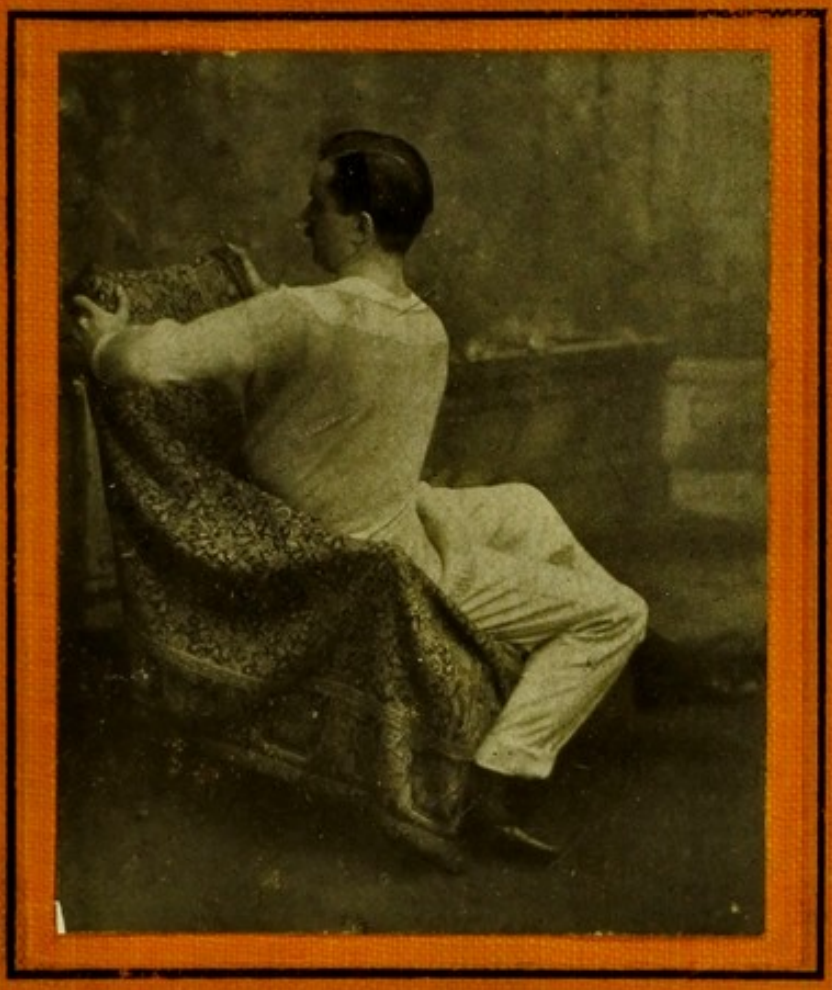
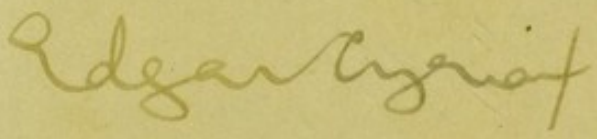
Home exercise and health : five minutes' care to the nerves the rational system of exercising for health rather than mere strength / by Percival G. Masters.

HOME EXERCISE AND HEALTH

FIVE MINUTES CARE TO THE NERVES



PERCIVAL G. MASTERS



HOME EXERCISE AND HEALTH

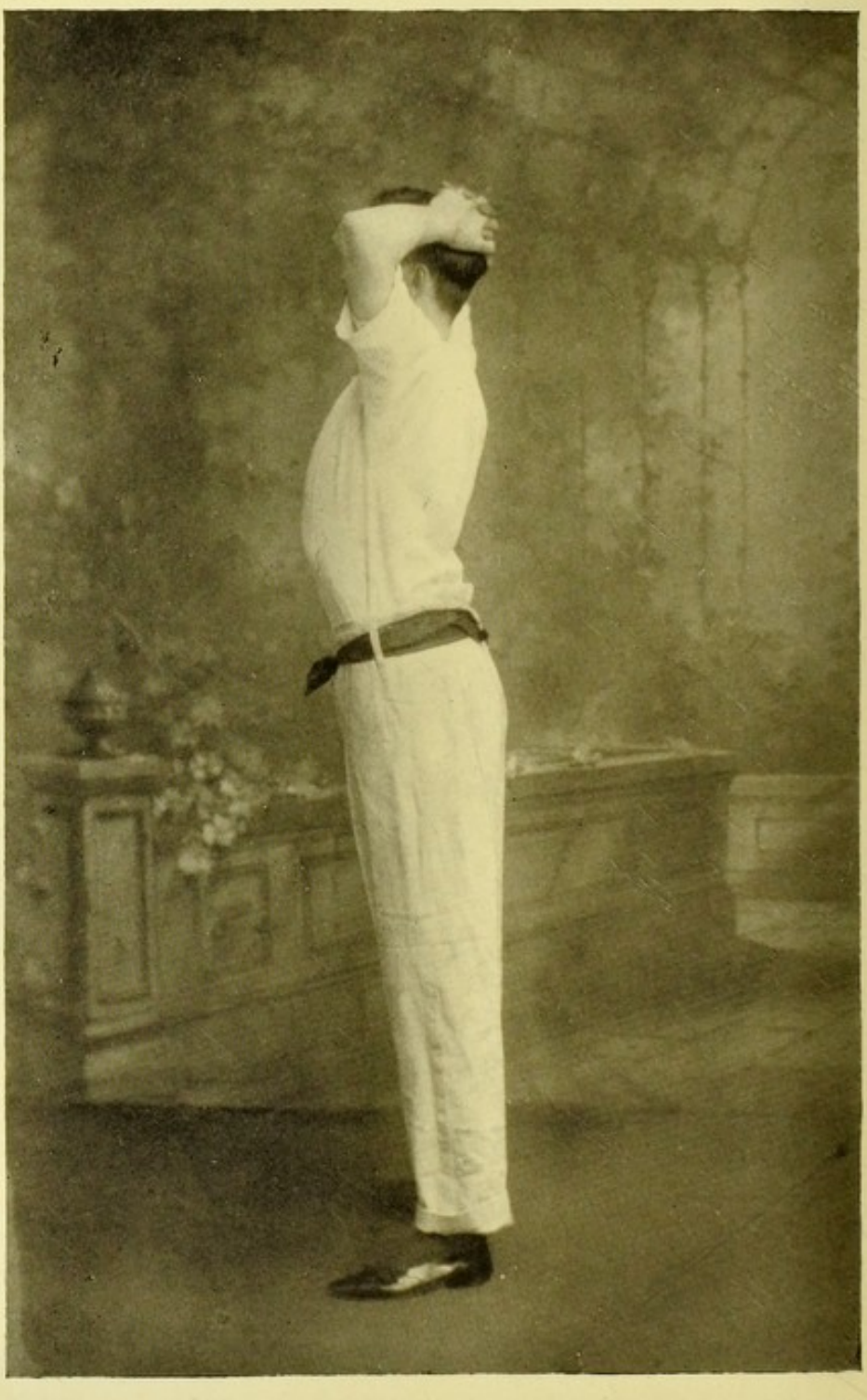


FIG. 10 (*see page* 112)

HOME EXERCISE AND HEALTH

FIVE MINUTES' CARE TO THE NERVES THE RATIONAL SYSTEM OF EXERCISING FOR HEALTH RATHER THAN MERE STRENGTH

BY

PERCIVAL G. MASTERS, B.A. CANTAB.

WITH 34 ILLUSTRATIONS AND A PICTORIAL CHART DEPICTING THE EXERCISES

SECOND AND REVISED EDITION, WITH ADDITIONS

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PREFACE

I MAKE no apology in presenting this book to the public. There would be need of some excuse, I think, were I contributing yet another to the already large number of systems of muscular physical culture exercises, or, again, to the still larger number of books on health subjects—books which but teach surface régimes in the guise of something else, or with vague doctrines which leave us with no definite, practical knowledge. But as it is, I venture to think this is the first book dealing with a system of physical exercise based on exact principles. The series of movements given belong to what is now known to many as the "P.G.M. System of Self-administered Remedial Movements," and contains some of the principal ones I have used with success in advising those whose experience of curative exercise had hitherto been a vain one.

To quote from the original booklet describing it, "The P.G.M. System has for its main object the giving of free articulation to all the spinal joints.

It therefore differs in its character from any of the several physical culture systems in vogue, which aim to cure disordered functions through the stimulation given by voluntary muscular action. Those exercises are of undoubted service, but as the true cause of so many physical disorders becomes better understood, it will be seen that they do not accomplish the essential—a removal of the trouble at its starting-point."

I think this book will help to supply what I know to be a very real need—means that one may learn a common-sense way of keeping the body in a fit condition and of preventing the starting-point of ill-health. Sound functions depend primarily upon a physically unhampered nervous system, and this, we may also learn, depends in turn more than upon anything else, upon the frame being in as perfect a condition as possible in its mechanically working parts, of which the vitally important are the joints of the spine, because of their intimate structural relation to the central nervous system. This, with lung development, is the groundwork of physical culture, and physical culture can have only one real meaning—culture of the physique so as to preserve and increase the vital forces. Only after we have seen to this should we give attention to the adjuncts of physical culture, or the good effects of the latter

will not exist. Muscle culture, pure and simple, purer food, etc., are all dependent upon this vital integrity which is to be secured by intelligent frame exercise.

Therefore I believe this system will come to be widely used.

It is better in every way, and certainly much easier, to prevent than to cure. Therefore, notwithstanding the efficacy of properly designed and directed exercises in curing even serious physical disorders, my principal reason for writing the following pages is to explain what constitutes preventive exercise, both in theory and practice, and to provide a simple course of physical movements which, while having the definite object of preventing those bodily conditions which are a very common cause of illness, shall at the same time require one to take an intelligent interest, and to know exactly why each movement is to be performed. The ways of prevention may be easily, and should be, learnt and practised oneself. I have accordingly arranged a short series of movements which will be found both effective and interesting, and I commend them, by reason of my own experience and that of others, to the many who have used ordinary exercises with no benefit or satisfaction. And a point that will appeal to most is that they take but half the time of the latter.

There is no essential difference between preventive and curative exercise. In writing, therefore, of the effects which are produced in different degrees in different individuals by consistent neglect of proper exercise, and the resulting direct and indirect bodily disorders which can only be gradually removed by intelligent use of suitable exercise, the subject of preventive physical treatment will be best made understood. Used really curatively, the application of exercise is an art which demands experience, and it is undoubtedly best at first to be guided by one who can make it most suited to the individual case.

Five minutes' care to the nerves. For in the nerves is the cause of failure or accomplishment, of muscular strength or weakness, of every little bit of good health or bad health possible.

CONTENTS

LIST OF ILLUSTRATIONS

HOME EXERCISE AND HEALTH

CHAPTER I

Physical culture—Its principles—The spine in physical culture—The spine and its nerves—Mechanical principle of the spine—General observations on the whole subject—Physical culture for children—For women.

THE term "physical culture" does not convey much to most people. They will think of it as something intended, not for the many, but for the chosen few. It conjures up visions of dumb-bells and weights. "Curative physical culture," a fairly common phrase nowadays, may perhaps suggest some other meaning to the words. But however this may be, as the true meaning of physical culture becomes unfolded it will at any rate be then gradually recognized that, in the widest significance of the words, it is something which is vital to everybody, and most of all to those who, from their slight acquaintance with the subject—or, rather, the words—think of it only as some part of athletics, which can have no concern with themselves or the average person. In point of fact, as usually practised, physical culture is of use to many, but not to those who are most in need of it, and this because of its inexact character and the imperfect recognition of

its scope and proper aims. True physical culture, used as it should be in preventing the body from becoming an imperfect machine, has then its greatest efficacy, and is both a pleasant and simple practice which entails neither irksome time nor trouble. More than that, it has a perfect genius for putting in a nutshell and making real all the supposed merits of complicated "cures" which really have no merit at all.

The necessary conditions of an everyday physical system are that it must be simple, exact, efficacious, economical of time, and quite self-administered. If such a thing as massage, mechanical or otherwise, were an everyday necessity, it would be impossible to the majority of people, because of its requiring an operator. However, it will be found that the necessary regular cares and exercises of body can all be self-administered; and it is better so, because thus can each individual best come to learn the inner meaning of preventive exercise, and of its use to him or her.

To those who say that nothing of the kind is necessary (because for the moment they are of the happy-go-lucky healthy kind), I would reply that they will seem foolish, pitiable creatures when, in the natural order of events of their own creation, things go wrong, and they know nothing of how to put them right. And he who improves what he starts out with, no matter how much his handicap, is worth far more to himself and posterity than a

so-called *bon-vivant*, with a constitution of cast-iron which he knows nothing about, and abuses until he no longer has it. That is all the grumble I have against them, and they will have one against themselves presently, unless they do a little more now than living on their capital. "Well," the average person may say, "I don't mind the exercise; but I don't want to belong to a cult which seems to make it absolutely necessary to wear no collar, never go to a barber, have lunch up an apple-tree and dinner in the woods, or profess anything inconvenient like that." Well, you needn't. Physical culture is neither a fad nor game only for muscular people, and when you use it you will wonder how you ever thought it was. You can still be as ordinary as you like in your habits, and in your own old way, although I will not guarantee it will not give you some ideas of how to live better.

Those who are already converts to exercise I will show how to make it exact, simpler, and better than hitherto.

In framing a system of curative physical movements, if it be possible we should go upon a definite theory, and aim at definite effects rather than the inducing of general improvements (which, as far as we know, may have no good physical foundation—a "flash in the pan," so to speak) by vague exercises. If we have no basis of this kind to go upon, there is nothing to guide us as to whether we are working in the right direction if we get no immediate effects,

as far as symptoms are concerned, in improving the ill condition we are trying to treat.

The golden rule in physical culture is "let," not "make."

It is when we have learnt that all long-standing functional derangements are invariably associated with quite definite abnormal conditions in the mechanism and tissues of the body that we can make this fact our guide. If we arrive at a certain scheme of movements which is based on this definite theory, and is thus intended to have the discernible effect of correcting the particular kind of abnormalities of the body mechanism which would seem to be the cause of bodily ills, and we observe that our theories as to expected results are fully borne out in practice, we are in possession of the keynote of true curative physical treatment. And just as we must know what are the abnormalities in the body mechanism associated with deranged functions, so must we know what is to be the tangible effect of the movements, that we may not only do good with them, but know in what way the good comes about.

What I have to say in the following pages is based almost entirely on this contention—That the most important thing in preventive exercise is to preserve the nervous force. Everything else is less important. The centre of the nervous force is the brain, and its continuation the spine. It will not need much reflection to see that the brain must be an organ

which is different from the rest of the body, and owes its capability of fulfilling its supreme mission, when well fed, entirely to its cellular vitality, without any necessity of direct physical help. It is protected against any such help. If the body is healthy, and then loses its health through no apparent cause, it is not reasonable to expect that it does so because that part of the brain which is the supreme governing and directing influence of the body functions spontaneously loses its vitality (the "thinking" part of the brain is quite distinct from the "functional" part). But it will seem reasonable to suppose that somewhere else in the nervous system something is interfering with it, for the simple reason that the brain is not intended to be helped by any such thing as physical exercise of it, while other parts of the nervous system are, and in a way which is different from the general helping of organs by the muscular massage of exercise. Of the spine we shall learn something presently, and, to explain what an important thing it is in physical culture, I shall have to go rather more deeply into the subject than is usual in books on exercise. But, above all, this is a book of practice, not dull theory, so I give you leave to be as light-hearted as you like afterwards, because it leads to nothing complicated.

It will seem a reasonable contention, and it is a theory quite in keeping with practice, that, for a body to be really healthy, all its working parts must have normal freedom of movement, and that

minor faults, from a physical standpoint, arising from various circumstances, may be the starting-point of most of our obscure functional derangements. Experience in this more exact form of physical culture has proved that the all-important condition is that every spinal joint shall be kept free to move. What the effect of this is will be referred to later on, when I shall explain the important relation the spinal joints bear to the physiological functions, and also speak of the way in which the unnatural stagnation which commonly occurs in different ways and different degrees at the nerve centres in the immediate vicinity of the spinal column is responsible for the trouble it causes.

On such a definite basis as I have indicated were the exercises illustrated in the latter part of this book devised, and they therefore act in a more specific manner than ordinary exercises. I contend, from all I have learnt in curative exercise, that real functional inefficiency never *starts* in the organs; that it always has a central nervous cause; that the only functional trouble which starts in the organs is that due to continual and gross abuse of food, and which recovers as soon as the diet is corrected, if there is nothing obstructing the central nervous supply. Given a body kept healthy in this mechanical respect, our dietary errors would then, I think, stand a better chance of revealing themselves outright, as they do in the healthy,

uncomplicated, admonitory "stomach-aches" of our childhood. These exercises were designed for removing or preventing those faults in the spinal joints which, although minor from a physical aspect, are more than frequently the direct cause of illness, and are always, in whatever degree they exist, serious factors in aggravating and preventing proper recovery from troubles coming principally from other causes, through causing obstruction to the free flow of nervous force. Ordinary exercises are not directed to this end.

The training of the body as a means to health is a subject which has been revived during recent years, and we now have a formidable array of systems of physical culture, some good, some bad. There are the muscle-building systems. There are the systems which are styled "psychic," and profess to make healthy and strong bodies and minds by the power of thought only. There are the breathing plus psychic systems, which tell us that deep breathing and thought will enable us to do anything and everything—will cure any and every ill of the body. We could believe them all if only they could do what they profess. They do not and cannot. They have their good points, but each and all overlook how simple but rigidly defined are Nature's demands of help in making the body healthy.

Nowadays, if a man is not fit or well, it is the usual thing to advise him to take systematic exercise instead of medicine. He carefully exercises all his

muscles, and mayhap is often gratified by the results. If he is one of those whose body has escaped comparatively unscathed from the physical transgressions of his ancestors and the results of his own ignorance, the stimulus given by exercise is sufficient to put his functions, which were perhaps somewhat sluggish, more briskly on the move ; and if his ways of living and other conditions are favourable, he is able to materially benefit his general condition. But what if he is one of those representing the survival of the seriously unfit, and that it is not merely the temporary effects of perhaps some lack of exercise, the ordinary exercise of limbs and lungs, he wishes to correct ? Whatever proportion of the whole mass of mankind they may be, they are many in actual numbers. They are the people who do not appear as exponents of physical culture, and perhaps most of them we do not hear of. It is among this class—no less than among those who do not realize, because its neglect may have no immediately noticeable effects, how absolutely necessary in the long run is a proper physical care of the body—that we shall find the individuals who have no belief in anything whatever of the nature of physical exercises, or in any sort of physical treatment, as a means of giving them what they are deficient in. And coupled with it there is usually a lack of desire to test the value of anything which is without the mystery and consequent fascination which attach, for instance, to the swallowing of a nauseous draught, in

which, but quite without reason, they have come to have an ingrained belief. Or, on the other hand, they may experiment in a haphazard way with exercises, and do no good. But the general trend is now towards a desire for more exact knowledge of bodily derangements, and a more rational treatment of them than by the empiric and quite unsatisfactory methods of either indiscriminate medicine-swallowing, chance exercise, or food faddism. In this direction lies the domain of curative and preventive exercise of an exact nature. Our physical qualities are not at the mercy of any magical influence, to be altered by it instantaneously from the highest to the lowest, or *vice versa*. A state of health or want of health is dependent upon a long chain of happenings within the body which cannot be jumped over from one end to the other. It is our personal efforts which are responsible, and who, when once they grasp the truth of it, will deny that that is preferable to anything else ?

It is a fact, then, not to be lost sight of, that, of all those who use physical exercises as a curative means, the proportion who give it up as a failure is very considerable compared with those who are able to get some benefit from it. These results determine the question of how far an individual has gone in physical degeneracy as well as being some proof as to the efficacy of the particular kind of exercises used. And they will also suggest that there is a distinction between simple lack of use of muscle

or function and what may be termed "physical faults," as causes of physical inefficiency and illness. We are commonly taught, by the more modern school, that lack of muscle is the cause of illness. In a sense that is true, but it is really only a part of the truth, as you will begin to suspect presently.

When we know upon what internal physical conditions health of body depends, we shall see that there is no essential difference between preventive and curative exercise. It may be that exercises indefinitely designed are able to have some good effect in keeping a healthy body healthy, but altogether fail if a person is ill—making allowance for the longer time they would have to be used in the latter case—because they are not directed towards the first causes of ill-health, or that what little effect they have in this way is not then sufficient, no matter how long they are persisted in. The physical treatment (exercise) which is able to benefit an ill person is the same in character as that we should use to prevent illness, the only difference being that it may be necessary to use some local movements more persistently, or to moderate them until the body becomes gradually fitted for them to be used more effectively. But there are no two kinds ; the more we know of the subject, the plainer it is that exactly the same effect is wanted in both cases, whether it is to prevent or remove the physical causes of ill-health. Therefore the most valuable is the system which is able to have the same definite effect whether

one is well or unwell. In both cases there is the same abnormal condition to be prevented or removed. We do not want, as the essential things, muscle exercise in one case, increased muscle exercise in another, etc. That will all come in later on.

It is an accepted fact that predisposition to certain bodily carriage and attitudes, which without seeming to be especially related to it go with an all-round lack of healthiness, are as much due to heredity as are any traits and peculiarities of the individual. Therefore it may be suggested to look in this direction to discover reasons why one person is consistently healthy, and another is not, leaving out the question of environment, etc. To the casual observer it may not seem easily understandable that by natural stimuli the bodily and organic powers of one individual are restored to pristine vigour, while in exactly similar external conditions another quite fails to get the same results, but some knowledge of the working necessities of the body will throw light on the problem.

It is a matter of common knowledge that the same peculiarities of bodily carriage are seen in parents and children. It is easily understandable. If we know that minor diminutions in the freedom of the spinal joints, for instance, affect in some degree the nervous efficiency, and consequently the whole bodily vigour, such peculiarities and their effects would, by virtue of the truth that "A sound condition begets a sounder," and *vice versa*, tend to

become slowly progressive faults, which are handed down through generations, and particularly when neglect of ameliorating the causing conditions is favoured through our not knowing of their existence or exact significance. We can get an explanation this way of the reason why some families who live similarly with regard to food are altogether healthier than others, when we know from our investigations that these peculiarities of bodily carriage and attitude, such as round shoulders, a stiff, jolting walk, and what not, are both caused by and are the causes of various slight abnormalities in the spinal column, such as undue approximation and loss of freedom in the vertebræ. These are some of the things that happen through not recognizing that the human body is a machine which cannot go on working satisfactorily for an indefinite time without attention, either instinctive or intelligent. Whatever may be the exact physiological explanation of heredity, one of its influences, as far as the handing down of physical disorders is concerned, is traceable to the result which every kind of chronic bodily unfitness has of leaving the succeeding generation with a constitution of lowered vitality—if perhaps free from the same definite disorders of the preceding generation—and the fact that habits and ways of living, through force of circumstances, will generally be the same in each generation, and thus favour the continuation of the same states of physical unfitness, even if, as I say,

the latter is not directly transmitted. These are the two factors which make for progressive physical degeneracy, but we can control most of these influences; and, then, in just the same way can our habits be made to improve, in their mutual dependence, the physical and mental condition.

On the subject of heredity in disease, Sir B. Ward Richardson says : " It is observable that the injuries to nervous matter which are capable of producing hereditary diseases must be inflicted either on a nervous centre or on the trunk of a nerve. Injuries inflicted on the extremities of nerves do not seem to be followed by changes transmissible by heredity. It is not until the nutrition of a part directed by central nervous control is perverted by a central injury that the inherited mischief is established." In other words, this means that real and persistent perversion of function (due to cellular changes in the body) is caused by interference with the central nervous system.

To take up the theme of suppleness in relation to health, it is a significant fact that never is a person really well who has not a supple body, supple in every joint and tissue, as evidenced by the ability to make all natural actions with freedom and comfort. It may be taken as proof of something wrong with the body mechanism, and something wrong with its health, when such a natural and ordinarily pleasant action as " stretching " is not instinctively performed, or when one is prompted

that unless the actions and attitudes are kept within very restricted limits unpleasant symptoms will be experienced. These feelings ought to be your guide, for they are intended as such, in investigating and correcting matters; but usually they quite fail to interest people in this way, and they are content to take what comes until more serious results follow on or else they take a medicine, and think how cleverly they have got over the trouble. I will show presently what this suppleness means to the internal parts of the frame and body.

The slouching of a "slack" person is due to the fact that "bracing up" the spine is not followed by the proper nerve reaction. When the spine is fit and free, bracing it up stimulates the whole nerve tract, and one is comfortable until a new position becomes necessary.

It will not do to become only generally supple, when there are parts of the body which do not take their share of movement. People do not know this, and will perhaps spend a lot of time on exercises which do them no good, because they are only tending to affect the parts which least want it. To them "suppleness" is a term with an outward meaning only.

It frequently happens that one who has not been used to much exercise of any kind takes up some method of bodily training, and later finds that, although it has in a way given him better physical powers, it has not along with it improved his health

or even maintained it at its original standard. He is conscious of this—if there be nothing more marked—by lack of the sense of well-being which goes with well-poised health. In such cases, when there is no other discoverable reason, the cause is nearly always to be found on an examination of the spine. Perhaps before the exercises the would-be health-seeker was an average being who was not able to perform freely the ordinary tests of trunk flexibility, such as bending forward and touching the toes with the hands, but afterwards, as a result of the exercises, he was able to do so. If he was told in a general way that flexibility of spine was necessary for healthy functions, he would bring forward as a proof that this was an incorrect premise the fact that, although he could now easily perform the tests mentioned, whereas originally he could not, his health was in no way improved. The reason in nine cases out of ten may be found in the condition of the spine. On examination it ill be found that in one or more portions faults in the articulation will be apparent, but only when the body is bent forward to its limit. Standing erect, by feeling the spinous processes (the projections down the length of the spine) it will be noted that all may have their normal position relative to each other (the projecting bones will be touching); but on bending forward there will become apparent a want of separation in two or more adjacent vertebræ, and to compensate for this the next above or below will be opened a

little more widely than necessary, in order that the spine may be freely flexible as a whole, with the sum of the individual movement of each joint remaining approximately the same as when the spine is in normal condition. This condition of very unequal opening of the joints will never obtain when a proper use is given to the spine to insure its free mechanical working. It is a fact that, if the spine has never been allowed by neglect to get into a wrong state—too rigid, with hardened surrounding tissue—every joint is always ready to respond to a strain on it, and yields easily, rather than to throw the movement on to the next joint or next free joint, and thus to allow the faulty member still further to degenerate. Habit has a lot to do with this in the first place, and then after a time one naturally tends to use only that part (usually the lumbar) of the spine which is freely flexible. The illustration I have just mentioned is a result of using non-specific exercise. The effect of these stiffened and contracted parts of the spine is ultimately a serious interference with the nervous energy, not so serious at first, because the vitality of the nervous system is still good, but later, when the long-continued obstruction to free nervous flow has caused, directly and by roundabout bodily processes, depleted nerve strength, which will then further accentuate the cause.

But while the basis upon which the principles of this system of physical culture are built is the freedom of the spinal joints, according to their

design, this is made the working basis, because a freely-working joint is an indication that the ligaments and other immediately surrounding tissues are in their proper condition. More serious disturbance of function and general nerve tone is attributable to impeded nerve force and blood circulation caused by unhealthy, contracted muscular tissue, etc., occurring round the spinal column than by the inconvenience of the main nerve trunk resulting from a joint being kept long in the same position. This inconvenience is only temporary as long as the tissues are healthy and the joint quite free to move when it is necessary for it to do so. We are familiar with this by the relief obtained from altering the attitude of the body when a sustained position has become uncomfortable. It is a nerve effect of the latter kind pure and simple.

The spinal joints, therefore, are reliable guides to the state of the tissues surrounding them, where obstructions to the nerve fibres emerging from the spinal cord are likely to occur.

These are, without doubt, causes of ill-health more common—and I now know they are astonishingly common among those who have some chronic bodily unfitness or illness—than any others of a physical nature. Why, it is easy to understand. At no point in the whole of the distribution of the nerves are interferences more likely to occur than where the nerve fibres are in close proximity to bones—where they emerge from the spinal cord. The tissues are

normally more constricted here than in other parts, in addition to the effect of the whole weight of the body having to be borne by the spine; and it would seem, both by reason of the foregoing and the results that assuredly do happen when the joints are no longer playing their part, that freedom of the joint and frequency of motion are essential to prevent abnormal and permanent constriction, and consequent interference with the nerves. And apart from the importance of mechanical movement in the condition of muscular and other tissue, the sub-inflammatory state of body, which is largely produced by great excess and unsuitability of food, is always likely to fix on some part where there is most resistance to free circulation. Certainly, at no other part is it more important that abnormal conditions should not occur than around the spine, for if elsewhere (in the joints of the limbs, for instance) the trouble that would ensue is not directly a disturbance of the main nervous system before it has supplied the vital organs. If we have a stiff shoulder, elbow, or knee, there is nothing to at once affect the vital functioning of the body. Preservation of movement in the spinal joints is of paramount importance, there being no other part in the whole tract of the nerves where they may be subjected to similarly serious interference. It is interesting to know that a well-known medical writer states that rheumatism is primarily caused by some affection of the spinal nerves. The tendency to

rheumatism — and I put "tendency" advisedly, because the rheumatism itself can, we know, be made better or worse by different foods—undoubtedly has a cause other than food, the underlying one being in all probability as stated. In this connection I will mention the case of a pupil of mine who, despite having gone through various "cures" and dieting for rheumatism, did no permanent good until he had practised special dorsal (although there was no rheumatism *there*) exercises for some months, in order to free some joints that were fixed.

