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Military Gymnasia

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LECTURE.

Friday, April 15th, 1864.

LIEUTENANT-COLONEL T. ST. LEGER ALCOCK; Vice-Chairman of the Council, in the Chair.

MILITARY GYMNASIA.

By ARCHIBALD MACLAREN, Esq., The Gymnasium, Oxford.

WHEN I had the honour, some time ago, of reading a paper on this subject to the members of this Institution, I endeavoured to show the value of a gymnastic training to the soldier.* I desire to-day to do myself the honour of describing the material means which I have found it necessary to employ, and in many instances to devise, for the purpose of carrying out my system of training, which means are now being provided by the military authorities with a completeness which leaves nothing to be desired.

With the first conception of the leading features of the system, I perceived that the construction and fitting up of proper gymnasia would be a *sine quâ non*, indeed must be viewed as an integral part of the system itself; and as in this respect it differs from the military systems of other countries,† which are entirely carried on in the open air, I will, with your permission, mention a few of the advantages arising from the organization of such schools.

The first of these is, the value which regular and consecutive instruction possesses over irregular practice.

In the cultivation of the bodily powers it is quite necessary that the instruction should be progressive—that to-day's lesson should, as it were, be taken up to-morrow and carried a little farther on, and the next day and the next a little farther still, and so on to the end of the course. When thus administered each lesson is in accord with that which preceded it, and with that which is to follow it—each aiding each—

* Journal of the Royal United Service Institution. Vol. vi.

† National Military Systems of Bodily Exercise. By Archibald Maclaren.

each improving that which has gone before—each preparing the way for that which is to come; but this, of course, can only be done where provision is made for regular and consecutive instruction. Now regularity and consecutiveness, it will at once be seen, are quite incompatible with open air practice in any country whatever; and in a climate like ours are simply impossible. There are few days in the year that are really fit or suitable for such practice, or on which men would willingly encounter its discomforts; and a system of bodily training which is dependent upon the favour of the weather is in reality no system at all. My anticipations in this respect have been conclusively proved. In connection with the first gymnasium erected, that at Aldershot, which is comparatively small and inadequate to the requirements of so large a station, it was considered possible to extend the accommodation by the erection of certain machines in the open air, on a convenient spot in front of the building. For this purpose I prepared a plan of a gymnastic ground, embracing some of the most attractive and interesting articles of apparatus, on which exercises of competition and emulation might be performed. This was four years ago; but to this day a learner's hand has not been laid upon them; it is either too hot or too cold—too sunny—too windy—too wet or too something; but the fact stands out that, at a station where the gymnasium could give employment to but a small per centage of the troops, nothing whatever could be done with these open-air erections.

I have alluded to the discomforts of open-air practice; these may seem trifling, but when examined are more serious than appears at first sight.

To execute any gymnastic exercise, or any exercise indeed of any kind in which strength is to be exerted, or is to be derived from its performance, there must be complete freedom of clothing. This simply means that the soldier must be stripped to his shirt and trousers, with his neck open, his head bare, and his sleeves tucked up to his elbows. Now it is of the essence of gymnastic exercises, after the rudimentary lessons, that the efforts will for the most part be brief and energetic, with some necessary standing about,—waiting for and watching the efforts of others. And this with men so employed, and so exposed, and so constituted, is, save on rare occasions, neither sanitary, nor even safe in the open air.

I need scarcely, I am sure, state, that I, of all men, am least disposed to enervate or *coddle*; the whole work of my life has been, and is, and probably will be, to make men not only healthier but hardier; to teach them how to retain the strength they have, as well as how to add to its amount. But if experience has taught me anything, it has taught me this, that more evil may be done by rash and sudden exposure—by what is generally known as the *hardening system*, than by all the coddling in the world. It is not by exposure that men are either strengthened or rendered hardy; they must be strong and hardy, before they are fit to be exposed; they must be seasoned first, and exposed afterwards. If we cannot season a piece of timber by sudden, or extreme, or unregulated exposure, we must not think we

can do so with a living man, or a living anything; and from what I have myself seen, and from what I have learned from those who have had the most ample means of judging, soldiers are as sensible of discomfort, and as liable to injury from undue exposure, as any other class of men.

