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LECTURE.

Friday, February 13th, 1863.

W. STIRLING LACON, Esq., in the Chair.

ON SCIENTIFIC PHYSICAL TRAINING AND RATIONAL GYMNASTICS.

By M. ROTH, Esq., M.D.

A FEW weeks ago a gentleman connected with this Institution called on me because his attention had been directed to some of the means for scientific physical training which I had placed in the International Exhibition, and for which the jury had awarded a medal. After having explained to this gentleman my views on scientific physical training, and the prevention of many diseases and deformities, I was invited to communicate these views in this Institution.

Although I am neither a lecturer nor a public speaker, I have accepted this invitation from a sense of duty, and relying on your indulgence I hope that you will excuse the ungrammatical construction as well as the bad pronunciation of my English.

I say a sense of duty induced me to come here, because I wish to act according to a quotation from a French writer—a quotation which I have made use of frequently, namely:—

It is the duty, of whoever has an idea which he believes useful, to publish it for the common good.

Whatever you know to be useful, and good to be known by every one, THAT you cannot conscientiously keep to yourself.

MY MOTTO IS—PREVENTION IS BETTER, EASIER, AND CHEAPER THAN CURE, and as scientific physical training includes the means for preserving health, I believe such training to be useful, and good to be known by every one; I will, therefore, not further apologize for bringing before your notice a subject which is of some interest to everybody; because I am sure you will agree with me that there are many more agreeable ways of spending your money than for medical

fees and for poor-rates, which last are always higher in proportion to the greater neglect of scientific physical training of the masses.

The highest aim of medical science is prevention of disease, and my attention has been especially directed to this branch in consequence of the ailments of long standing, and of bodily deformities of every kind, which for more than twenty years I have had opportunity of observing; the majority of these cases have been traced to the neglect of the science of physical training, and of the elementary laws of health, or in other words, to ignorance, indifference, and neglect.

Without stating the results of my personal experience, I will read a few facts extracted from official reports, you will then be able to judge whether it is worth while to think of physical training, whether our *public and private schoolmasters and schoolmistresses* are to continue to restrict their instructions to reading, writing, and arithmetic, without paying the slightest attention to bodily training; or whether it is time to introduce some reforms in our training-schools, and thus prepare a staff of intelligent teachers whose task will be to *educate mind and body simultaneously, and who will not train the one without the other, but will guide and lead them like a pair of horses harnessed to one pole, as Montaigne proposed.*

The following are the few facts to which I beg to call your attention:—

“In 1860, 27,853 recruits were examined at the head-quarters of the recruiting districts for the army, and 7,128 of them, or 256 per 1,000 were found **UNFIT** for military service. This number does not include **ALL** rejections, for 11,054 were secondary inspections; that is, inspections after the men had been examined and accepted at out-stations, where, of course, there must have been rejections.

“Of the 16,799 primary inspections, 318 per 1,000 were rejected; while in France, in 1859, the rejections were *only* 317 per 1,000. I say **ONLY**, because in France *every* man is liable to be drawn for service; and the proportion would be probably smaller if the enlistment would be voluntary, as in England.

“In the various recruiting districts the rejections per 1,000 amounted in Glasgow to 43 per cent., Belfast to 42 per cent., London to 33 per cent., Bristol to 20 per cent. The rejections amongst the Scotch are 31 per cent.; Irish, 25 per cent.; English, 24 per cent.; Welsh, 23 per cent.

“Two-fifths of all rejections were for causes indicating general bad health, an item = 0.126 per 1,000. One-fifth for causes which would affect the soldier's powers of marching = 63 per 1,000.”

On comparing the causes of rejection, I find that England has the highest proportion of small and malformed chests, and curvatures of the spine. Scotland excels in loss and decay of many teeth, which is deemed a symptom of bad health, defects of both upper and lower extremities, and varicose veins. Ireland has the largest number of diseases of the eyes. Having mentioned varicose veins, I wish to point out that while the *French* have 10 per cent., the English count 28 per cent.

Half of our recruits examined in 1860 were described as labourers, husbandmen, or servants. One-fourth came from mechanical occupations, which are in general favourable to physical development, as carpenters, smiths, masons, &c.

The proportion of rejections with regard to occupations is also instructive; amongst mechanics the amount of rejections was 27 per cent.; manufacturing artizans, 26 per cent.; labourers, husbandmen, and servants, 25 per cent.; shopmen and clerks, 23 per cent.; professional occupation and students, 16 per cent.

Of 530 candidates for railway employment, 201 were rejected. The chief causes of rejection were small and malformed chest in 92 cases. This is from the report of the medical officers of the Great Western and its Associated Railways Provident Society for 1862.

It is a blessing that our female population is not enticed by the recruiting sergeant to accept the shilling, and if I were obliged to state the amount of rejections amongst females, the number of those who are unfit for hard work would exceed *fifty* per cent.; because we must add to the complaints of the rejected recruits all the bad effects of tight dresses, of corsets, stays, bodices, waistbands, busks, and of other injurious influences, by which our female population only is affected. How numerous the complaints arising from these causes are, every medical man who has paid some attention to this subject is able to state.