Letting alone the question of its causes, it is almost undisputed that nerve disturbance is at the bottom of all chronic functional disorder. That in itself is cold comfort. But for my part I will say it is beyond doubt that the intelligent practice of a physical treatment which is based upon this hypothesis, and therefore aims directly at removing all causes of a mechanical nature which might produce this nerve disturbance, will achieve results which adjustment of food alone does not, and which are material and not merely transient stimulation at the expense of the nervous energy, which may often be the case if indiscriminate muscle exercise is used; although mere muscular exercise is not always able to produce this normal reaction when, as the result of a slow deterioration, the state of the body is far from normal. Sometimes an internal stimulant will apply the spur, which deceives people, and they think they have hit the right nail on the head.

Sometimes it will not. In any case it has no success in removing causes. We simplify everything at once by getting the machine fit and free.

When there is no natural and full reaction from exercise, and at the same time there are no indications of any organic disease, the one way of commencing a regeneration by physical culture is by means of movements for giving the whole spine its fullest extension, its individual joints their ample freedom, and promoting general suppleness of body. That is the order of work. In such cases it is almost invariably found that the condition of the spine is causing the trouble, and by using suitable methods we shall find we are removing the "faulty innervation" which we so often hear given as a vague explanation of digestive derangement or disturbance in the easy and regulated working of other functions. There are, of course, people who, although physically efficient, and who take rational exercise, are unwell because of the kind, and particularly the quantity, of food they eat. Nothing can put them right but an adjustment of diet, which in the case of an otherwise healthy person always has quick effects. However, it is not with these heavy-eating people that I am concerned here, but with those who, after having faithfully followed the usual regimen of exercise and diet advocated, find there is still some cause which this does not remove.

A close observance of the effects of ordinary physical exercises would suggest a system consisting

primarily of spinal exercises, because, of all the movements used, it is a matter of experience that those for bending the body are the only ones having any material effect in improving the health; and this fact—because the good effect of ordinary body exercises is not satisfactorily explained by the usual theory given, as being due to their simple action of using the trunk muscles, this in many cases having no good effect whatever—points the way to an investigation into the condition of the spine in a permanent standard of good or bad health. In a work on massage I have seen it mentioned that most cases of obscure functional derangement are associated with tender and contracted parts in the spinal muscles. This is mentioned as an indication of some affection of the nerves which govern the functions, and attention is drawn to the value of giving these areas massing treatment as an incidental to the main manipulations. If the masseur had investigated a little farther, he would have found that the origin of these contracted parts was almost invariably a thickened and immovable joint. But there seems to be no suspicion of such a thing on his part, and his aims are not calculated to be very successful.

"Shut the eyes," says a nerve specialist, "breathe deeply, and stretch: these are three of the principal cures for the particular types of bodily unfitness and tiredness which inevitably end in nervous and mental strain." The first injunction, at any rate, is

simple enough to follow. The others, which the nerve specialist seeks neither to explain the virtue of nor to instruct in, I will show you the best way of doing later on. The crux of the whole question with us is, What are the best ways of securing this basis upon which all other parts of physical culture are built—spinal fitness ?

The Spine and its Nerves.

The accompanying illustrations, which are approximately true to nature, will give the reader an idea of what the spinal bones are like. In the other sketches it has been a little difficult to be true to nature, and at the same time convey what was necessary ; but they are near enough for the purpose.

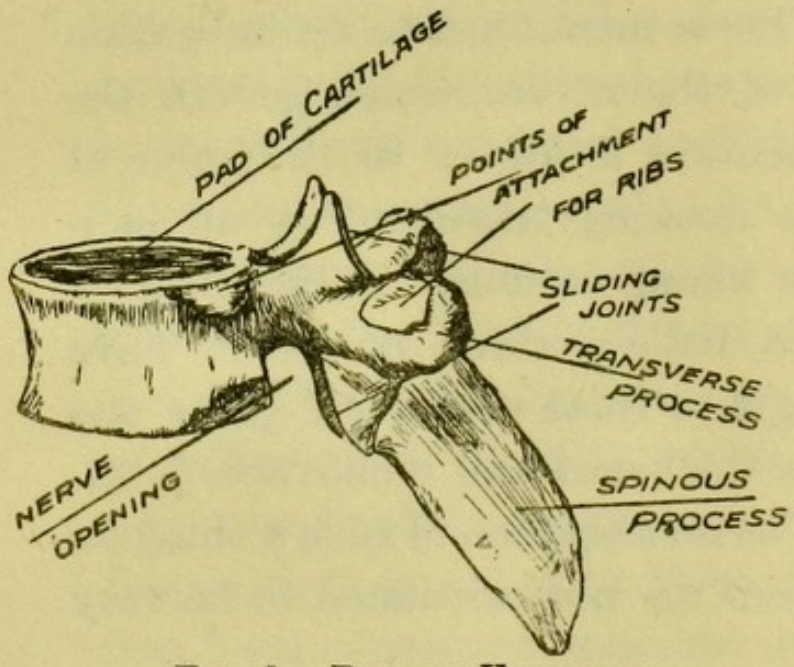


Fig. 1.—Dorsal Vertebra.

Each of the vertebræ is intended to have a certain movement on its seat, a relatively small movement, but of which the sum gives the spine its easy flexibility as a whole. The real importance of this flexibility lies, not in its relation to bodily grace and activity, but in its influence on the nervous system.

From between each joint there emerge, through their special openings, which are in the form of little arches in the bones (except in the cervical joints, which are somewhat different), two large nerves, one from each side going to the corresponding part of the body, where it is distributed. These are the main nerves of the central nervous system, which controls all voluntary movements of the body, enabling us to move our limbs, walk, run, jump, etc. All of them are in direct communication with the sympathetic nervous system, which controls the involuntary functions—digestion, blood circulation, etc. The sympathetic system may be looked upon as a series of storage batteries, sending out nerve filaments to the digestive apparatus, heart, blood-vessels, etc., and depending for its energy and efficient working on the central system. It will thus be seen how important it is that this nerve-supply

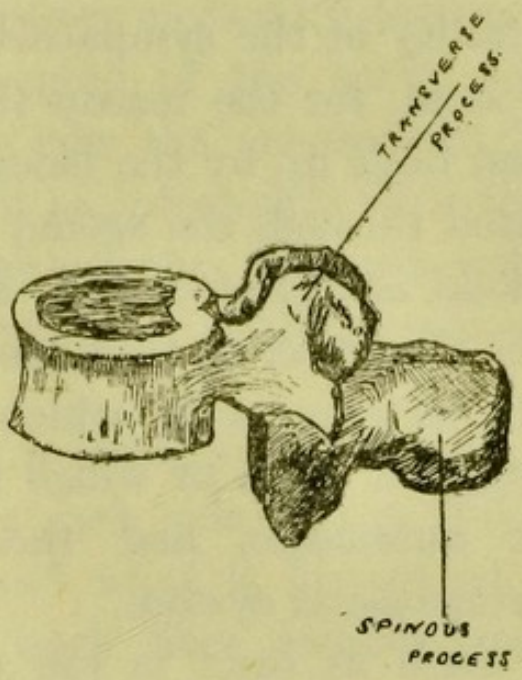


FIG. 2.—LUMBAR VERTEBRA.

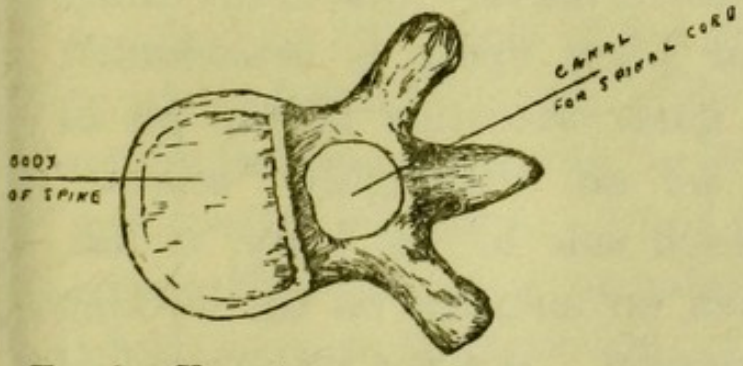


FIG. 3.—VIEW (SOMEWHAT DIAGRAMMATIC). OF VERTEBRA SHOWING SPINAL CORD CANAL.

be kept unimpeded, obstruction of any one of the central nerves resulting in derangement and a gradual lowering of the vitality of the sympathetic system. The effect of this is twofold, the lowered vitality of the sympathetic reacting on the central system, for the reason that the latter is sustained and built up by the blood manufactured and circulated through the agency of the sympathetic. The blood is manufactured, in the first place, through the digestion of food, and then circulated through the arteries with which the spine is plentifully supplied, both of which functions are involuntary, or automatic, and therefore controlled by the sympathetic system.

Such in brief is the relation between the two nervous systems, and they are consequently vitally interdependent in their ordinary everyday working.

There is also another nerve communicating direct between the brain and sympathetic system ; it is called the "pneumogastric nerve." One of the things it is responsible for when upset is seasickness; probably also that queer sensation at the pit of the stomach when we are thoroughly "scared." Running down on each side of the body, it has, among other functions, an influence on the working of the heart and digestion. But not being a spinal nerve it is not subject to mechanical interference with its proper activity, as are the latter where they emerge from between the spinal joints. But, nevertheless, any sort of unnatural condition, how-

ever it is produced, in any part of the nervous system is reflected, in a way which is not clearly understood, to remote parts which seem to have no direct concern or connection with the origin of the trouble. Thus it is that pressure caused by degenerate joints in the dorsal region of the spine, for instance, almost always disturbs the pneumogastric nerve in some way, as well as interfering with the functions of the organ or organs the primarily obstructed nerves are themselves directly concerned with.

The sympathetic system is made up of a chain of nerve fibres running down each side of the spine, just to the front of it, and what is known as a "ganglion" is found on each fibre coming from between the spinal joint. These ganglia are the storage batteries I have mentioned, and each or a collection of them supplies the energy which is stored up in them for some particular function. Thus, the large splanchnic or intestinal nerves are supplied by the whole of the ganglia from the third to tenth dorsal vertebræ, while the lesser splanchnic nerves are connected with the ganglia of the eleventh and twelfth vertebræ. All of these nerves run into a collection of nerve fibres called the "solar plexus," which governs the functions of the digestive apparatus, liver, kidneys, etc. The whole of the spine, therefore, from the third to twelfth dorsal vertebra inclusive, is concerned directly with these functions, and faults in the mechanical condition have a direct

effect on the functional efficiency, as well as ultimate reflex disturbance elsewhere, which it is never possible to exactly foresee, because they will vary according to the constitution of the individual. No two persons who are said to be suffering from indigestion will experience the same sensation or be affected in precisely the same way. In one, his feelings may predominate before he suffers much physical harm. In another, he may become a physical wreck without being especially uncomfortable over it until the damage is done.

Now we can see why the dorsal part of the spine is so important.

These little ganglia are the quite sentimentless causes of most of our miseries and their opposite state. If they cannot get their due they will cause a sluggish liver, inefficient kidneys, a congestion here, a pain there. Time and place are nothing to them. They will develop the cachectic constitution, the rheumatic, the gouty tendency. They are directly responsible for all this, and more besides. If they can, they will send out a steady flow of nervous energy. If they cannot, they will do the next best thing by sending a little at a time. It is a part of their peculiarities that they will perhaps prefer to take a semi-holiday from distributing work now and then, and spend it in collecting a supply of energy from the central system, to be sent out to the best of their ability later on. In the meantime, they say, the individual must put up with his feelings,

and not expect their sympathy ; they have done their part by reminding him, and it is now a serious matter with them.

The nervous system, with all its wonderful direct and reflex actions, has been exhaustively studied in medical science, and the functions of the various centres are known to a nicety. All this has been discovered by experiment. But while the results of definite injuries artificially inflicted, or acute accidental injuries, are known, this does not provide us with information which would enable us to predict with accuracy the results which would follow on the slow and progressive injuries to nerve centres which show their effects on a constitution now disorganized and in an unhealthy state. There is a vast difference between the results of acute and sudden injuries to the main nervous system and the troubles caused by slow progressive irritating influences on the same centres. A knowledge of the latter will be of more practical use to most people than the former. The slow progressive injuries, starting at first as a slight interference, which concern us in the subject of physical culture by exercise are those caused by congestion following on disuse or misuse of the body, and invariably arise from long neglect to give the working parts of the frame their full movement.

What happens when a spinal joint is not kept freely moved is that the cartilage separating the bones, and the surrounding tissue, become slowly

hardened and inelastic, a condition contributed to by want of observance of the minor rules of living and unsuitability of diet. This tends to make the joint sink and become fixed, with the effect that the large nerves emerging through their openings between the joints become subjected to a continuous unchanging pressure, which ultimately seriously impedes their functions, locally and in distant parts, starts digestive trouble, and thus leads to nerve impoverishment (see Fig. 4). A freely-moving joint exercises a sort of massage on the nerve trunks, thus keeping them in condition, and also prevents the local tissue from contracting and hardening, both by keeping the nerve influence free and by the mechanical movement given to the part. Normally the nerve openings are constantly undergoing variations in size, as the joints move, but in the fixed joint they are usually shut more than the average amount, and remain so. Our observations lead us to conclude that the openings are intended neither to remain wide open nor partially shut, but to be free to constantly vary. They are able to do so only when the articulation is kept quite free. The nerve trunks are attached to the spinal cord in such a way

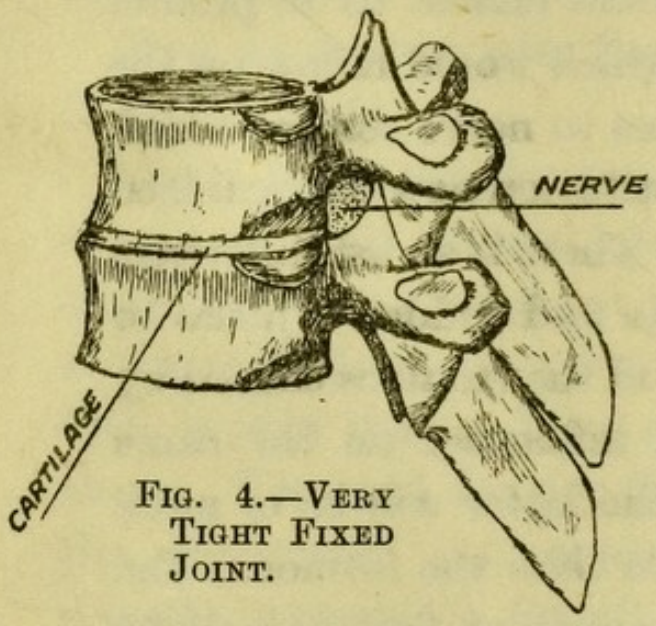


FIG. 4.—VERY TIGHT FIXED JOINT.

as to allow without inconvenience of any temporary alteration of contour and length of the spine, but

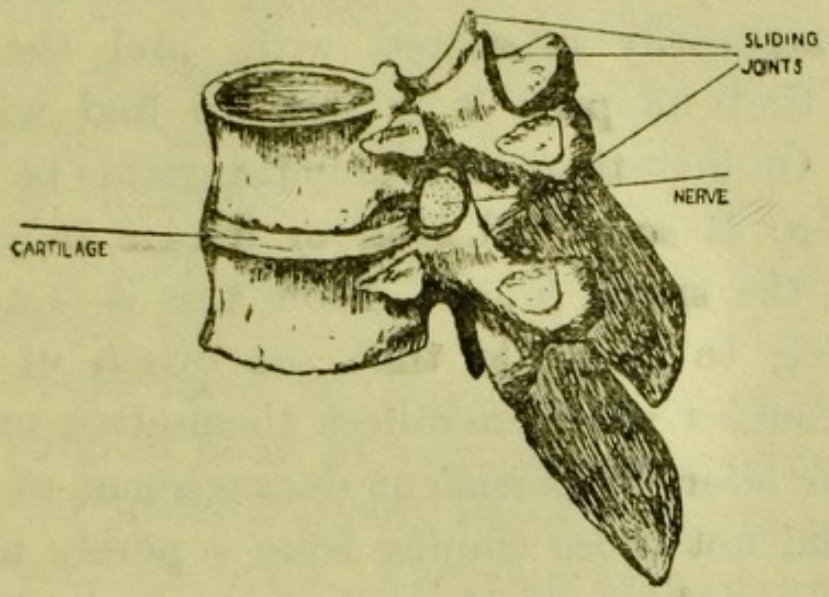


Fig. 5.—A Freer Joint in Normal Position.

when given no use it becomes permanently shorter than it should be. The joints sink a little, and interfere with all the nerves. The normal poise of the spine, which can vary within certain limits, always adjusts itself if kept properly exercised. The part played by the odd shape of the bones will be explained in the section on the mechanical principle of the spine.

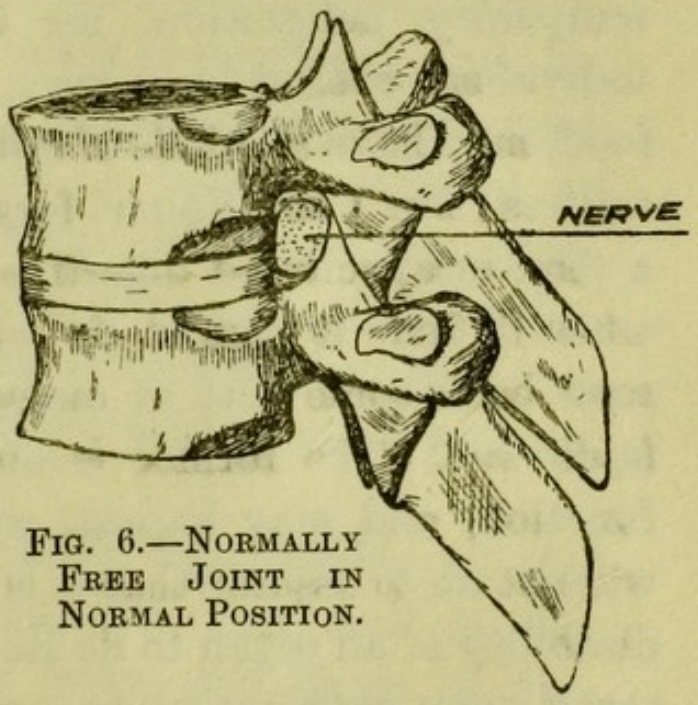


Fig. 6.—Normally Free Joint in Normal Position.

When one ceases to find relief, by a rapid response in the nerves, in a change of body position, a straightening up of the

back or a relaxation from an upright position, it means that proper nerve activity has been more than temporarily interfered with, and the very instant that happens it is time to find what is wrong. On investigation it may invariably be found that there is some tightness or fixture in one or more of the spinal joints. From this it is a fairly safe thing to conclude that the origin of most nerve troubles which manifest themselves mainly, sooner or later, by persistent derangement of functions, and not those coming from a purely mental cause or simple lack of food, have their definite starting-point in a degeneration of the spinal articulation, whatever may be all the causes contributing to this. I am, of course, quite aware that nerve interference may be reflected back or forward—that temporary indigestion, for instance, in a sound individual, caused by a very big meal or irritating food, may have all kinds of reflex effects on the nerve centres; but I also do not forget that the first thing a semi-incapacitated digestive apparatus would do, when it finds it cannot do with food, would be to send back some sort of message to ask where the fault was. The former is only a direct abuse of function, and may happen with any of them. It will not do to assume that it is the same thing as the disability of an organ to do its work properly. It is much more satisfactory to suppose that, where, for instance, there seems a constant indisposition on the part of our internal arrangements to deal pleasantly

with good food, there is a radical cause for it. That is the reason why the spinal region should be the first part to be attacked by physical exercise in our army of nervous dyspeptics who are for ever "tinkering," and finding that causes or effects, known or unknown, are not altered one way or the other by the usual things they are told to do. These simple spinal degenerations are of a nature which would have no significance or importance from a surgical point of view, and may or may not reveal their presence by any alteration in the carriage or contour of the body. But they may be suspected by the presence of permanent functional torpidity, or, at the outset, of over-activity, which would indicate that in some way the nervous force was being obstructed. When we know how easily this may occur through a loss of freedom in the spinal joints, an explanation of the trouble is suggested, and, by the very simple method of feeling whether every pair of vertebræ separate on bending forward or rounding the back, it is invariably found that there is an unnatural tightness in some part of the spine. This is simply being a little more observant than has been the wont of physical culturists, and we arrange our exercises accordingly.

The joints which normally are capable of the widest movement, and are the most used in the ordinary actions of the body, are those of the lumbar or lower portion of the spine, the bones of the upper portion to which the ribs are attached

having a narrower range of freedom. It is the latter which are the most liable to become faulty in their movement—too tight, or even fixed—with all kinds of undesirable and far-reaching consequences; among them, trouble in the digestion, lungs, liver, kidneys—in fact, general disharmony of the vital organic functions, including the circulation. All these are factors helping towards a starvation of the nerves themselves, a state commonly called "neurasthenia," with its multitudinous symptoms. It is then that something more direct and efficacious than ordinary exercise for the muscles is needed to put matters right. The spine must be given its natural condition of free articulation, not merely as a whole, but in every one of its twenty-five joints. The most effective way to do this is by employing movements of the levered kind (see explanation in section on the mechanism of the spine), in conjunction with others which shall be persistently directed towards giving thorough freeing movements to every joint. Ordinary physical culture exercises have merely a tendency, and that only incidentally, because they are not designed with this object, to put right these faults in the less freely moving parts of the frame. Physical exercises, of which the primary object is to use and develop muscle, have a wide field of usefulness, and are, indeed, indispensable; but the common mistake is not to recognize that there must be definite conditions which are the true cause, rather than simple lack of muscle development,

internal or external, of inefficiency of the functions, and that probably systematic muscle exercise, which has but little effect in moving the main framework of the body, will have no effect on them. Thorough muscular exercise is always necessary, and the desire for recreative exercise is natural to a healthy body; but if lacking we must proceed more intelligently than by giving the body what it does not call for. We shall find that the way of restoring the desire to make use of and develop the bodily powers inseparable from an abundance of physical well-being is by leaving out strenuous muscle exercise for the time being, and, instead, stretching, freeing, and uplifting the frame, helping this with breathing exercises. If it has always been a practice to use some simple exercise for imparting suppleness of body, *and one was in the first instance normally healthy*, that will usually have been sufficient, or at least have kept things going fairly satisfactorily. Normal muscle development and frame freedom will have gone hand in hand. However, it is not really sufficient to leave this to chance.

But quite apart from any explanation as to how and why there exist different degrees of vitality and health in different individuals, there is the fact that these faults indicated by the spinal articulation, although they may be usually overlooked, do exist very commonly, and that they are accompanied ultimately by lowered vitality or disordered functions,

or both. And, further, it is a fact that when these faults are removed by means of mechanical movements of the right kind, the state of health always improves, more or less rapidly according to how long the faults have existed. These facts have the proof of actual experience, and should be a guide to those who have experimented in physical culture, perhaps with the belief that much good might come from it, but with no knowledge as to what the exercise was to actually accomplish. It really does seem an inconceivable thing, or at any rate opposed to common sense, that failure or continuous inefficiency of a function should occur, unless from some purely outside influence, or as the result of wilful and knowing abuse of a function, without there being a main cause, a primary cause, in the nerve-supply. This becomes a more than likely explanation when we see that either physical neglect alone or combined causes are the most likely, from the very nature and design of the human body, to affect those parts of the frame where are the nerve centres upon which the whole functional efficiency depends. If we reflect, this is what would appear, and it is my experience that spinal unfitness with nerve interference occurs imperceptibly in the average unathletic person, and is the last thing in the world he would think of as the cause of at first nondescript unfitness, and then perhaps an intermittently recalcitrant digestion, which, on each occasion when this happens, he probably tells him-

self will get right again by itself, or with a little persuasion from medicine. Undoubtedly it will, quite a number of times, get somewhere near right again, thanks to Nature's reserve; but presently the border line is reached where the nervous force cannot keep up the pretence that all is well, and the result is what we call "nervous debility," perhaps, from its very complexity, the hardest of all functional disorders to cure.

Therefore, whatever else curative physical treatment consists of, in all cases of failure of health, attention should be given to the spine first and foremost. Such adjuncts to a curative treatment as massage and systematic muscle exercise may be advisable in coaxing back normal vitality to the organs of digestion or elimination (liver, kidneys), when they have become affected by interference with their nerve-supply, but to employ local massage or strenuous abdominal developing exercises without knowing that the source of nervous energy is free is to fail in achieving good, and possibly to do further harm. Where any sort of exercise is permissible, a properly devised and graduated system of spinal movements will never have any other than a beneficial effect on the body generally, and because they are concentrated on a particular curative effect without involving undue muscular exertion they may be more widely used than most systematic muscular exercises. Concerning haphazard exercise, if there be any serious reason why it should not be used, a disinclination to persevere,

which becomes more marked if the exercise is continued with, will tell us of the inability of the body to respond to the stimulus, and is a safeguard to harm being done by attempts to correct the trouble by wrong means. Doubtless some of my readers have experienced this. Effort steadily directed towards giving perfect freedom to the spinal joints, with a resetting and poising of the congested and hardened surrounding tissues, and an uplifting of the body structure, will in almost every case, when combined with ordinary recreative exercise, do all that is necessary. It makes no call for a response to stimulation until the body is fit and begins to assert it. If this is not sufficient, massage and muscular exercise of a light kind may be of much service. But always let it be a precaution in the first place not to exercise before ascertaining that the condition of the spinal joints is such that they are able to assume their normal position in all attitudes of the body, and if not free, to use those movements which will gradually but surely correct the faults and render the body fit to respond to exercise and be benefited by it. If there be some fault, with the accompanying contraction in the spinal muscles, it will probably be realized later that general exercise of itself, notwithstanding its importance in health, is not capable of removing ill-heath; and because of this discovery exercise may be sweepingly condemned as an altogether overrated thing as either a preventive or curative means. But let no one be

so sweeping until he learns more about it. The proper training and care of the body, on an intelligent basis, is not a subject of haphazard effort. Painstaking thought and work are necessary if the causes of ill-health—how they may arise, how they may take effect, and (the all-important) how they may be prevented or removed—are to become of plain understanding.

This more inner revelation of the why and wherefore of physical culture certainly is not, I think, even part of the acknowledged basis of the teaching of the majority of those who profess knowledge on the subject. I have every admiration for a well-developed body, but I do think physical culturists are quite wrong in regarding muscle as either the prime producer or guardian of health. No doubt, in those cases benefited by general exercise, these unrecognized causes of nerve inefficiency, when not of long standing, are removed by the rule of thumb trunk movements, such as the majority of the bending and stretching exercises of the physical culturist. The effects of these are observed to be good as far as they go, but exactly what their good effects rest upon may not be attempted to be explained. Avowedly their object is to develop the external abdominal muscles, and thus benefit the digestive processes. Personally—and I speak from actual acquaintance with the exercises used in every well-known system, Sandow's in particular—I have no doubt that their principal merit, albeit a chance

one, rests with the effect they have on the nerves by stretching and freeing the spine. But they are far from being effectively designed for this purpose, even those in such a good system as Lieutenant Müller's, which contains some really good exercises (having, however, much more effect on the muscles than on the spine, except, perhaps, the lower part) calculated to benefit a large number of people. But I know from my own personal observations that it is quite possible to undergo an extended course of so-called curative physical culture, designed with no knowledge of spinal anatomy, and in no wise free a fixed pair of vertebræ in the dorsal region. Sometimes a dorsal joint is absolutely closed and immovable, and until it has had a little freedom given it by frame exercises, persistently carried out, one should not employ any other kind.

Now, if we closely study the form of the spinal bones, we may see how admirably designed they are to preserve their joints in good order, and we shall probably see how it is possible to devise simple movements which make full use of the peculiar construction of the bones in freeing and exercising the joints when they have become contracted and stiffened through any cause. We can devise movements which are but ordinary actions of the body systematized and made more effective. In this way we can move the bony framework of the body more effectively than is done by the incidental means of muscular exercise.

Therefore, the first thing the intelligent physical culturist should learn is to accustom himself or herself to feeling the outward bony projections which are on the surface of the body down the whole length of the spine. These vary but little in individuals, and it may be easily known when the joint is in a fit condition by the simple fact of the joints opening and shutting. This becomes quite interesting, and it helps much in the process of getting rid of ill-health to know there is a tangible result to be attained before there can be a sound and absolute improvement in health. For this reason it is a mistake to place reliance on the good achieved as merely indicated by our feelings of the moment. We should mark the progress of our work by noting the improvement in the condition of the joints ; and this is ascertained by manual touch, which in some of the exercises is a necessary part of their application. Impress your mind with : " Take care of the frame, and the health will take care of itself." It is almost wholly true.

There is one remark of Lieutenant Müller's I would take exception to. He says neck exercises are not necessary to health. If he simply means to develop bulk of muscle is not necessary, I agree. But it is of the utmost importance that the neck should be mobile and free. Stiffened cervical joints may cause asthma or a host of other troubles indirectly. And now, concerning neck-developing exercises, I will mention an interesting fact. At one time I could

not develop my neck, despite very strenuous muscle exercises. Now, having given them up, by the use of cervical nerve-freeing exercises as a part of my whole system I have incidentally gained a comparatively powerful neck !