Another important reason why proper gymnasia are essential is, that they may be fitted up with apparatus of a character and description which could not be attempted out of doors. In elaborating my system of bodily training, I have found it necessary to invent many new machines to yield the special form of exercise which I desired in order to produce certain results in the learner; and almost all those which may be called of an educational character, and have for exclusive object to cultivate the resources of the body, require the roof and walls for support, and the soft floor of the building for safety; and those of an entirely opposite description, which have for special and direct object the teaching of the soldier to surmount obstacles, such as the scaling of walls, traversing beams and platforms, with and without implements and arms, can be erected, and the exercises practised on them, with much greater facility here than in the open air; for every portion of the interior face of the walls, and every part of the internal roof may be utilised for purposes of this kind, turned to immediate account, and made to serve as *bond fide* apparatus.

I say nothing of the facilities which a school presents over the open ground for giving and receiving instruction, and of preserving order and propriety among the learners, without having recourse to strict military discipline. For it is quite essential to safety, as well as to advancement, that the strictest order and propriety should be preserved in the gymnasium, at the same time that it is most desirable that formal military discipline should be relaxed during the lesson; and there is no fact more undoubted than this, that amongst gymnastic apparatus, the disposition of the learner to be inattentive and careless, and the difficulty of the instructor in communicating instruction and maintaining order, is uniformly beyond comparison greater in the open air than in the gymnastic school. Neither do I notice the safety arising from the assured condition of the apparatus in the gymnasium, exposed as it is to no atmospheric influence, always dry and always clean. Indeed while the out-of-door apparatus must necessarily be getting worse and worse, the indoor apparatus, if properly constructed, and its materials suitably selected, should be virtually indestructible. Nor do I dwell upon the advantages to the individual soldier, as well as to the service, which the building presents, of utilising bad weather—the very time when the soldier's frame most requires activity to sustain its power—the very time when his professional duties are necessarily suspended: and the equal, if not even greater advantage which it gives of utilising the long winter evenings, thus devoting to a source of health and strength, a leisure which is too liable to be spent in idleness and unworthy indulgence.

I have thus noted a few, and only a few, of the advantages which the gymnasium possesses over the gymnastic ground, but each one of these is most important in itself, and is pregnant with many others.

I would now inquire, are there any advantages on the opposite side, any advantages which the ground has over the building? And, if so, are they of such importance as in any way to counterbalance those which I have just enumerated? These are questions which I have fully considered, and I am prepared to answer, None—not one;—the open-air practice has not one real advantage; it has not even any apparent one which may not be shown to have a reverse influence and bearing.

Its apparent advantages are,—1st, ample space; 2nd, abundance of light; 3rd, pure air.

With the phrase “out of doors” and “open air,” we are led to associate ample space, but this signification is often quite illusory when applied to the present subject; for it is found that the very places where gymnastic exercises are most wanted, where they would prove the greatest boon, are precisely those where ground is scarcely obtainable at any price or for any purpose, namely, in garrison towns and in barracks situated in closely populated districts. In such cases the advantage, of course, is all in favour of the building—in favour of the method which knows how to economise every square foot of ground, and to make it serviceable all day and every day, morning, noon, and night, wet or dry.

A small nook in a barrack yard, 80 feet by 40 feet, will be sufficient for a gymnasium, which will give abundant accommodation throughout the year to a garrison of a thousand men. They require no more ground than the apparatus covers; and they could use no more were it planted in the middle of the widest common in England.

The question of light, when examined, is solved at once; and I have no hesitation in saying that it is in favour of the building; abundant light for any purpose can be admitted into any building; and in the gymnasium it can be so admitted and so distributed, as to meet precisely the special wants of the special exercises.

The question of pure air is less easily disposed of, for there is nothing more essential to health and to health-giving exercise than pure air; while there is, on the other hand, nothing more liable to deterioration, for every breath we breathe acts injuriously upon it,—subtracts from it some portion of the good which it possesses, and imparts to it that which is pernicious; and it must be admitted that this process of deterioration is only sustained where the air is confined around the breather in a building, and is entirely avoided when he stands in the great air ocean out of doors.

Moreover it must never be forgotten that a gymnasium is a veritable temple to health in the highest sense of the word; and pure air, which is desirable everywhere, is imperatively necessary here, absolutely essential during exercise, not only for the perfect aëration of the blood, but as the natural stimulant to physical exertion.

And again, just in the same ratio with the requirement for the purity of the air in a gymnasium, is its liability to deterioration, first by the doubly increased respiration of the inmates—each breath being larger in volume, and each following each, in quicker succession during exercise than when the body is wholly or comparatively at rest; and

secondly, in a great degree also, by the exudations from the skin, which is stimulated to its utmost activity by the powerful and sustained muscular exertion; and it must be remembered also, that while these exudations are increased to their utmost extent by the energy and freedom of the partly denuded body, its escape into the surrounding atmosphere is also by the same means facilitated. Now while these are all incalculable advantages to the individual, and the very source and secret of the health and strength which he derives from exercise, they all tend directly and powerfully to deteriorate the air.