People unfortunately believe that illness under every form is a dispensation of a higher Power, and that they can but submit to it, and thus they try, only when ill, to recover health.

Many are not aware that a kind Providence has given us the means of preventing a large amount of diseases, the majority of which are but a certain and necessary effect of causes, which could be removed if we would not neglect the elementary laws of health revealed to us for our own well-being, as well as for that of our less educated fellow-creatures.

These laws form a most important,—I may even say *the* most important part of all scientific physical education, the object of which is the simultaneous and harmonious development of the bodily and mental faculties; such a development is the basis of a sound constitution, and enables the will to control the body, and the body to obey the demands of the will; sound physical education enables us in any condition of life to move and to act with caution and firmness. The beneficial action of mind and body when sound being mutual, a certain amount of energy is produced, which has the most beneficial effect on our moral, intellectual, physical, and bodily faculties.

If the will has, within reasonable limits, perfect control over the well developed body, we can not only resist with more ease many injurious influences, but also preserve our individuality while in contact with the external world; being exposed not only to external influences, but also to the attacks of others, it is important that we should be able to defend ourselves against these attacks, and therefore rational physical education serves as a first step to prepare us for the defence of our homes and our country.

These few remarks show the connection which exists between physical education and military gymnastics; that all those who are entrusted with the mental education of the young and adolescent should also be able to conduct their bodily education; at present, with very few exceptions, only *uneducated* persons have the care of the bodily development of the growing generation, and they are expected, by a merely mechanical drill, or by falsely called *calisthenic* exercises, to produce that harmony of the various bodily and mental faculties which it is impossible to do without previous training, and without the knowledge of the structure and functions of the organs of the human body, and without the knowledge of the laws which govern the right development of the human frame.

The drill-sergeant and the dancing-mistress are the persons who in the majority of educational institutions are resorted to for the physical education of the young.

The drill-sergeant is engaged to drill the boys and girls once or twice per week. He does this most conscientiously, and exactly as he is accustomed to drill the adult recruits, according to the directions of the manual of drill as published under the sanction of the authorities.

The dancing-mistress tries her best to give the young gentlemen and ladies by calisthenic, or at present by what she calls the fashionable Spanish exercises, or by exercises with the chest expander or any other exercises, the appearance of what is usually called a *good figure*.

The few persons who think about physical education at all, believe that climbing on poles, ropes, and ladders, leaping, and athletic exertions of *any* kind, as used in the majority of gymnasia, are all that is necessary for the development of the body; the consequence is that gymnastic apparatus are provided on which the pupils may hang, swing, or make any *tour de force* at their own option; the *principal aim is to produce brute muscular strength*; all rational instruction is necessarily neglected, because the teachers themselves have not even an elementary knowledge of the manner in which the body is formed, and for what purpose its various parts are wanted, they do not know the injurious influences to be avoided in order not to interfere with the free action of the lungs and other organs, as well as with the natural growth, development, and movements of the body and limbs.

The non-interference with the natural development of the body is one indispensable part of a scientific physical training, which can be completed only by *rational* gymnastics, that is, gymnastics based on anatomical and physiological principles.

There are many *systems* of gymnastics, but there is and can be only one *rational* system of gymnastics; we owe the development of this science to the *genius* of a countryman of Linnæus, the Swedish patriot and poet, Ling.

The models placed before you, the originals of which are in the Kensington Museum, refer to that part of the physical training which may be called the *non-interfering section*, while these figures, drawings, books, &c., serve for the instruction in the various branches of *rational* gymnastics.

The fact that people are much more impressed by what they see

than what they hear, and that they learn easier by what strikes the eye, induced me to form a collection of models for the instruction of those who have the care of the young—mothers, nurses, governesses, school-masters, and especially schoolmistresses. I say especially schoolmistresses, because these most important persons ought to be well informed in all matters concerning the health and the physical training of the young, of whom at present 40 per cent. die before the completion of the fifth year, while of the remaining sixty, if boys at the age of 20, at least twenty-two are unfit for military service, or railway employment; and if girls, at least thirty are unfit for hard work. If every schoolmistress were well instructed in these subjects, she being a centre acting on an average number of fifty to sixty girls, who in their turn will be wives and mothers, there would be some hope that in the next, or third generation, the fruits of scientific physical training would be visible, and that every English woman would be the officer of health in her own house, and that the rejections of our recruits would be under 10 per cent. There is no intention on my part to exclude other persons from being trained in the subjects I have named; my object is only to point out *one* of the many practical modes by which, according to my humble opinion, the physical state of the masses would be improved.

There are ladies' and other colleges, training schools, where instruction can be obtained in all branches of science, except in that of physical training; certificates are given to the future governesses and tutors, to the masters and mistresses, that they are capable of instructing and taking care of the pupils, although they have not the slightest idea how to preserve their own health or that of their pupils. The consequence is that many of these, in other respects, excellent persons believe it to be beneath their dignity to attend to the physical development and training of those placed under their care.

