Illustrated medical in-door gymnastics : or a system of medico-hygienic exercises requiring no mechanical or other aid, and adapted to both sexes and all ages, and for special cases / by Moritz Schreber ; translated from the 3rd German edition by Henry Skelton.

SCHREBER'S MEDICAL GYMNASTICS

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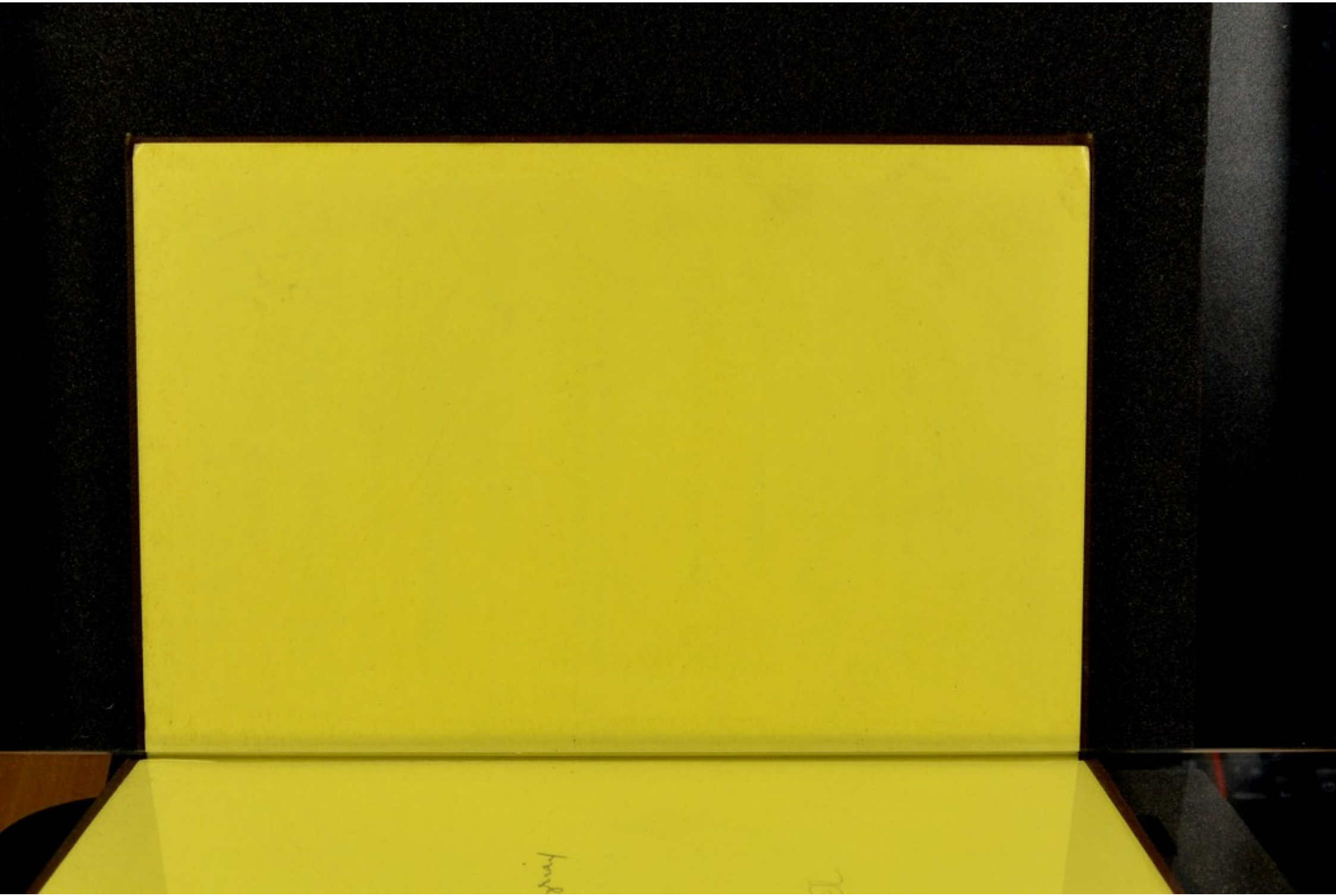

ILLUSTRATED

MEDICAL IN-DOOR GYMNASTICS

OR A SYSTEM OF

MEDICO-HYGIENIC EXERCISES

REQUIRING NO MECHANICAL OR OTHER AID, AND ADAPTED TO BOTH SEXES AND ALL AGES, AND FOR SPECIAL CASES.

BY

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TRANSLATED FROM THE THIRD GERMAN EDITION (1857)

BY

HENRY SKELTON.

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Preface.

It often happens in life that we overlook or underrate that which is simple, natural, and within our reach, and believe that our happiness is only to be found in that which is complicated, artificial, or distant. So do we act with regard to our health. Providence has implanted in us the germs of innumerable faculties and capabilities. Their natural development (which we ourselves must of course actively promote), and the use we make of them, form the groundwork of the aim of our whole life, and the principal condition upon the fulfilment of which depends the easiest possible attainment of that aim — the non-fulfilment of which causing the non-attainment and disarrangement of the same.

In this manner, our physical motive powers, which require but the exercise of our will, not only afford us, by their rational development and use, the means of

protection from a thousand inconveniences, but also of essentially contributing to the removal of inconveniences already existing.

In order to profit by the salutary working of these means, which are at every body's disposition, it is only requisite to explain the *How?* and the *Where?* This explanation must be given by a medical man, and is the subject of the present work. May it be of service, and thus fulfil the earnest wish of

The Author.

I. Introduction.

MAN is, so to speak, a *double being*, consisting of a wonderful, intimate union of a mental with a bodily nature. He is destined to activity in both ways — to the full use of his mental and bodily powers: his whole being is so arranged. The sluggish of mind or idle of body long in vain for the full enjoyment of mental or bodily pleasures. The sweets of life are only the reward of activity. A want of this quality causes a bluntness of the organs, an interruption of the functions, disease, and premature death. As all our powers are increased and kept up to a certain point by a rational use of them, so do they become weakened and completely lost by want of exercise.

These are truths which every body acknowledges but which are nevertheless too often sinned against. Many concentrate their whole force one-sidedly on mental occupations, and thus forget the claims of their bodily half — a fault which is, in a manner, a consequence — although by no means a necessary one — of the progress of civilisation and the refinements of social life. Some

wish only the enjoyment, without obtaining it first by the exercise of their powers. But we cannot force our nature; and those who act in opposition to it are infallibly punished, and often severely. And especially is our bodily nature a stern vindicator of the laws of its organisation.