Another point still. Admitting that the gymnasium is occupied to the estimated extent of its working capacity, at the end of an hour (the usual time allotted to an ordinary lesson), the air in the building, were there not an unceasing interchange taking place between it and the external air, would be so deteriorated as to be rendered less suitable to the use, and less pleasant to the sense of the next batch of men, and less and less so with every succeeding one; for it is contemplated that every gymnasium shall be in full operation for many consecutive hours in each day.

Here, then, we encounter these important facts, not only that pure air is essential to health, and to the pleasurable sustentation of active bodily exertion; but that this exertion itself is a powerful agent in its deterioration, and that this deterioration is only felt where the same air has to be inspired and re-inspired, as in a building.

Now as this necessarily applies to all buildings, though not to all in an equal degree, we may be sure there is a way by which this evil can be avoided, for He who planned our existence did so with the full comprehension of our wants,—saw that while we were so constituted as to require the shelter and protection of dwellings, in which to live, and learn, and toil, that these very buildings expose to deterioration the substance on which we depend for momentary existence. The difficulty that seemed insurmountable is at once overcome by the action of the law regulating the constitution of the air itself. On the slightest change in the constituents of the air, such as that caused by respiration, or by the elevation of its temperature, it is impelled to instant motion—forced to shift and change its place, that place being immediately occupied by the surrounding air, so that motion and change of position is induced, proportionate in force and in extent to the primary displacement. This law is in unceasing and unerring operation over the whole surface of the globe, regulating equally the mighty currents caused by the sun's heat on the belt of the tropics, and the slight undulations in an ordinary room, caused by the breath of a solitary inmate. This law is the key to all our rational systems of ventilation. It teaches us to construct our dwellings in such a manner that the air, which is in unceasing motion—a mighty current ever flowing, though changing its direction with proverbial inconstancy—may pass through them in its course, cleansing them of every impurity. It teaches us so to regulate the admission of this current, that at any time, and at any season, it shall be in accordance always with the wants and the wishes of the inmates.

The special mode of ventilation for a gymnasium I conceive to

be—the building must be so constructed that the whole body of air within it may in a few minutes be changed for an equal body of fresh air, for this will be required at frequent intervals. It must be so constructed that the deteriorated air may ascend and pass at once out of the building, and a fresh supply at the same time enter; and these apertures for ingress and egress must be so placed, that the fresh air may be admitted at such distance from the inmates that it shall not strike them in compact cold currents, or draughts, as they are called, but be uniformly diffused; for this must be maintained throughout the working day. It must be so constructed, in fine, that it may be as snug as an ordinary room in winter, and as free and airy as the open heath in summer. And this should be done by what may be called *natural* means; that is to say, by simply bringing the internal and external air face to face, as it were, passing through no intermediate channel, forced together by no artificial means.

Thus much for the purity of the air; but air has other qualities besides purity, for we live in it as well as breathe it—it comes in contact with our skin as well as with our lungs; temperature, therefore, is very important. The air may be quite pure when the thermometer stands at 20 degrees below freezing point, as we have experienced this winter, or rises to 80 in the shade, as we felt last summer; but neither of these conditions are favourable to exercise, and least of all to gymnastic exercise.

Now, in a properly constructed gymnasium, the temperature of the air may be rendered pleasantly cool in summer, and sufficiently warm in winter to let men freely strip for active exercise. We do not want a heated or rarefied air to breathe during active exercise; men have the materials of heat within themselves, and want but exercise to ignite the fuel and sustain the fire; but we *do* want the temperature of the air so raised as to remove actual discomfort in stripping to work, and to dry and keep dry the apparatus, which must come in constant contact with the naked hand, and this can only be done in the properly organised gymnasium.*

Having thus, as I trust, shown the advantages of a properly constructed gymnasium, I will now notice a few of the principles which guided me in preparing a design for a building suitable to the system.

The first of these was, that the gymnasium should be of that form and manner of construction, as to admit of the erection of the desired system of apparatus, and to present the greatest facilities for instruction and supervision. The second, that it should be constructed to meet, in the best manner, the sanitary requirements which I have just noticed.

The third, that in all important respects, the same design should be capable of reduction or extension, so that its working capacity might be in proportion to the garrison where it was erected. In this last respect it was not necessary to compute the absolute working space

* For this purpose there is nothing so good as the open fire-grate, distributed in suitable places in the different divisions of the building.—A. M.

