis anterior

Peroneus longus

Peroneus brevis

Flexor digitorum
longus

Brachialis

Biceps

Deltoid

(Supraspinatus)

Extensor carpi ulnaris

Extensor digitorum

Flexor carpi ulnaris

Extensor carpi
radialis longus

Triceps

Teres major

Teres minor

Infraspinatus

Trapezius

Latissimus dorsi

Gluteus medius

Gluteus maximus

Iliotendinosus

Biceps femoris

Semitendinosus

Semimembranosus

Hamstrings

Gracilis

Gastrocnemius

Soleus

Calcaneal (Achilles) tendon

Frontal

Temporal

Nasal

Orbit

Maxilla

Mandible

Cervical Vertebrae

Sternum

Clavicle

Costal cartilages

True Ribs

Xiphoid
Process

Humerus

False ribs

Floating rib

Lumbar vertebrae

Radius

Ulna

Ilium

Saccrum

Coccyx

Pubis

Carpals

Metacarpals

Ischium

Phalanges

Femur

Pubic symphysis

Patella

Tibia

Fibula

Talus

Metatarsals

Phalanges

Frontal view

Lateral view

parietal bone

coronal suture

sphenoid bone
— greater wing

frontal bone

ethmoid bone
orbital plate

nasal bone

lacrimal bone

zygomatic arch

zygomatic bone

maxilla
anterior nasal spine

infraorbital foramen

occipital bone

temporal bone

mandible

ramus

coronoid process

external acoustic meatus

mental foramen