While from the health point of view it is not so important that the spinal joints should be kept continually moved to their limit, there are reasons why it is advisable that they may always be free to do so. The exaggerated contortions of the acrobat are unnecessary ; but as to its fitness, I do not think the average spine bears much comparison with that of the acrobat, who is usually an extraordinarily healthy person, even though his surroundings are against it. The ordinary alterations of attitude in the hundred and one movements we make, or should make, every day, are sufficient to give the variations in pressure at the more constricted parts in the nerve distribution, by movement of the joints, when the body is healthy and the nerves strong. But it is easy to understand that

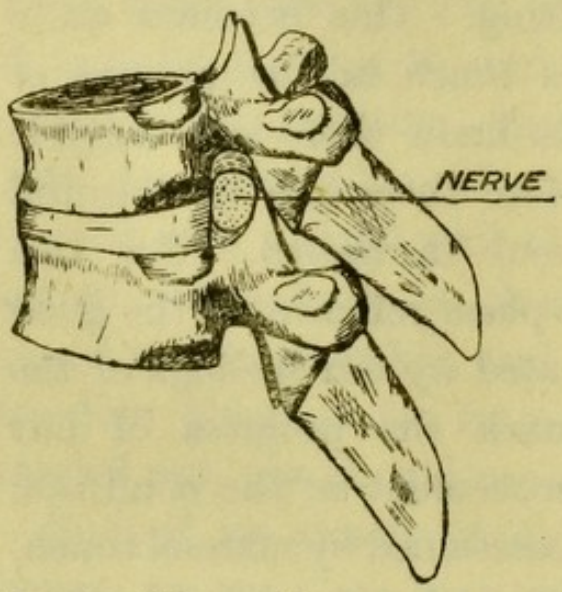


FIG. 7.—NORMAL LIMIT OF MOTION IN ACROBATIC SPINE.

Although actually small, this amount in each joint means a *very* supple spine. So we can understand that with many people some joints get no more movement than is represented by Fig. 4.

to allow of this smaller necessary movement, and to prevent each joint from becoming a little closer than it should be, it would be wise to keep the joint free to move to a fuller extent, and to give it the occasion sometimes, the difference between the two representing the margin which separates body soundness from unsoundness. Therefore, while it is not necessary for the spinal joints to be kept working to their limit in order to preserve the nerves from interference beyond the normal juxtaposition of their fibres with the bones and tissues, there should always be the ability to move farther than is called for by ordinary attitudes, to give a little extra stretching sometimes, in order that the smaller necessary range of freedom shall not be lost. And this is of most importance when the vitality is not good. When the nervous efficiency is low, one of the results on the constitution is that the joints become stiff, with a greater resistance than usual to the vital currents ; and when this, too, begins to affect the spinal joints, a nervous force which is moving but weakly, with very little *vis a tergo*, is easily interrupted by the obstruction. That is the starting-point of real mischief in the body. On the other hand, good nervous energy would perhaps overcome the difficulty, or at any rate be practically unaffected by it for the time being. Various causes may render the body less supple than normal in its tissues, and, by lessening the *inclination* to activity, be the reason for its not

receiving due exercise. It is because the spinal joints are not moved beyond a small amount, and perhaps, by habit, some not at all, in an everyday sedentary life, that they are liable to lose their power of mobility, and lead by slow degrees to complicated troubles; while factors due to unnaturally heavy or unsuitable diet are always at work to help this come about unless we regularly do our share by an intelligent assistance of Nature. We see thus how exercise is doubly important to a non-vital type of person. It is necessary to prevent him becoming worse, and by imposing this condition Nature subtly makes us help her to make him better and sounder when *she* can get diligently to work. We cannot do better than to remember that the strong nervous system of a healthy person, which prevents, both directly and indirectly, sluggish functions from becoming established, is insured, more than by anything else, by the soundness and efficency of the parts immediately surrounding the nerve track from the brain to the base of the spine.

Exact exercise is something which can make up for quite wide transgressions of Nature in other ways. And I have not any doubt that our sins of omission in the matter of the most necessary kind of exercise are responsible for more than our sins of commission, because one who takes intelligent care of the body is much less likely to commit the sins of over-eating, over-drinking, over-smoking, or over anything, as an habitual

thing. He will have a better understanding of his duties, and his natural instincts will have a chance to help him. Supposing a certain food does, besides feeding one, have a *bad* tendency, it is only likely, because it is part and parcel of the normal functions of the body to fight harmful tendencies, to do serious damage when we allow the body to become crippled in its mechanism. All food has some harmful effects if the body is not fit to assimilate it.

Generally speaking, the more healthy and vigorous of function a person is, the freer the joints of the frame will be found to be. The really healthy person will be more active and free of carriage and movement than one who is less healthy. A wrestler, who keeps the whole of his spine free and exercised by constantly performing such feats as the "bridge" (arching his spine over backwards and supporting his weight by head and feet) is the healthiest of men, as well as being a finer physical specimen than any other athlete. And who is healthier than the dancing girl, who undergoes regular and very strenuous spinal training (although only with the aim of becoming perfectly supple)? We sometimes, however, notice people who, while they have never in their life taken much exercise, or given any care or training whatever to their body, are nevertheless, to all appearances, quite healthy, even if somewhat unathletic. This may appear somewhat paradoxical and a refutation of

all arguments that health is the result of a proper treatment of the body; but I think the explanation is the original strength and integrity of that particular constitution, which, unbeknown, is the result of heredity. An original vitality is proof for a very long time against any abuse. There are always found different degrees of vitality and health due to a long continuance of favourable conditions of living, or *vice versa*, and we do know it to be true that anyone with a long record of sound and healthy ancestry can disregard with apparent impunity many of the things which have to be observed by the less fortunate, whether it is to do with food, drink, or exercise. But there is no profit in it. The knowledge of most importance to us is not that the human machine is such a wonderful apparatus that it can go on for a long time in spite of neglect, but *what is the way in which it will go wrong when neglect begins to take effect.*

As usually advocated, systems of exercise, codes of living, and the regulation of dietary, are founded on such vague principles as to be of no real value when there is immediate need to practise definite curative measures. Do you really think it does a sick person much good to tell him or her to masticate the food, develop the muscles, eat only when hungry, etc. ? I do not think so, because it is merely telling them to do the things which are beneficial or possible only when one is healthy. It is not taking close enough a view to expect that advice to do anything

for them alone, except in a very few cases. I have known so many people, even those who could not be called ill, to whom ordinary light muscle exercise, cold baths, reformed diet, etc., were not of the slightest benefit until after they had intelligently and persistently used frame exercise, performed, as far as possible, with the muscles relaxed. The one thing that teachers of exercise do not recognize is that, whereas muscular exercise makes the well person "feel fine," as the sturdy "gym" sergeant expresses it, anything but the same effect is produced in the unwell person. The usual effects on a normally healthy person of any kind of exercise, or unimportant changes in diet, are sure to be beneficial to some extent, because the healthy body always likes a change, and this experience will mislead as to what are the important and what the unimportant parts of a health régime. To be any real good, a system must be based on a sounder principle than the ability to make a healthy person "feel fine." His are merely the symptoms of health. Why this is so necessary is that in order to benefit a constitution which is in the first place degenerate, and which other influences have tended to still further break down, it may be necessary to practise even the most efficacious physical measures for an indefinite time before the health is able to take on a higher standard for itself, and then benefit by such general aids as purer air and food, slower eating, muscle use, etc. It therefore

requires knowledge that what we are doing is really working to *remove the cause*, and is not merely playing with symptoms, sometimes bettering them, sometimes otherwise, but with always the standard of health and physical soundness going down. This, I think, sums up the reason for the majority of failures among those who try to give themselves better bodies by the very tentative effects of haphazard exercise, and perhaps similar experiments with food. They either know nothing or not sufficient of Nature's physiology.

The body is an automatic machine with an interdependence between all the functions, which are always working for the improvement or deterioration of the structure, as a whole, by the cycle of changes we call "metabolism" going on within the body. We know nothing of the why and wherefore of the physiological workings of Nature, but we do possess accurate knowledge of the conditions which are necessary that these physiological changes may be smoothly carried out. We know, or may learn, that for functional efficiency there must be no broken or obstructed lines of communication in the nervous control, and that this is the most important primary condition, because upon it all else depends. Different foods will not vary the metabolic processes of the body, or no foods will produce health unless these lines of communication are kept free by suitable exercise. Whatever agents we employ as curative measures, whether it be physical movement or

manipulation, electricity, or drugs, the effects are always due to the inherent energy of the body—that is, the nervous energy—being either stimulated to overcome obstruction, or allowed free play by the direct removal of influences which have hindered the natural forces from working. We can only deal with causes. If we allow a cause to exist or if we remove a cause, Nature sees to the effect which, through her unchangeable laws, must follow. Whether the cause is the immediate one of absence of food or the less immediate one of unnatural interference with Nature's working, the rule as to effect is always the same. We do not supply it—Nature does.

Now, although I am writing this book for the purpose of setting before you some of the main and most important principles to be kept in view in the cure of very common disorders and the prevention of more serious ones, the scope of the exercises I advocate is not restricted simply to this. I have a word for the athlete. Whether the object be to keep the body and brain fit for their varied occupations, as is a necessity in the case of the average person of to-day, or to train for muscular strength and prowess, the basis of success in either case lies in the soundness and vigour of the organs of the body, and this can only exist with an efficient nervous system. Whereas in the first case the soundness of function is all that is aimed for, in the second it is the foundation which must be

laid before the athletic powers can be built. One can gain a certain measure of added strength of limb and body by muscle exercises, although there may all the time be some sort of obstruction to generation and free circulation of nerve force—in other words, although the health is not good. But this is not true physical culture, which should so act as to create a reserve of nervous strength and energy, and not merely exhaust what is already there. By training on rational lines every athlete would be able to get the best out of himself, and at the same time preserve his vitality.

The subject of muscle development and its relation to health will be best dealt with in a chapter to itself.

Because they so seldom point to the cause or exact location of trouble, symptoms should have but little importance attached to them, except as symptoms. We cannot know, from the simple sensation, that a cramp, a pain, or a contraction, in a lower part of the body, may have its origin in the upper part of the spine, nor can we know that a purely reflex symptom may cause us much more trouble, as far as our feelings are concerned, than direct results of impeded nerve force ; and yet this is frequently the case. It is such a common thing for those who teach so-called curative physical exercises to devise and prescribe all sorts of local muscle movements for the treatment of symptoms which, although they manifest themselves principally there, have a widely removed

cause, that we cannot but wonder at the want of success attending their efforts. They have not started physical culture from the beginning. The extent of what a loss of freedom in the spinal joints may give rise to varies according to its duration and position as well as the original soundness of constitution. All sorts and conditions of symptoms are found at various stages, ranging from the slight disturbance of a main function, like digestion, to the wide and varied results of a depleted and harassed nervous system which will follow on later; but far from each having a separate and distinct cause, these results can be traced down to a common cause.

Nerve depletion, which I have already referred to as being responsible for such a lot, may be produced in two main ways. It means, literally, inefficiency of the nervous energy, and inefficiency of nervous energy is the result of nerve substance being expended faster than it can be built up during rest by the normal processes of the body. If a healthy nerve is irritated or obstructed, its first way of showing it is by performing more than its intended work, which is its way of drawing attention to "something wrong with the works," and furnishing the extra energy necessary to help throw off that which obstructs it. This is how the nerves preserve themselves, and the organs they govern, from the onslaught of mere temporary enemies, such as the effects of isolated errors in food or drink, which produce irritating poisons in the blood. If irritated

from other causes, and no help is given, a nerve is continually harassed by something which it cannot remove, and literally wears itself out. After a time it slackens down, not comfortably and easily, for it is always resentful, becomes no longer capable of performing its work, except by fits and starts, and loses its ability to respond properly to stimulating influences. It is quite certain that this kind of neurasthenia cannot be started on the road to cure except by directly removing the cause; but what a common thing it is for practically every treatment to ignore bothering about a cause, and aim at curing the symptoms, which it will usually fail to do, hunting from one to another in endless succession, and in the end doing no good! Tissue thickening around the main nerves produces this kind of nerve depletion, not at an early stage, but ultimately. Necessarily this then starts the other kind. It is a little strange that doctors know of the bad effect on the nerves of long-continued slight pressures caused by tight clothing, etc., and yet never give a thought to the possibility of similar pressures, but with worse effects, occurring within the body in the way I have mentioned, at the points whereon the weight of the body is sustained, the spinal joints.

On the other hand, if the faculties and bodily powers are kept excessively employed, and the body is habitually supplied with unsuitable foods, similar results will follow, a jaded, worn, nervous system manifesting itself in innumerable ways. It is not to

be supposed that these multitudinous symptoms have each a separate cause. We must not jump to the conclusion that the heart wants a "tonic" or the nerves want a "pick-me-up" to make them separately do their part. The diversity of the symptoms is all due to the one cause of nerve inefficiency taking effect in different ways according to the peculiarities of the individual. In both cases it is rest which is needed to restore the nerve strength. To secure this, it will be necessary in both cases to remove the cause or causes which are at the bottom of it. When due to excessive use of the mental and bodily powers, and unsuitable food, and to that only, the nerves will always recuperate themselves more or less quickly by rest and an adjusted diet. This kind of neurasthenia, which is usually called "nervous breakdown," is acute, but easily cured. It may be the result of excessive use of either mind or body separately, or the less excessive use of both together. Although it is possible to develop both mind and body in the same person, they cannot be constantly exercised to their limit simultaneously without making too great a demand on the nervous energy. A scholar may be an athlete, and an athlete a scholar, but each must exercise his dual abilities with plenty of rest between. The bodily economy will not allow it otherwise. It is quite an exploded notion that an athlete can have no brain-power.

In the other case, where the free passage of nervous force is interrupted by something of a mechanical

nature, this primary cause must be removed directly before the nerves will be able to renew themselves. Long-standing neurasthenia in one who is physically degenerate is very slow to cure; but it can be done, and exercise is the first of the indispensable aids to it. Not muscular exercise, but stretching, freeing, *resting* exercises for the frame, used as regularly and steadily as we can, without a thought to any other exercise than recreation in the open air. Neurasthenic people of the crotchety, "jumpy," or "backachey" habit are the most numerous of the failures at physical culture. They fail partly through not appreciating how necessary it is to use the right exercises, but above all by reason of the methods they use not being designed to have a specific effect in correcting the faulty, sagged, and stiffened frame which is the primary, and no doubt quite unsuspected, cause of the long train of ill effects. But the thin, bilious person, the foolish, furtive person, the jumpy, ill-balanced, unreliable person, and others too numerous to mention, can all benefit in a way which will surprise them, by doing the right kind of exercise.

The utter absence of the physical factor in the strictly conventional ideas of what to do explains the failures. One can hardly expect a house to be built, let alone last long, without a foundation.

It is good advice to tell all the foregoing to set steadily about freeing exercise. Medicines may please them more at first, but the natural result

of this foolishness will find all of them out in time. Once you get a true grasp of the simplicity and meaning of our part in these things, you will not be in such a hurry to think that mysterious patent foods, tonics, furtively but ineffectively used, except perhaps at first, by ignorant thousands, women especially, are a regular necessity.

There is another way of approaching nervous ruination which affects the man who by heredity is a strong and healthy individual. He eats, drinks, and lives too well generally, and from the very fact that he can assimilate a lot of food he stands a more than good chance of at some time developing an organic disease of the liver or kidneys, the two organs which usually bear the brunt of high living under modern conditions. Or he will develop arterial degeneration, which is a loss of the normal elastic power of the arteries. These things may happen if, so to speak, he has inherited a sufficiency of "health" to last him in spite of abuse through a lifetime, which he passes in quite the wrong way, living at too high a pressure in the matter of stimulating food and drink, with utter neglect of body-renovating exercise. In one way the feeble person is the better off, in not being able to imitate his habits. Were he to attempt to eat and drink in the same way, he would be immediately reminded that his assimilative powers were unequal to the task of building up the false health of the latter. False health, because up to a certain point he may both appear

and feel quite well and healthy, up to the time when the results of his living descend like a thunderclap, and his wisdom comes, if at all, too late. So, if neither of them does the right things, by the eternal compensations of Nature, the hard-living, neglectful, healthy person does irretrievable damage sooner or later, and the practical result comes out the same. Even if he knows no more about Nature's laws, the feeble person cannot dissipate so much energy, and thus drags on until he is as old (old ?) as the other.

And yet it is quite simple for the healthy man to keep so. If he wants the satisfaction of knowing he has done better than breaking up and wasting something which he ought to have given to his children, let the hereditarily healthy man awaken the natural physical culture sense, which will soon prompt him to live more moderately, and to appreciate the conservation of what he already possesses—nerve strength. He has the power to do infinite good or infinite harm to himself and his descendants.

The man who is healthy enough, and is sufficiently misled by the survival of less modern tendencies to build up too heavy a body—for the time being to be comfortably unathletic, in other words—by over-eating and insufficient recreative exercise, will not be able to move about freely, much less to effectively keep his spine and lungs moved. He is storing up trouble for the future while blissfully

unconscious of it. "It is splendid to be as healthy as I am," he says; "why, I can eat and drink with the best of them." The amusing old fellow!

The Mechanical Principle of the Spine.

From the back part of each spinal bone there projects what is called the "spinous process." These are the bones which are discernible on the surface of the body down the whole length of the spine. They serve as points for the attachments of the trunk muscles, but apart from this they are important in other ways. When the body is held partially erect these projecting bones are almost touching at their extremities, and when the spinal column is braced back they are actually touching, and able to fulfil an important duty—to act as levers for preserving the spinal column in its fullest extension (Fig. 8). When the body is straightened up, the joints are merely bent without any of this levering effect; but as soon as the projecting bones come into contact a powerful influence can be exerted to lift every bone from its seat, stretching

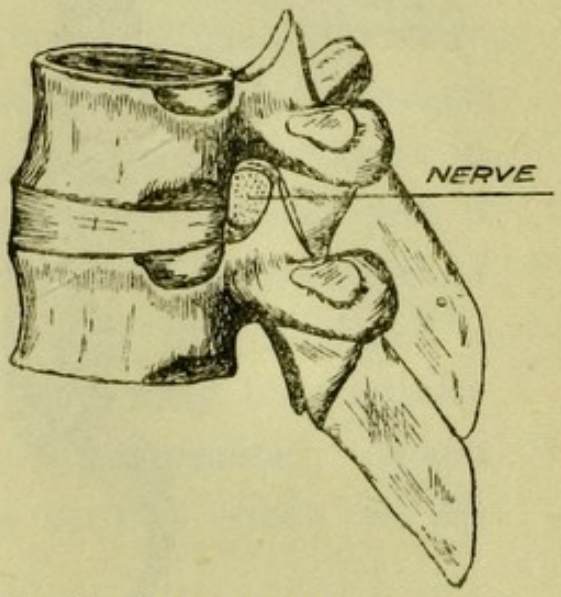


Fig. 8.—Illustration of the Levering Principle when the Dorsal Joints are bent strongly backward.

the intervertebral cushions, and preventing permanently congested states due to the vertical weight on the spine. This is what happens when the back is strongly hollowed in what is called "having a good stretch." I suppose all know that the lumbar or lower part of the spine will bend backwards and forwards more freely than the dorsal part. If they do not know it let them try the experiment. There is a reason for this. If the reader will compare the two sketches of a dorsal and a lumbar vertebra, he will notice that the spinous process in one is at a different angle from that in the other. The dorsal process is long and bent downwards, while the lumbar process is short, and goes out almost straight from the body of the spine. The effect of this is that the lumbar joints can be bent much farther back before the spinous processes touch and begin to lever. This arrangement and the greater size of the vertebræ makes the wider movement of the lumbar part of the spine possible. The last three or four dorsal processes are somewhat similar to

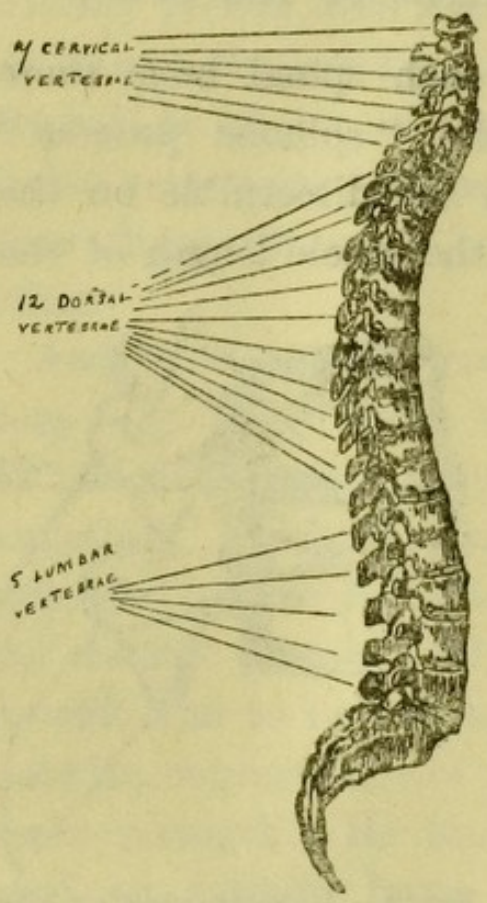


FIG. 9.—NORMAL CONTOUR OF SPINE. SHOWS THE DIFFERENT SHAPE OF CERVICAL, DORSAL, AND LUMBAR VERTEBRÆ.

the lumbar, and therefore these joints bend more freely than the upper ones. This can be noticed in Fig. 9.

However, it is not only the intervertebral cushion part of the joints which may become permanently congested, and consequently hardened and inelastic. If movement is not given in a forward direction, the external ligaments are likely to lose their elasticity, and refuse to allow the spinous processes to separate when the body is bent forward. Perhaps this fault is even worse in its consequences than the other, since it is in the forward movement that the large nerve openings are most widely opened (although this wide movement will depend on the freedom in all directions of the intervertebral cushions); and if the main nerves become affected, the affection of the tiny nerve fibres distributed in the joint is bound to follow. A fixed joint may be partially open or quite shut down and compressed. When the latter, it has the most serious effect on the nerve-supply.

On consideration, then, it becomes apparent that the spine is really a wonderful mechanism, so designed that its oddly-shaped bones have a very good reason for being so. Owing to their shape simple movements will keep the spine free and supple, and when it has become shortened with compression and hardening of the joint tissue, it is possible to use very effective movements for removing these faults, which may no longer be possible by the ordinary

unassisted stretching and bending exercises intended to *preserve* the natural elasticity of a healthy spine. It is when the nutrition has been affected by a long-standing loss of free elastic movement, and when the joint is held tightly closed, or perhaps only partially closed, by contracted and thickened ligaments and muscles, that these seemingly minor maladjustments are able to develop and to have their effect, in spite of such aids as muscular exercise. They naturally go with a lack of healthy muscle, and are therefore quite overlooked in the effort to develop a healthier tone by muscle exercise.

Superficial nerve troubles are the first result of this compression and lack of elasticity, followed by a disturbed and weakened blood circulation in the spinal arteries, and then lastly the more serious and specific troubles caused by the thoroughly depleted and disorganized central and sympathetic nervous systems performing their duties in various fitful and ill-regulated ways. Always, as a result of inheritance, there is more or less decidedly a "weakest link" in the organic functions; and when the nervous energy has become insufficient to perform its work easily and regularly in supplying the demand of every function and part of the body, the "weakest link" will at some time bear a large part of the effects of this insufficient supply of nerve force, and develop in itself, according to whether it is the digestive apparatus, heart, lungs, or other

organs, and according to the inherited constitution, whether of the lymphatic, nervous, or other types, some particular state of body which will not only manage to accentuate the cause, but at the same time lead one to think that the "weakest link" is at the bottom of the trouble, and must be goaded into efficiency, the goad no doubt being administered in the form of a "tonic." Needless to say, it resents this unreasonable treatment, and matters become worse. In one individual it may be that through irritation of the nerves of digestion the heart or lungs are thus indirectly affected, in another nervous congestions located in different parts at different times, and all this may happen quite distinct from the direct functional trouble. A single and, in the first place, quite minor trouble can in time create widespread and complicated results in the human body, in which all the functions are so interdependent, and no permanently good effects will come from separately treating any of these manifestations of a widely-removed cause. As long as there is a certain degree of vitality each may be temporarily whipped up, but that is all.

It must always be remembered that the exact effects and sensations coming from a similar cause will depend on the kind of constitution an individual possesses. In each of the different types of constitution one may inherit, there is a tendency towards particular forms of illness when for any reason there is given cause for them to develop.

And not only this, but in the constitution in which the non-vital characteristics predominate causes which affect the general bodily efficiency and lead to illnesses will more easily arise than in the constitution in which the vital, vigorous characteristics are most marked.

I mention these things as an illustration of the mental turmoil the under-informed symptom-hunter may get into. It is so easy to lose one's bearings in the many possibilities. It makes an unending study if we are going to approach things from the end or the middle in this way. As long as we ignore the simple things, so shall we make mountains out of molehills for ourselves.

If a man is in possession of a strong and balanced nervous system, and supposing he uses the foods needed by his body, the temporary illnesses he subjects himself to by wilful or unknowing abuse of food, for instance, can be removed, and the normal rhythm of health restored by the expedient of swallowing medicines. We all know there might arise an occasion when it would be expedient to use a medicine or drug, as the most suitable thing at the time; but let there be no delusion as to their ultimate, or the limitation of their present, effect. Probably the use of medicines to whip up or slow down the nervous system (for this is the general effect of them all) would not be particularly harmful if the vitally important physical cares for preserving its soundness were exercised. The danger is that

in using medicines, of which the only possible immediate effect is a stimulation or depression of nervous activity it may be thought that we *are* exercising those cares. Whereas the truth is that indefinitely continued medicine-taking alone will lead to a gradual lowering of the standard of nerve force and functional efficiency, and at some time either the culprit or his descendants will find that the reaction to medicines which they have grown to think must always follow does not do so. By their complacent, self-satisfied use of "simple remedies," on top of other abuses, has been produced an effect they have not expected. And yet they have only followed the common practice, not knowing that *the fundamental necessary to insure normal reaction to medicines is the maintenance of the bodily vigour, which all the time they have been doing their best to destroy !*

Any kind of medicine or drug can only have an effect which may be likened to throwing ballast out of a balloon to prevent it falling or to make it rise. It answers splendidly for a time, but only as long as the fabric of the balloon is sound and the gas does not leak. It must come down to be overhauled and refilled sometimes. These overhaulings and refillings are the physical and dietary necessities of the human body. It cannot either work normally or be stimulated for an indefinite time without them. The only people who ought to take medicine are those who are well enough not to want it ! If you

are unwell enough to want it, then only take medicine if you have given up all idea of becoming well by another, the only possible, way! These are the general rules. In other words, you should rely on medicines for no other purpose whatsoever than an emergency, or you will regret it.

One of the most effective and simple ways of stretching the main body of the spine is by bending the body backward and strongly hollowing the back. When the intervertebral cartilages are thus kept stretched and elastic, the outward projecting spinous processes are able to move freely and separate when the body is bent forward. We are familiar with this kind of movement under the name of a "good stretch," although we may not know what effect it has, except that it feels pleasant. It is instinctive, and usually accompanied by arm-stretching. The instinctive physical culture of infants is principally made up of writhing, stretching, and kicking exercises; and provided the instincts were kept normal and the conditions of our life did not mislead us, they would always be used naturally. Who could be more diligent in his spinal exercises than a dog? It seems an impossibility for him to rise from sleep without moving his spine from head to tail, sometimes humping it until he resembles a miniature camel, at other times hollowing it and putting his head back.

It is by making use of the limbs that it is possible

to employ movements which are capable of thoroughly stirring and loosening every joint in the spine. These movements may be made to put a forcible strain on the joint, and gradually get it to move to its limit in every direction. This limit is bounded by the ligaments with which the whole of the spinal joints are surrounded. When a joint has come to have a smaller range of movement than its structure intends, or no movement at all, it is impossible to correct it unless we use these methods. In some of these movements the spine is placed in such a position, by suitable attitude of body, that the spinous processes are called into operation to exert a lifting influence on the main body of the spinal bones, and while in this attitude the body is given a motion to still further affect the joint and stretch the spinal ligaments and muscles to their normal state. In most of the movements the arms or legs, or both, are used to assist. Such is the keynote of a rational system of spinal exercise, movements designed with a knowledge of spinal anatomy. We cannot expect the same good results to be attained by long repetition of a trunk muscle exercise which is performed well within the extreme limit of motion of the joints to which the muscles are attached, and with an attitude of body which renders it impossible to have the best effect on the frame. I have never yet known a case where certain parts of the spine are compressed, with fixture of the joints (and this is quite a common thing), for this part of the spine to be made free, and

normal nerve and blood circulation restored, by ordinary exercises which are not *concentrated* on the spinal column. When the standard of nerve power has become lessened, and muscle exercise does not produce normal quickened circulation and stimulation of nervous energy, ordinary unassisted exercises, even long continued, will not correct this unhealthy thickened tissue in the vicinity of the spine, because it does not have the necessary effect upon the joints. Sooner or later these more remote parts will call out for their due, and woe betide if we do not understand their signal!

But naturally there is no magic in any kind of exercise. The results we are going to get always depend on how good or how bad the vitality is when we start to assist Nature. Granted that we do not start too late, it may sometimes even then be necessary to work for a very long time with no apparent result if the body has become extensively deranged by passing through a series of disturbances, such as the neurasthenic person experiences before he realizes that his old remedies do not help him. Very well, then, we want something more than symptoms to guide us, or else our efforts would probably be given up.