And so it happens that of itself alone the neglect of the development of the physical powers and of that formation and renewal of bodily matter — a necessary condition to the right performance of the functions of life, and only to be brought about by the exercise of our faculties in every possible way — have caused and still cause so much disease in the world. Well acquainted with this, medical men in all ages have represented rational bodily exercise as an indispensable condition for the preservation of health and recovery from a state of sickness. To those whose occupations kept the body in a state of comparative inactivity they recommended first this movement and then that — walking, pedestrian excursions, riding, fencing, boxing etc., working in the garden, or other strengthening exercises. And for those who have the opportunity these different motions are to be recommended, although firstly too partial and then — what is of the most consequence — nearly all only practicable for the few, and for a certain time only — not for a continuation, and therefore not to be considered as a balance or means of compensation. They were therefore obliged to limit themselves to simple, methodical walking, as the only motion capable of being practised at all times and as a continual exercise. They were well aware that this motion — if the wants of the body alone were to be satisfied, was, at least for the whole period when man is still in his vigour

— much too partial and insufficient*). And as, moreover, in consequence of the higher destination of man, tending to a progressive state of civilisation, the claims on mental capabilities and activity increased, and required more time and attention, and greater exertions — so not only the desire but also the time was wanting, in most cases, to include in their daily programme an otherwise aimless walk of one or more hours' duration. The disproportion between the claims of mental employment and of professional duties on the one hand, and the requirements of the body on the other, become, in the case of a great part of mankind, more and more prominent and important in their results every day.

An artificial means was then sought for to balance this disproportion, and in fact, by the conditions of our whole social life, we absolutely require such a one. And so arose the modern system of gymnastics. But it is our intention to treat here of gymnastics only in as far as they present a welcome means of carrying out medical ends — as a remedy, *curative gymnastics;* as prevention, *hygienic* or *sanitary gymnastics* — for certain cases of disease or infirmity. Both the above definitions are comprehended in the term *medical gymnastics.*

In the natural order of things, *curative* gymnastics

*) In order to form a right idea of the insufficiency of the walking exercise taken for health's sake by an otherwise comparatively inactive person, contrast it with the amount of daily motion which men not over strong easily perform in, for instance, mountain travels, in what are but moderate daily tours of ten or fifteen miles ascending and descending, and that for weeks together — or with the ordinary performance of a gardener in a large garden; an amount of motion at the same time sufficient and good in every respect for the health, and, as proved by the result, in no way immoderate. Ah, what a difference!

were at first used as a remedy for all those chronic diseases (without fever) whose existence could be traced to a want of sufficient bodily exercise. But it was soon acknowledged that their domain extended still further, over many other complaints not exactly a direct consequence of this want. But one must not go so far as some enthusiastic adorers of curative gymnastics, who set them up as a universal remedy, and reject as useless nearly every thing besides. There is no universal remedy or universal curative method, nor can there ever be, with the very complicated constitution of the human organisation and the relations of life, and with the consequent infinite variety of complaints of man. And yet on the other hand, when curative gymnastics are comprehended, and used within their true bounds, free from partiality, and in intimate connexion with the universal medical art, every unprejudiced person must feel himself compelled to acknowledge them as often a really indispensable remedy — as an important and valuable addition to it.

In order to give a true basis to the judgment of the nature of curative gymnastics in general — in order to be able rightly to estimate physical motion as a curative, we must represent to ourselves, at least in its most general points, the physiological importance of the organs of motion — of the muscular system — and the part it is intended to play in the economy of the whole system.

The arrangement of our system is caculated for full activity of all its parts and organs. If, then, man is to develop his powers in conformity with the intention of their creation, and keep himself in his normal (healthy) state, a proportionate amount of activity on the part of

his mental faculties and bodily powers is requisite. But the full exercise of our physical powers — motion bringing the muscles into play — is, however, much more indispensable to our existence than mental exercise, as will be better seen by what follows.

The whole organisation of our being depends upon the uninterrupted renewing of the material of which our body is composed — on the getting rid of that which, having served its purpose, is now of no more use, and the assimilation of fresh organic stuff, or matter, which the body receives from the nourishment we take, and the air we breathe. The more therefore this renewal of stuff — this transforming process — is brought into action — within certain bounds — the more does the body gain in freshness, force, and durability. We see then that a continual renewal and revivifying of its parts is necessary. All interruption of this process, if not soon remedied causes sickness, disease, and death. Thus is happens that an insufficient assimilation of matter, and an insufficient throwing off of used-up and therefore useless matter (the remaining of the same in the body) — in short the want of balance between the amount of matter taken into the body and the amount of it which is consumed, is one of the most general causes of irregularity in the development and working of the mechanism of our nature.

But the causes which lead to a renewal of matter are a consequence of the activity of the physical organs in general, as long as it is in just proportion to the intervals of repose. Now the muscular system is by far the most voluminous of all the systems of the body, and the muscle (flesh) substance belongs to those organic tissues

which, by their activity (conformable to their end and aim — the movement of the body by means of a contraction of the muscular fibres) most readily allow of a transformation of their substance (renewal of matter). It is clear, that, from this two-fold reason, the muscular system, by its great activity, must be the best able to promote the transformation of matter in the quickest, most powerful, and completest manner, and consequently to give a natural, healthy impulse to the functions in a regeneration and revivifying of the blood and the juices of the body. For, as the blood is the common nourisher of all the parts of the body, so, by the reaction of muscular activity must the affluence of the blood (the flow of the blood *to* these parts), its whole circulation (this already by the action produced on the circulating juices by the contraction of the muscles), the formation and mixing of the blood, and thus also the digestion, respiration, the excretive process — in short, the whole organic mechanism — be set in motion. Hence comes it that, for the time, the heart beats more quickly, the breathing becomes faster — that a genial warmth is developed — and by continuous muscular exercise, the demand for nourishment is greater, there is an increase in the amount of matter thrown off from the body in the shape of perspiration and urine, and the sleep is more profound and refreshing. It has been shown by physiological observation and experiments, that a man in continual muscular activity completedy changes the whole mass of his body in the space of about from four to five weeks; while a physically inactive person, under the same circumstances in other respects, requires a space of from ten to twelve weeks. By active motion the muscular substance itself be-

comes fuller, firmer, and more flexible; and the useless accumulation of fat and flabby cellular tissues no longer takes place.

If then it is shown that muscular motion is the most natural agent by which the no longer useful parts of the blood — which without this motion would accumulate in the body, causing disease — may be got rid of more readily, and exchanged for new invigorating substance — in the same manner it follows as a matter of course, that accumulations of this kind can be prevented by the same means which is employed as a remedy. It must not be forgotten, however, that for a perfect attainment of such curative ends, a conformable regulation of the whole manner of life is especially necessary, and at times also medical advice and assistance; and yet a rational exercise of the muscular powers will always be one of the most essential and natural of all curative agencies. And here may be mentioned, as caused by these accumulations, the chronic pains in the abdomen so general in persons of maturer years; with the legion of different evils arising from this complaint, a weak indigestion, constipation, obstruction of the liver and milt (of the port-vein system); thence violent head-aches, so called hypochondria, melancholy etc. (from physical not mental causes); and also the diseases incident to youth, proceeding from an insufficient or faulty formation of the blood, such as a poorness of the blood (chlorosis), scrofula, etc. Besides that, the gymnastic treatment of this kind of diseases is aided by a direct mechanico-curative influence which is in connexion with the special gymnastics of the abdominal muscles, and of which we shall speak again by-and-by. There is also another mechanical action in connexion with the above,

which this universal movement of the limbs exercises in stimulating to full activity the functions of the skin — a so necessary condition to health — and not to be lightly estimated. It is this — the soft salutary friction of the skin by the clothes (even although they be quite loose) caused by such movements of the body.