The society for the employment of women has a large field of female occupation open to those who wish and seek for employment which is healthy, useful, and will be remunerative, because *educated* teachers of physical training are wanted; many families who do not wish to send their children to the dancing academy, would be glad to avail themselves of the services of such female teachers.

If we wish to have strong soldiers, sailors, and working men, we must first think of their mothers, who have the difficult and responsible task of rearing them in infancy and childhood. This opinion is shared by many of my professional brethren. Other eminent men begin also to pay some attention to the subject, as for instance the Very Rev. the Dean of St. Paul's, Dr. Millman, from whose address as chairman of the educational section at the International Social Science Congress, the following lines are extracted:—

There was, however, an education anterior to that of school—the education at the mother's breast; and as to that they might depend upon it that the best educated female would in general be the best mother, and do her duty best to her infant children. But this, above all, should be recollected, that the first duty of national education was the *health* of the children. A sickly child might be very intelligent, over-intelligent, but in general, quickness of intelligence would be much affected by animal spirits, and animal spirits rested on healthfulness.

Although the physical, moral, and economical advantages arising from a *system* of physical training have been clearly shown in evidence before the Royal Educational Commission, there is still at present but very little hope for the general introduction of scientific physical training, because its bearing upon diminution of infant mortality, upon prevention of diseases, and consequently upon diminution of poor-rates, as well as upon the general increase of the population, and their working efficiency, their greater power of defending the country, and of colonising the various parts of the globe belonging to this empire, are not yet sufficiently understood; the greatest impediment is, that we are accustomed to pay for the diminution and removal of an evil when developed, but we do not like the cheaper course of prevention; there is a want of encouragement on the part of the legislature, and no inducement is held out to the teachers of schools under Government inspection to give up a part of their time to the introduction of a branch of education, which is not yet considered necessary, and for which, as it is not obligatory, no remuneration is awarded. I am sorry to be obliged to repeat a passage written ten years ago, in a letter addressed to Lord Granville, at that time, President of the Council on Education. I was then advocating physical training, and the introduction of rational gymnastics as a very important branch of national education. The passage is—

We have cattle-shows, exhibitions of poultry, distributions of prizes, and medals to the trainers of beasts for improving them. There are, humane societies, philanthropic enough to reward a man who has saved another from drowning or fire; but what is there to reward those whose life is devoted to the mental and bodily improvement of our fellow-men? Would it not be desirable to encourage the zeal of educators by offering prizes to the man, who, by his moral and physical training, has brought up the greatest number of healthy and well-educated pupils? How is it that blind, dumb, and deaf children, idiots, and other unfortunates, are taken care of, while we allow so many, originally healthy and able-bodied children, to become crippled in body and mind by the ignorance of their parents respecting the most necessary and simple means of preserving health? How many more lives might be saved, and human beings preserved from disease, poverty, and crime?

These introductory observations will be sufficient to give you some idea of the general views I entertain on the subject of physical training. I beg you to understand that one main feature of the system is the non-interfering with the development of the human body.

At present people think of training soldiers when they are twenty years old. That is very hard work. They can be drilled to do certain things; but if you wish to train them to be more than mechanical instruments, it is desirable they should be able to place the body under the control of the will, and in order to produce this general influence of the will upon the body, it is necessary that the education of the body should go hand in hand with that of the mind from the earliest school period—I mean from the time they begin to go to school; and this training must be continued through the different stages of their growth, and then we shall be able to have soldiers in a much shorter time; because if I give a man a general power and influence through his will to act upon his body, what he has to do

becomes very easy to him : but if you take a man whose mind has never been accustomed to act upon the body, the task is very difficult. Therefore, physical training is, at the same time, a mental training, and the means which we use to develop the body are, at the same time, means to develop certain of the faculties of the mind, because a certain amount of order, exactitude, energy, quickness, and a certain degree of mutual assistance, will be produced if we train body and mind mutually.

Before I begin to speak of the second or active part of physical training, by which I mean rational gymnastics, I wish to point out, that there are certain agents, without which we are not able to live, agents of which people in general do not think so much as they ought.

For instance, we are not able to live without a certain amount of air. I have had opportunities of visiting workhouses, and of seeing how the children are reared in them. Upon going into a room, I have found five or six ventilators, but they have all been closed. Lately, through the aid of the Ladies' Sanitary Association, we made a move in one of the large training schools to introduce some sanitary knowledge and physical education. I have found as many as 200 school-mistresses occupied in very large rooms, and I have been scarcely able to breathe when I entered. I enquired about ventilators ; there were plenty of ventilators, but they had not been opened. Now, the object of this apparatus before you, which is simple and cheap, is to give you some idea of how it is possible to have a constant admission of fresh air without the power of excluding it. This model was suggested to me by a gentleman in the Exhibition, and I believe some mention of it was made in the *Builder*. In the lower part of it is a piece of wood which prevents the lower sash descending. Through this space, between the two sashes, a current of air will constantly arise, without producing a draught in the room. It is called *inexpensive ventilation*, because the only expense is to have this piece of wood, which can be taken out if required. That is the whole apparatus. It is so practical and good, that I thought it my duty to mention it here. Here is another apparatus, that I can show in this model also, suggested by the same gentleman, by which you can have twenty-five feet of window open, without producing draughts. It consists simply of an oblique curtain, the air rises up, and does not interfere with the comfort of the people in the room. For schools there is another contrivance ; it is the best for schools, or where there are a number of people congregated, because it is placed at a considerable height, and people in general will not take the trouble to close it ; indeed, it is intended never to be closed. I have another ventilator of iron on the same system as the first, like a Venetian blind, which cannot be closed entirely. They are used very much for barracks, where the extent of superficial surface must be in proportion to the number of persons in them.