Mainly in these physical cares does the secret of preserving or building up nervous strength rest. We may supply the body with "nerve foods" *ad libitum*, but they will not be taken up and made good use of if the body structure is in bad order.

The nervous system is a very interesting thing to study. In the presence of its necessary foods it will fail to make proper use of them. Give the body certain assistance, and it will commence to do so—not at once sometimes, but surely when started. What the exact physiological effect is beyond giving freedom to the nerve trunks in keeping the spine stretched and mobile is a little speculative. Dr. Goldthwait says: "Whether weakened spinal muscles explain the common association of neurasthenic symptoms with the condition of spinal weakness, or whether it is that the motions of the spine are made less freely, and thus lead to venous stasis, is entirely problematical. Certain it is that these two groups of symptoms are commonly met with in the same individual, and that the improvement in the nervous symptoms which so often follows the relief of spinal strain would suggest some such explanation."

No exercise which does not give thorough movement to the moving parts of the frame which are intimately connected with the nerve centres will have any material effect in restoring to health or improving the health. This is my own experience and that of others whom I have instructed, and who had previously diligently followed so-called health exercises with no good effect.

A "stretch," by strongly hollowing the back, is pleasant to a healthy person, because it relieves the weight on the cartilages between the bones, as well

as relieving or varying the pressure on the large nerves. And holding the breath at the same time varies the blood-pressure, with a beneficial effect. One penalty of the erect position assumed by mankind is the tendency for all the bones of his structure to sink on their seat, and cause a congestion of the cartilaginous cushions between them; and this is counteracted by occasional stretching and hollowing the back, as well as other actions which are both pleasant and beneficial to a healthy person. If it were not for the peculiar design of its bones, we should not be able to thoroughly extend the spine, and those who neglect to make use of this levering principle of its bones will inevitably allow a fault in its mechanism to develop. Pulling on the feet when hanging by the hands does not have a stretching effect upon the spine in nearly so strong a degree, because one involuntarily contracts the trunk muscles, and the strain is taken almost wholly by them. Unless a physical movement is so devised as to concentrate its effect on the frame, and not on the muscles, it will be unable to give the movement necessary to a sound mechanical condition of the bony structure of the body. Herein lies the essential difference between muscle exercises, which are not curative in the real sense of the word, and the levered or assisted movements, which are concentrated on the frame, and are really curative because they can free the obstructed nerves, and thus remove the causes which prevent the body from

benefiting by a rational exercise of its muscluar powers.

It is not very difficult to see that in the people around us there are many inherited and acquired differences. For these reasons it is foolish for anyone to lay down the axiom that everyone who teaches or practises the care and training of the body must himself necessarily be extraordinarily fine and healthy in every way. Rather should we be suspicious of the advice of an extraordinarily fine man, unless he practises what inferior ancestors have taught him to be the main things in physical improvement. We are hardly likely to find that to-day. In all probability he is an inheritor of vital quality, and knows nothing about the real principles of health. Anyway, it is obvious that an individual who may both know of and practise a deal more of those things necessary to produce health may be a less fine specimen, both as regards health and mental and muscular powers, than another who lives under some particular, but wholly unimportant, régime, to which, either in his ignorance or enthusiasm, he ascribes the health and powers he undoubtedly possesses ; or than others who are equally healthy while practising no especial cares in diet, hygiene, or exercise. Just as I will at once admit myself to be a less fine man (for a variety of reasons—heredity, etc.) than Sandow, for instance, so will I unhesitatingly say that, *for anybody*, curatively or preventively, I can do much more by my methods than he

can by his. The majority of those who use my exercises had previously followed out Sandow's, Müller's, etc., but with nothing like the same beneficial results. Müller's system, by the way, I think is considerably better than Sandow's for developing the muscles in a way that makes for a healthy body. Some of the exercises, though, seem to be the common property of Müller, Sandow, and Macfadden.

After all, the amount of good that can be done by any system of health cultivation must be limited for each individual by his original physical endowments, combined with the results of his own errors of living and wrong cares of body before he has been able to find out the essentials of real physical culture. The absolute health and soundness of a man must depend on these several factors; and because of differing circumstances in the make-up of his own life and the lives of his ancestors, a man may, although improving himself out of all knowledge, be still worse off than the fortunate individual who is able to reap the rewards coming from others having by hook or by crook managed to preserve a physical soundness or a dominant vitality to be handed down to their descendants.

As a constant guide to us we can hardly lay too much stress on these facts: That the "absoluteness" of either good or bad health is something which is either built up or broken down to the possible limits by a long continuance of either state

in oneself or one's ancestors. That there are two divisions of health — one which we know as the difference between being well and unwell, and the other coming from the internal resources which make possible large excesses of vitality beyond the comparatively little which is necessary for the foregoing. The inherent power of the body is to preserve itself, and the longer it is enabled to be in good health—without taking into account the slow process ending in old age, which to all intents and purposes is not connected with health of body—the better will it be able to withstand those influences which tend to weaken it. Whenever we see an exceptionally fine physique and vitality it is certain heredity has had a lot to do with it. So follow the advice of no man just because he is an outstanding specimen. He may be teaching you the wrong things—no doubt in good faith—because he does not know what a vast difference there is between a body with its powers of muscle and health limited to a certain range by original structure and quality and a more finely organized one crippled to somewhere near the same level by a little lack of care (*the kind of body he once had*).

However, *right* physical exercise *is* the all-powerful something which will give first healthiness and then the finer constitutions that are built up by it. The kind of exercise I am telling you about will start anyone on the upward road, so long as it is possible.

The modern tendency towards pseudo-scientific cures may make us forget natural cares.

As an instance, it is an interesting study, but one which is apt to give distorted views to some, to learn of the mission of the phagocytes (or scavenger corpuscles of the blood). Modern research has shown that in some unaccountable way these scavengers only multiply as the presence of active disease germs in the blood increases; that if hygienic living and physical care of the body are observed they decrease in numbers, because their presence is less called for; and that their presence in excessive numbers is incompatible with health. This is contrary to the idea of those who, from what they had observed, had a tendency to think that if these phagocytes could be increased in numbers by artificial means, such as by being introduced by means of serums, absolute immunity from all the so-called "germ diseases" could be secured. What is more likely is that this unnatural interference would be productive of states of illness which could not be foreseen. No, there seems no reason to doubt, and every reason to believe, that the due presence of these scavengers, and all other active and counter-active influences, are part of the resources of a well-cared-for body, and that their proper co-ordination is only to be secured by the natural cares of that body. We should conclude that the mission of the phagocytes is to fight germs of disease which have gained access to the body, but that there is a limit

to their scope of action, it being our duty to preserve the body from harbouring these disease germs, which it will do when natural laws are neglected. If we should fail in some degree, which is inevitable in a human being, the phagocytes will come to the rescue, but they are only intended for these emergencies. By the combined cares of hygiene, diet, and exercise, is secured as a normal state of body the freedom from diseased conditions and disease germs, and a proper co-ordination between the internal resources which are able to provide against emergencies. It is a dangerous thing to let ourselves be led away by the study of the internal processes of disease-resisting into a consideration of the subject which will make us forget the very simple means by which all these processes are made to take their place, and for us to start the introduction of methods of artificially overbalancing the various influences which work sometimes with, sometimes against, each other for our good. We should very likely in this way give rise to unnatural and irreparable conditions which would be much worse than the original disease we sought to provide a safeguard against.

A letter I once received illustrates some of this want of clear-sightedness. The writer said he was struck with the soundness of the basis of my exercises and the good effect they had had on him. He welcomed them as a system which carried out general ideas he had had on the subject ; but then he went on and spoiled himself by suggesting it might be

possible to devise some means of directly exercising the brain centres which control the functions! He lost his balance there, and could not see the difference between Nature and artifice.

Again, we hear a lot of "scientific" talk about uric acid and rheumatism. The fact of the matter is that uric acid is only the half-way cause of rheumatism. The nerves are the root cause. Under the influence of good nerves and breathing plenty of fresh air, uric acid is converted, in the ordinary course, into urea. When you are a rheumatic subject with bad nerves the process is incompletely carried out, and the liver and kidneys begin to shirk their work. Do not conclude that artificial methods will at once put everything right. You may remove the uric acid, but you do not touch the cause, which very soon has you back where you started from.

The body is made up of vast numbers of cells. Whatever condition we allow it to get into, the process is a gradual one. In the normal course of life these cells are constantly being broken down and renewed. When the body is kept in a condition of health, as the cells which make that health possible become broken down and used, the new cells will always, by an unchangeable law, have the same formation and nature as the old ones. This has its effect both on the functions and the formation, or structure, internal and external, of the body. If we start with a healthy body, but disregard all natural cares of it sufficiently long for it to begin

to have effect, as the cells are renewed, instead of each one being exactly like its predecessor, it will only be something like it; and this will go on in succession, each one being less perfect. Supposing we allow the body to be habitually in an attitude which tends to any minor faults and deformities, and thus to lower its functional efficiency, it will be easy to see that through this process of cell renewal a wrong attitude will become established, and the lowering of function also. In the case of the lower animals all this is seen to by instinct, but for civilized human beings, who have lost most of their instincts, but, after all, still have the same kind of body, it becomes necessary to practise natural laws with intelligence: they must be reasoned out. People must do more than passive eating, drinking, and sleeping, as their part of helping Nature. Even if the lesser natural impulses toward body gymnastics and the like have been lost, their *practice* cannot be dispensed with, for nothing can take their place.

The body cells are, of course, attached to each other in some way, but there is a certain latitude in this association to allow the muscles to stretch and contract, etc. This does not mean any alteration in the cells themselves; they merely move relatively to each other. But when we allow a nerve, a muscle, or a ligament, to remain contracted, it means in time an alteration in the shape and nature of its cells. At one time it was said that every part of the body is wholly renewed every seven years, but now it is

said the period is only about a year and a half. I do not know how it is calculated, but if the minimum is right it will explain the slowness of Nature in establishing fixed ill-health or in re-establishing fixed health. I mean that, if one has been allowing the health to go down for years, several generations of less sound cells will have been produced, and the last will be considerably less perfect in structure and function than the first. They will have a lesser ability of producing what is called "health." If it takes some years for the cells to be wholly renewed, then we see how impossible it is to jump right back to the beginning. We can only work to remove the causes, and when she is ready Nature will begin to help us in this, and then to improve the quality of each generation of cells.

These are some of the useful things that scientists find out for us.

Physical Culture for Children.

I think children should be taught, when they are old enough, a system comprising movements for maintaining the structure of the body in its fullest extension and flexibility. These are nothing but the instinctive actions of children in a systematized form. Then later they may learn of their exact significance. It is not necessary that a child should systematically train its muscles; the gradual and natural development coming from recreative exercise, during the time that the organic powers are

being built, will be all that is necessary to give the muscular system its sufficient use and strength until later years. The thing of vital importance is that anything which interferes with this gradual development should be prevented. Everything in the way of systematic physical culture, even more so before than after the body is set and matured, should aim principally at giving Nature freedom to work without hindrance, so that they can move, breathe, jump, and run, as children should. The movements which are primarily designed to perfect the body as a mechanism will be the most valuable. Conditions which in childhood are so little perceptible are more than apt, especially when the inherited qualities are not good, to become serious factors of harm in later life, when they and their effects are also far harder to remove, according to how long the causes may have been able to go unrecognized. And one has to remember that a cramped frame, with its bones not perfectly shaped, developed, and set, and a nervous system which has been stunted in its growth and development from this cause, can never be radically altered when the growing period has passed. The hardest constitution to benefit by any possible means is that which has never had the chance to develop an original soundness — hence the importance of an efficient system of physical training when young. I question whether *any* good from the physical culture point of view comes of the aimless arm-waving and lunging which one and all of whole classes of children

are required to go through, under the supposition that this is what is meant by "the physical training of children." The motive is a step in the right direction, but the exercises are quite unscientific and aimless of purpose. If in some cases they possibly do have a good effect, this might be accomplished more easily and thoroughly by better methods.

A child inherits the nucleus of several characteristics, some of which develop, while others lie dormant or disappear altogether. Very often we notice that up to a certain age a child takes after the healthier of its parents; then for some not very obvious reason it begins to develop the characteristics of the other parent, or the bad instead of the good in either. It may seem, and usually is, altogether a matter of chance. But it should not be, and there is this simple truth about it: By helping Nature to prevent the onset of an inefficient internal state of body, and by feeding it plainly and naturally, a child will have every chance to go on developing the best of the qualities it has inherited. Patent foods and "strengthening" meat foods with which quite small children are pampered all work against this. They are poisons to a child.

The whole application of physical culture for children as well as older persons resolves itself into this: First of all the direct prevention or removal of hindrances to the vital processes of Nature, and then in conjunction the cultivation of the powers by their proper use.

For Women.

A good carriage, a strong body, a supple figure, and vital quality, which a woman usually does quite the wrong things to attain, depend upon right clothing, food, and air, and exactly the same kind of exercise as is necessary to give a man a fit body. In this respect their needs are identical, and physical fitness and physique are just as necessary for a woman as for a man.

The exercises contained in this book are quite suitable to be learned and practised by a girl or woman, provided discretion is used as to when to do or omit them. There are already many who use them. The only word of warning necessary is that they accustom themselves to them gradually. The present-day athletic "flapper," who emulates her brothers in games, may very soon become an adept at the exercises, improve physically, and make herself look even nicer than she already does.

CHAPTER II

Muscle development and its relation to health—Good exercises.

A VOLUNTARY muscle, such as those of the limbs and external parts of the body, is developed and strengthened by full contraction; but a permanently contracted muscle is an unhealthy one, and it will become so unless methodically and regularly stretched. Hence, *especially after hard exercise*, each muscle should be fully stretched and relaxed. This is done by loosely extending the limbs and body, and is made more complete by thoroughly stretching the body. When we stretch until the joints crack it is good for us. Herein is the difference between body-building physical culture and curative physical culture, as usually accepted, as far as muscle use can be called such. The effort to build muscle may be overdone, but the other is scarcely possible. Both are valuable, but quite distinct. Muscular strength is not synonymous with health, but there is no reason, *per se*, why an exceptionally strong and developed athlete should not be quite healthy, provided he exercises those cares upon which health depends. But it is a fallacy to suppose that it is development of muscle, pure and simple, that makes one healthy. It is a matter of common knowledge

that a man with comparatively small development of external muscle may be both healthy and enduring, his only limitation being an inability to perform a feat requiring concentrated strength. He will have the free and developed nervous system which makes his internal strength possible, and, if he so wished it, could make use of this vital strength to develop the muscles of his limbs. He will usually have inherited his vital strength. Let him remember how to keep it.

The part played by voluntary muscle exercise in maintaining a fit body is in the assistance it gives the assimilating and eliminating organs ; the blood will be circulated and purified better. It is an aid in maintaining the highest standard of health, but is not the fundamental basis of it. In short, a person who has become really unhealthy will not be able to become healthy by aiming simply to use and develop his muscles. Furthermore, it is often found that the development of muscle does not depend simply upon the amount of exercise. Some are able to immediately and steadily develop the muscles, while others cannot, however much they concentrate their attention on it. The internal resources determine this.

One very important part played by well-developed trunk muscles is that they enable the body to withstand physical strains which might injure it otherwise. They are also a natural protection to vital organs. I am now speaking of the voluntary muscles of the trunk (such as the abdominal, etc.), and not the involuntary, which are concerned only

with the carrying out of the functions of digestion, respiration, circulation, etc. It is by the proper development of the whole of the trunk muscles that the internal organs are protected against displacement, and the body against strains, due to actions of any kind, which it could not do otherwise. For these reasons, apart from the numerous and obvious advantages which an evenly and well developed body will have over an untrained one, it is a part of physical education which, although not of primary importance as far as healthy functions are concerned, should not be neglected. General exercise of the voluntary muscles will, as I have said, when there is the proper nervous co-ordination between functions, also improve the muscles which control the vital processes, as well as assist the healthy action of the skin. It will make a normally healthy person healthier within his limits.

Again, the successful athlete will be he with properly-developed trunk muscles. In all the athletic sports and games we practise does this strength of body count. We know, now that science has entered into our athletics, that, given a due strength of limb, there is a real art in so directing our actions that the body takes the strain which, with an unskilled man, would fall on the limbs and spoil his performance. The tennis-player, the jumper, the hammer-thrower, the weight-putter, of skill, and to a less extent the runner, know this. Art rests in the poise and swing of a strong body.

The point to emphasize in connection with

development of muscle is that constant contraction, at the expense of stretching, produces disturbance in blood circulation and nerve impulse, and is thus a starting-point of bodily derangement. It has been found that exercises which fully stretch as well as contract the muscles have a far more beneficial effect, as far as restoring or preserving an equable circulation and functioning of the body are concerned, than exercises which only contract, probably because in the ordinary way some muscles are contracted much more than they are stretched. There are certain muscles, such as those of the trunk, internal and external, which are not as readily stretched as those of the limbs. But it is absolutely wrong to constantly contract without fully stretching the spinal and general trunk muscles. Unhealthy fibrous muscle is thus produced, probably causing at least interference with the motion of individual parts of the spine. Most developing systems have this tendency, and especially the newer ones styled "psycho-physiological," which endeavour to contract muscle without flexing the body—simply by will-power. Muscle, however much or little its bulk is developed, must be stretched during development to make it healthy. It may be possible, too, that constant use of the body in one position, when nothing is done afterwards to counteract it, helps to cause, by slight but continuous muscle contraction, those alterations in the frame which affect the nerve centres.

Remember, then, whether you are a worker at

some cramping occupation or an athlete with good muscles, that every action which stretches and extends the body in different directions is good for it; and you certainly ought to make it a practice to spend five minutes a day in systematically freeing, and thus strengthening, the spine.

I wonder how many people have got into the habit of never progressing at any pace but walking? One of the finest and healthiest of exercises is running. Of course I do not advocate violent running for everybody, but a steady jog-trot on the balls of the feet for a few hundred yards is a splendid thing. If you think it undignified, it can easily be done after dark! From the exercise point of view it is a cheap substitute for horse-riding, and gives one the same gentle shaking up without much expenditure of energy. And this shaking up is a very necessary thing.

Dancing, too, is a splendid exercise. I do not mean the somewhat monotonous whirling round in a hot ballroom (which answers the purpose very well of parading the "eligibles"), but classical dancing, which calls into play all the muscles, keeps one lissom, and is at the same time a pleasurable pastime. It is, however, one of those exercises which, when done well—to the onlooker so gloriously simple and easy—is in reality the result of assiduous practice. Perhaps most of my readers will never become classical dancers, and, anyway, it is not the first thing one should do for health.

CHAPTER III

Diet and its relation to health—Drinking—Smoking.

It is not my intention to write much here concerning diet, but something on the question will not be out of place.

It is quite certain that the adoption of pure and natural foods alone is not the immediate panacea that will in all cases and in all conditions banish bodily troubles. An enthusiast in food reform is apt to get the impression that this is so, and say, "I need do nothing else now ; I am eating the right kind of food." There is more in bodily care than this one factor. This same enthusiast, who is at the time perfectly healthy, but not through any special care or practice of his own, and who was, of course, originally in quite a different physical condition from others who use his régime with no success, will perhaps swear by certain foods as a cure-all, and with the utmost belief that his own well-being is solely due to those foods. Whereas the truth is that he has simply practised a refinement of diet which in some way is suited to his particular needs and tastes, and is capable of maintaining his standard of health because he already possessed health in a

good degree, or at any rate health which was only temporarily suppressed by some trivial cause. And therein seems to be the crux of the whole matter. Provided one is really organically sound and healthy, one can live on an immense variety of foods without any obvious harm, unless through overeating. Nevertheless, we should all like to live on foods with what may be termed a big "margin of safety," as long as we can enjoy eating them. Animal substances, such as meat, contain all the necessary food elements combined in the right way ; but the most cogent argument against the use of meat, for instance, is that it also contains certain harmful substances which are the products of body metabolism of the animal (the consumer therefore has to get rid of his own waste products as well as those of the animal), is an especially favourable medium for containing and conveying the germs of disease, and, if not perfectly fresh, is always liable to contain the products of putrefactive changes which are the cause of ptomaine-poisoning. The argument in favour of foods from the vegetable kingdom is that therein are found foods every whit as valuable in body-building and energy-producing power, with the advantage of being practically free from the aforementioned dangers and drawbacks of animal foods, and in addition containing various purifying agents which are an absolute necessity to the human body if its highest efficiency and disease-resisting power are to be maintained.

Letting alone its inadvisability when you are ill, there is no doubt that, in the case of the majority of healthy persons, the less the quantity of animal food in the diet, *when this is replaced by suitable non-animal food*, the better do the qualities of mental and muscular endurance become, and the less the tendency to organic diseases of every description. This is no evidence that a small quantity of animal food will directly cause organic disease or that non-animal food will prevent it. But it would seem to indicate that harm from overeating is more likely to be caused by animal foods than by non-animal foods, and that, if the body is inefficient from any cause, non-animal foods are better. This is especially true as one becomes older, and the body less efficient from that cause. One of the main arguments against meat as a staple diet, *provided that it is fresh and clean*, is that it gives the internal organs, liver and kidneys, much more work than is necessary, while not improving one's health and strength in a corresponding degree. So if you are not as healthy as you might be, and you want to make everything favourable to improving yourself, or if you are healthy and want to live long and do the best work you are capable of, then abstain from meat, or at least cut it down so that it is but a flavour in your staple diet.

The less food we eat consistent with maintaining bodily weight and strength, the better. Provided our food contains the essential body-building sub-

stances, is agreeable to the taste, and is free from definitely harmful elements, the real importance of the question lies, not in excluding certain foods that we like, because we know by analysis they contain rather more waste products than others, but upon the *quantity* of food eaten being kept within certain limits. People will ask: "How am I to know whether I eat too much or not?" Well, granted you are healthy in other respects, a prolific cause of eating too much is *bolting* the food. If people would masticate what they eat, *it would be almost an impossibility to eat too much without knowing it.* By masticating you get more pleasure out of eating, and more benefit, with considerably less food than if you bolt it. And you know when you have had enough. Overeating is a habit often acquired because it provides a sensation which disguises internal unfitness for a time, paradoxical though this may seem. And, my dear nervous reader, do not try to prove that you need it because you feel hungry after "fasting" an hour or two. In all probability you are eating three times as much as is necessary to keep you well. Every wrong habit has a way of deluding us as to its necessity, so it will be better for you to use a little common sense and find out what is wrong. The example of the Italian nobleman Cornaro is one which many people would do well to follow.

There are causes of illness, then, which need more radical attention than by the refinement of diet to its ideal point, although the latter is advisable if

one is ill. Because of the wide range of adaptive power possessed by the body when it is healthy and receives its due physical care and assistance in assimilating foods and protecting itself against any harmful properties these foods may contain, I do not think an ultra-conservatism in the matter of diet is one of those vitally important things which are the basis of health. It is easy to delude oneself over this question, but I would emphasize the difference, about which there can be no question, between roads to health by diet and exercise, or perhaps I had better say by physical methods. One's constitutional peculiarities may demand that certain food constituents be taken in some particular form, or that certain foods be taken in preference to others, in order that they may be pleasantly and easily assimilated. But no matter what peculiarities of bodily constitution one may have, or under what conditions one has to live, it is an absolute necessity for any and every body to be mechanically sound and free in order that the powers peculiar to that body shall be allowed to work efficiently and uninterruptedly. This is a universal necessity, but to attempt to lay down a hard-and-fast rule with regard to any particular food is folly. Physical culture is our first care, whatever we do afterwards or at the same time regarding the refinement of our food. In the whole range of pure foods, accepted as such both on scientific and practical grounds, none can be arbitrarily designated as the right kind of food for

one and all to live upon. There is plenty of literal truth in the saying: "What is one man's meat is another man's poison."

Neither can we do away with the fact that *enjoyment* of food is necessary. It is no good trying to make a man eat something else when he is longing for his accustomed meat and beer, and knows no reason why it might be better for him to do otherwise. Unfortunately, there are many people who cling *blindly* to customs because they never like doing anything but what their grandfathers did before them. Tradition is a splendid thing, but it is better to exercise a little intelligent revision now and then. A "blind" feeder must learn first, before any less "strengthening" foods will make him healthier or stronger and more enduring. He will not enjoy them otherwise, and that is a great thing.

The way to make a start, then, is, Eat moderately of what you have been used to, live in your accustomed way, practise real physical culture. Everything else, under the guidance of your common sense, will follow on naturally, whether it is alterations in food, ways of living, etc. Personally, at one time I found I was no better off with any kind of food; but now I can find that the less meat I eat the better, the reason being that I am a better-adjusted machine. The fitter one is in this way, the better chance one has to distinguish the difference between suitable foods and unsuitable foods. The senses are made more acute. Plenty of people are

sufficiently out of gear to make their experiments with food either negative or misleading. Therefore take steps to get the body mechanically fit first.

I will now just mention one or two things connected with food and feeding which some find out for themselves, while others like to be told. During the day eat little. Do not eat a lunch resembling the mighty dinners of our forefathers, who knew no better, or it will help you to become old and inefficient before your time. A breakfast of one kind of food will do you more good than a mixed one. You want variety in food, but the fewer kinds at a meal the better. A light breakfast, a light lunch, tea as a break if you want it, and a moderate dinner in the *early* evening, makes for a clear head and strong body if you are an average being, and can get rid of all your prejudices. It is equally bad to eat much during the working hours or late at night. A lot of internal energy is required to digest food. During the day you want most of that energy for other purposes. When you are sleeping, all of it is needed for the repairs and recuperations which go on to make up for the day's wear and tear, and to provide for next day. All foods which you can eat raw are better for you than cooked ones. Fruits, salads, etc., ought to be a regular part of your diet. But let them be clean. To a healthy person raw foods are more vitalizing than cooked ones.

There is one more aspect of the food question I

should like to say a word on—that of the mutilation or preparation of natural foods. To mention an example, a fanatical food reformer, on learning that proteins are the muscle-building parts of food, will sometimes go "protein-mad," and seek to eliminate all fats and starchy foods from his dietary, because he supposes they are not necessary. "Proteins will give me muscle and energy. Nothing else can be necessary." Or he will overbalance his diet by using artificially separated parts of foods. But we cannot do this without trouble ensuing. Whatever foods of the vegetable kingdom we use, the different food elements contained in them—whether they be proteins, starches, sugars, fats, or salts—are always found in the proportions which render them perfect as some particular variety of food for the human body. The extraction of some of these elements and the use of the remainder as food upsets the proportion and destroys the food value. I am not alone in thinking that unprepared foods are invaluable, not only because their well-recognized body-building substances have not been removed or overbalanced, but because it is probable that, as well as containing all these proteins, etc., there are also present very small quantities of unrecognized compounds or elements which enable the body-building substances to be made full use of, and which are destroyed when the food is artificially separated. How much the modern very much "manufactured" white bread is responsible for would be a hard question.

The bleached and faked article is very little more an all-round food or "staff of life," than is ordinary starch as used in the laundry. In the craze for appearance and profit we are dosed with bleaching agents and "improvers," almost the whole of the most valuable parts of the wheat have been removed, and the result is a product quite inadequate or positively harmful as a food.

Want of conservative cooking spoils most of our good food. I do not know whether we shall ever return altogether to the uncooked foods of our ancestors; but in the meantime the obviously right thing to do is to cook things conservatively, not to boil out all their nice flavours and more valuable parts, and then eat the remainder.

Fortunately, to profess a liking for natural, nice foods no longer stamps one as a crank.

Alcohol is not a food. It extracts energy without giving back anything for it. Some people like drinking wine, spirits, or beer. If they are organically sound (alcohol is a heavy tax on the liver and kidneys), to drink on isolated occasions will not do harm, except perhaps to shorten their lives a little. But the "steady" drinker, who no doubt prides himself on having never been drunk in his life, is doing harm which cannot be undone. If anyone drinks for pleasure on festive occasions, knowing that it is not for making him sounder and healthier, all well and good. I am not for preaching against it. But there is something pitiable in men and

women drinking "to get strong." Strong drink never has made strong people, and never will.

Smoking is not a natural habit, as our first cigar will bear witness. But tobacco is often blamed for a lot it is not responsible for. Food and exercise are the "inner" things, tobacco an "outer" one, and not quite on a par with alcoholic drinks, which are so often made to take the place of proper food and drink. The "inner" things are the all-important. One who is healthy does not feel an overwhelming need of such a thing as tobacco. But it is too much to expect it to be banished altogether. There are times when it might even be advisable. If you do smoke a little, and also do what is necessary to keep healthy, the tobacco has not much power to harm ; if you degenerate into an inveterate smoker, slothful in everything else, it certainly has the power to, and will do, harm. But in any case it is not a habit we should try to cultivate.

Inhaling the smoke is a pernicious custom, and in making the above remarks I have presupposed you have not learned this little trick of taking the smoke right into the lungs.

Since this is neither a treatise on food nor a cookery-book, I think I have now covered the necessary ground in this chapter. So with these hints I leave it.

CHAPTER IV

The lungs and their relation to health—A note on breathing—Body poise—Mental therapeutics—Hygiene.