Another physiological condition, by which muscular motion is enabled to operate in a very salutary manner, is the intimate relation and reciprocity of action which exist between the muscular system and the nervous system — i. e. the muscle nerves (nerves of motion) to the nerves of feeling. A good state of the body and the healthy tone of the spirits is clearly dependent in the first place upon the whole normal state of the nervous system. It seems particularly to depend upon a nice balance of these two parts of the nervous system, with respect to their state of excitement and activity. It is only at the expense of the one part that the other can raise itself above the balance point; but only by means of the same can the balance be re-established. Upon this condition depends the strength-exciting influence of rational muscular exercise, which, by promoting the carrying-off and discharging process, is so welcome in cases of over-excitement of the nerves, and which has also such a beneficially cheering effect upon the spirits. So it is that it becomes in the hands of medical men a sovereign remedy — or at least an indispensable aid for the curing of muscular debility, excitable weakness or bluntness of the nervous system, nervous hypochondria and hysteria, of sickly weakening pollution, mental diseases, certain spasmodic complaints, viz., St. Vitus's dance, epilepsy &c. &c. And it should not be regarded as an unimportant ad-

vantage mentally, that the result of the regular exercise of the will in the making of active bodily manifestations (so to speak) — of perseveringly overcoming bodily laxity and luxurious ease — is, as a psychological necessity, a strengthening of the power of the will and of action in general, promotes steadiness and decision of character, and gives us greater courage for the trials and struggles of this life; and that, therefore, that dangerous spiritual *(immaterial)* enemy within us is conquered, which in so many cases of chronic diseases defies the best chosen bodily remedies.

And, finally, the influence exercised by muscular motion in strengthening the bones and ligaments, and on the proportion of the different parts of the body, is also of great service to the medical art, and can be brought about by no other agency. The structure of the skeleton, and the position of the muscles of the human body, especially of the trunk, are such that the degree of flexibility and tension of the muscular parts has much to do with the carriage, form and contour in general; and this is more especially true of the uppermost part of the trunk — the chest. A long list of complaints take their rise from a faulty room-accommodation for the organs — all-important for life and health — situated in the chest and abdomen. This is easy to be explained, seeing that, in the case of a numerous class of men, the very strongest arm-moving muscles, which are situated round the chest, are scarcely ever set in full motion. (Of this we shall speak again.) If now there be an opportunity afforded to these organs, so crowded, pushed out of place, or otherwise mechanically injured, of returning to their normal free state and organisation — or, if this be no longer

possible, a partial amelioration in their circumstances takes place, the improvement in that state as regards room is naturally the first and most essential condition. To this end a particular, nicely calculated course of gymnastics alone affords the necessary means. We seek here by means of muscular motion — by the so-produced mechanical extension or compression — to act, now on particular parts, then on the contour of the whole trunk (especially of the breast), dilating or equalising — giving the skeleton first more room, and then strengthening it in its newly conquered position. For those who might yet doubt the possibility of a change being effected by these means in the size (roominess) of the osseous framework of the chest, we will mention that by measurements taken, even of adults, and often after having been subjected only a few month to the influence of a system of gymnastics, we have found an increase of from one and a half to two inches in the circumference of the chest, after having deducted the increase of muscular substance. The great gain thereout resulting in the cubic measurement of the interior of the breast, may be easily calculated.

But also the necessity for a more general introduction of *hygienic (health-preserving) gymnastics*, that is to say, such as have for their aim, not the curing of complaints already existing, but the prevention of the same — will be seen at once, if we examine the general bodily life of those persons who may be said to have little or no active physical motion, and to which denomination belong nearly all the members of the higher classes. Namely, of we compare it with that which may be considered as a really healthy average amount of bodily

exercise*), we see immediately that not only the amount and intensity of their general motion are far below the normal standard, but also that the motion itself is in the highest degree partial and unsatisfactory. In cases where walking is almost the only bodily motion of any consideration, there are three sets of muscles, all of great importance for the whole process of life, which are neglected in their development, and exposed to the danger of becoming useless: — 1) The muscles of the shoulders and chest, proceeding from inactivity of the arms; 2. The muscles of the abdomen; 3. The muscles of the back: the two last proceeding from a want of a sufficient motion of the trunk.

1. The muscles of the shoulders and chest serve at the same time for the movement of the arms and for the regular distension and contraction of the coats of the chest — in other words the process of respiration. But upon the circumstances under which this operation is performed, depends the circulation of the blood in the lungs, and consequently the uninterrupted regeneration of the blood (exchange of matter between the blood and the air), necessary to the support of life. Man cannot exist one minute without breathing. The energy of the whole life is therefore in exact proportion to the strength of the respiratory organs. For want of movement in general, but particularly of the arm muscles, the breathing is weak and imperfect. The elastic framework of the chest either does not even attain its full development and extension, or the chest becomes gradually narrower and narrower. In time are developed

*) Take for instance four hours only of garden work, heavy or light, according to circumstances, and distributed over the whole day.

the germs of mortal diseases of the lungs and the heart, and manifold interruptions of the whole system of alimentation.

2. The muscles of the abdomen compose the soft framework of the abdomen, situated nearly all round between the ribs and the hip-bones. This partly fleshy partly sinewy apparatus serves, by virtue of its contraction (which is voluntary), as well for promoting and stimulating the functions of the abdominal organs (digestion, circulation of the juices, in evacuations, in child-bearing, &c.) as also for assuring their situation, and for their protection in cases of vigorous bodily exercises or violent exertions. The aid of the abdominal muscles is also required for respiration — consequently for speaking, singing, laughing, coughing, etc. — and for the different movements of the trunk. From this will be seen the prejudicial effects of a want of exercise and a laxity of the abdominal muscles, such as sluggishness and interruption of all the functions of the abdomen, hernia, and in women painful childbed and delivery — which are all direct consequences of the above.

3. The muscles of the back serve for the extension (stretching out) of the spine, and for its maintenance firm yet flexible in an upright position; as well as for its sideward movements, (consequently of the movements of the whole trunk); and they are also operative in the process of respiration. Their constitution and activity is accordingly, for manifold reasons, of importance for the whole operations of life. Namely, the maintenance of an upright position of the trunk, which is dependent upon the above, is of great consequence, as well for the free, healthy performance of the functions of the chest and abdomen —

which always suffer by a continually bent and doubled-up position of the trunk — as also more especially in youth, for the conservation of the natural form of the back and whole body. From a want of exercise of these muscles arise the greatest part of cases of curvature of the spine. But also in other respects the power and activity of these muscles are of the greatest importance, viz., firstly, because the spine, situated in the median line of the body, forms a universal support *(point d'appui)* for the movements of the other parts of the body, the intensity of which movements is more or less dependent upon the rigidity of the muscles of the back; secondly, because most probably by great activity on the part of these muscles the strengthening of the spinal marrow is brought about in the most direct manner: and then again a consequence of that is a strengthening of the normal, and prevention of the abnormal reflexive working of the nervous system: as also more easily rendering powerless otherwise pernicious outward influences (a more powerful universal reaction). A vigorous spinal marrow is certainly one of the best preventitives against general debility and a too great sensibility (excitement), against the multiform enemies of life, hypochondria, hysteria, &c.