GYMNASIUM AND SCHOOL OF ARMS. CHATHAM.

Ground Plan

Front Elevation

Side Elevation

Upper Plan over Dressing Room &c.

Elevation of Vertical Escalading Apparatus. Slanting Escalading Apparatus.

Plan of Platforms on Tie-beams.

N ^o . of Section	Title of Section	N ^o . of Plan	APPARATUS.
SECTION 1	Movable Apparatus	1	Dumb Bells
		2	Bar Bells
SECTION 2	Exercises of Progression	3	Leaping Barriers
		4	Leaping Rope
		5	Vertical Ladder and moveable Platform for leaping depth
		6	Horizontal Moveable Beam
		7	Horizontal Fixed Beam
		8	Vauling Bar
		9	Vauling Horses
SECTION 3	Elementary Exercises	10	Fixed Parallel Bars
		11	Moveable Parallel Bars
		12	Trapezium
		13	Pair of Rings
		14	Rows of Rings
		15	Elastic Ladder
		16	Horizontal Bar
		17	Bridge Ladder
		18	Ladder Planks
SECTION 4	Free Climbing	19	Vertical Poles
		20	Slanting Pole
		21	Turning Pole
		22	Mast
		23	Pair of Vertical Poles
		24	Pair of Slanting Poles
		25	Vertical Ropes
		26	Rosaries
SECTION 5	Escalading	27	Prepared Wall (Files, Blocks, Grooves)
		28	Planks
		29	Inclined Ladder
		30	Rope Ladder
		31	Vertical Poles, fixed
		32	Vertical Pole, suspended
		33	Vertical Rope
		34	Knotted Rope
		35	Series of Upper and Lower Platforms with Vertical Poles connecting them.
		36	Wire Guard Net under Tie-beams

required for every squad of learners, but to ascertain the smallest dimensions of a building which would contain with adequate freedom a fair selection of the essential apparatus in the different sections of the system, and from this minimum size to ascend by carefully regulated gradations to a maximum size; the minimum to be adequate to the requirements of a station with half a battalion of men; the maximum to that of our larger stations, such as Chatham. I mention Chatham, because at that station I can perceive, not one only, but all the different classes of men, and each of these in large numbers, to whom the gymnasium must be the greatest possible boon. First, the recruit, in large numbers, this being the *dépôt* of several regiments of different arms of the service; next the trained soldier in considerable numbers, this being a station where several regiments are quartered; and, in consequence, many young officers, for whom it is most desirable to provide suitable and attractive means of healthy and manly exercise.

Indeed, all the features of all other gymnasia should be combined in a gymnasium at a station of this extent and character, and the one recently erected there, and of which a model is before you on the table (see Plate XVIII), in my opinion does so. Nay, all departures from the plan of this gymnasium, should be but modifications of it, to meet some local or exceptional want.

The sanitary requirements of lighting and ventilation have been provided for on the most abundant scale, and as the official regulations on this point have been well considered and clearly defined, there is no room for failure with the most ordinary care on the part of those to whom this special duty is entrusted.

In preparing a system which aimed at providing means for the bodily training of the recruit and for the trained soldier, for the officer of matured frame, and for the yet growing cadet—a system which should yield not only adequate, but suitable and attractive exercise to all of these—it was necessary that it should be very extensive and wide-embracing; that it should be markedly progressive, and above all, that the early courses should be of such a character as to accomplish the setting up, the putting into proper position, and the correction of the evils in gait, action, and attitude of the recruit; that his whole body, and his whole body equally, should receive employment, and that the employment should be of the kind which would at the same time cultivate the contractility of the muscles, and the mobility of the joints; and also promote the expansion of the chest, and give that stimulus to the organs of respiration and circulation which is best calculated to increase their functional vigour.

For these important objects, and for the reasons explained in the book of the system,* I have discarded all exercises of mere movement and position, as affording inadequate action to the muscles, while giving extreme effort to the joints, as being equally severe or inadequate to weak and to strong, as admitting of no progressive advance-

* "A Military System of Gymnastic Exercises, for the use of Instructors." By Archibald McLaren, Adjutant-General's Office. February, 1862.

ment, and as being in attractive and uninteresting; irksome, indeed, to all; and for my introductory course I have adopted a series of exercises with what I have called *moveable apparatus*, that is, with dumb-bells, single and double-handed. This lesson is so organised, that almost any number of learners may take part in it at a time, all acting by the same word of command.