WHILE the cultivation of nerve force is the most important aim of bodily training, the efficient working and condition of the spine being the first consideration in securing this, there are other physical conditions necessary to enable the body to gain the fullest state of health possible for it. A fully expansible and fully contractible thorax or chest cavity is the next important condition which may be attained by our voluntary efforts.* When we have done what is necessary to secure these two conditions, and we see to it that the frame is kept free and the lungs fully expansible, the body is in its most efficient state, and, given that it is supplied with a due quantity and quality of food, is ready for any kind of exercise a normal body is capable of, for the purpose of building it up in strength of internal and external muscle and helping Nature in the carrying out of its functions.

The thorax is given its expansibility by means of

* Teachers lay stress on full chest expansion, but it is obvious there must be full contraction as well.

the rotation of the ribs at their point of attachment to the bones of the spine. The ribs are connected with each joint by the cartilage which separates the spinal bones from each other, and also to the transverse processes, which are bones similar to those which may be felt on the surface of the body down the length of the spine—the spinous processes. The act of inflating and deflating the lungs by means of muscular action in the walls of the chest causes the ribs to move on these hinges at the back, and also where they (the ribs) are attached to the cartilage of the breast-bone in front. When the lungs have not been developed during the time the body is growing, it is very difficult to give the thorax its full elasticity and capacity, partly by reason of the low air capacity of the lung cells, and partly by reason of the difficulty with which the ribs are lifted and rotated, both where they are connected with the spine at the back and the breast-bone in front. While a free spine and expansive lungs help mutually to preserve efficiency in respect of keeping the spinal cartilages in condition, the lungs, when well developed, are better able to carry out their work of oxygenating the blood and purifying it by converting its waste products into carbon dioxide, thus also insuring that the nerves are well fed.

The difference between comparatively undeveloped lungs and lungs with good capacity, is that the former are only able to do their work satisfactorily when the body is quiescent, and have little

or no reserve for the further capacity required in hard exercise, when the blood circulates faster and requires more quickly oxygenating. Lungs which have a good reserve capacity are able to fully discharge their duties under all conditions. It is possible for a body to be healthy without large lung capacity, but there will be no reserve if the normal average of health is disturbed through some cause, and an extra demand is made upon the lungs to assist in righting matters. As a matter of fact, though, it will seldom be found that a man or woman with somewhat low lung-power is healthy, for the reason that, if the lungs have been neglected, it is more than probable that the body generally has been also.

Undeveloped lungs mean this : they are not really efficient to carry out their work of oxygenating the blood, and they are not sufficiently proof against disease. They are prone to many things when undeveloped.

Now as to the value of deep breathing—the way to breathe. If your lungs and spine are right, and your mind easy, you will breathe freely and deeply without conscious effort. But supposing you become the victim of circumstances which compel you to " worry," if you take notice you will find your breathing has changed—it has become shallow and without rhythm. You have come to a sort of blank wall, and no longer spontaneously draw in your full supply of air. That is one of the ways in which

worry affects you physically, and if you go on like it you slowly become devitalized, and neglect everything that is essential to keep you sound. But by will-power you can, although it is more or less an effort, still breathe properly and keep active. Then you can endure most things, and presently come through unharmed. Deep breathing is beneficial in every way. It is good for the blood, good for the nerves, and helps the liver to do its work.

Practically speaking, then, there are only these two main ways of cultivating health of body by physical exercises—by putting the spine into good condition and maintaining it so, and by developing the lungs with proper rib expansion. By securing these conditions directly we achieve much more indirectly, and affect for its good every part of the organism. When the body is once healthy, and is kept so, it will be possible for the normal development of mind and physique to go on until the body is old. The nervous incapacity of old age is a very different thing from any imitation of it in youth. Real "old age" is something which cannot happen until the body has been in existence and done its work for a long time—let us say anything in the neighbourhood of one hundred years.

These two conditions of spine and lung fitness, to be obtained only by physical exercises, must exist before all the benefits of hygiene, diet, etc., can become apparent and real, and the means of securing them is the one health practice of universal applica-

tion. There is thus secured the sound internal condition of body which will mean properly working functions when not upset by causes from without. And these external causes may be habitual excesses in food or drink, the non-observance of laws of hygiene (washing, bathing, fresh air, cleanliness, etc.), or habitual excesses of any kind. Habitual, because the healthy body which is habitually well treated suffers practically no harm from occasional wrong treatment, just as the body which is habitually wrongly treated will not benefit from spasmodic attempts to improve its condition. The habitual influences, good or bad, are the ones that tell always, and each in proportion to the previous duration of the other.

Correct position as a habit is important. The natural carriage of body when walking or sitting is with the spine loosely upright. This position gives the internal organs most room, is the most favourable to easy expansion of chest, and, because the body is balanced, prevents undue strain on any muscle. It is a mistake, however, to always keep the back straight, and particularly when our feelings tell us that it wants a change. It is quite natural, when lying down, to sometimes do so with the back rounded. An upright back or a rounded back are both bad unless frequently alternated one with the other. You will see the reason for this if you will read all I have said about the spine. It is a significant fact that an animal which goes on all fours

always counteracts the effect which this has on the spine by sleeping with its back rounded. I have mentioned, too, how a dog always thoroughly stretches its spine after sleep.

Assuming that you are fit and well, the natural balance of the body in walking will be found by loosely clasping the hands on top of the head and walking along thus (see Fig. 10). When you find what the balance is, remove the hands, and walk with exactly the same balanced and mildly undulating movement of the hips and spine. Even if you have been used to a jolting walk, with the body leaning too far forward, you will find it very uncomfortable to walk like that when the hands are clasped on the head. You will instinctively want to straighten the dorsal part, and dip in the lumbar part of the back, which is right. Try this both before and after you have done the exercises for some time.

Mental Therapeutics.

The question of the influence of mind is always being talked of. There are people who would have us believe that by ignoring the body we make it healthy. That is true to a small extent, and only in so far as the fidgety, fussy, ignorant people are concerned. Or that by telling ourselves it is healthy it becomes so. Health of mind and body are certainly bound up in each other, and there is no doubt that it is through the agency of the mind that we

can gain or retain a healthy body ; but it will not come about simply by thought. I think, when we examine and analyze the question of mental therapeutics, we shall find them to consist simply of the resolve to accomplish some end, of the conviction of the worth of that end, and that this attitude of mind will give us the energy and interest necessary to practise the measures of a physical nature and the rational ways of living which are the producers of health of body. And when this cycle of forces is once started it will go on, the body helping the mind, and the mind helping the body, with very little trouble on our part. Will-power, used in the right direction, will see us through all sorts of unpleasant experiences, and is, of course, a good thing ; but to imagine that the mental part of prevention or cure of bodily ills consists of simply telling ourselves that we are all right, or that we must become all right, can do no good if we ignore the fact that we have a body which *must* be given certain physical and dietary cares, or fail in its functions sooner or later. This sort of mental treatment will do no good alone, and its followers will degenerate into health maniacs or mind-cure maniacs, with no other thought, and possessing no real knowledge of the one absorbing subject. It is merely using up vitality to no purpose. The power of volition, or willing to do a thing —at any rate, as far as our bodies are concerned— is dependent upon the physical state of the brain. We could not even form the resolve to give the body

its needful physical care if something were to go wrong with that part of the brain whence the resolve proceeds. The brain that we think with, and that is the supreme but automatic director of all our bodily processes, is absolutely dependent for that power upon the nourishment it gets from the sound working of those processes. And we cannot make it otherwise. I think then the majority will agree with me when I say that I believe the physical cares—and here I will use the words in their broadest sense to include diet, hygiene, etc.—to be *the* necessity for securing health of mind and body, as far as is in our power to do. It is more than probable that the person who gets credit for keeping himself well by his cheerfulness in all circumstances gets that cheerfulness from a soundly-working body, which he may or may not have been responsible for, as well as partly from a mind in accord with his circumstances. There is no reason to doubt that the state of mind, whatever kind of mind it be, is caused by the state of the body and the consciousness of our abilities and disabilities. I will not say the latter is not important, because it is. We must either live in an environment suited to our nature, or at least see the possibility of at some time living in it; otherwise we shall be unable to take either care or interest in anything.

As to the effect on the body of developing the reasoning powers, I think this both helps to generate and bring out the finer physical qualities. That is

to say, the due development of the "thinking" part of the brain (as I have said, we "think" with a different part from that which controls our body functions) helps the "functional" part to take on its best qualities. The athlete with a "mind" will come better out of a searching physical test than the dull-witted but well-muscled labourer, who has none of the alertness of mind and movement of the other. I think it more than probable that a sufficient degree of this mutual training of mind and body produces the most tenacious, enduring kind of vitality. To me, and no doubt to others, it seems that the bent but keen-minded professor, who knows nothing about keeping himself fit physically, and during his life has all the ills of the average mortal, has a much better potential vitality than an unintellectual person who is equally unmindful of care of body. It is a well-known fact that men of science live long. By looking after their bodies they will be doing double service to humanity. All other things being equal, I think that if, of two similar persons who do all that is necessary to keep the physical processes free, one trains his mind, he will be the one to develop the better vital quality. But, anyway, this is hardly a question of health in its sense of "wellness," as opposed to "unwellness," and will not concern the people who merely want to know first what to do not to get ill.

To conclude, most will agree there is very certainly something in directing the mind into right

channels. By all means, then, cultivate a mental attitude of cheerfulness if you can. But in this case the cheerfulness of the ever-cheerful, unknowing, unseeing fool is not what you want. He raises a crow of delight very easily (and oftentimes when we don't want it!), but where, oh where is his sense of humour, and where are the half-dozen other things that are missing in him? We are all fools of some sort, and we certainly have our place in the scheme of things; but if you can become one of those nice "understanding" people who are irresponsible only sometimes—perhaps when no one is looking—so much the better for you and everybody else.

Look into things a little. Then, by "doing" as well as "thinking," you will leave the mind-cure people a long way behind. Swearing black is white *when you know it is not*, that a broken leg is not a broken leg, that you are blissfully happy when chagrined, will not help one anywhere much, except towards becoming mentally unhinged. The best interpretation of mental therapeutics is: Will-power plus the intelligence to use it in the right direction.

The laws of hygiene are of necessity to be observed by everybody, in all conditions, if we are to prevent those virulent and infectious diseases against which a soundly-working body is a protection only to a certain extent. No matter how healthy and free from physical derangement one may be, by living

in surroundings, sufficiently bad, of uncleanliness, or infections which are the result of uncleanliness, with lack of fresh air, sunlight, etc., it may be insufficient protection. That, at any rate, is the safest thing to conclude, and decent people, for their own personal feelings, like to live cleanly.

There are some questions I would ask the germ theorist. Where are the germs, and what are they doing, when there is no illness ? If a germ is the real cause of disease, does it (the germ) for some malign reason come into being spontaneously ? If it is always present, and is the *cause* of disease, then it must necessarily cause disease in every individual. But it does not. Our work evidently lies nearer home than running about trying to isolate a little germ, and calling it the cause of a disease. The germ theory is not quite satisfactory. Perhaps the germ is a harmless little chap who gets rushed into things and blamed for a lot that he is not responsible for, in very much the same way as the harmless spectator who gets into the thick of a street fight, perhaps has a little enjoyment while it lasts, and then gets arrested as being the ringleader. However, do not bother about the germs. They would never do the slightest harm if *everybody* lived rationally.

CHAPTER V

Summary—Further remarks—My experiences.

In this chapter I will summarize the substance of the preceding pages relating to the proper exercise of the body, and add some further remarks.

You will perhaps have come to the conclusion that nerve-power is the foundation of all health and strength of mind, function, and muscle, and that the first and fundamental way of insuring it is by sane exercise.

It is much more simple to prevent than to cure. This is a conclusion that will come naturally to all who are acquainted with the way in which a single cause has multiplied effects, and I hope that all I have tried to make clear will serve to strengthen that belief. When there has been given good reason for the body to become refractory in its working, the removal of the primary causes—and this is much harder than their prevention—cannot make it immediately sound. Its perversion of function has become a sort of second nature, and its restoration will not be hurried. It will also be a conclusion that a physical care of the body should not consist primarily of shilly-shallying with local symptoms,

but of exercise which aims at preventing or removing the main causes from which these local manifestations arise. We should start right from the beginning. The spine first, then the lungs, then muscular training and upbuilding. All else should be auxiliary to this.

For bodily health and efficiency, all joints of the spine must be kept free to move to at least somewhere near the limit intended by their structure. This will keep all ligaments of the more remote parts of the frame free, will give them the work necessary to a proper performance of their duties, will keep the bodily structure uplifted, and prevent obstruction of the nerves. When supplied with its needful food, and the blood is properly oxygenated by the lungs, the nervous system is enabled to build itself up in strength and soundness as long as it is kept free from undue and permanent pressures. The natural tendency and inherent quality of the nervous system is to maintain its strength and efficiency; but the lower the standard of health is allowed to become, the weaker is this natural power to restore itself. Gradual failure is due, not so much to absence of its necessary food, as to causes of a mechanical nature which interfere with it and prevent it from freely exercising its functions, and from sustaining and building itself up from the foods with which the body may be plentifully supplied. These mechanical causes occur through stagnation in the tissues, with later permanent contraction and

hardening. From experience, this most often occurs, through various contributing causes, of which the mainly important is lack of frame exercise, in the thickening of the tissues immediately surrounding the spine. By physical movements which are designed for the purpose, the tendency which always exists, and especially in a neglected and ill-used constitution, to congestion in this more constricted part of the frame, is at once provided against.

The next most important condition is a proper development of the lungs.

And after that of the general muscles of the body. Rational muscle development as an aid to health is only possible when all the foregoing conditions have been fulfilled. By making muscle development the *first aim* of physical culture we are committing a mistake. Only when one is fit should a start be made to systematically develop the muscles, and then it should always be done in conjunction with frame and lung exercise.

Frame exercise for securing spinal freedom is the first aim in physical culture.

From simple parts is the complex human organization made up, both in the matter of function and of the structure which is concerned with the body as an instrument of utility or pleasure in carrying out the demands of its owner. In its structure are found all kinds of tissue and substance, all of which are designed for some particular purpose. For the work of body or brain depends altogether on bodily

action and co-ordination of parts and functions. If, by protecting them from those influences which are not included among the things the normal vital activity is capable of protecting itself against, all the parts and functions are allowed to develop and preserve to themselves a certain average of efficiency, guided by Nature's unerring power, the body as a whole will work smoothly. In short, it will be well, according to the limits which are marked out by its original structure and the quality of substance it has inherited, and in time Nature will succeed in improving both of these. The balance between function is part of health, and is maintained, not by especial and deliberate cares to make any one function separately do its part, but by the automatic and only power of the body to work together as a whole, when it is kept free to do so by our help. In normal conditions, if the mind is used at the expense of the body, it is a purely instinctive action to take exercise of body, and in this way is the balance between the voluntary uses of mind and muscle maintained. Unbalanced constitutions in which one physical or mental characteristic predominates, the result of deliberate or enforced influences, such as environment, which lead to the development of one at the expense of another, may be healthy within fairly wide limits, but it is probable that it is in this way the different kinds of constitution with tendencies towards special kinds of disorders and diseases are able to develop. If we

discover we have an intellect, and by will-power use and develop it within reasonable limits in any direction, then we must also consciously and intelligently care for the body, not by working it hard, but in the way which will allow it to maintain and keep balanced its own and the brain's vitality, or there will be trouble later on.

By the inherent (and wholly uncomprehended) selective power of the body are maintained all the different kinds of substance of which it is made up. No efforts of ours will alter the nature of the bones, muscles, ligaments, etc. The body is designed to have a variety of actions and movements which are kept from becoming abnormal by these different substances of muscle and ligament. All the actions of limb and joint are made possible by muscles and ligaments. Some of the ligaments which bind round the joints of the frame for the purpose of holding them together compactly are elastic to allow of movement, and others are inelastic to prevent undue movement ; and it would seem that the more we give movements to call them into play, the more do the parts concerned take on those characteristics which fit them to carry out the work for which they are intended. Within reason, the more work that is given them in either resisting or checking movements of body, the better is their condition preserved, and *vice versa*. It is only by long disuse that they gradually lose their powers. Knowing this, it need not concern us further, provided we

see that the frame is given those movements which its structure intended it to have. It is believed, by some of those who have no knowledge of the body and its mechanism, that by taking care that every physical movement is restricted to only those it is absolutely necessary to perform in living a civilized and artificial life, they are benefiting the body. They would do away with those if they could. Every fact observed in relation to it goes to prove how utterly wrong they are. The result of similar ignorance, and equally fallacious and harmful, is the "feeding-up" which these same people think is what the body invariably needs when anything goes wrong with its working. Yes, it may need feeding up ; not, however, by giving it unnecessary quantities of food, but by the possessors of the body giving up their queer ideas, and doing those sane things which will enable it to *make use of* a sufficient quantity, the inability invariably proceeding from a different cause than lack of food.

What may be called "overknowledge," as well as lack of knowledge, is a dangerous thing. Simplicity is the keynote of everything we can do to help Nature, and experience is teaching us that a large quantity of knowledge—useless from a practical point of view—we have gained by careful study of pathological phenomena serves but to blind us to the simple causes from which arise the innumerable and diverse diseases the body can suffer from. The most serious organic disease is never the first, but

always the last event of a series. By our ignorance or carelessness we may complete all the first until the last is inevitable, and it will never be any good supposing that there is some species of magic by which we can calmly wave it back. The very complacent idea of a specific "cure" for each and every disease ought to be got rid of as soon as possible.

One must admit there will always be differences in people. The witty, the stolid, the brain-worker, the manual worker, the imaginative, the unimaginative, will always be with us. But from the cleverest to the stupidest, from the richest to the poorest, there is one common necessity. No matter who you are or what you are like, by practising real physical culture you will be doing the best thing possible for yourself and those who come after you. You really should give Nature a chance to prove to you that with simple food and the simplest of physical help she knows everything about the body better than we ever can. That she knows exactly how to make and keep in repair such things as arteries and bones; how to construct and shape any and every part of the body in its appointed way; how to make the brain and nerves send out their currents properly; how to make us grasp instead of lose an opportunity; how to direct the functions of every organ; how to make us hungry, how to make us thirsty—in short, that she knows exactly how to do anything and everything over and above the very small part we are asked to per-

form in keeping her machine in working order. That she cannot make up for. When we do the simple and obvious things she wants, and do not do those things which ape her knowledge, and *then* find she does not know how to conduct things, it will be time enough to say so. The fact that such a thing as the human machine has ever been evolved is sufficient proof that the unhindered constructive forces of Nature always work on in smooth, uninterrupted order, and in a fixed direction. They cannot, so to speak, get out of the cycle and run their head against a brick wall by, apparently without reason, fashioning the architecture of the body so that it cannot work. All of the seeming mistakes of Nature—and do not most people assume that it is part and parcel of Nature to make mistakes ?—are but due to our own faults. Exactly how many of these are due to forgetting that the body is a machine it would be hard to say. But probably nearly all. When forced to allow abnormal things to happen, Nature does it only rather than give in altogether, in the hope that we shall discover before it is too late what it is she wants. She is insulted more than ever when we try to imitate her knowledge, and give complicated assistance which *we* do not understand and *she* cannot avail herself of. Only when thus crippled does Nature allow abnormalities in the body to occur. It is no good, either, simply looking on and saying : "What a wonderful thing Nature is ! I suppose she will go all right presently."

As a final word of advice, let the so far normally healthy, or the would-be physical culturist who is not seriously unfit—one of those for whom I intend the following exercises—learn, if he be so minded, something of physiology ; but it is not indispensable, provided he knows what cares are needed by the body. Farther than that it is quite unnecessary for him to go. Providing our instincts are kept normal, the less thought given to its working, and the less attention given to superfluous cares of the body, the better. Neither do we wish to parade as health maniacs, with no other thought, however sound our principles may be ; but in these days the practice of rational health preservation has become a necessity. Take care of the body, as you would a machine, by keeping it in mechanical order. The importance of this cannot be over-estimated. Give it as plain and sound food as possible consistent with reason, give it recreative exercise, observe the laws of hygiene. If we do this, its inner working, the powers natural to that body, and the shaping and framing of the desires and resolutions which direct our actions, will take care of themselves, because there will then be the controlling influence of a sound mind in a sound body.

It is more than fourteen years since I first took up physical culture, in the first place to become healthy through it. I signally failed, although I underwent courses of " curative " exercise with the

best-known exponent, as well as living on reformed diet, and sometimes, perforce, for weeks on milk only. I learnt nothing except that all this had a negative effect on me. Then, during my Cambridge days, I developed—albeit without any of the *joie de vivre* that an athlete should feel—my natural athletic powers to a great extent, and was able—this for my athletic readers—to throw a 16-pound hammer 141 feet, and put a 16-pound shot 40 feet 8 inches, representing the University *versus* Oxford in both events. But I did it under more than slight difficulties, and in my last year I had to retire from the C.U.A.C. team. For years I had developed a diabolical form of internal rheumatism, which ultimately reduced me 2 stone in weight, and did damage more or less permanent. All this was the result, as I afterwards found out, of three fixed dorsal vertebræ causing contraction along the splanchnic nerves, and then all kinds of incessant reflex trouble. But no, that was never thought of as the cause of what was pronounced to be spinal congestion; and after being the subject of considerable experiment, all in the wrong direction, I was advised, in the usual unsatisfactory way, to go for a sea-voyage. So I went to Australia. Incidentally, the only result was that I spent the worst six months of my life.

I then came to some new conclusions. For over two years I worked at getting the whole spine free, improving the exercises I devised as I went along. For a year there was practically no result, but I

knew my principles were right, and now I am pronounced organically sound (before I was not). Perhaps, because I was very unpromising material and started late, I shall hardly do to serve as an outstanding advertisement for health exercises, but it is nevertheless a fact (which is more to the point) that I have devised a system which has done for a number of people what nothing else in the nature of physical movements, diet, or medical advice, was able to do, and for me is doing what I was finally told nothing could do. I have now taught these exercises privately, with universally good results, for over two years (1912), and many have asked me whether I would not write a book on the subject, so that everybody could learn and use them.* The foregoing facts make me believe that exercise on these lines will be more widely used than any in the future, either as health exercise for the thousands who need it or in conjunction with muscle exercise for athletics. I hope, therefore, this book will meet a want. I know everyone who uses these preventive movements will soon come to say they are the best he or she has ever done.

* At first I had not thought of such a thing, but it was not long before I found that all the common kinds of illness that one is advised to take light muscle exercise for are benefited by spinal and breathing exercises more than by anything else.

CHAPTER VI

Description and illustration of the exercises—Conclusion.

We can now, metaphorically speaking, shake the dust of the preceding chapters from our feet, and get to the practical part. "Thank goodness, he has done with all that!" I can hear some of you saying. Not all, but some. However, if I have given you a new idea of physical culture, and you use it to your advantage, I am satisfied. I think you will agree that the simple act of physical culture should be understood. You will do more good that way than by just performing without intelligence, and yet not because of instinct, the best of exercises, taking it for granted that they are good without knowing why. In that case you are pretty certain to have your faith wane, and the exercises will be performed inaccurately and ineffectively or given up altogether. Console yourselves in any case with the fact that the best understanding of physical culture leads always to the easiest and simplest of exercise.

Now, although these movements were devised as health exercises pure and simple, it will be found that they also have the effect of giving one increased strength and activity, to say nothing of an improved carriage of body, and all without special efforts in

that direction. Just by simple exercises which, when one is quite familiar with them, are both interesting and a pleasure to practise. And do you not think this is better—to give the body the attention which is necessary to keep it healthy, at the same time and by the same means strengthening all its parts in a sufficient degree for any person of average vocation, than to spend much time and hard work exclusively on developing certain muscles which have really nothing to do with health, and go only to the making of an athlete ? If you aspire to be an athlete—and this is an aspiration born in one—it will nevertheless be the most fitting thing to start the necessary preparation for success in either athletic sports or games by practising health exercises, letting the extra muscle development come when you are fit for it. Whatever your latent capabilities in athletic prowess, they will best be developed in this way, and without the smallest harm resulting, which might be the case if you work and strain at developing muscle when the body is not fit to supply the needs of much use of muscle in enduring or concentrated effort—that is to say, whether you play tennis or lift weights.

If you are not already used to exercise, it will be as well to do some preliminary exercises, such as bending forward and touching the toes with the hands, or any other simple muscle exercise. Then you can proceed to the exercises proper. First of all, *before trying to do them*, make a point of under-

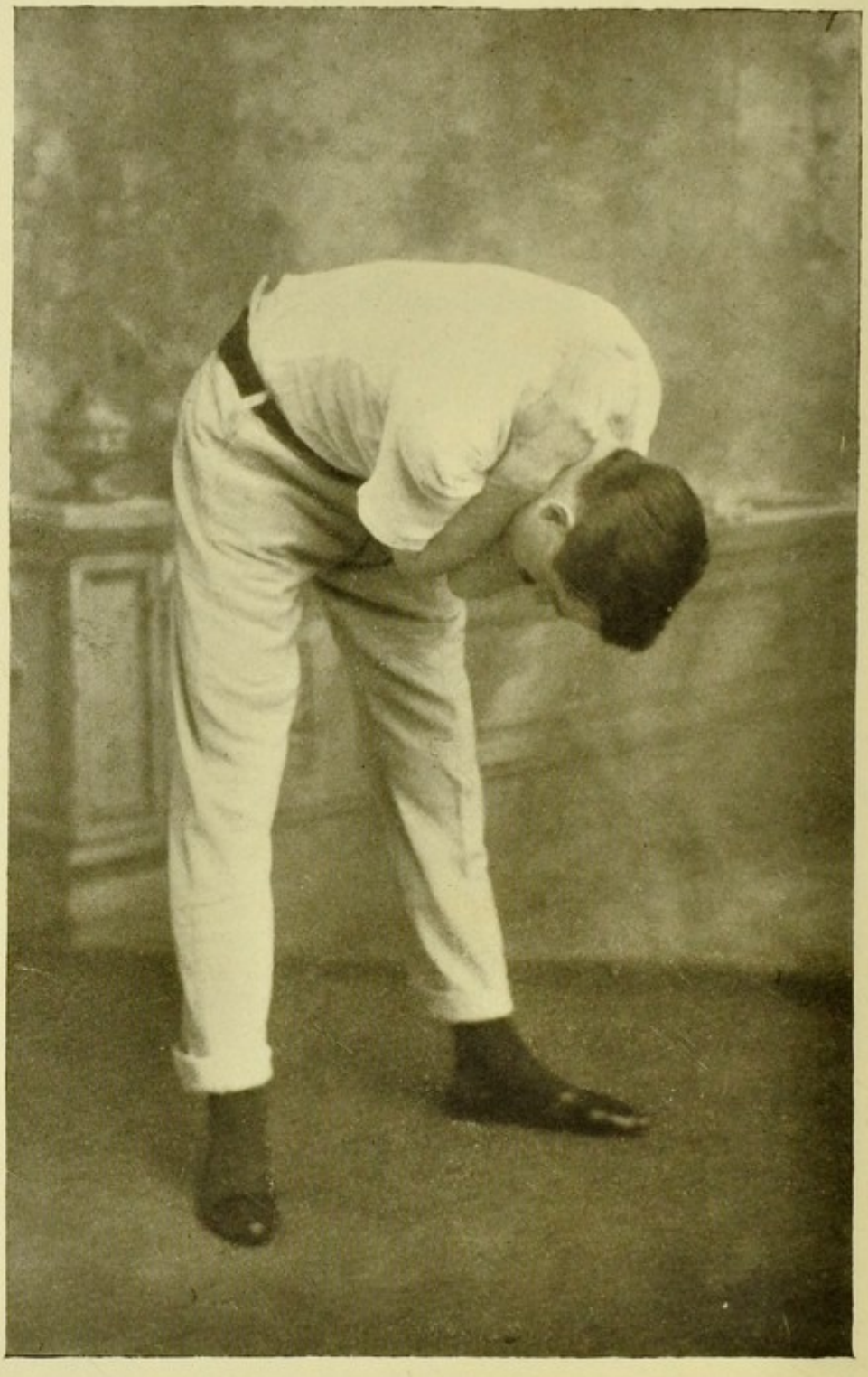
standing them. Keep it in your mind, when doing them, that before all else these exercises were designed to free and stretch the spine thoroughly, and to gently stretch the main nerves, so that the process of repair and renewal may go on unimpeded in a normal direction, and with the freedom of all parts which insures an active and graceful body. It cannot then become a gradual habit of body for stiffness and fixture to occur—perhaps without your being aware of it until well started. See that this does not happen, and you will not find later that what you might think to be some illness of a trivial "medicine" nature is really the outcome of a long-established cause, and that, if it be possible to set things right, it will only be by means of a persistent and tedious course of exercises for renovating the main bodily architecture. The little trouble necessary to *prevent* this is worth it.

It will be a good plan to go through the exercises night and morning. There is no need to rise or retire an hour earlier than usual for the purpose. They take but five or ten minutes to perform, and you may wear any clothing you wish, but the looser and lighter the better. There are no restrictions imposed as to diet, etc. That is all quite apart. I will leave each to find out what is best. Fresh air and cleanliness you cannot have too much of—but you all know about the rules of open windows, baths, damping with cold or tepid water and rubbing the whole body with a rough towel every morning,

teeth-cleaning, etc. They have now become a matter of course with us.