A scrutinizing glance at the general state of health of that class of mankind who have but little muscular movement, confirms the truth of what has been stated, and reveals in the greatest part of their complaints a connexion clearly to be explained.

Either, if, as so often occurs, the want of muscular motion produces already in youth its enervating influence, the body never attains to its full normal development. It remains faulty and defective, partly as regards its out-

ward form, partly as regards its organisation. It does not attain gradually and regularly to a vigorous maturity. General poorness of the blood, or qualitative faulty mixing of the juices weaves round such a youthful life a many-linked chain of complaints — the influences of the exterior world weigh heavily upon the tender plant, and bow its head — serious diseases (especially of the chest) menace its existence ere it arrives at maturity.

Or, this want of exercise is first associated with certain social conditions later in life. It is true that a vigorous maturity often neutralises for a long while its bad effects, and prevents its being so sensibly felt. But this lasts as a rule only to middle age. If not sooner, at least then begins this or that complaint to make its appearance — from what cause is for the most part not known or guessed at — such as the legion of chronic abdominal diseases, hemorrhoidal affections, congestion of the blood, precursers of the gout, asthma, hypochondria, hysteria, melancholy, paralysis, attacks of apoplexy, &c. Well for him who understands and acts upon the first warning hint of nature, jealous of the observance of her laws.

This is but a slight sketch of a picture presented by every-day life, in cases without number, and under different forms. We are certainly not wrong in considering a want of muscular motion, although not the only cause, at least one of the most essential causes of the existence of all those enemies of life, forming, as it were, a frame to that picture. We see from it that hygienic gymnastics are a necessity for all those whose condition in life does not call into action other muscular movements than those caused by simple walking. And if here and there we see such a person spared the heavier

penalties of a want of a proper amount of motion, yet in *all* cases the effect will be felt, by a premature old age, a bluntness of the faculties, a stooping and shrinking together of the body, general debility, &c. With a certain normal manner of life, an age of sixty or seventy years does not necessarily suppose a bluntness of the faculties. Among men of muscular activity, and, in other respects, of a rational way of living, even in less favourable circumstances of climate, it is no rare thing to find full vigour of mind and body at the age of seventy and eighty. *Temperance*, *activity*, and *contentment*, are the three principles of the philosophy of health, the following of which holds out a promise of the attainment of a healthy old age. With this, this precept of the ethic philosophy of life is in perfect harmony: — "Strive to obtain a full command over thyself, to remedy thy mental and bodily defects; begin with courage this struggle (*sapere aude!*) — at whatever period of life thou mayst be, it is never too late — and be unwearied in thy endeavours for the attainment of this true (subjective) freedom — for the ennobling of thy nature; so willst thou, within the limits set to thy earthly career by a higher hand, going on from victory to victory, come nearer and nearer to the end and aim of thy life."

In the faithful following of these two precepts, hygienic and ethic, lies the whole secret of the most difficult but noblest and most important of all arts — *the art of life*, i. e., *the art of living as we ought.*

II. Aim and Plan of the Work.

As the title duly sets forth, the aim of this work is the illustration of *Medical In-door Gymnastics;* and these depending *immediately* only upon one's will, and requiring no *foreign* conditions (mechanical or other aid), and therefore practicable any where and at any time. It is true that this does not comprehend all that is understood under the term *medical gymnastics;* for in many cases (e. g., for orthopedic purposes) such particular arrangements and conditions are required (continual and immediate medical guidance and superintendance, for instance) that they are only practicable in curative gymnastic establishments. But notwithstanding, there are in a good system of in-door gymnastics so many changes and modifications, that for by far the greatest number of medical purposes they are sufficient. Their great importance will also certainly be recognised if we take into consideration that the frequenting of such curative gymnastic establishments is for many reasons, only possible to the very few — that, on the contrary, in-door gymnastics — whether practised in a room, in a summer-house, in any convenient spot in the open air, at home or when from home — require neither especial arrangements

or instruments, nor (like the Swedish system of curative gymnastics) the aid of another person, but can be practised when and where one will. And besides this, to those who have followed a course of gymnastic treatment in an establishment it affords a welcome means of working out a corresponding after-cure, and of further carrying out such treatment.

The end and aim of this work is, then, summarily this: *To lay before the public a system of individual bodily exercises, under all circumstances easily intelligible and accessible, and directly useful to medical men, their patients, persons of sedentary habits, parents, and teachers; exercises acknowledged to be so important for the curing of numerous complaints, for the growth of the body, the maintenance of the health and vigour of body and mind to a ripe old age.*

And especially to all those who are making use of certain methods of cure, taking the waters, inwardly or outwardly, at home or at watering places, it affords a desirable means of procuring bodily motion, so much to the purpose, and in a much more universal, more specifically proportionate, and easier manner than were otherwise possible. In all such cases of methods of cure, an well-known essential condition is a corresponding regular and at times a powerful energetic bodily motion. The almost only means hitherto employed, walking, is certainly a very healthy exercise, especially in as much as it is connected with the enjoyment of the fresh air; and when it can be taken where the scenery is pleasing, affords variety and recreation to the eye and the mind. But without saying any thing of the partiality of this sort of exercise, it must be much too dependent for its regularity

upon the weather; or on account of the particular malady of the patient it may be impossible. This system of gymnastics presents most certainly the surest means of furthering, regularly and in a manner the best adopted to particular cases, the aim of the method of cure employed, in as far as it depends upon bodily motion. We therefore recommend even to those whose bodily state and other circumstances allow of regular methodical walking, to untertake a certain amount of gymnastic exercise every day, and as much walking or other motion as they have time for, or as their state of health will allow of. And to this may be added, that it is precisely at watering places, where, as a rule many cases of such complaints are to be found, that the patients have the best opportunity of forming themselves into groups for gymnastic purposes, according to their strength and expertness in such exercises; the thing takes then a more social, agreeable, interesting, and practical character. And also for the medical superintendance of such cases, the difficulties and inconveniences arising therefrom are removed in the easiest and most suitable manner, by the means being provided for constant, uninterrupted, regular motion, adapted to all times and circumstances.

To attain the end proposed in as complete a manner as possible, we have endeavoured to present to the reader in a summary manner just those of all imaginary medical gymnastic exercises which, depending upon no particular arrangements or conditions, are practicable under all circumstances, and at the same time well adapted to obtain the desired result. The motions are systematically arranged from an anatomical point of view, extend their influence over the member-moving muscles of the whole body, and

in this manner form the ground-work, or elementary or principal motions, out of which the thousand movements of every-day life (movements having some aim) are composed. By this system it is put into the power of every individual to obtain for himself, and that with ease the *united* advantages important for his health which are partially enjoyed by the labouring classes in the pursuit of their several callings, and which, although in each single case of less value than these gymnastic exercises, are yet sufficient to preserve them from the greater part of those health-destroying influences to which the working classes are exposed. The gymnastic exercises therefore afford at the same time a not unwelcome additional advantage — a great degree of bodily superiority in power, activity, and perseverance for general practical purposes, consequently also forming a groundwork for (among other things) military education, rational and graceful dancing, &c.; and by perseverance in the same assure a conservation for a longer period of the bodily faculties, even up to a most advanced age.