The whole exercises of the system thus resolve themselves into two distinct kinds: first, those with moveable apparatus, and used for the first or introductory course, in which the learner lifts or wields the article of apparatus, he himself standing firm; and, secondly, those on the fixed apparatus, comprising the bulk of the system, where the learner himself moves or turns, the apparatus or machine being fixed or firm.

This distinction is very important, not only as affecting the character of the exercise to be performed, but the whole material means used in performing it, and actually necessitates a distinct division of the building itself into two parts, each part being in certain respects, in appearance and in fact, the very antithesis of the other. In the first division, that for the moveable apparatus, the floor is retained perfectly free and firm; the apparatus, when not in use, being ranged in racks along the walls. In the second division, the floor is made of soft and elastic material, with every spot of its surface mapped out and studded with apparatus permanently fixed.

For the first division there was needed simply a large room, but as I had long been impressed with the fact that at the dépôts, to which our recruits are sent for the exclusive purpose of drill, there was no place where this drill could be carried on in inclement weather, and keeping in view always that the gymnasium should be the place for the instruction and practice of all professional bodily exercises, I so prepared this portion of my design, that at our dépôts it might also serve, when desired, for the setting up and position drill of the recruit, and also as a school of arms, where fencing, sword exercise, and bayonet exercise might be taught and practised. One of these exercises which I have just named, fencing, is eminently suitable to officers, and yet it is one in which the officers of our army, generally speaking, are greatly deficient. I am convinced that they require but fair opportunities of instruction and practice to follow it earnestly and successfully, and I have therefore made special provision for the practice of this exercise, by a large fencing school, carefully planned and fitted up for this purpose, with suitable dressing-room accommodation.

I have already stated that in elaborating my system of bodily training, I have found it necessary to invent many new machines to yield the special form of exercise which I desired, in order to produce certain results in the learner; for instance, I have found that few men are equally developed on both sides of the body, as a natural result of the greater employment given to the right side during the period of growth, and this applies not only to the arm, but to the whole side, from shoulder to hip, and not unfrequently including also the lower limb, when the development of the right leg and foot preponderates over the left. Now I consider it of the greatest importance to health, as

it undoubtedly is to serviceability, that this lost balance of power should be restored, this equilibrium of development re-adjusted; and to accomplish this I have found it necessary to invent a number of machines, for the sake of the form of exercise which I desired to be performed on them. Among the first of these I would mention the elastic ladder and row of rings, machines designed expressly to give employment to both sides of the body equally, and especially to the chest and upper limbs, by necessitating that both sides of the body shall perform the same duty, requiring the exertion of the same degree of effort, and that neither side shall be able to aid the other; each side must do its own share of work, and can do its own share only; and therefore if the weaker side be doing as much as the stronger, it will virtually be doing more (being weaker), and the amount of difference in exertion will be of course in relation to the amount of difference in development or power. And therefore, the unerring result of the natural law of development being, *ceteris paribus*, in relation to activity, the weaker side will ultimately recover its lost position and its fitness for fair companionship with its fellow.

I have mentioned the nature and object of these two machines, for the two-fold purpose—1st, of showing that it was what I had discovered to be the actual wants of learners or pupils which guided me in preparing my exercises, and in inventing apparatus which would yield the form of exercise desired; and, 2nd, of showing that it was the form of that apparatus and the nature of the exercises to be performed on them which determined the form and construction of the building itself.

For instance, an important section of apparatus is that which teaches the soldier to clear objects by running, vaulting, and leaping; therefore for these considerable length is required. A second section of an elementary character, as the horizontal bar and the two machines which I have just described,—machines all capable of being worked by large numbers of men at the same time, and by the same word of command, also requires length; therefore the oblong shape, which admits of the apparatus of these important sections being arranged side by side, has been chosen for the gymnasium. A third section, consisting of all climbing apparatus, whether mast, rope, or pole, requires height; but as these are all vertically placed, they may be closely grouped, so that a small portion only of the building needs to be very lofty. These three sections of the apparatus in a very clear manner determine the most suitable and serviceable form of building, namely, an oblong, of a breadth about half the required length, and with one portion of it lofty. The position of this lofty portion naturally falls to the centre; for the two end walls are utilised for escalading, the one bearing every form of vertical apparatus; the other every form of slanting apparatus, connected by narrow platforms running along the tiebeams of the roof, in order to accustom men to traverse narrow objects at a considerable distance from the ground. I have utilised the elevated portion farther by making it serve in lighting and ventilating the gymnasium in the place where light is most wanted, and ventilation, of one kind, may be most effectively obtained.