Before starting, go down the whole spine to find out whether each joint moves (perhaps it is one of the dispensations of Nature that the spinal bones can be felt on the surface of the body). If a joint moves at all, and you intelligently use exercises to insure its mobility, the amount of movement and the adjustment of the joint and surrounding parts will look after themselves. It is impossible by any ordinary means to make a joint move too freely. If you find, on bending forward, that a dorsal joint does not open, then you will have to try and concentrate the exercises on that joint until you gradually get it to move more freely. The thumb exercise will be the special one usually, and all the time you should be using the more general spinal exercises. Every joint of the spine *must* move.

And do not forget this—that the spine is not the bare mechanism the sketches suggest. It is closely invested with muscles and ligaments, making it a closely-knit and extraordinarily strong apparatus. No matter how we move it, there is not the smallest possibility, except by violent accident, of any part getting out of place. Always, from any position, the joints are guided and pulled back to the normal. The proof of this is the exaggerated contortions which are possible by the acrobat who accustoms himself to them by very forcible exercise when young. But you are not going to become an *acrobat*.



EXERCISE 1, FIG. 11 (*see page* 133)

Now, just a foreword. In all the exercises make the joints "creak" or "crack," if possible. Learn *not* to set those muscles which will prevent the joints from being thoroughly stirred. Treat the body more as a passive instrument in your hands. After a time you will find you can do the exercises firmly yet loosely, so that they have just the effect you want. Every exercise you should do slowly, *to the limit of motion*, and as forcibly as possible without causing any discomfort.

First of all proceed to somewhat mildly stretch the upper dorsal and cervical part of the spine (Exercise 1).

Exercise 1 (Fig. 11): Upper Dorsal and Cervical Stretching.

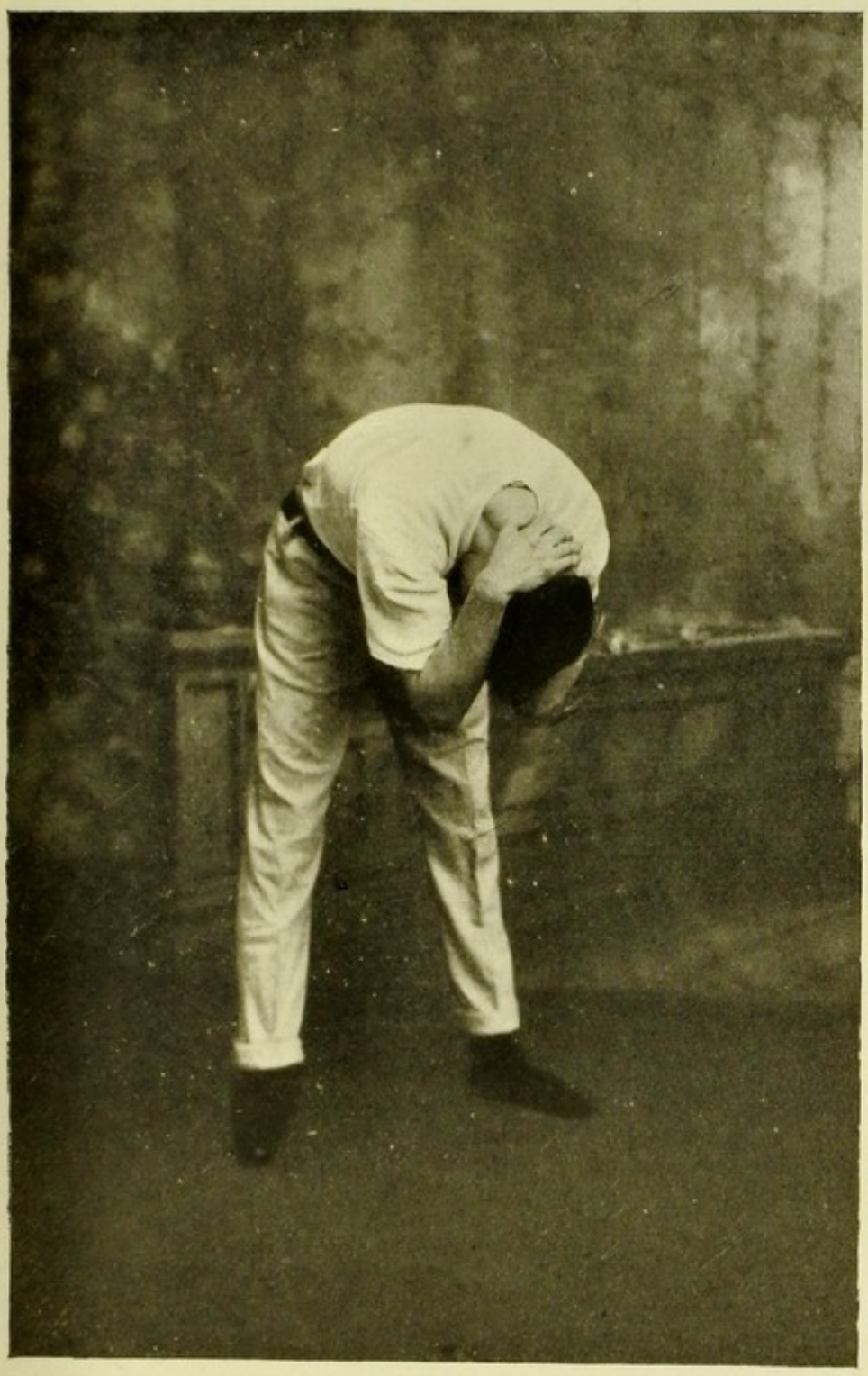
Place the hands rather more overlapping and farther down the spine than shown in photograph (Fig. 11). Bend forward, and pull downward on the vertebræ, with a wriggling, coaxing sort of motion, imagining your spine to be a rope. When you start the exercise, the hands should be overlapping, as far down the back as possible. Then, when pulling on the spine, let them (the hands) slip upwards a little to the two prominent vertebræ, which are easily felt at the base of the neck. This gives a sort of massage. At first you should not do this exercise very strongly, but when quite used to it do it as strongly as you can, humping the back to the utmost limit. As far as possible, leave all muscles relaxed when doing

the pulling. You will find by experience how to do this. Do the exercise only two or three times, standing up between each "bout."

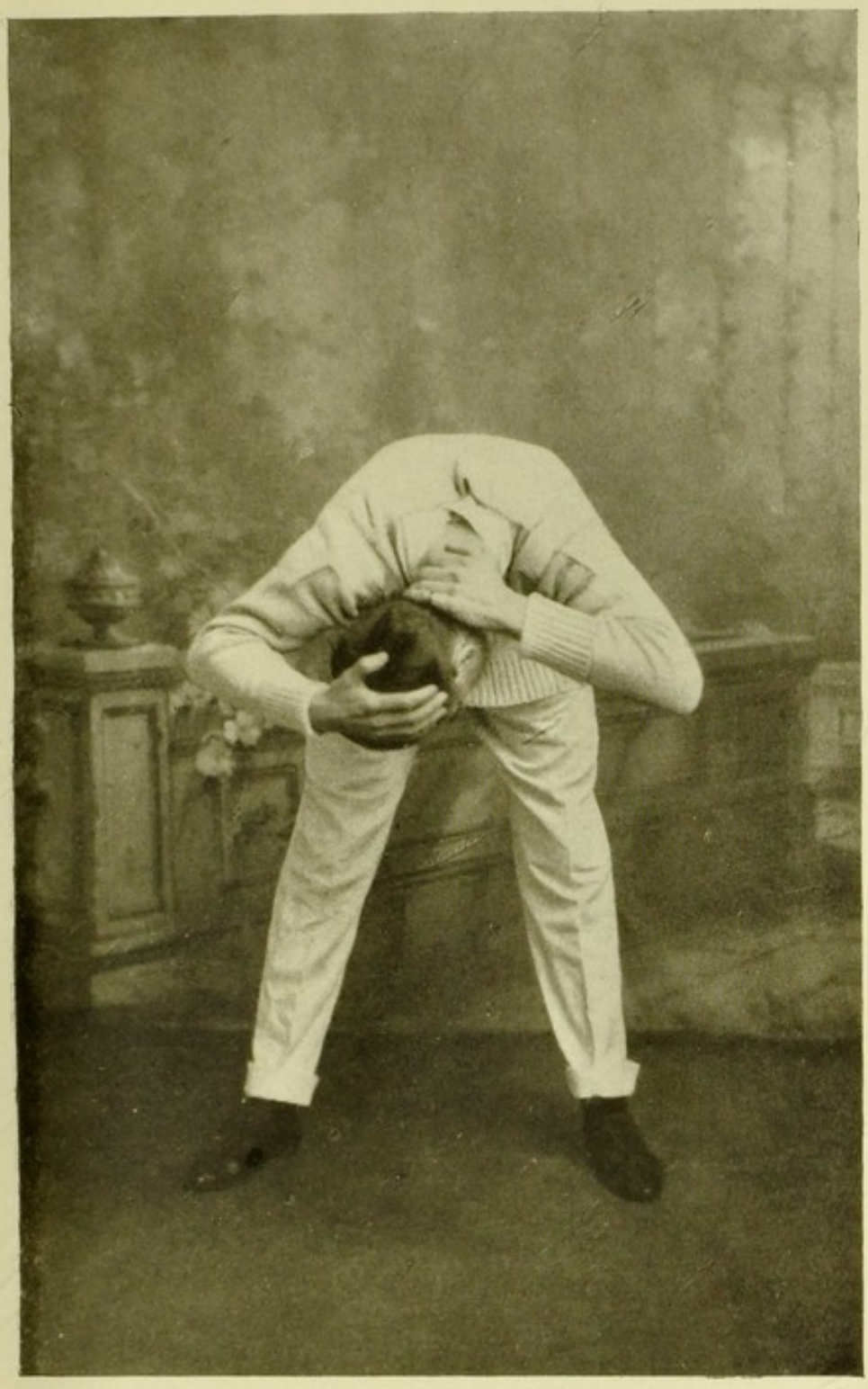
Exercise 2 (Figs. 12, 13, 14): Cervical Stretching and Freeing.

Overlap the hands, as shown in Fig. 12 (Position 1). The forearms are pressed firmly against the side of the head. Then bend forward, and pull and wriggle the head straight downward. Before you are used to it do not do it too strongly, or it will make the muscles sore, but later you will find you can hardly do it too strongly. You must relax all the neck muscles as far as possible. After doing this pulling and wriggling for two or three spaces of, say, three seconds each (there is no need to do more), alter the position of the hands, as shown in Fig. 13 (Position 2), and pull the head straight over to one side as far as possible. Then reverse the hands and pull over to the other side. Once or twice to each side will be sufficient. Perhaps the neck ligaments may creak or crack a little when you are able to get the head well over, but that will only show you have done what was necessary. Sometimes in doing the second movement curve the body round when pulling the head over, as in Fig. 14. In Fig. 13 the body is quite stationary, only the head being bent over.

Some will find it better to stand upright, instead of as shown, when pulling the head over in second movement.

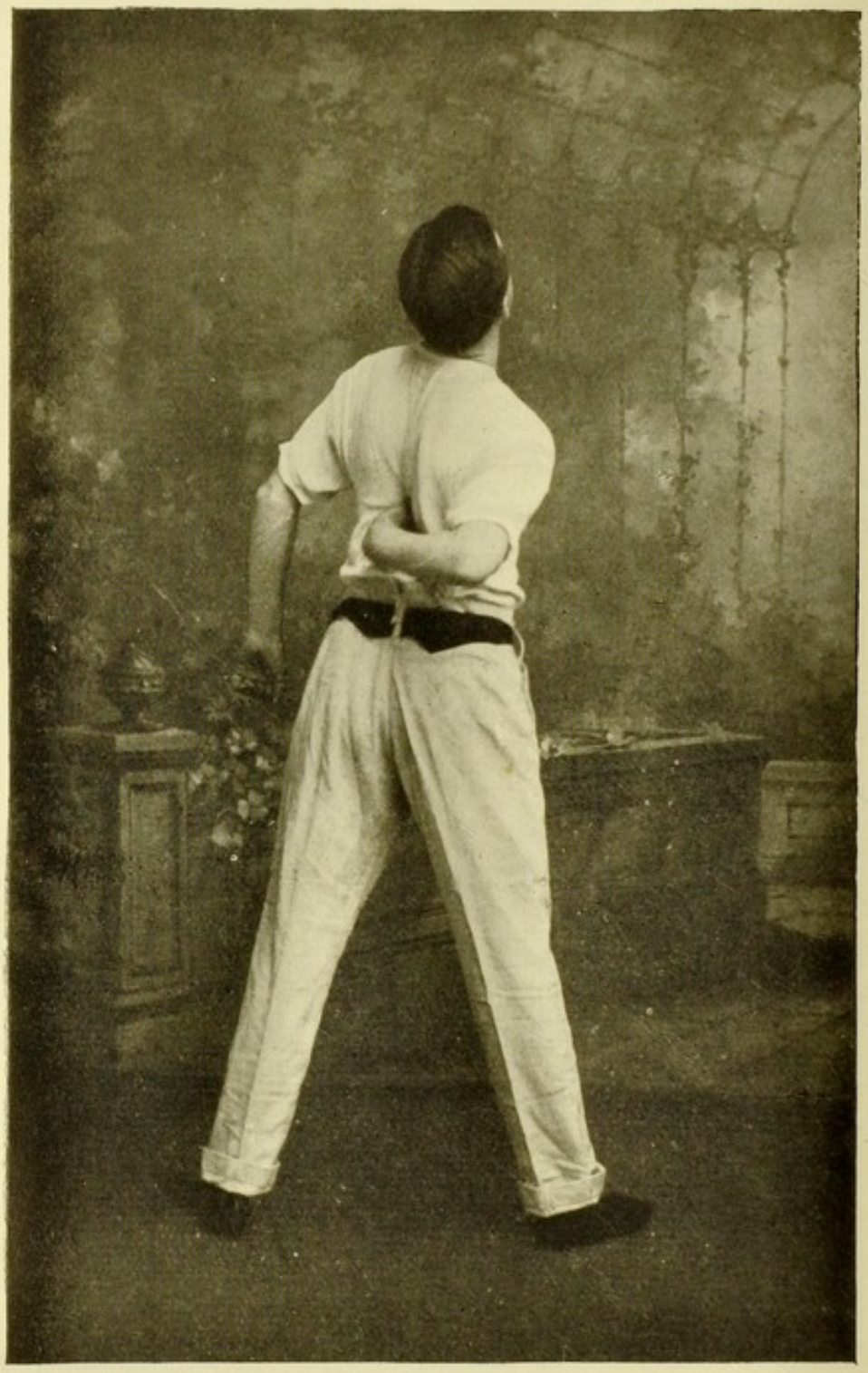


Exercise 2, Fig. 12 (*see page* 134)



EXERCISE 2, FIG. 13 (*see page* 134)

EXERCISE 2, FIG. 14 (*see page* 134)



EXERCISE 3, FIG. 15 (*see page* 135)

Exercise 3 (Fig. 15): Dorsal Freeing.

Stand erect, *muscles relaxed.* Place thumb on side of opening between two vertebræ; then with a bending, twisting, writhing motion of body, concentrated on the spot where thumb is, try to make that joint move, pressing hard with the thumb (Fig. 15). There is a knack to learn in this

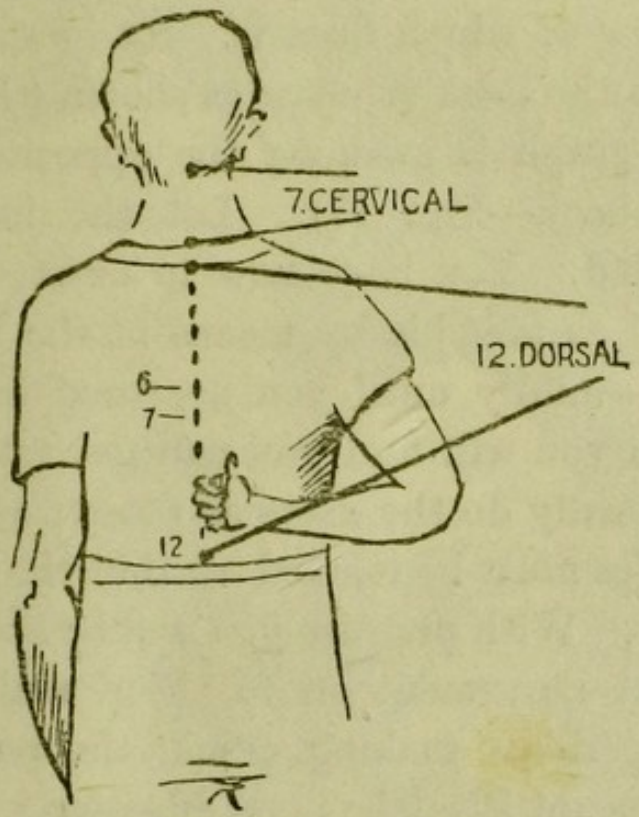


Fig. 16.

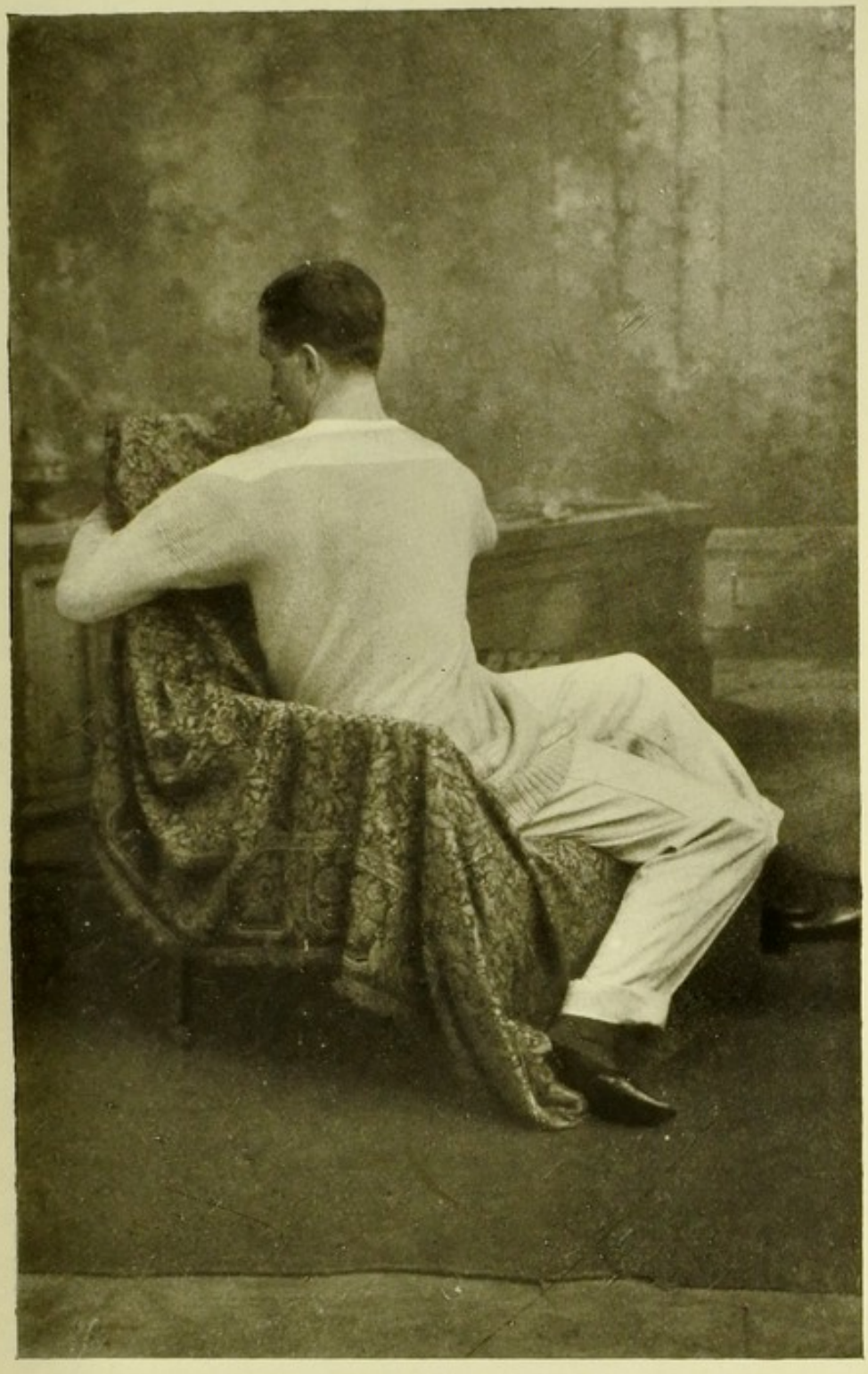
exercise. You will find after a time that you can give a sort of jerk and pressure with the thumb, when in a certain part of the writhe, which will make the joint move, and perhaps creak a little. Do this from the seventh to twelfth dorsal joints (you probably will not be able to reach higher than the seventh). Fig. 16 shows their position. Some-

times do this exercise with the clenched fist kneading and pressing up and down the dorsal spine, instead of with the thumb.

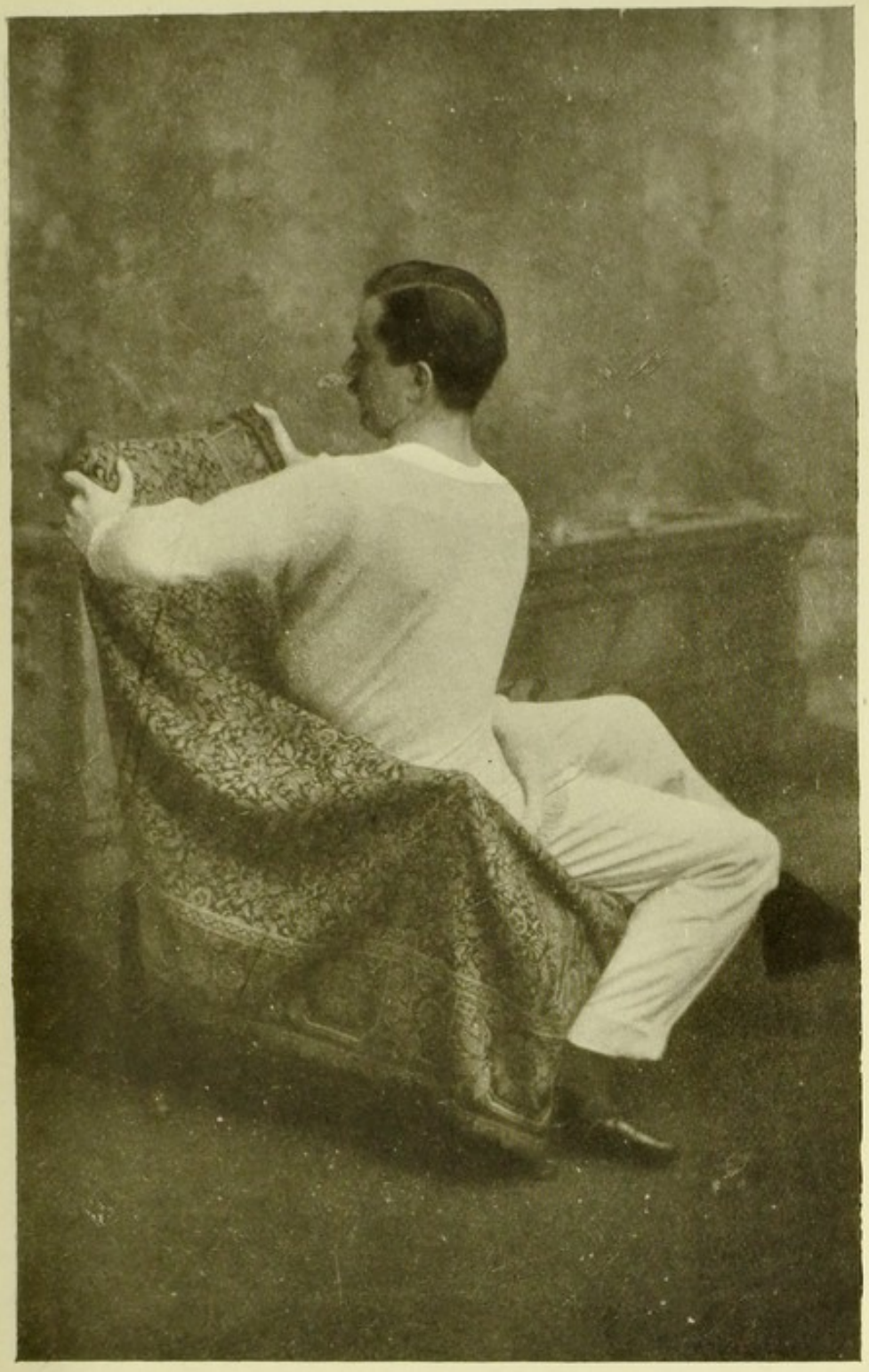
Feet 18 or 20 inches apart.

Exercise 4 (Figs. 17 and 18): Lower Dorsal Stretching and Freeing.

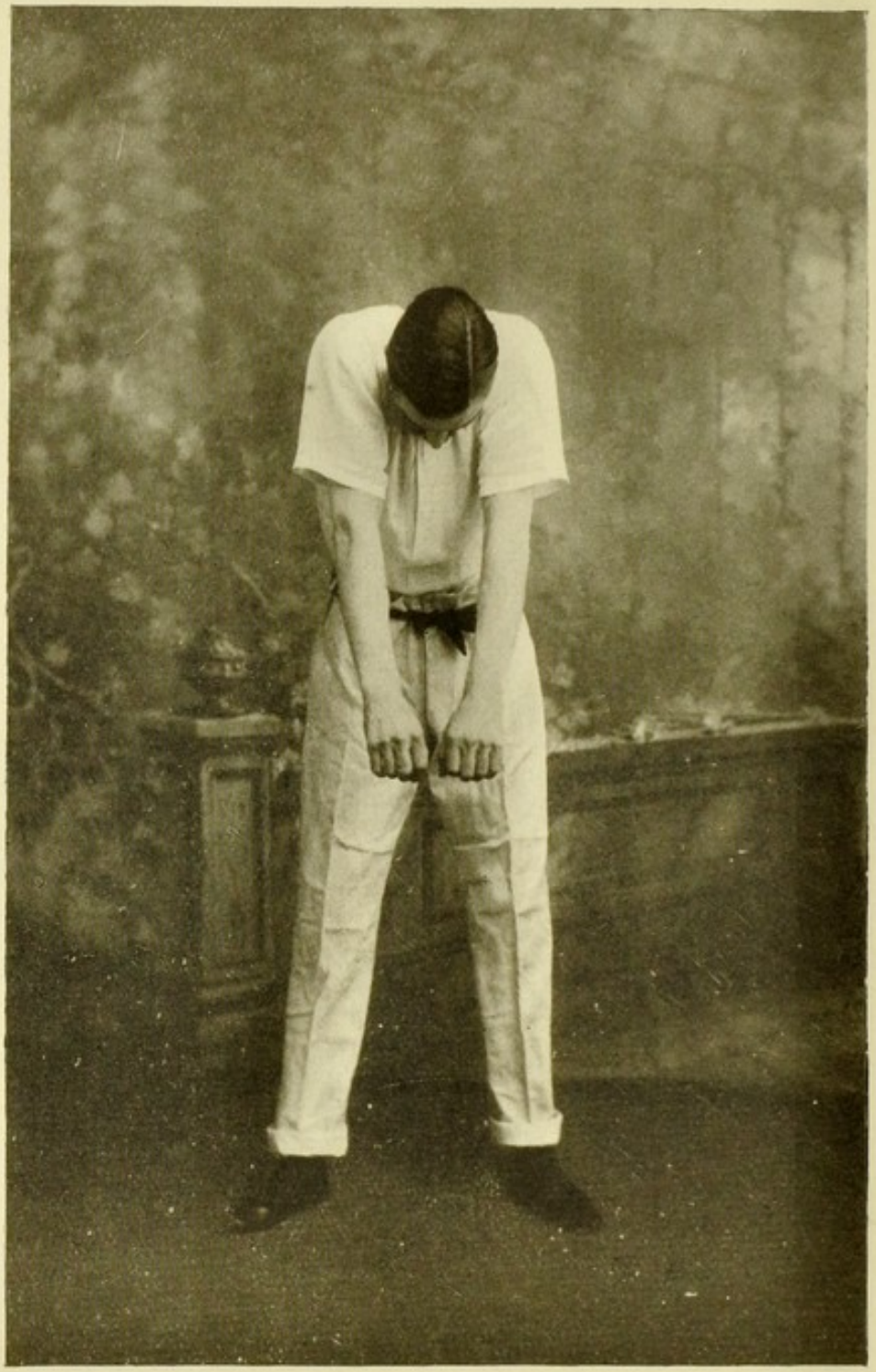
This is for thoroughly rotating and freeing the whole of the dorsal spine, and is the only exercise I know of which does it. Sit loosely in the chair. Grasp the back of chair as shown (the right hand in photograph is grasping the opposite top corner of chair-back—Fig. 17). Let the back be slightly rounded. You have now to twist the body as far round as possible by means of the hands on chair-back—mildly until you are used to it, but afterwards you will find you can get farther round and can hardly do the exercise too strongly. The trunk muscles must be relaxed, so that the spine can move freely. With practice you will be able to put almost all the movement on to the dorsal joints, freeing, and perhaps making crack, the parts which you know want it. The most effective way of doing the exercise is to go round as far as possible, relax a little, and then give a firm final pull round. Be careful not to tense the body muscles. Think only of the effect on the spine. It is not a muscle exercise, except for the arms. Repeat the movement, twisting round in opposite direction to that shown in photograph. It is only necessary to do one thorough movement, or at the most two, each way. After a time you may do the movement in a more