It must in general be considered advisable, that in all cases where certain cures are sought for by gymnastic aid, there should previously be an understanding with the physician about the choice of exercises, and the modifications required in individual cases, and that this consultation be repeated from time to time. The aim therefore of the present work is principally to put into the hands of the physician a suitable means of bringing about this understanding with his patient, and to afford the latter the necessary aid for the proper carrying out of the understanding thus brought about. And in fact this has been taken as much as possible into consideration in

the composition and arrangement, so that summary directions on the part of the medical man will suffice to make any body easily familiar with the particular, and most suitable method of the employment of the motions. In cases where no exactly definite special curative end is to be attained, but only a precautionary measure for the general health (hygienic gymnastics) is proposed, and where no exceptional circumstances, such as local organic defects, exist, no further medical advice or superintendance will be necessary. By means of the accompanying directions, every body, even the most actively employed man of business, and all those who, as a rule, most require such bodily recreation, such as home-students, clerks, shopmen, and all whose profession does not call the muscles into play — will be able to satisfy this want. And this is attained most completely by a regular methodical gymnastic exercise, once or twice a day, of only a quarter or at most of half an hour, than by a daily walk of some hours. And therefore must in-door gymnastics be of the greatest service to all comparatively inactive persons during the season when the weather is unfavourable, at which time, on account of a state of almost total inactivity, the germs of so many complaints are planted in the system, which, sooner or later, ripen into active diseases. Even the unfortunate being who, by paralysis, or the loss of a limb, is deprived of the possibility of procuring the amount of general motion so necessary to his general health — and even if confined to his chair or his bed — will find in them the means of performing the different movements practicable with his remaining moveable limbs, and so to ward off the bad effects of an entirely motionless state. The same occurs

in general with all those who by their bodily condition or other circumstances, are confined to their room, to whom the bad effects of a want of exercise become very sensible. How many thousands are there of the fair sex among the higher classes, who without perhaps being positively ill are yet nearly always weak and ailing, but who would enjoy good health of they could have regular and proportionate exercise. It is true that the family doctor insists on the necessity of exercise, but again and again even the best will in the world gives way before the thousand very often insuperable hindrances which oppose themselves to a *consequent* carrying out of the like measures, hitherto at any rate practicable, and which are more numerous than among men.

To satisfy this universally existing want, in all these different cases, is the aim of this work, and its plan is as far as possible in conformity therewith.

In order to facilitate, as much as lies in our power, the understanding of the same, as well for physician as for patient, the description of each single movement, and the intimation of its most essential special curative effect and mode of employment are given with each illustration; and this in such a manner as will be sufficient to afford a sure aid in each single case where a particular end is to be attained.

III. General Rules.

1. The following motions are, as a rule, adapted to all circumstances, to every age, and to both sexes. Particular exceptions will be mentioned by-and-by: only a state of pregnancy can form a total exception, in which case the necessary bodily motion will be better obtained in a much milder but regular manner — walking for instance — than by more violent exercise. It is also hardly necessary to say that in cases of serious inflammation, or fever in general, such gymnastic movements cannot he practised.

2. But once in their proper place, they must be carried out *with the greatest consequence*, as long as no equivalent is afforded by one's daily occupation. And they must be included in the routine of every day just as much as eating and drinking, and continued, though perhaps modified, even after the attainment of any proposed special cure. It is only in such a manner that their true curative effects, in the long run, can be reckoned on. No one having any regard to his health will grudge such an easy sacrifice.

3. The best time for the performance of these motions is *just before one of the daily meals*, either break-

fast, dinner, or supper, but so that there shall be always an interval of at least a quarter of an hour between them and the respective meal, to afford the muscles of the stomach a period of repose. The abdomen should be as empty as possible, it is therefore advisable that, where necessary, this should be attended to before-hand. To promote a consequent carrying out of these motions we would recommend that the time set apart precede *regularly* one or the other of the daily meals — always the same: for in the every-day life of most persons these times afford the most material and surest remembrancer

4. All articles of clothing which restrain the free action of the parts of the body, especially the neck, breast, and abdomen, must be laid aside.

5. *Where there is a great disposition to a flow of the blood inwards, or to bleeding, or where important organic changes of the generative organs, or hernia, exist* (for many cases of not too long standing can even be radically cured by the use of gymnastics), *only such motions must be practised as the medical man, after a careful selection, recommends.* In all these cases the hereafter-following sixth rule is especially to be rigorously observed. And persons suffering from hernia should never go through the exercises so recommended, except when the rupture is perfectly restrained by the truss.

6. When the breathing and the beating of the heart become sensibly accelerated, a short interval of repose must be observed before going on to the next motion.

7. The intervals should be devoted to a *careful, regular respiration, quiet, full,* and *deep,* as is the case in yawning; and in so doing it is better not to let the

arms hang down loosely by the sides, but to set them lightly on the hips, as by this means the full respiration is favoured by easing the weight of the shoulders. This is one of the most important and beneficial operations (taking place without any especial exercise of the will where the person is regularly muscularly active), directly and essentially promoting, as it does, a free and healthy state of the lungs and a lively and free circulation of the blood, particularly in the abdomen. The habit of taking a series of full, deep breathings daily (which may also be very well practised out of doors if the air is pure) is therefore especially to be recommended to persons of little motion; for as such persons, in their ordinary way of life, which is in no way calculated to promote the strengthening of the muscles of the arms and breast, very seldom breathe fully — only half the depth — a part of the cellules of the lungs remain thus inactive, and are therefore, in the greatest number of cases, often already early in life, diseased, and consequently become useless for respiration, as post-mortem examinations fully prove. We shall treat the employment medically of compensating irregular breathing by-and-by.

8. The movements must be performed *quietly*, and not hastily, but *with a full stretching of the muscles*, and in all cases as exactly as possible according to the illustrations given. All irregular jerking motions are to be avoided, as well as the moving of other parts of the body not designated, which is liable to distract the attention, and render the motion itself imperfect. Only in this way can the intended full concentration and employment of the powers of the body upon the parts to be exercised be brought about.