Ventilation is, in my opinion, a most important part of physical training, because people are not able to restore and purify their blood without a constant influx of fresh air. We are better able to digest

everything we eat, where we have a large supply of air. This is the reason why labourers living in the country are always able to digest coarser food than persons living in towns, although at night, from the arrangements of their dwellings, they may not have so good a supply of fresh air.

Another subject in relation to physical training is food and drink. The Registrar-General finds the largest amount of disease of the digestive organs in Scotland, which is attributed to the use of coarse food, and the unscientific way of cooking it. This matter of diet is also an important object with those who have to deal with physical education, because air, food, and drink, are the materials of which we are built, and without which we cannot be built up; consequently, if the child has not a sufficient supply of the proper materials for its growth, it is impossible for nature to produce physical strength. I have frequently given the advice to give daily a piece of bread to weak children whose want of strength depended only upon insufficiency of food.

Another indispensable agent is to have a certain amount of warmth. We produce, through our own natural functions, warmth in ourselves, besides which we have artificial means of retaining this warmth by the aid of clothing. Inasmuch as military men suffer very much, when on the march, from being improperly shod, I have thought it desirable to bring here some models of shoes as they ought to be made, and to show how a foot is to be developed, and what are the general bad influences acting upon its development. In the skeleton of the foot we find the big toe is very straight, quite in a straight line with the other toes. Here are casts of the feet of a few children whose parents have taken care of this point since they were born, and you will find the big toe is as straight as it should be. There is a model of another foot, where the big toe has begun to move on one side and to approach the next toe, instead of remaining in a straight line. Another example will show how one of the toes is already pushed out. The result will be that as the foot continues to grow a badly-formed foot will be produced. Here is a specimen of what is wrongly called a beautiful foot. We see ladies dress in tiny boots, and this model shows the deformity of the foot when taken out of that tiny boot. Here are two boots made for the same foot. One has the high heel, the narrow sole, the pointed toe, and high instep; the other, which is made to accommodate the natural form of the foot, has a very large basis and no heel. I am sure, if we were destined to have a high heel, nature would have given it to us. The shoe which I propose for a man, as it should be worn, is made with a bend in the sole, which is not required to be elastic. All that is necessary is to have the bend thinner, wide soles, and the inner side of the boot in a straight line. This is the most comfortable boot, and it will enable a man to march much better and much longer than any other kind of boot. We find that a great obstacle to the adoption of the proper form of boot lies partly with the public, whose ideas of a beautiful foot are wrong, and partly with the shoemakers, because, everything now being made for the trade, and on a large scale, they do not like to make an article which is not yet generally used, and which wants any

particular care in the making. So that, should any shoemakers wish to do the right thing, they would meet with some impediments. I point this out because one great object towards the adoption of a proper physical training is to change our ideas about certain matters. I am told that among soldiers, boots are not worn with comfort until they have been torn and mended again in the barracks. How far that is true I do not know, but it was mentioned to me as a fact when I made enquiries on this subject. Many of the rejections of recruits, in consequence of complaints of the foot which affect the powers of marching, are partly the result of this cause—the improper form of the boot. I have been told by another gentleman, that in some parts of the country they wear boots of the weight of 14lbs. It will explain how difficult it is for them to march if that is the case; and if, in addition to this, they have not the right form of boot, you can easily understand how the development of the foot is prevented, and that the men are unable to perform their duties. Short and tight stockings aid in producing deformed toes; these models show divisions for each single toe, and may be called foot-gloves. In the other model, is only one division for the big toe; such stockings have proved very useful in some cases of deformed and compressed toes, and I may say that they prevent the pushing out or down of single toes, which is frequently caused by narrow shoes and boots.

I am sorry I am not honoured with the attendance of a larger number of ladies, because what I have mentioned in regard to the foot applies equally to the chest. If you look at this figure, which shows the natural development of the chest, you will see that the external lines of the space in which the lungs are enclosed, are almost round or oval. But the form into which the chest is usually compressed is different—the external lines are angular. I have sent to a shop in Oxford Street for a stay such as would be worn by people of the working class, as I wished to say something on this subject. I did not like to send to a fashionable staymaker's, where the compression is carried to a still greater extent. Now, stays such as these interfere very much with the action of the lungs. But so long as gentlemen admire this form of waist, there is no hope that the ladies will give it up. In short, the object of my bringing this subject forward, is not to blame the ladies, but to tell the gentlemen that so long as they admire this deformed figure of a lady, and say, "Oh, I can span her waist! oh, how beautiful!" so long will it be perfectly useless to induce the ladies to relinquish the bad habit of wearing tight stays. It does much mischief, for though it may not matter with fashionable ladies, who have their doctors and can remain at home, it is imitated by the middle class and the working class, and it produces a very bad effect. Therefore, gentlemen, do not blame the ladies, but blame yourselves. So long as you do not change your ideas of beauty, so long as you think a curved line is ugly, and an angular line is pretty, we have no reason to expect that any change will take place.