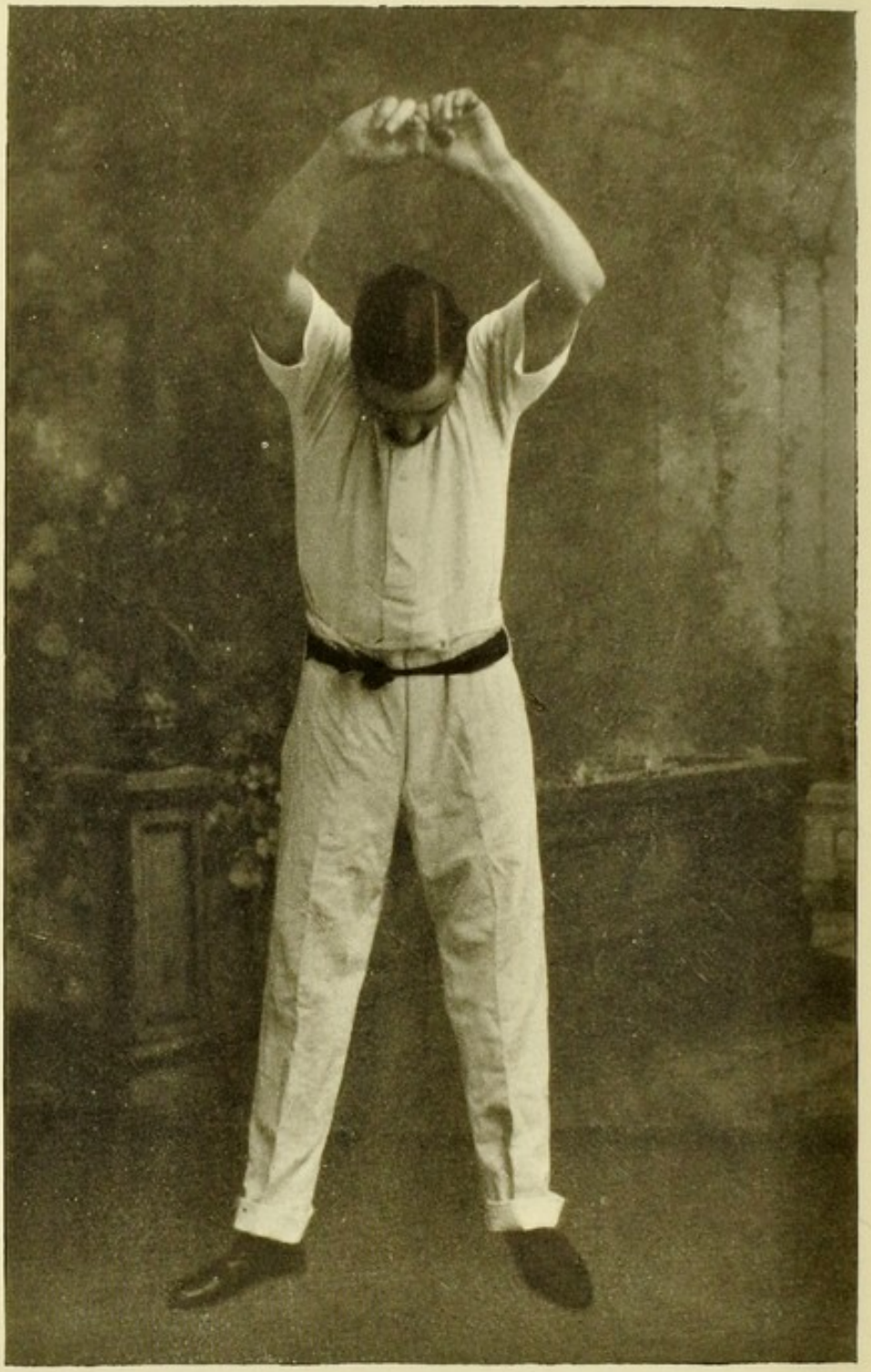
EXERCISE 4, FIG. 17 (*see page* 136)



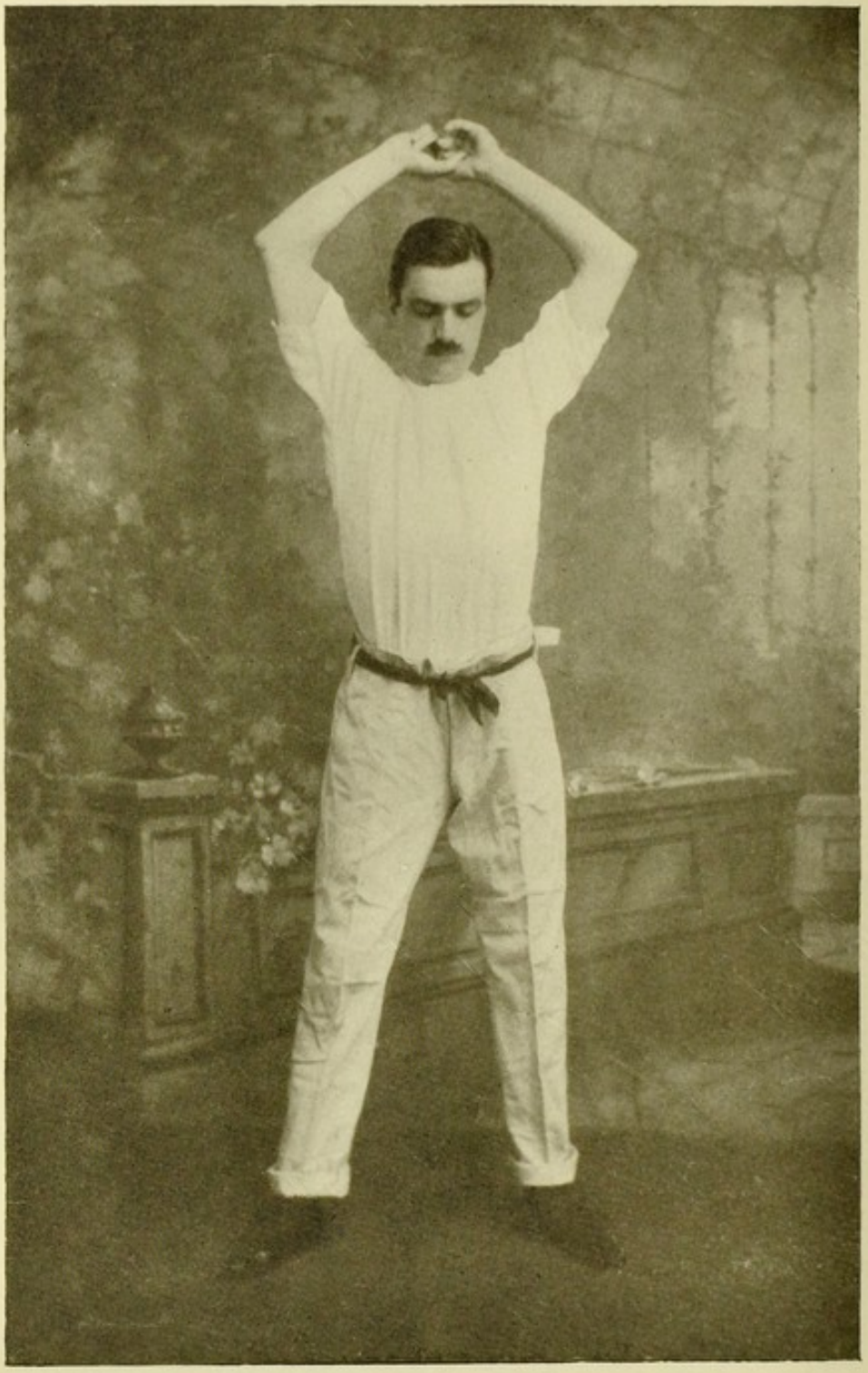
EXERCISE 4, FIG. 18 (*see page* 136)



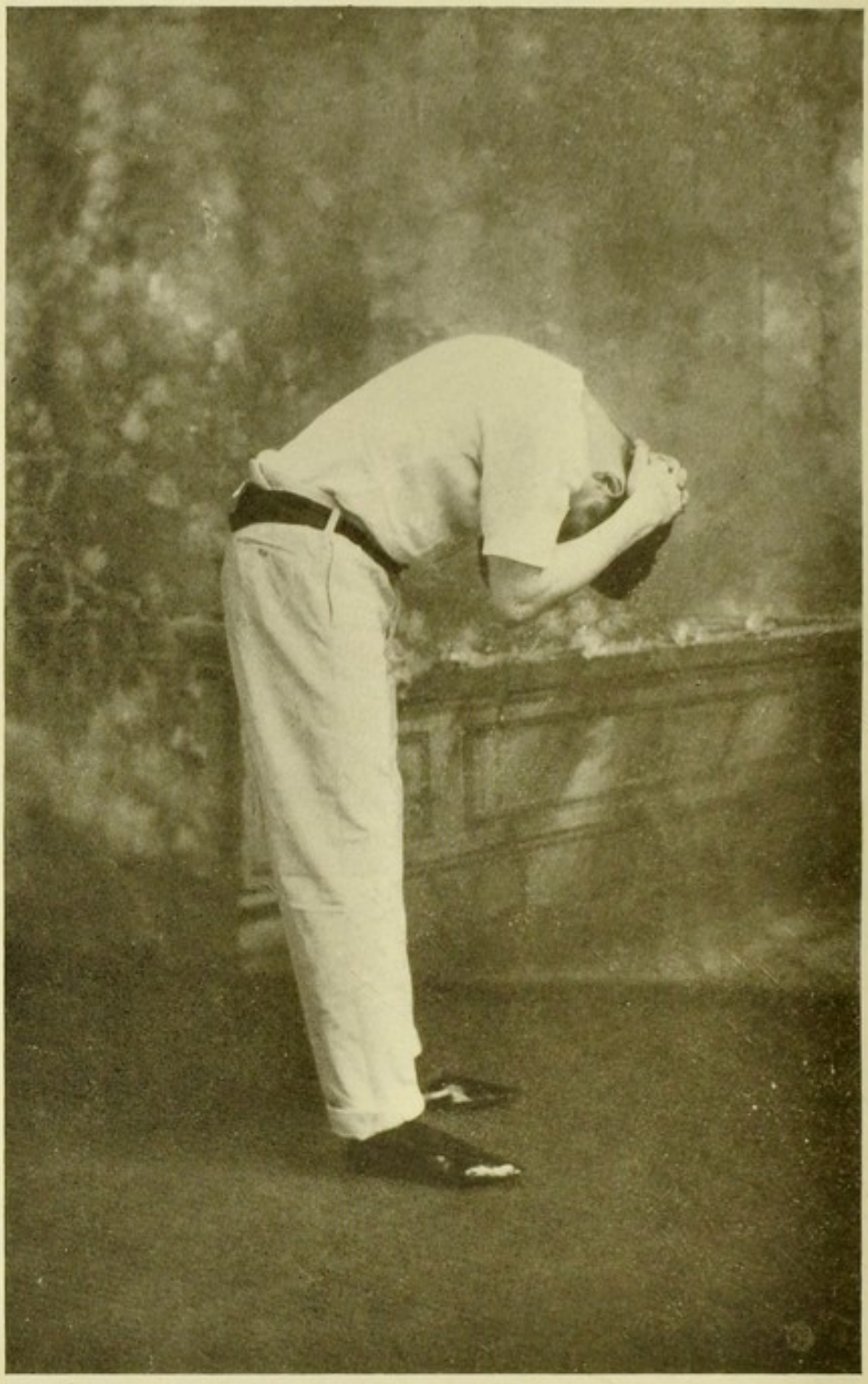
EXERCISE 5, FIG. 19 (*see page* 137)



EXERCISE 5, FIG. 20 (*see page* 137)



EXERCISE 5, FIG. 21 (*see page* 137)



Exercise 6, Fig. 22 (*see pages* 137 *and* 138)

thorough form, as in Fig. 18. It is a good plan to do the easier one first, and then immediately follow it with the other.

Exercise 5 (Figs. 19, 20, 21): Shoulder Freeing.

This is for freeing the shoulders and stimulating the upper thoracic nerves. Stand erect, muscles relaxed. Put the shoulders right forward, and hump them forcibly as high as possible (Fig. 19, Position 1). Shrug them once or twice, if you like, to make sure they are as high as they will go. Now grasp in the right hand two fingers of the left hand, pulling on them slightly, and lift the arms as far over the head as possible, *taking care to keep the shoulders humped right up* (Fig. 20, Position 2). When the arms have gone up as far as possible (try hard to get them farther), *drop the shoulders*, lift the head a little, put the arms right back as far as they will go (try to make them go farther) and firmly straighten up the dorsal spine. This is shown in Fig. 21 (Position 3). You may then also put the head right back. Repeat all three positions two or three times only.

Exercise 6 (Figs. 22 and 23): Cervical and Dorsal Muscle Stretching.

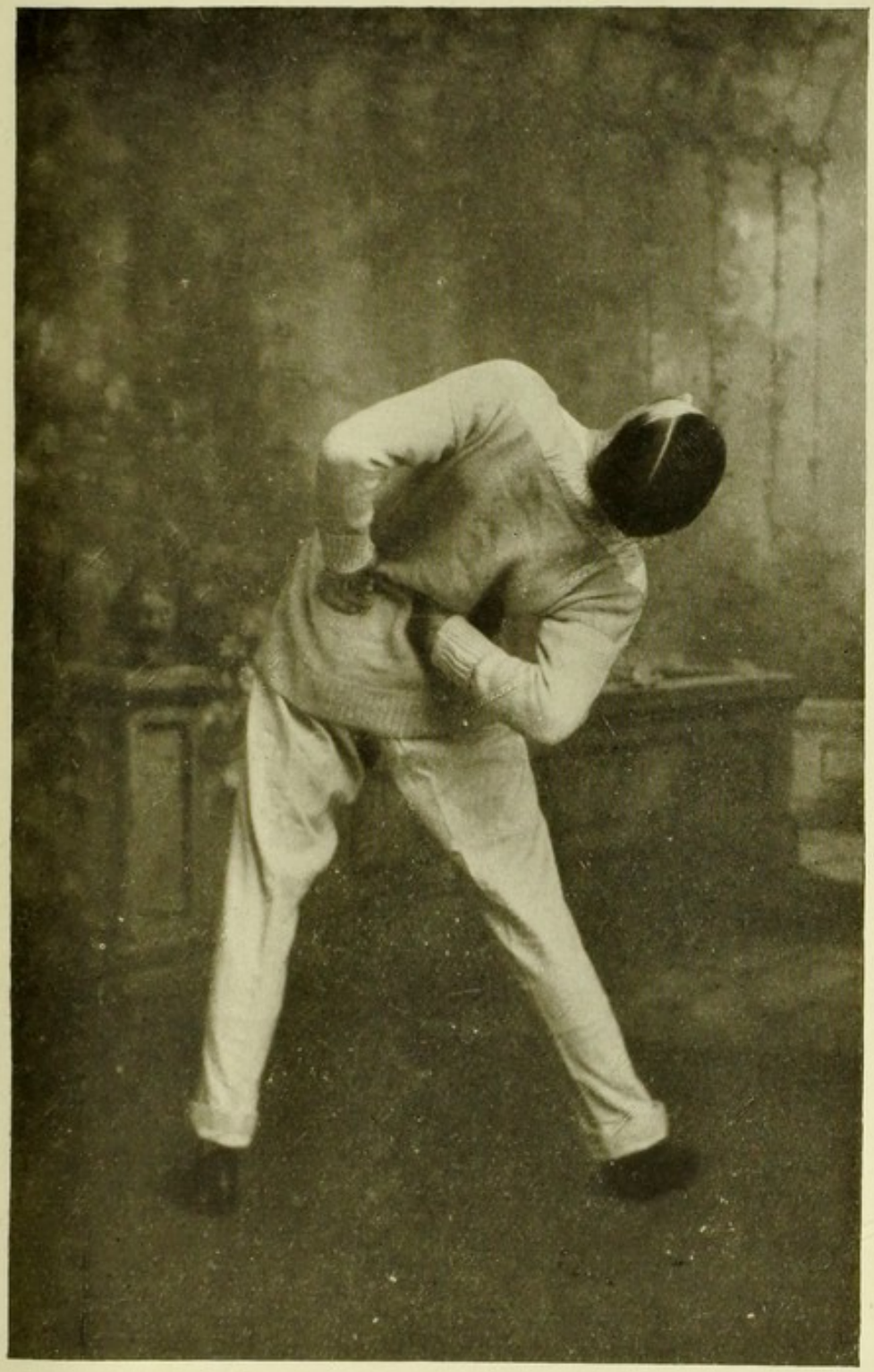
You may now do this very strong (at will) stretching exercise for the dorsal and cervical spine and muscles. Bend forward to position shown in Fig. 22 (Position 1). Clasp the hands on back of head, and pull the head forward until chin touches chest.

Notice how the back is humped. Then, *still holding head thus*, endeavour to straighten up body until in position shown by Fig. 23 (Position 2). By the time you have got as erect as this, you will feel the effect on that part of the back where the hump is. Perhaps at first you will have to let the chin off the chest when coming up, but that will detract from the merit of the exercise. Only do this exercise twice ; afterwards stand up quite erect and put the head back.

Exercise 7 (Fig. 24): Lumbar and Dorsal Freeing.

This is for uplifting, by the levering principle, the whole spine, and for freeing and stimulating all the spinal nerves. Bend back from the base of the spine—make sure you are as far as you can go—then hollow firmly all the spine, not, however, by unduly contracting the muscles, but more by letting the weight of the body keep the spine loosely but firmly bent back, if I can use two such seemingly contradictory terms. It is essential that all through the movement the spinous processes are kept touching. Practice will teach you how to do it if you bear in mind all the directions. Lightly press the thumbs or loosely clenched fists on each side of the base of the spine, and *slowly* and *firmly* go over as far to one side as possible, then a little round to the front, at the same time lifting the uppermost shoulder to stretch the muscles of the side. Then, keeping the whole spine firmly arched backward all the time, go slowly over to other side in exactly the same manner. Repeat the whole movement two or three

EXERCISE 6, FIG. 23 (*see page* 138)



EXERCISE 7, FIG. 24 (*see page* 138)

times. You must keep the upper as well as the lower part of the spine firmly hollowed, or you will miss most of the benefit. If it is uncomfortable at first, relax the spine a little, but still go over as far to the side as possible. Thoroughly to stir the internal organs, you may sometimes vary this exercise by going right round instead of stopping at the side. You may describe one or two circles in each direction, *but you must keep the spine hollowed when doing the back half of the circle.* The back should also be humped when doing the front half of circle, but that is not so important, because the levering principle is not then working. If you merely swing round from the base of the spine it will be practically useless, except for the muscles.

Feet should be about 26 inches apart.

Exercise 8 (Figs. 25 and 26): Dorsal and Lumbar Lifting.

Something like an exaggerated stretch. The general movement may be described as an effort to hollow every part of the spine without leaning backwards. The hands are clasped behind the back, the shoulders are raised, set back, and the back is forcibly straightened up, while you endeavour to make the movement more effective by lifting the arms up backwards as far as they will go (they will only go an inch or two). Then relax a little and repeat, when the head is also put right back (Fig. 25). Sometimes vary the movement by bending the whole spine over first to one side and then to the

other when in the final position, with all the spinous processes touching and levering. Take care to bend the dorsal spine sideways as far as possible (until it becomes uncomfortable), then heave up uppermost shoulder, still keeping hands clasped, and slightly round the back. Then hollow the back again, and bend spine over to other side in same manner. Repeat once or twice. Another variation is to bend slowly forward from the right back position, not letting the arms touch the back until you relax and round the dorsal back with a sort of jerk (Fig. 26). Immediately after the exercise it is a good thing to shrug the shoulders as high as possible without contracting the muscles, except just those that lift the shoulders—that is, *loosely* shrug as high as possible. Make the shoulders creak.

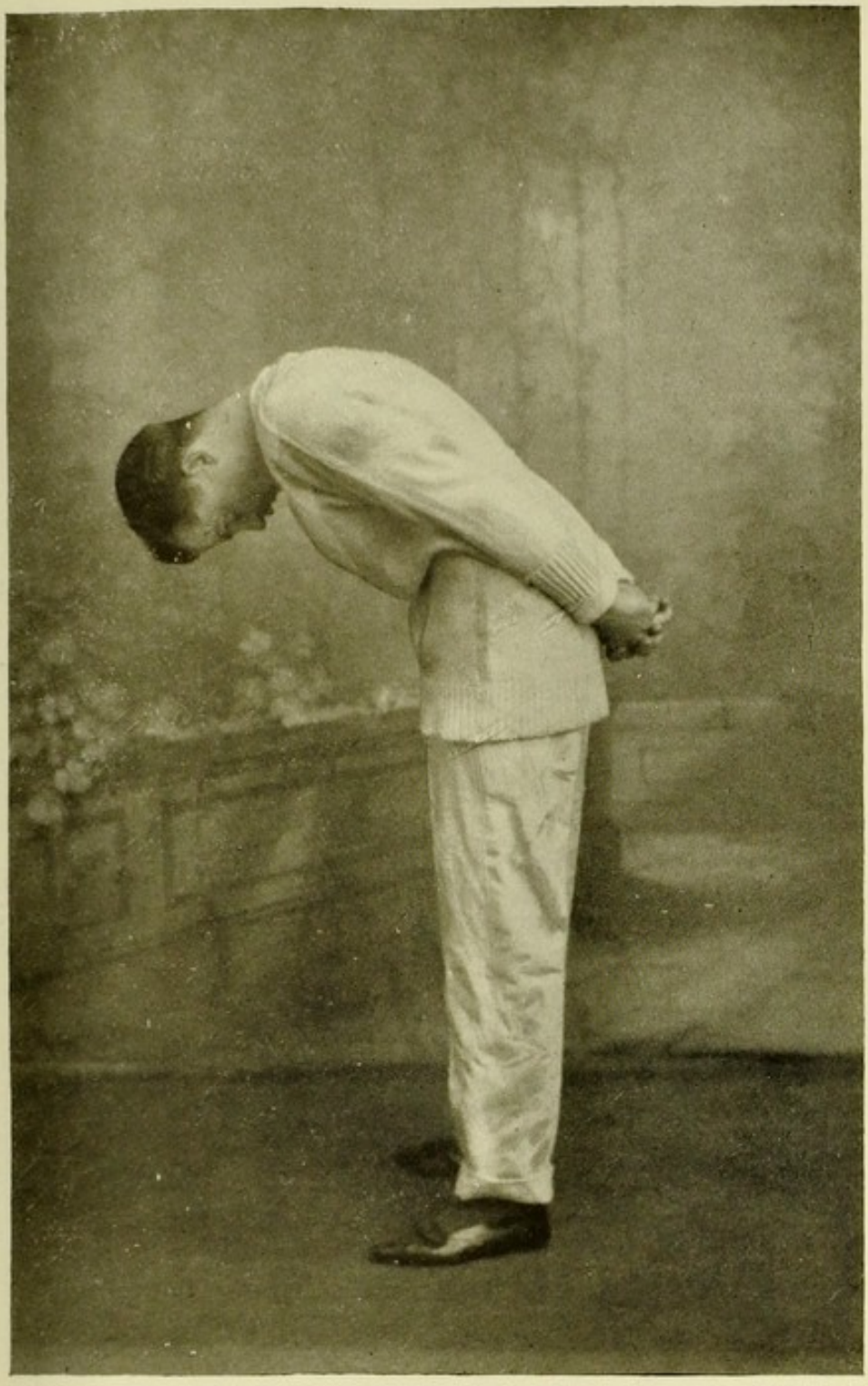
Feet 18 inches apart.

You should now finish the exercises proper by two thorax and breathing movements and the "sciatic" exercise.

Exercise 9 (Fig. 27): Breathing.

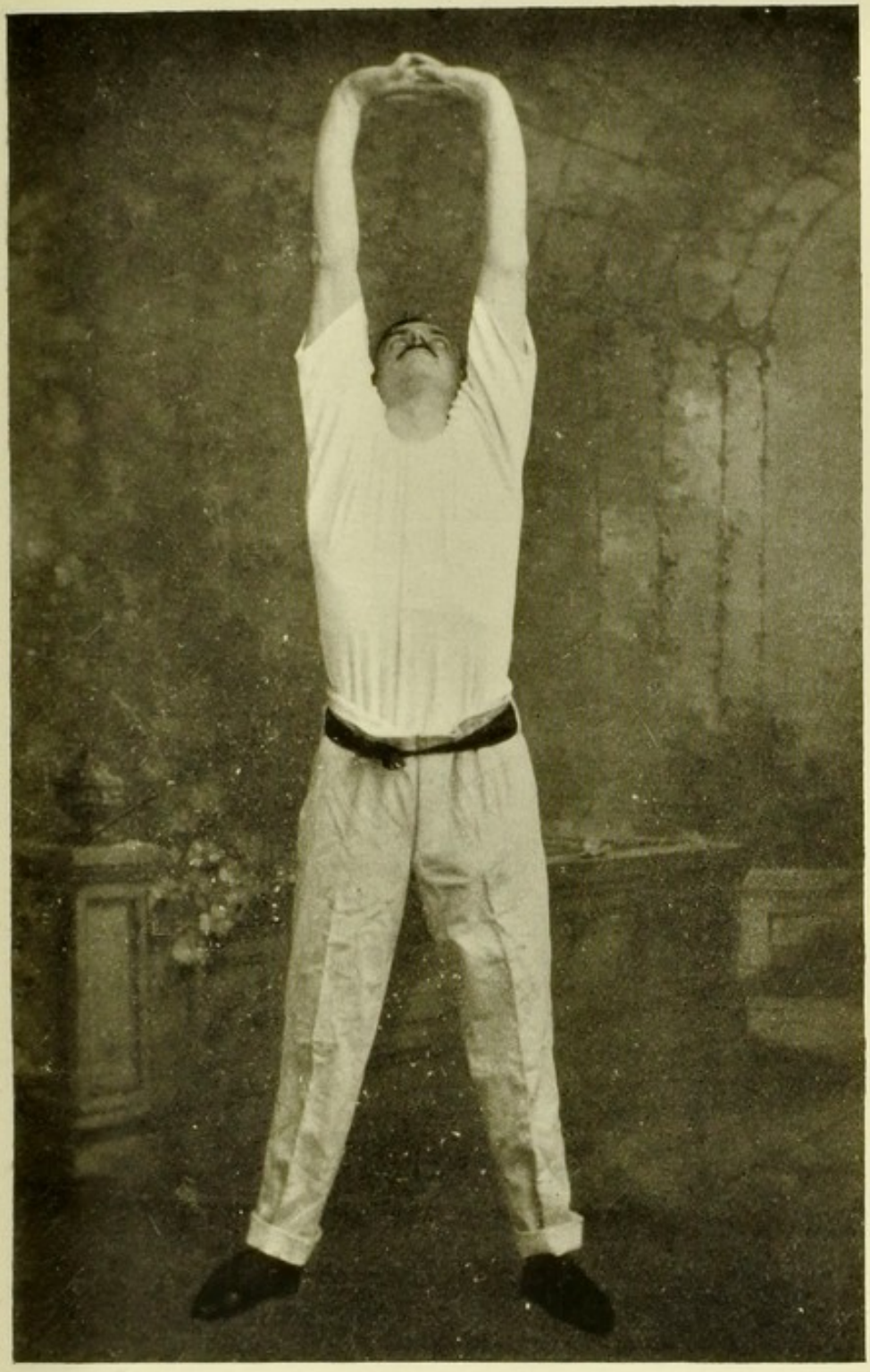
Stand erect and balanced, *muscles relaxed.* Swing arms backwards and forwards fairly quickly, on a level with shoulders, while steadily inhaling and exhaling. Do not make the breathing keep time with the swing of the arms, but breathe slowly and deeply irrespective of where the arms are. Every time the arms come back, straighten up the dorsal spine with a firm jerk, and jerk the arms into the forward swing. It is important that there should

EXERCISE 8, FIG. 25 (*see page* 139)



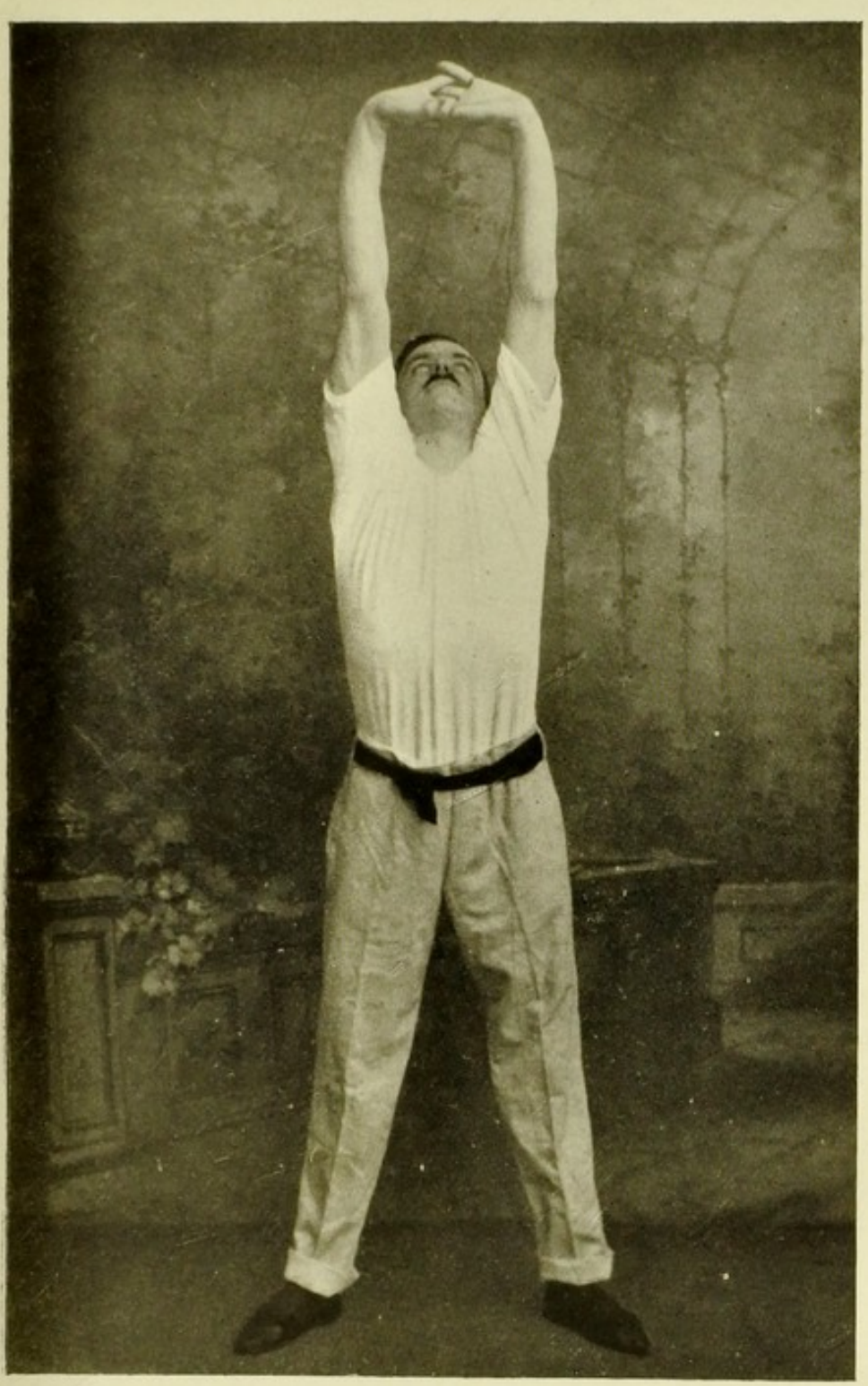
EXERCISE 8, FIG. 26 (*see page* 140)

EXERCISE 9, FIG. 27 (*see page* 140)
Breathing, with, at the same time, dorsal jerk for stimulating chest nerves



EXERCISE 10, FIG. 28 (*see page* 141)

Stretching with lungs nearly empty



EXERCISE 10, FIG. 29 (*see page* 141)

Stretching with lungs full.

be this jerk (Fig. 27). You may do up to twenty arm swings at a time, completing, perhaps, two or rather more inhalations and exhalations. Sometimes vary this exercise by swinging the arms *loosely* in *wide* circles while breathing in just the same manner as before. First describe ten circles in one direction, and then ten in the opposite, the most effective being those in which the hands go down to the front and up to the back.