9. The attainment of the desired end of gymnastic exercises depends chiefly upon the *proper amount.* But this is naturally different in different individuals; and especially at first is the amount of exercise that can be taken always small, increasing with practice. As far as it is in general possible we shall give the average, as well for each single movement as for the promoting of especial cures, by which means a sure rule *(Anhaltpunct)* is given for all cases. Two conditions must thereto be rigorously observed: 1. *That the feeling of fatigue must be allowed time in the intervals of repose to pass quite away;* 2. *That no great pain of the muscles remain:* for the painless feeling caused by the exercise of the muscles which is especially the case with beginners, is, from the agreeable sensation experienced, a proof that it is natural and harmless. These two conditions, then, must be considered as limits, never to be exceeded, and particularly by beginners. And so, if at the commencement, in spite of great caution, lively pains in the muscles are now and then felt, which is the case with many persons after even a little but unaccustomed motion, these pains must first be allowed to pass over, and the party recommences with less fatiguing exercises. Soon, with a little familiarity with the movements, the repetition of them becomes far easier and less fatiguing than at the beginning. The objectionable maxim, *Much helps much*, must be avoided, both here and in every method of cure. Only as long as the increase of bodily activity caused by muscular motion is in proportion to the nourishment, i. e., to the formation of new organic matter, can a certain amelioration of the health take place. Beyond these limits the contrary is the case. By an over-excitement of the muscular fibres,

they become in the end stiff, organically deteriorated, and ever less and less serviceable. Instead of an increase of health and vigour, the consequence is a weakening of the powers of the whole system. Those suffering from chronic complaints have especially to guard against that impatience which is liable to show itself — to wish to force a quick attainment of the end desired — which, by the nature of nearly all these diseases, is impossible. When a gymnastic method of cure is undertaken in a right place and in a proper manner, it will have its recompensing result, but, as rule, only *gradual* at first. So, once more, we recommend the observance of a *gradual progression in executing the motions, and the never going beyond certain limits.*

10. When, after a long use of this system, a still greater development of the muscles is desired, and can be borne without injury, this will be produced by the use of a pair of dumb-bells of from two to six pounds' weight, the individual going through the same movements with them in his hand as he did before without them.

11. If it is desired to unite the enjoyment of fresh air by having the windows open at the time of exercise, this may done, even in cold weather, of course common precautionary measures being observed.

12. The arrangement of the whole manner of life depends naturally upon different circumstances. As is in general the case where regard is had for the health, so is also here a simple, temperate and regular life — not anxiously pedantic — the best means to the end in view.

13. In cases of indisposition, the daily gymnastic exercises should only be omitted when they sensibly disturb the body, The period of monthly courses in women does not require a total cessation, but only certain modifications in the exercises, which will be indicated in the proper place.

IV. Illustration and Description of the Medico-Gymnastic Exercises.

Remark.

In cases where it is proposed to perform a certain number of these motions every day, in order to give a sure average rule how often each single movement is to be repeated, such an average is here expressed by three numbers. The first designates the number of times by beginners, the second after a fortnight's regular performance, and the third after a lapse of two months. The last number is to be considered as that to be observed by a further carrying out of the same. This standard is calculated for a male adult, and supposes full normal muscular power — that is, that no organic defect exists. For those over sixty, for very corpulent persons, for females and children, the half of that amount will be sufficient. Where a particular cure is to be attained, the motions most adapted to bring it about can be oftener repeated than the average given, and the others correspondingly less. If it is advisable to go through the series of motions resolved on more than once a day, must depend upon circumstances,

especially on careful observation on the part of the performer himself. As a constant exercise, twice a day would, in most cases, be not only unobjectionable, but even to be recommended.

The motions undertaken for any particular purpose can be easily adapted to these and other directions which may be given hereafter; and the modifications here and there necessary, both as regards the manner and the amount of the motion can be definitely regulated accordingly.

1) Rotatory Head movement — 10, 20, 30 *times.*

The head describes a circle from right to left, and from left to right, the circumference being as extended as the articulation of the neck allows of. The other parts of the body remain immoveable.

2) Turning of the Head — 6, 8, 10 *times to each side.*

A turning of the head on its axis. With a free articulation of the neck, the head describes on each side nearly a quarter of a circle, so that the chin comes nearly over the shoulders.

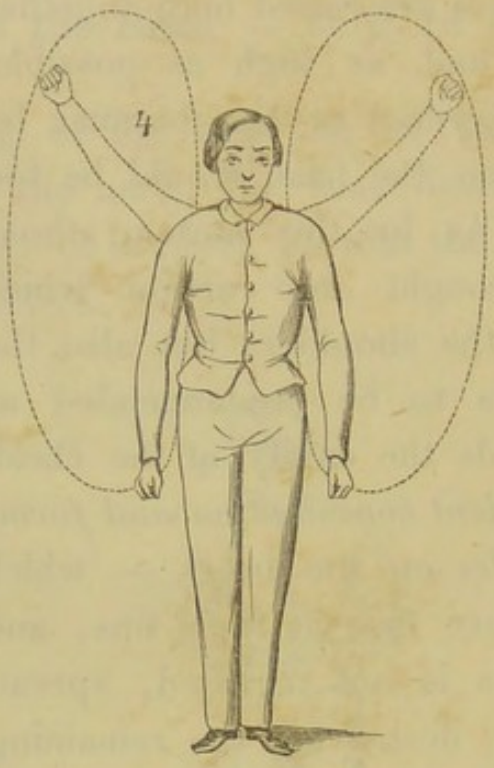
These two movements set the whole of the muscles of the neck in motion, and serve to render *their action freer in cases of stiffness* — when no organic hindrance exists — and as a remedy for a *disabled state of the same*, and against *nervous giddiness*. The latter soon disappears because the head gets accustomed to all positions and changes from one to another. If there is a great disposition to giddiness, it is better at first to perform this movement in a sitting posture.

3) Raising of the Shoulders — 30, 40, 50 *times.*

The shoulders are raised both together as powerfully and as high as possible. They must be lowered gently, because by frequent repetition the head would be too much shaken. As by this motion, those muscles are brought into action which raise not only the shoulders but also the upper ribs, it is to be recommended as enlarging upwards the cavity of the chest, in cases of *incipient consumption and formation of tubercles* on the lungs — which usually takes place first at their tips, and if their progress is not arrested, spread lower and lower, destroying the remaining tissue, and so causing the ordinary form of consumption. Of more direct service is this movement against *paralysation* *) *of the shoulder muscles*, which is seen by a loose hanging of the shoulders. In cases of unequal height of the shoulders, proceeding from a partial paralysation of one of them, or from curvature of the spine, this movement should be performed with *only* the defective shoulder.

*) By the word *Lähmung, paralysis, paralysation*, is to be understood not exclusively a completely paralysed state, but also a partial paralysation, of which there are, it is true, an infinite number of degrees. Paralysation is already present where the normal balance of the muscular parts of the two sides of the body compared one with another, or in general the normal condition and power of motion of a limb, is visibly disturbed. In this general sense it occurs both here and elsewhere, and is generally translated *paralysation*, which must also be understood in this modified sense.