Besides dress, there is another important part belonging to this non-interfering principle, and that is the action of the skin. I have therefore brought here some models of a bath, which I recommended

more than twelve years ago for introduction into barracks, men-of-war, and workhouses, where a large number of people are congregated together. It combines the full bath, the shower-bath, and the hot-air and vapour-bath, and being mounted upon wheels, can be used not only in hospitals and barracks, but also on the march and in camp, and, if necessary, it can be used as an apparatus for washing linen, and also for cooking.*

Then, again, there is another injurious influence which acts against our natural physical development, and that is, the injurious positions in which our bodies are kept. To give an insight into this I have prepared a table of some injurious positions. The first are some of the injurious positions as they are going on in the working classes, and some others as they are going on in the better classes during the time of education. So the table is called "Injurious positions during growth and education." It will give some notion of the effect of these bad positions. For instance, how little girls having to nurse children, begin to get crooked before they are grown up; besides this, they have to encounter the injurious action of a hard wooden busk in their stays. You can fancy what a bad effect would be produced by such an instrument upon the body in conjunction with the stooping posture necessary in nursing. Then, again, needlewomen have to work in low rooms, in a bent position, where there is no ventilation, and plenty of gas and people.

This anatomical figure before you, is for the purpose of showing the development of the lungs, and how injurious it must be to have these compressed. This is an invention of Dr. Auzeaux, and very useful for the purpose of teaching the elements of the structure and functions of the human body, the knowledge of which is indispensable for those engaged in scientific physical training.

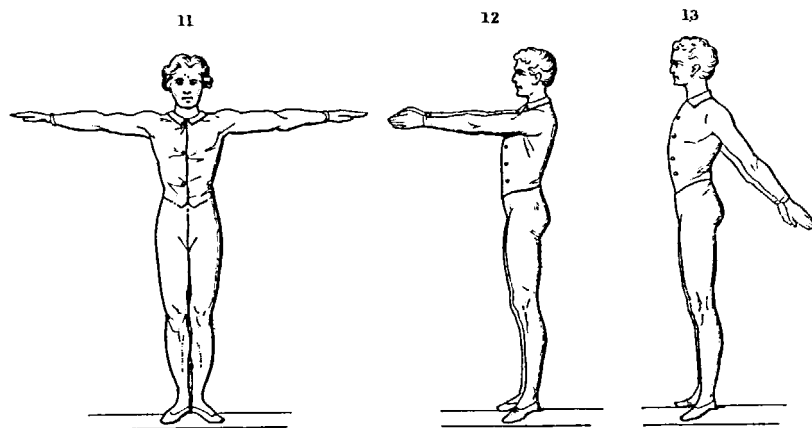
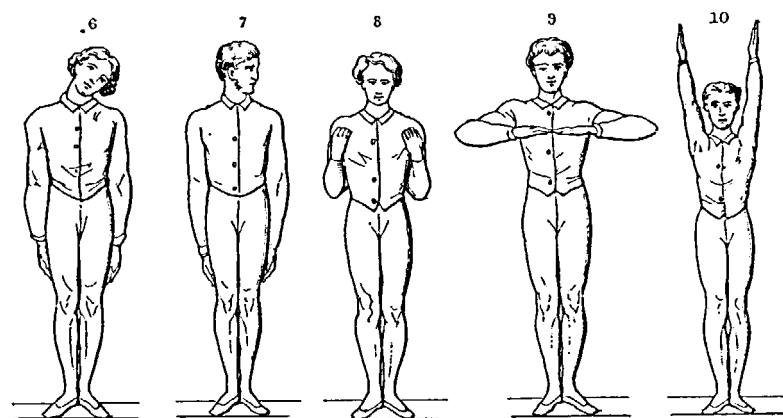
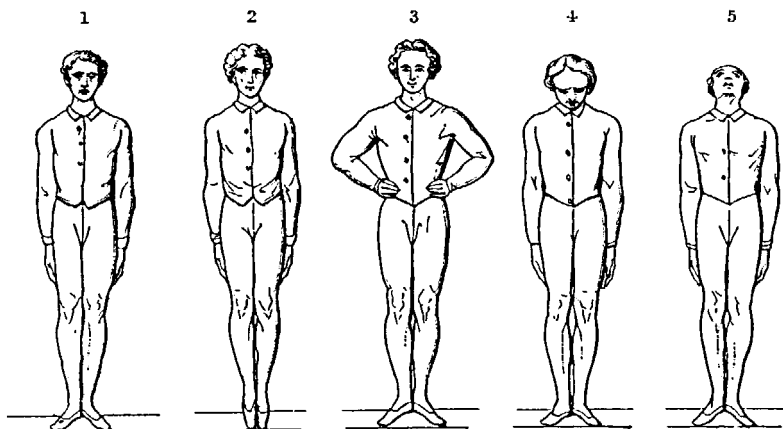
We come now to the point of rational gymnastics. I repeat there is only one good system of gymnastics, that which takes care of the human body. It should not be the object in a gymnasium to see who can climb the most, who can vault the best; but the object should be to produce harmony of the different parts of the human body, consequently, every part should be simultaneously developed. The figures before you have been modelled by an eminent French artist, under my own superintendence, in order to show the elementary actions of the human body on which all other movements are based. The figures will show the various positions in which the elementary movements can be executed. The positions must be compared to the various keys in music, because the same movement in a different position produces a different effect. Figures 1, 2, 3, (Pl. xvii) show different positions of the hands and feet; 4, 5, 6, 7, different movements of the head, as thrown forwards, backwards, sideways, and turning. These flexion and turning movements can be combined in various ways. Figures 8, 9, 10, 11, 12, 13, show the elementary movements of the arms. We use the arms in all directions, but here we have only