Exercise 10 (Figs. 28 and 29): Breathing and Stretching.

Stand erect and balanced, *with every muscle relaxed as far as possible. Partly fill the lungs.* Interlace fingers and stretch arms as high overhead as ever you can (Fig. 28). Palms upwards, by giving the locked hands a sort of "cat's-cradle" twist. Then yawn and move the jaws about as though eating. *Swallow*, bring the arms down, lean forward, and try forcibly to expel every little bit of air from the lungs. This will make you contract all the chest and abdominal muscles (draw in all the waist-line muscles and "stomach" as much as possible). Now relax, and inhale a slow, deep breath right down to the diaphragm, distend the "stomach," moving shoulders up and down to help lungs to get fully expanded. Then interlace fingers, raise hands over head, and endeavour to reach as high a point as possible with the upturned palms (Fig. 29). Quickly and forcibly expel the air from lungs as before, at the same time letting arms drop down to

sides. Then fully relax all the muscles, and the exercise is finished. Repeat each exercise two or three times, taking care to do them very thoroughly. Sometimes stretch with backs instead of palms of hands upwards, and rise on toes when stretching.

Feet should be kept about 18 inches apart during both m ovements.

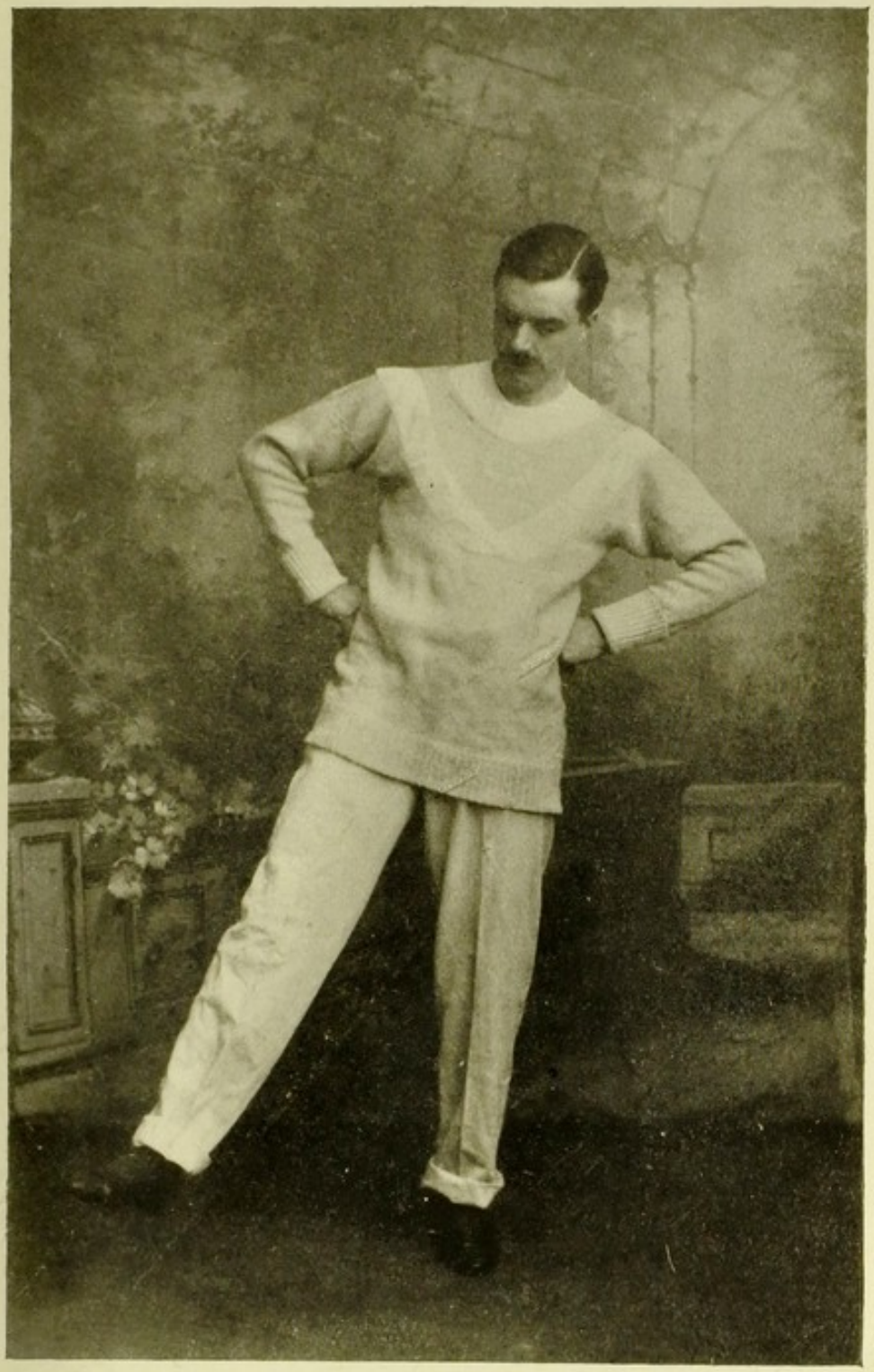
Exercise 11 (Fig. 30): Kicking—Sciatic Freeing.

This finishes the exercises proper. Stand on one leg, steadying yourself by holding on to a chair-back or anything similar. Now kick, *with the leg muscles relaxed*, quickly from five to ten times in different directions, forwards, backwards, and sideways. First with one leg, then the other. Do not point the foot downward when kicking: keep it either level or slightly inclined upward (toe rather higher than shown in photograph). This is for freeing and stimulating the great nerves of the lower part of spine—the sciatic, etc.

You have now gone through the mainly important exercises, but sometimes make a point of following on with these auxiliary ones :

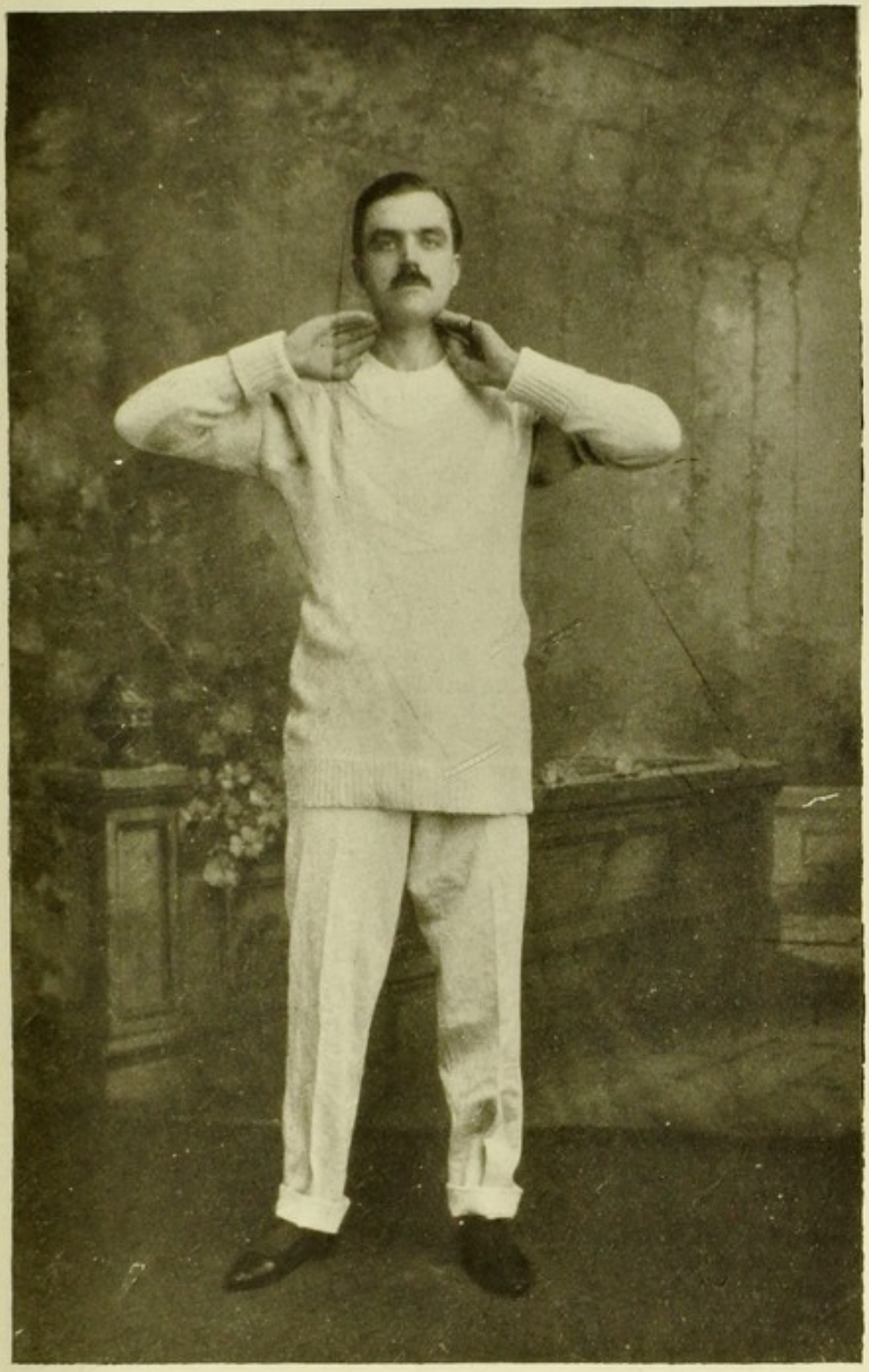
1. Thoroughly knead and press from side to side the neck (Fig. 31). *Then swallow.* The muscles should be relaxed. The very important thyroid gland is situated here. You have already stirred up the nerves in Exercises 2 and 6.

2. Place the arm as far over the shoulder as possible (Fig. 32). The fingers are pressing on the

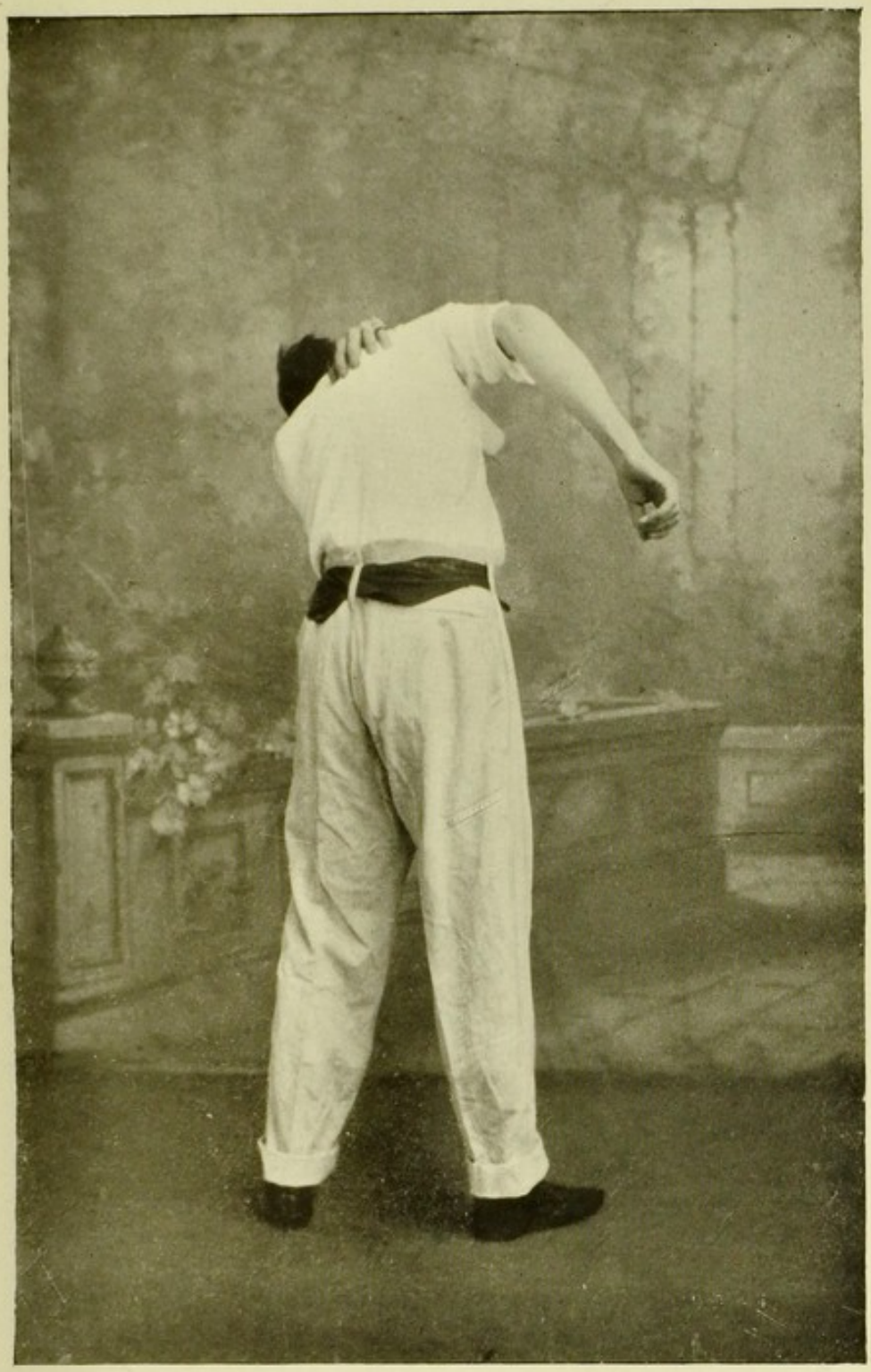


EXERCISE 11, FIG. 30 (*see page* 142)

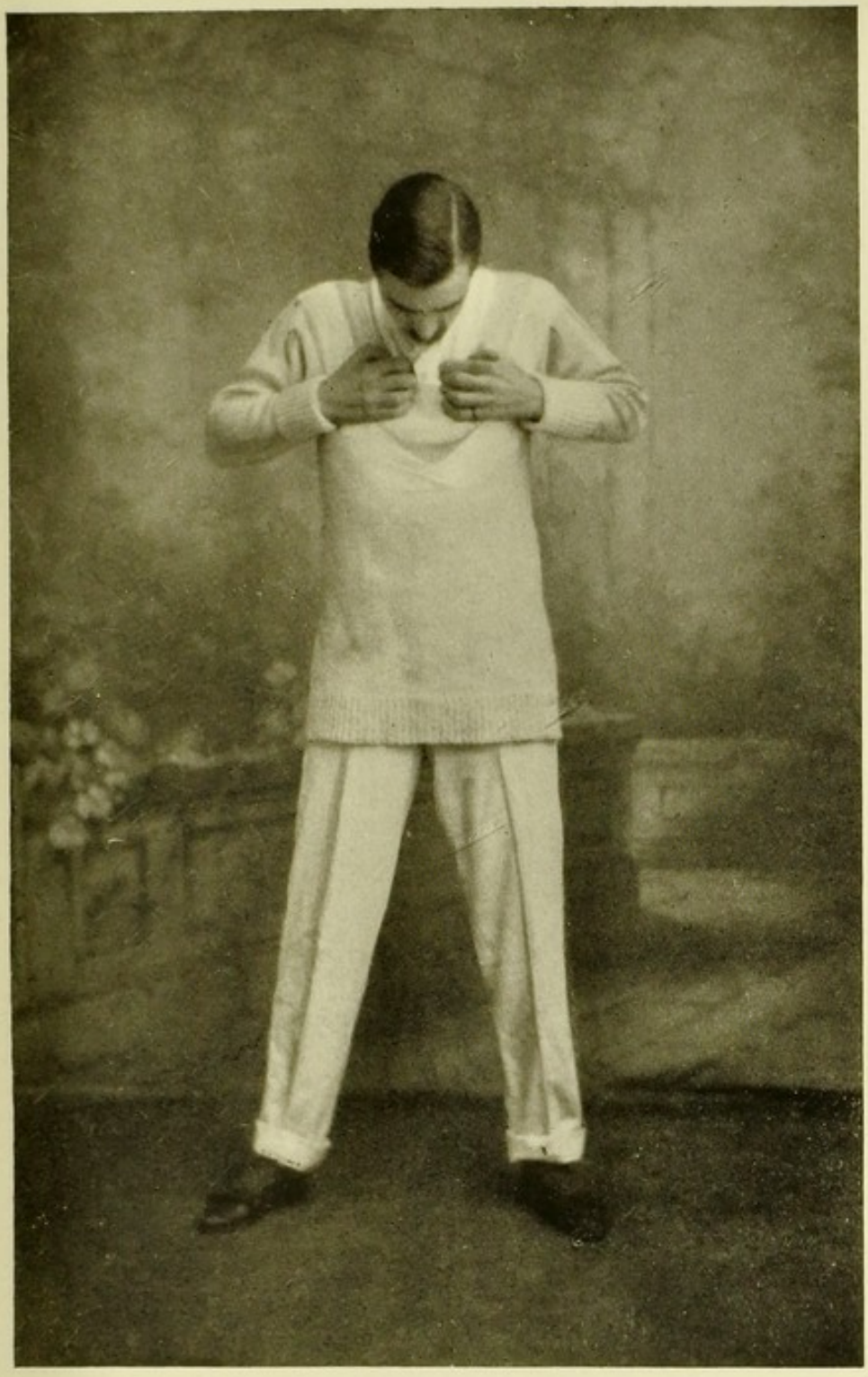
Let each kick be short, sharp, and jolting in a downward direction, to full extent of leg, lifting knee well up before each kick



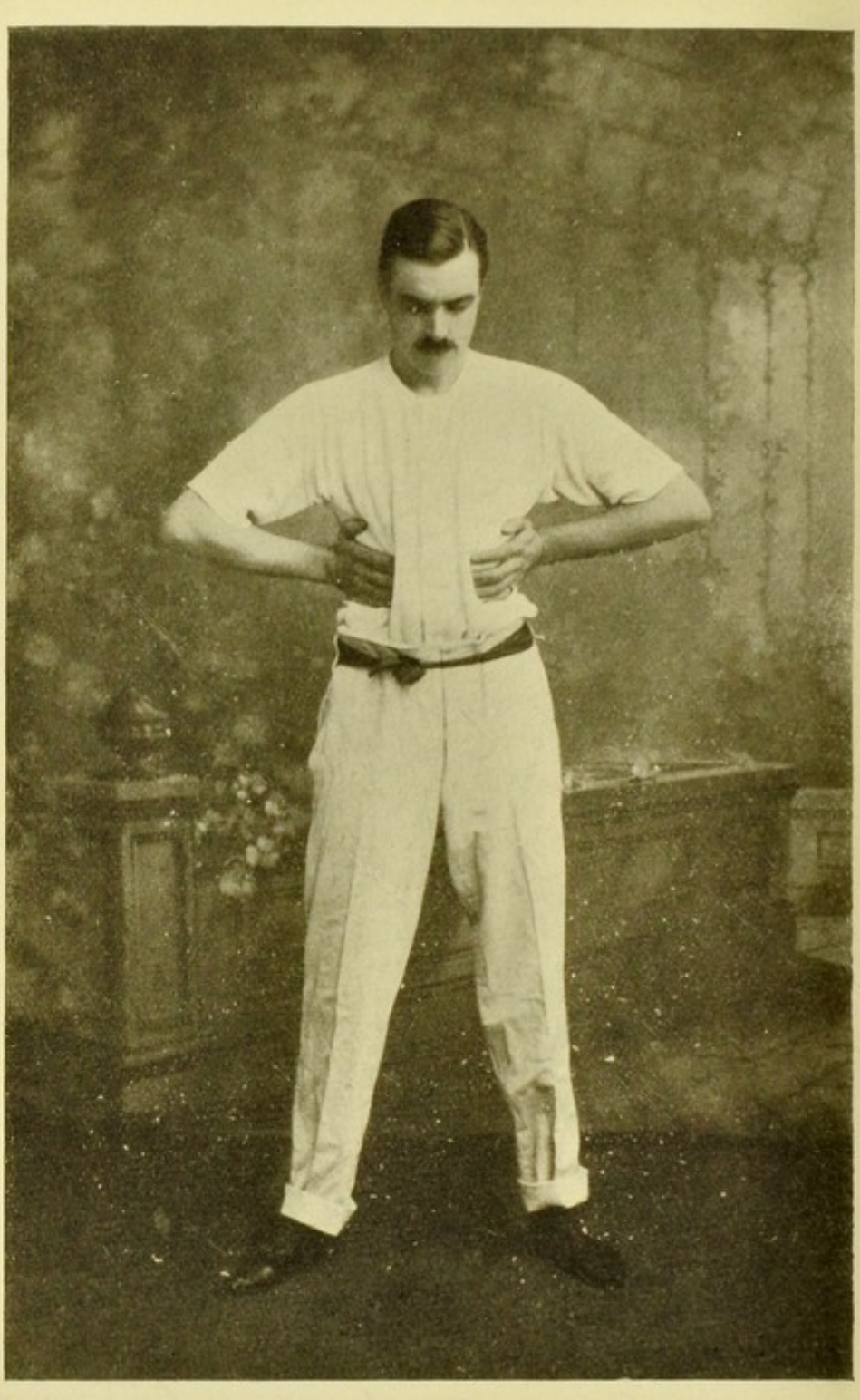
Auxiliary Exercise 1, Fig. 31 (*see page* 142)



AUXILIARY EXERCISE 2, FIG. 32 (*see page* 142)



AUXILIARY EXERCISE 3, FIG. 33 (*see page* 143)



AUXILIARY EXERCISE 4, FIG. 34 (*see page* 143)

shoulder-blade. Then lean over, heave the shoulder back and up (with a sort of circular motion), and thoroughly stretch the side of body. This will stimulate the thoracic nerves. The fingers pressing on shoulder-blade will greatly assist. You will find this by experience.

3. With the lungs nearly empty, thoroughly press quickly and firmly every part of the breast-bone and front part of the ribs. Perhaps they will creak or crack. The elbows should be close in at the sides. Then, while still pressing with the fingers, lift the shoulders as high as possible once or twice. See Fig. 33, which was taken when the shoulders were being raised. Finally, inflate the lungs.

4. While steadily inhaling and exhaling, with all the muscles relaxed, firmly press the lower ribs with a sort of movement as though you were using a pair of bellows (Fig. 34). This is good for the thorax generally, and stimulates the liver. Press direct on to the "heel" of the hands. Do not try to press with the fingers. In addition to this, sometimes draw in a moderate breath, and, while holding it, percuss (quickly, but not too heavily) all round the ribs with the clenched hands.

If you sometimes want to curtail the exercises, omit Nos. 5 and 6, and Nos. 2, 3, 4 of the auxiliary.

I think with these descriptions you will be able to learn and practise the exercises effectively. As you have seen, there is no mystery or anything

complicated about them. *Taking care always to be mindful of their object,* try to get the knack of doing each one in exactly the manner most suited to you. You will soon come to find that out. To do each exercise thoroughly and intelligently once or twice is far better than to do it a number of times in a slipshod manner. It will not be long before you know they are good, and then it will be a pleasure you would not forego, to spend five minutes over them.

You will be agreeably surprised to find the physical and mental satisfaction this kind of exercise gives. You have nothing mystifying to think about; no question of "physiologic load," or "osmotic pressure" of the body fluids, or wondering whether it is the thoracic or abdominal muscles that want more developing. And when you have given all your attention to doing these spinal exercises thoroughly, you will find that, instead of being a muscular weakling, you are well on the road to becoming as strong in every vital part as it is possible for you to be, and with strength of muscle which comes, not from its mere bulk, but from good nerves.

Finally, let me repeat, whatever your personal needs in food, or in any of the smaller things appertaining to your life, keep it ever in your mind that the mechanically efficient body is the mainspring of everything which will benefit you and posterity.

And let your children be taught.

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HOME EXERCISE AND HEALTH

FIVE MINUTES' CARE TO THE NERVES

BY

PERCIVAL G. MASTERS
B.A. CANTAB.

CHART OF EXERCISES

FOR READY REFERENCE

(For Explanations see Book)

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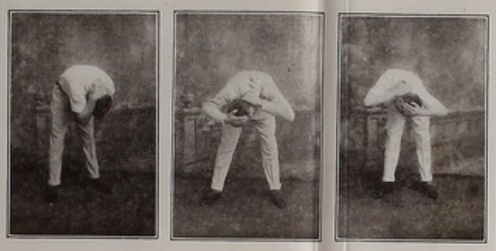
Exercise 1.—Upper Dorsal and Cervical Stretching



Exercise 2.—Cervical Stretching and Freeing

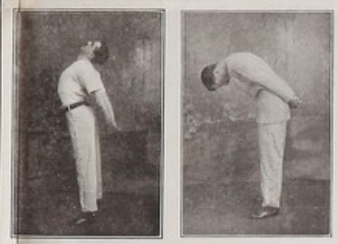
Exercise 3.—Dorsal Freeing
(For 3 or 4 seconds at each joint)

Exercise 4.—Lower Dorsal Stretching and Freeing

Exercise 5.—Shoulder Freeing

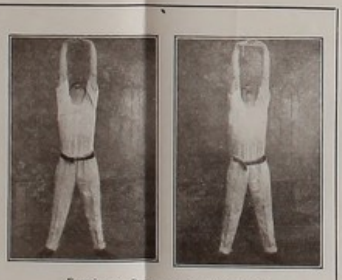
Exercise 6.—Cervical and Dorsal Muscle Stretching

Exercise 7.—Lumbar and Dorsal Freeing



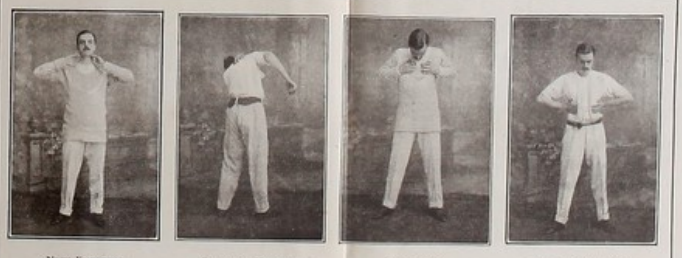
Exercise 8.—Dorsal and Lumbar Lifting

Exercise 9.—Breathing



Exercise 10.—Breathing and Stretching

Exercise 11.—Kicking: Sciatic Freeing



Neck Kneading — Shoulder Heaving — Chest, Ribs — Thorax Stimulating

Auxiliary Exercises, 1, 2, 3, 4