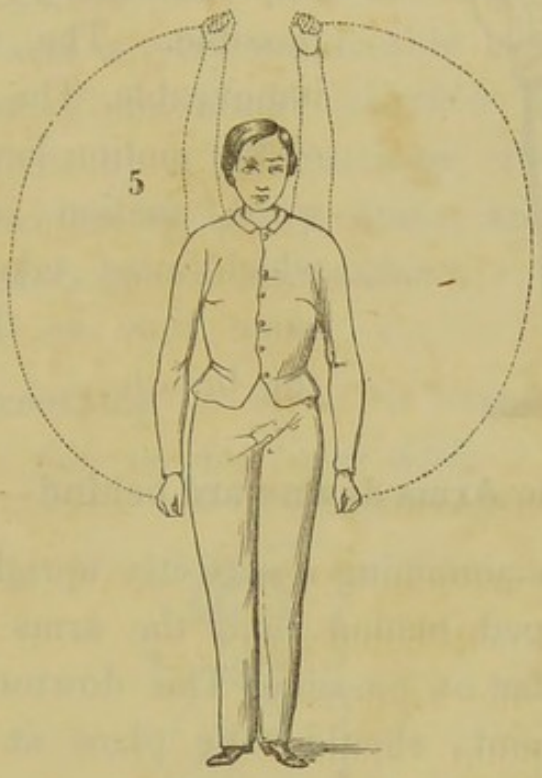
4) Circular Arm movement — 8, 12, 20 *times.*



Both out-stretched arms describe as large a circle as possible, first in a backward direction and then forwards. The arms must pass close to the head, which necessitates a certain freedom of the articulation of the shoulder, in most cases only to be attained by practice. The shoulder muscles, as well as those lying round the framework of the chest, are by this means set in freer universal (all-sided — in opposition to partial or one-sided) motion. Its essential working consists in causing a *freedom of action of the shoulders,* and *promoting respiration*, with which must also be reckoned an *enlarging of the framework of the chest,* which is a mechanical consequence. This movement is decidedly of great service in cases of a *defective action of the shoulders, narrowness of the chest,* and therefore for certain forms of *asthma, incipient consumption* — in short wherever an amelioration of the process

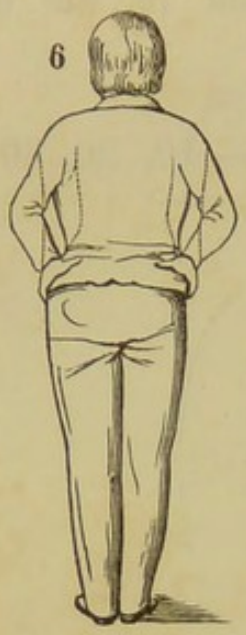
of respiration is the end to be attained. Besides this, it acts a preservative against *paralysation* of the muscles brought into play.

5) Raising of the Arms sidewards — 10, 20, 30 *times.*



The arms are raised sidewards as high as possible, without the slightest bending of the elbow. If the muscles and articulation of the shoulder are healthy and free, the fore-arm, when fully raised, should touch the sides of the head. The allotment (raising) muscles of the arm, and the side neck muscles are chiefly operative in this movement The sides of the chest, and the space between the lower ribs are considerably enlarged by the mechanic action. As one consequence of this motion is a *promotion of healthy respiration,* it can be profitably used for *asthma,* and in cases of *adhesion of the membrane of the lungs to the side* (after inflammation). And then also against *paralysation* of the muscles exercised.

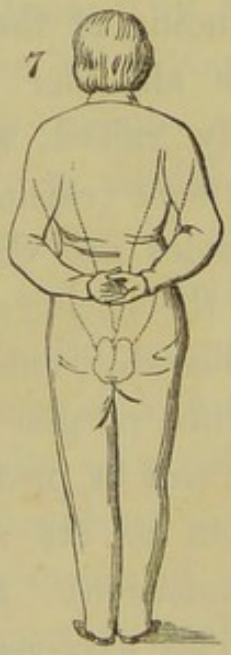
6) Throwing back the Elbows — 8, 12, 16 *times.*



Both hands are set fast on the hips, and in this half-bent position the arms are thrown forcibly back as far as possible. The trunk remains immoveable. The accent (stress) of the motion lies on the backward motion of the elbow, which must take place at the same time as the *in*haling of the breath.

7) Stretching the Arms downward behind — 8, 12, 16 *times.*

The body maintaining a perfectly upright position, the hands are clasped behind, and the arms then stretched downwards as far as possible. This downward movement, the essential point, should take place at the same time with the *ex*haling of the breath.



By this and the foregoing movement the shoulders are strengthened, and thrown more back; and by the present one they are also drawn down; thereby promoting a *nobler carriage*, and one in many respects favourable to the health, as also *widening the chest.* It aids respiration, and remedies that *wing-like standing-out of the shoulder-blades*, and is very serviceable in cases of *laxity and defectiveness of the hinder shoulder muscles*, which manifest themselves by a bad carriage, and the inability to assume at once an upright position; and in the greatest number of cases of *chronic asthma.*

8) Unequal breathing — 6, 8, 10 *times, but repeated four or five times daily.*

The aim of this exercise is a compensating action. and is therefore only of service in cases where the action of the respiratory organs on either side is *unequal*, i. e, where one half of the chest — one lung — is less active

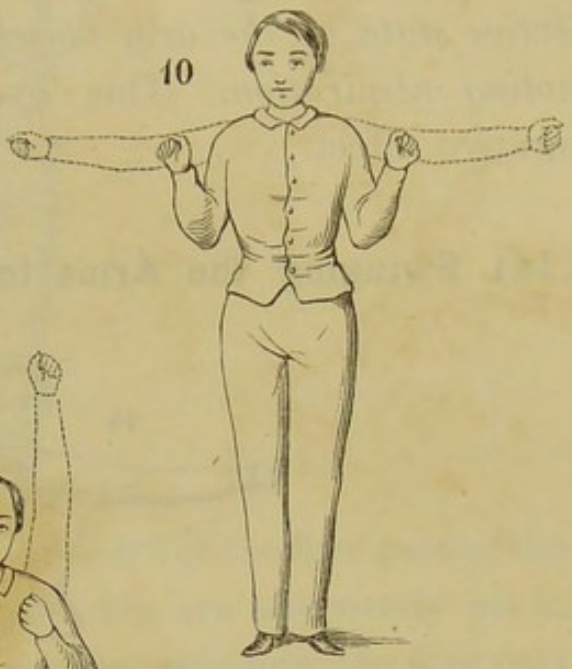
than the other; whether this arises from a disabled state of the respiratory muscles on one side, or from organic changes (such as the adhesion of the lungs to the side), the consequences of former diseases of one part of the organs of the chest. The open hand is placed high up close under the axillary cavity (arm-pit) on the healthy side — in the illustration the right side is supposed to be the healthy side — and pressed firmly against the ribs, thus causing here an obstruction; while the other side, rendered more than otherwise free by the passing of the arm over the head, is so much the more stimulated to stronger and deeper breathing. The hand placed at the side must be tightly pressed against the ribs, particularly when inhaling. The breathing must be as deep and complete as possible, but at the same time gentle and regular, as in yawning. All haste and exertion must be avoided.

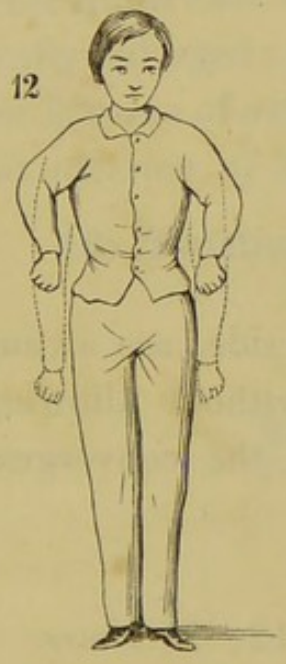
This operation of unequal breathing can be sometimes used, in cases designated, instead of the usual equal breathing recommended *rule* 7, *page* 27, without the latter's being entirely neglected.