* Such baths have been made by Messrs. Teaks and Son, in Great Russell-street.—
M. R.

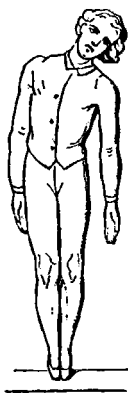
the principal directions of the space, viz., to the body, arms bent fingers touching, upwards, outwards, forwards, and backwards. You will observe that the difference between these and the so-called extension movements in the army is, that in these movements the hand is always stretched, and the fist is not clenched. When we have the hands clenched, a certain set of muscles at the back of the forearm are not brought into action. Other figures show elementary movements of the trunk similar to the movements of the head. We have actions to the right, to the left, forwards, and backwards, and two instances of combined movements: see figures 14, 15, 16, 17, 18 and 19 (Pl. xviii). Figures 20, 21, 22, 23, show the movements of the feet.

By forming a combination of these elementary movements of the different parts of the body, we have a basis upon which you are to act. Just as with the twenty-four elementary letters of the alphabet we can form endless combinations and also talk much nonsense, so it is with these elementary movements of the human body. Our object is not to make the greatest exertions in any one direction, and to do as many exercises as possible, even injurious ones, but to combine these movements for purposes that are useful in life. Our object is not to form tumblers, rope dancers, &c., but to develop the powers of the body harmoniously; therefore we seek the combination of these simple ideas. The same movements which are necessary for the first educational development of the body can be also made use of for the purpose of mental instruction, and an intelligent teacher can teach the elementary geometrical forms by the aid of the various positions and movements of the limbs and body; thus children can be taught what a horizontal and vertical line is, the various angles formed by two-lines, circles, and ellipses can be formed, &c., as you can convince yourselves by looking at these models, which form the basis of some other very important branches of physical training. I have also tried to introduce these elementary movements under the form of gymnastic games, which afford amusement while the body is exercised.

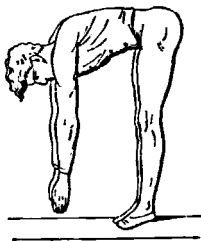
They form the basis of military gymnastics, because men are prepared for the drill through these. The greatest and best results have been obtained in the Swedish and Prussian armies by preparing the recruit before he enters upon his military duties, by these apparently simple exercises. Although they appear simple, they are not so simple, for the man has to do them with the greatest exactitude, and he is obliged to think for himself. They are called "free exercises," because there is no external help, no apparatus, no machinery is wanted. By placing together two, three, four, five, or more men, you can make them all work at the same time, and supply to one another the place of apparatus. This is the importance of this scientific basis in comparison with other systems, that you have a certain number of men working together at the same time under a certain word of command, either as individuals, or as one compound body, without being obliged to raise heavy dumb-bells, under the weight of which the men are panting for breath. The men on the right and left can supply the weight of the dumb-bell by their power