The same form I found also to be the most suitable for the other division of the building, for the distribution of squads in the introductory course of gymnastics, for their arrangement during drill, and for classes of fencing and sword exercise. And as it was desirable for purposes of supervision and instruction that both divisions should form one building, and that every portion of it should be overlooked from every other portion, these two divisions have been placed rectangular to each other.

I have only now to notice the galleries for spectators. It is most desirable to encourage visitors to the gymnasium; it is wonderful, sometimes, how the presence of visitors serves to stimulate the learners to energetic action, and at the same time to assist in preserving the proper decorum of the lesson; but it is equally desirable that they should not mix among or in any way interfere with the learners. The galleries for spectators in both divisions are so arranged that they overlook the whole gymnasium without encroaching upon the working space.

I have already, on several occasions, laid before the public some of the results of this system of bodily training; first, when divested of its military bearing, in connection with the youths of Oxford, with whom the practice is necessarily voluntary, and liable to every form of interruption; and yet such is the want of systematised exercise with growing lads—such are the innate and latent resources of the human body, waiting but the opportunity of development, and such is the power of this system to draw forth these resources, that I have been able to establish beyond controversy the fact, that every youth who comes up to the University, whatever may have been his previous health and habits, has a large arrear of power still undeveloped, and of which a considerable instalment may be almost immediately obtained.

In a paper which I had the honour to read here two years ago, I was able to show that in a detachment of twelve non-commissioned officers, some of them of many years' service, the results of the system were as satisfactory as upon the young Oxford undergraduate. The men composing the detachment had been irregularly selected, the youngest being 19, the eldest 28, the average age 24; and after a period of eight months' training, the increase in the measurements of the men were—

	Weight.	Chest.	Fore arm.	Upper arm.
	Pounds.	Inches.	Inches.	Inches.
The smallest gain ..	5	1	$\frac{1}{2}$	1
The largest gain ..	16	5	$1\frac{1}{2}$	$1\frac{1}{2}$
The average gain ..	10	$2\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{4}$

With a second detachment, in which the men were of more uniform powers, the youngest being 22, the eldest 26, and the average $24\frac{1}{2}$, the increase in the measurements, after a similar period of instruction, were*—

	Weight.	Chest.	Fore arm.	Upper arm.
	Pounds.	Inches.	Inches.	Inches.
The smallest gain ..	$1\frac{1}{2}$	2'	$\frac{1}{2}$	$\frac{1}{2}$
The largest gain ..	7	$4\frac{1}{2}$	$1\frac{1}{2}$	2
The average gain ..	$2\frac{1}{2}$	3	$\frac{3}{8}$	$1\frac{1}{2}$

Within the last two years, the system has been so far extended into the army, that seven large gymnasia have been organized at important stations,† and are now in full operation, giving an ample bodily training to several thousand men; and I am enabled to state, that the returns of measurements on this wide scale confirm the results of the experiment made on small detachments.

It was wisely determined from the first adoption of the system by the Authorities, that the cadets at Woolwich and Sandhurst should have an early opportunity of sharing in its advantages, for whatever may be the value of a powerful and active frame to the soldier, it could be no less to the officer; and the advance in bodily power made by the cadets has fully equalled my anticipations.

I am indebted to Major Hammersley, the officer to whom the direction of the gymnastic training in the army has been entrusted, for a tabular statement of the measurements of a class of cadets at the Royal Military Academy at Woolwich, the youngest 16, the eldest 19, the average age being $17\frac{3}{4}$. In this class, in a course extending over four months, the increase was‡—

	Weight.	Chest.	Fore arm.	Upper arm.
	Pounds.	Inches.	Inches.	Inches.
The smallest gain ..	1	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$
The largest gain ..	8	$5\frac{1}{2}$	1	$1\frac{1}{2}$
The average gain ..	$1\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{1}{8}$	1

* Vide Appendix.

† The stations where gymnasia are already erected are, Aldershot, Woolwich, Warley, Parkhurst, St. John's Wood London, Chatham, Royal Military Academy, Woolwich, and Royal Military College, Sandhurst.—A. M.

‡ Vide Appendix.

Again, in another form still I have tested the results of the system, not by brief courses or periods of voluntary attendance, but by a year's steady practice from birthday to birthday, with two articulated pupils, the younger being 16, the elder 20. In the year's work the increase was—

		Weight.	Chest.	Fore arm.	Upper arm.
		Pounds.	Inches.	Inches.	Inches.
With the younger ..	21	5	2	2	
With the elder	8½	6	1½	1½	

I need not make any remark upon these figures. I can make none better than every gentleman who hears me now can make for himself. They simply record a complete transformation of the learner's frame; so complete, as to defy all comparison between it and that he possessed previous to the practice. And it must be remembered that this is not an acquisition to be retained only while following some exceptional course of life. It is what he can never wholly lose in this world again, because it is himself that is altered, it is himself that is changed—altered and changed only by being brought so much nearer to the power which he was designed to possess, and to the place which he was designed to occupy from his birth; a place from which he can never wholly fall, a power of which he can never be wholly dispossessed. Not even by illness can it be taken away; for, as his state was his legitimate state, and his power was a natural power, from illness he will rise again towards the height from which he fell.