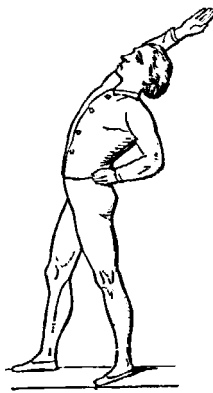
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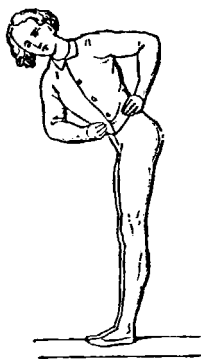
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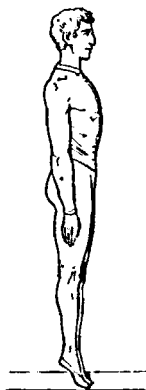
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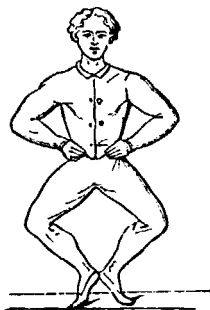
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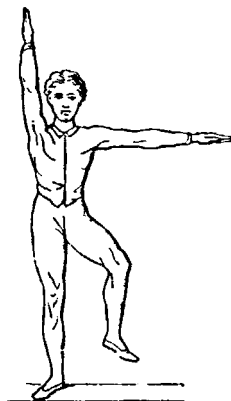
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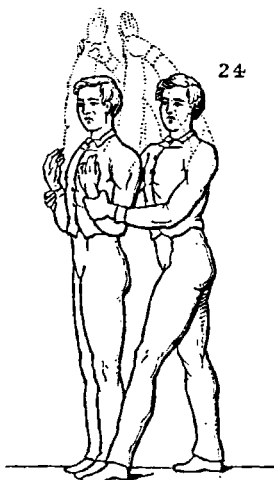
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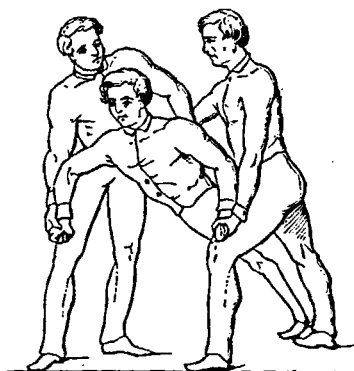
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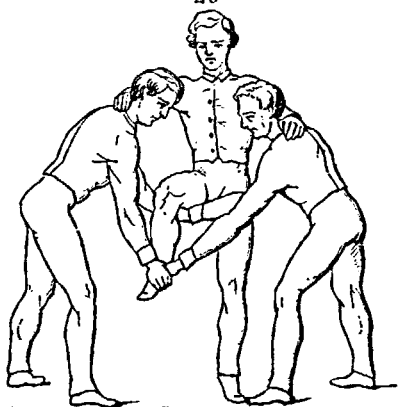
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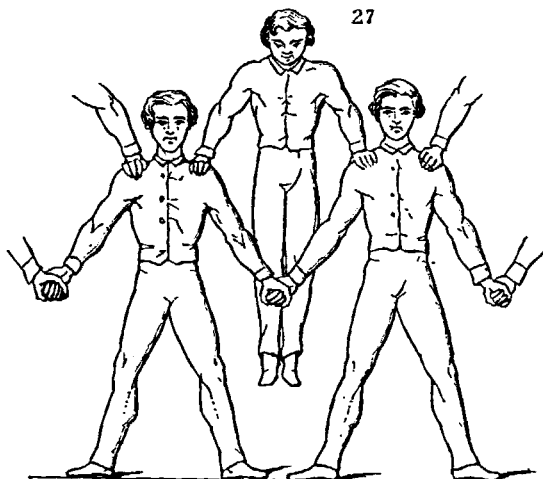
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of resistance, which can be increased to any desirable extent, and if there is a living resistance it is constantly necessary that the two or three men should work together, as if they would form but one body governed by one mind. So that in fact we have not only a machine, but we have here a living body, whose mental faculties are brought into power by the exercise at the same time as the body.

Figs. 24, 25, 26, 27, (Pl. xix) will explain to the reader the mode of combining these movements, in which two or three men can take part at the same time, and bring into exercise the various muscles of the body without the aid of apparatus of any kind.

To show the importance of this system for military training, I will read the following extract from a letter just received (12th February, 1863) from Major Rothstein, who is at the head of the Royal Central Institution for Gymnastics at Berlin.*

"I am happy to say that rational gymnastics are progressing favourably in our military institutions (Kadetten und Kriegs-Schulen), as well as in all the regiments of the army; even the old Commanders who did not like this mode of physical training, acknowledge its merits.

"The free exercises of Ling have proved exceedingly useful for the development of the recruits. Here, at Berlin, the regiments of the Guard show much zeal for the practice of the gymnastic exercises.

"In the regiments in garrison in the provinces, the progress of this branch of military education varies according to the views of the commanding officers, and depends also very much upon social and other circumstances, but on the whole, progress is visible everywhere.

"The full extent of this system on the physical development of our soldiers and of our nation in general, will be shown only then when our youth shall share in the benefit of a rational physical education.

"The greatest impediment to this attainment is the fanatic advocacy of such systems of gymnastics, which aim only at brute muscular development."†

If time permits I will try to show some of these movements with resistance with these three guardsmen, that you may see how unnecessary it is to introduce what is now supposed to be requisite, the use of dumb-bells and clubs into the army. Government, as a rule, prefers things that are not expensive; and if it is proved that the introduction of these exercises will save expense in the way of apparatus and dress, then I have some hopes that the system will be adopted.

Advantages of Free Exercises are—

a. That the movements, being very simple, are easily understood and easily executed.

* In this Institution, commissioned and non-commissioned officers are instructed in the elements of anatomy, physiology, hygiene, educational, and military gymnastics. After having passed a theoretical and practical examination, they return to their regiments, and train there a number of non-commissioned officers, who assist in the physical education of the privates.