In conclusion I would desire to draw your attention to this fact—a fact which all the tests of the system, and all the observations of my life go to establish, namely, that the advantages to be derived from physical training are all in favour of the *youth* of the learner. Get the man while he is young, get him, if possible, while he is growing; every year and every month of his growing time is worth double and quadruple the number of months or years after growth is completed; not only for giving shape and carriage, and activity, and muscular strength, but for giving that stamina of endurance to the whole frame, and that healthy and energetic action to the organs which, so to speak, carry on the whole work of life within the frame, which alone will make the man a man indeed, and enable him really to perform the duties of a soldier.

APPENDIX.

Tabular Statement of Measurements of the Second Detachment of Non-commissioned Officers selected to be qualified as Military Gymnastic Instructors,

FROM OCTOBER 27TH, 1862, TO JULY 12TH, 1863.

No.	NAME.	MEASUREMENTS, &c.						INCREASE.		
		Age.	Height.	Weight.	Chest.	Fore arm.	Upper arm.	Weight.	Chest.	Fore arm.
		Years.	Ft. In.	Stone lbs.	Inches.	Inches.	Inches.	lbs.	Inches.	Inches.
1	Corporal Mellor, 22nd Regiment	22	5 10½	9 13	34	10	10½			
2	" Pike, 22nd Regiment	23	5 9½	10 6	38½	11½	12½	7	4½	1½
3	Sergeant Wilcox, Coldstream Guards	24	5 10½	12 0	36	10½	12½	Less	3½	1½
4	" Griffiths, Royal Artillery	25	5 10½	11 2½	39½	10½	12	3	3½	1½
5	" Moss, Grenadier Guards	25	5 9½	11 4	39½	11½	13½	1½	3½	1½
6	" Adams, Scots Fusiliers	25	5 9½	10 6	36½	11½	12½	Less	2	1½
7	" Richards, Royal Artillery	25	5 11½	10 4	38½	11½	12½	2	2	1½
8	Corporal Pentecost, Royal Horse Artillery	25	5 9½	9 12	34½	10	11½	3	3½	1½
9	" Pullin, Royal Artillery	25	5 11½	10 1	37½	10½	12½	1½	2½	1½
10	Sergeant Elliott, Grenadier Guards	28	5 10½	11 2½	38	10½	12	Less	2½	1½
				11 4	40½	11½	13	9	2½	1½
				12 4	36½	11½	12½	6	3½	1½
				11 9	39	12	13½	Less	3½	1½
				12 5	38	11½	14	3	3½	1½
				11 0	35	10½	12½	4	2½	1½
				12 3	38½	11½	13½			
				12 7	40½	12	14			

*Return of Course of Gymnastic Training at the Royal Military Academy,
Woolwich,*

FROM FEBRUARY 10TH, 1863, TO JUNE 22ND, 1863.

No.	MEASUREMENTS, &c.							INCREASE.				
	Age.	Height.		Weight.	Chest.	Fore arm.	Upper arm.	Height	Weight.	Chest.	Fore arm.	Upper arm.
	Yrs.	Ft.	In.	St. lbs.	Inches.	Inches.	Inches.	Inches.	lbs.	Inches.	Inches.	Inches.
1	18	5	12 $\frac{1}{2}$	7 8	29 $\frac{1}{2}$	9 $\frac{1}{2}$	8 $\frac{1}{2}$					
2	19	5	8 $\frac{1}{2}$	9 5 $\frac{1}{2}$	28	11	10 $\frac{1}{2}$	1	..	$\frac{1}{2}$	....	$\frac{1}{2}$
3	17	5	5 $\frac{1}{2}$	9 1	31 $\frac{1}{2}$	11	11 $\frac{1}{2}$	$\frac{1}{2}$	5 $\frac{1}{2}$	3 $\frac{1}{2}$	....	1 $\frac{1}{2}$
4	18	5	6 $\frac{1}{2}$	9 1	29 $\frac{1}{2}$	10 $\frac{3}{4}$	10	$\frac{1}{2}$	....	3	....	1 $\frac{1}{2}$
5	18	5	8 $\frac{1}{2}$	10 0	33	10 $\frac{1}{2}$	10 $\frac{1}{2}$	$\frac{1}{2}$	3	2	....	1 $\frac{1}{2}$
6	17	5	3 $\frac{1}{2}$	8 1	31	10 $\frac{1}{2}$	10 $\frac{1}{2}$	$\frac{1}{2}$	3	2	....	1 $\frac{1}{2}$
7	18	5	5	8 7	33	10 $\frac{1}{2}$	11	1	6	2	....	1 $\frac{1}{2}$
8	16	5	5	8 2	29	9 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{2}$	3	3	$\frac{1}{2}$	1 $\frac{1}{2}$
9	17	5	5	8 4	31	9 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{2}$	1	2 $\frac{1}{2}$	$\frac{1}{2}$	1
10	18	5	5	8 $\frac{1}{2}$	11 3	33	11 $\frac{1}{2}$	$\frac{1}{2}$	....	2	....	$\frac{1}{2}$
11	19	5	11 $\frac{1}{2}$	11 8	30	10 $\frac{1}{2}$	10 $\frac{1}{2}$	....	....	3	$\frac{1}{2}$	$\frac{1}{2}$
12	18	5	7 $\frac{1}{2}$	10 2	33	10 $\frac{1}{2}$	10 $\frac{1}{2}$	$\frac{1}{2}$	....	1 $\frac{1}{2}$	....	$\frac{1}{2}$
13	19	5	10 $\frac{1}{2}$	10 11	32	10 $\frac{1}{2}$	10	1 $\frac{1}{2}$	....	1 $\frac{1}{2}$	....	1
14	17	5	11 $\frac{1}{2}$	11 13	33	11 $\frac{1}{2}$	12	1 $\frac{1}{2}$	....	2 $\frac{1}{2}$	....	$\frac{1}{2}$
15	19	5	9 $\frac{1}{2}$	11 13	35 $\frac{1}{2}$	11	12 $\frac{1}{2}$	1 $\frac{1}{2}$	....	2 $\frac{1}{2}$	....	$\frac{1}{2}$
16	17	5	6 $\frac{1}{2}$	9 13	29	10 $\frac{1}{2}$	8 $\frac{1}{2}$	$\frac{1}{2}$	....	....	....	$\frac{1}{2}$
17	19	5	7 $\frac{1}{2}$	10 3	32	10 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{2}$	4	3	....	1 $\frac{1}{2}$
18	18	5	10 $\frac{1}{2}$	10 1	27 $\frac{1}{2}$	10 $\frac{1}{2}$	9	1 $\frac{1}{2}$	8	5 $\frac{1}{2}$	....	1 $\frac{1}{2}$
19	16	5	3 $\frac{1}{2}$	8 13	29	10 $\frac{1}{2}$	10 $\frac{1}{2}$	$\frac{1}{2}$	....	3	....	$\frac{1}{2}$
20	18	5	5	8 13	33	10 $\frac{1}{2}$	10	$\frac{1}{2}$	....	....	....	$\frac{1}{2}$
21	17	5	6 $\frac{1}{2}$	9 8	27	8 $\frac{1}{2}$	8 $\frac{1}{2}$	$\frac{1}{2}$	....	1 $\frac{1}{2}$	....	....
22	16	5	7 $\frac{1}{2}$	9 8	30 $\frac{1}{2}$	10 $\frac{3}{4}$	10	1	....	3 $\frac{1}{2}$	....	1 $\frac{1}{2}$
23	16	5	6 $\frac{1}{2}$	8 10	27 $\frac{1}{2}$	9 $\frac{1}{2}$	7 $\frac{1}{2}$	$\frac{1}{2}$	5	2 $\frac{1}{2}$	$\frac{1}{2}$	2
24	18	5	5	9 1	30 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	$\frac{1}{2}$	....	2 $\frac{1}{2}$	....	1
25	18	5	7 $\frac{1}{2}$	9 1	31	10	10	$\frac{1}{2}$	....	2 $\frac{1}{2}$	....	1
26	18	6	1 $\frac{1}{2}$	11 12	34 $\frac{1}{2}$	11 $\frac{1}{2}$	11 $\frac{1}{2}$	$\frac{1}{2}$	....	1 $\frac{1}{2}$	....	$\frac{1}{2}$
27		6	2	11 12	35 $\frac{1}{2}$	11	12 $\frac{1}{2}$	$\frac{1}{2}$	....	....	....	$\frac{1}{2}$