† For further information regarding these exercises I must refer you to the following works on this subject:—

1. *The Gymnastic Free Exercises of Ling, according to the System of Ling*, arranged by Major Rothstein, translated, with some additions, by Dr. Roth. Published by Groombridge and Sons, 5, Paternoster-row.

2. *Elementary Exercises or Movements according to the System of Ling.*

3. *Sheet Tables of a few Gymnastic Exercises.*—M. R.

b. Much time is saved, because they can be executed simultaneously by many persons.

c. The expense for apparatus and machines is saved, and the dresses less spoiled.

d. The free movements can be executed in any place, in the open air, as well as in-doors; for instance, in schools, barracks, in the open field, in the camp, and in the bivouack.

e. As every motion of a free exercise is to be executed exactly, and as many persons are simultaneously at work, they must accustom themselves to a certain attention and precision, by which means the sense of order is developed, and the attention sharpened.

f. The free exercises produce an agreeable feeling in all the movements of the body, and develope better than the exercises on gymnastic apparatus, a good posture, and an appropriate appearance and deportment in ordinary life.

There is an erroneous opinion prevalent that free exercises are suitable only for youths, and not for adults. As long as gymnastics are not made a part of education generally, the free exercises are useful also to adults, although they may be considered only as preparatory exercises.

Without wishing to disparage exercises with apparatus, as long as they are practised with caution and within certain limits, I will mention in favour of the free exercises, that if the exercises with the aid of apparatus are exclusively or too frequently practised, the body loses its natural instinctive sense for equilibrium, instead of having it developed. The sense for form and graceful positions and movements of the body is lessened, while the sense for equilibrium in such artificial positions as rarely or never occur in life is developed.

Exercises in Gymnasia.—Notwithstanding that soldiers are inspected before they are sent to the gymnasium, in order to find out whether they are fit for the great exertions, there is too great a demand made upon their strength. This gymnastic forcing cannot be avoided, if men are, in the course of a month, to go through their desired gymnastic training. This is impossible, and the man returns, or the whole company returns to the regiment, where they have no apparatus, and, consequently, lose the little they have gained, and are as stiff as they were before. But if a system of exercises is introduced in which the mind is at work, it can be done very well, and if a man is too weak to do any of them, a second or a third person can assist him, and as no apparatus is wanted, it will be possible to give the men gymnastic education without sending them away from their regiment for a month.

Great stress is laid on the development of the chest, which is produced by what is called the Oxford system. I feel it my duty to protest against these violent exercises. I have to deal frequently with delicate and invalid ladies, whose chests are flattened and compressed; if they are not consumptive, the circumference of their chest is considerably increased, in a very short time, without the use of violent exercise. The development of the chest is accomplished by breathing, and by other movements by which the muscles of the shoulders and back are developed. In all these cases we bring the influence of the

will and the mind to act upon the part which is weakened, and that is the reason why we get rid of all apparatus.

The educational branch forms a part of the military gymnastics, that branch of rational gymnastics which teaches the exercises with the different kinds of weapons, viz., the foil, the single-stick, the sword, the lance, the bayonet, and also wrestling.

There is a third part of gymnastics also based on the educational branch, called "æsthetic gymnastics." It means the application of movements of the human body for the expression of our feelings and ideas. I have here drawings which show the attitudes of the body under the influence of different states of mind. Feelings of sympathy or kindness, affection and attention, have all oval lines; antipathy, anger, pride, and all bad passions, are shown by angular lines. The other drawings represent the attitudes in prayer, the arms being extended, and the hands raised in proportion to the fervency of the prayer. Others show the position of a person who is thinking; the natural position is, the head leaning slightly forward while the arms are crossed; in this drawing the head is more inclined, and appears to rest on the finger placed near the chin. Where there is deep meditation, the head is leaning still more forward and rests on the hand. I point these out just to show in what way rational gymnastics may be made useful.

There is another purpose to which these figures may be applied, and that is, the training of blind people. Blind people are very much neglected. In the institutions I have visited I find their chests very weak, and suffering from many complaints. As we have no other means for their instruction, I have made use of these models, and I find they answer very well. A firm in the City is publishing a series of these figures in papier-mâché for the object of teaching blind people.* In order to give another impulse to the introduction of these simple exercises, the same firm are publishing engravings of these figures in the form of a game for children, so that they can be applied in schools where they have no apparatus to entice the children to do these exercises.

There is a fourth part into which I do not propose to enter here, that is, the application of these movements for the cure of disease. You find on the table several of my books on the subject, with numerous engravings, showing the positions, movements, and manipulations which are used in the movement-cure. According to the individual case, the state of health, and the nature of the disease, different sorts of movements are used, which are either passive or active, with resistance on the part of the patient or the medical man.†

* Messrs. Joseph, Myers and Co., 141, Leadenhall-street, E.C.—M. R.

† 1. *Cure of Chronic Diseases by Movements*.—2. *Handbook of the Movement-cure*.—3. *Sketch of the Movement-cure*.—4. *The Prevention of Spinal Deformities*.—5. *The Hygienic Treatment of Paralysis and Paralytic Deformities*. Published by Groombridge and Sons, 5, Paternoster-row.—M. R.