9) Striking out the Arms forwards 10, 20, 30 *times.*
10) „ „ „ „ **sideways** 10, 20, 30 *times.*
11) „ „ „ „ **upwards** 4, 8, 12 *times.*
12) „ „ „ „ **downwards** 10, 20, 30 *times.*
13) „ „ „ „ **backwards** 6, 10, 16 *times.*

A vigorous bending and stretching of the arms from the elbow in five different directions. The movement is performed with closed fists, and a rigid tension of the arm muscles. The same power must be employed in

bending as in stretching the arm, yet not so as that it cause too great a concussion, which is not good for the head.

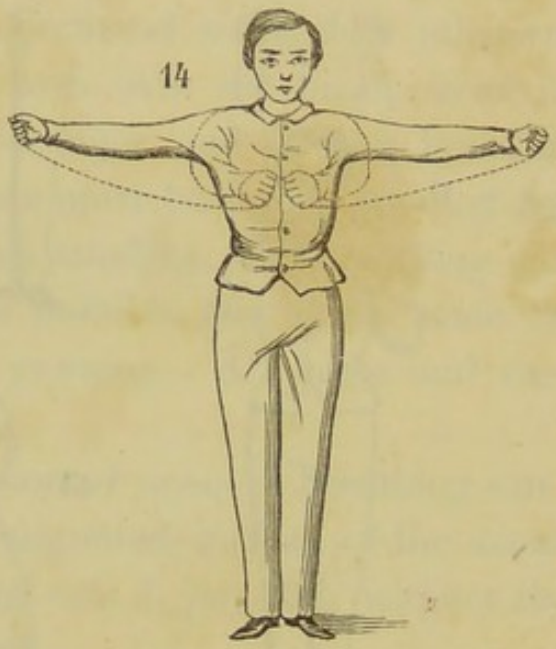




The flexor and extensor (bending and stretching) muscles of the fore-arm are here called most into play. As this movement requires the co-operation, more or less, of a great number of muscles (nearly all the arm

muscles), it serves in the first place as a part of the system of *universal motion*, and besides for facilitating the *free action of the elbow joint*, as a remedy against a *defective state of the arm muscles*, and partly also for *promoting respiration*. This exercise has no other special curative effect.

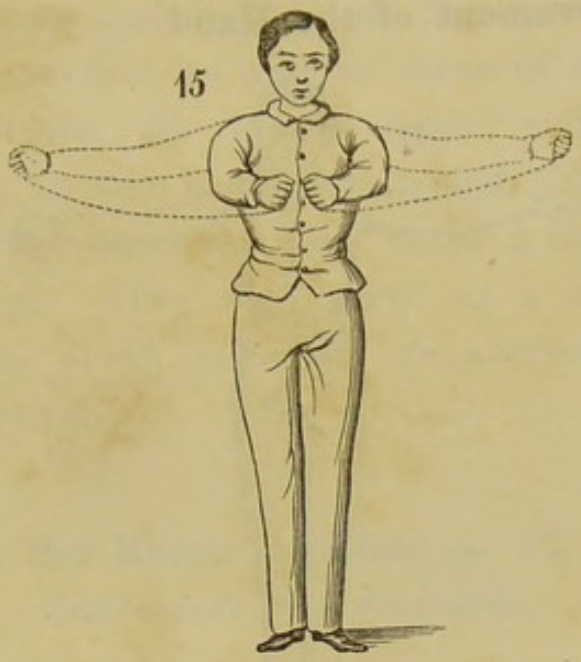
14) Swinging the Arms together — 8, 12, 16 *times*.



The arms first stretched out on either side, are swung energetically together horizontally, but without allowing the hands to touch. The effect lies in the convergent movement.

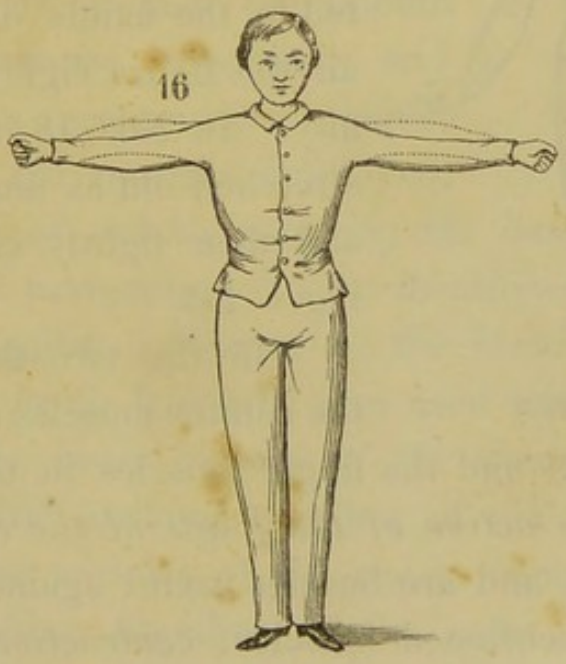
15) Swinging the Arms apart — 8, 12, 16 *times*.

A similar movement, only in an opposite direction. The structure of the body does not allow of the hands coming so close together as in the former exercise. The effect here lies in the divergent movement.

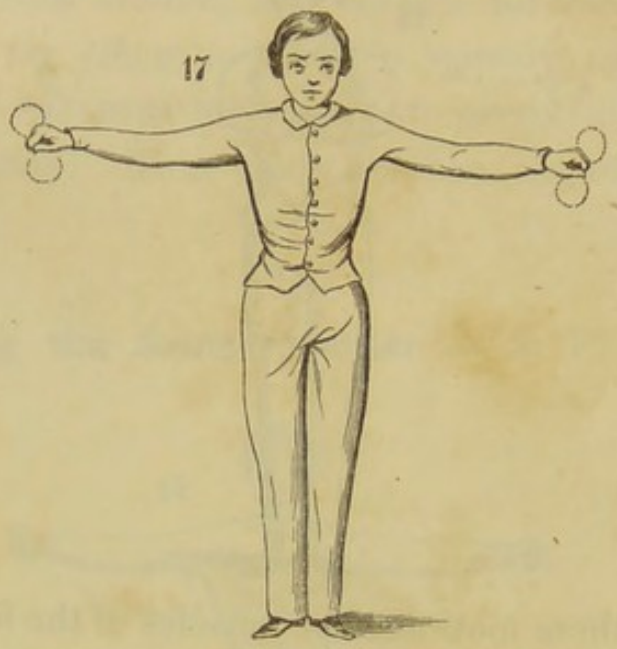


In both these motions, the muscles of the fore part of the chest and the hinder shoulder muscles are alternately set in predominant activity; at the same time that now the fore part of the framework of the chest, now the hinder part, is mechanically enlarged; thus *aiding respiration*, and being serviceable in cases of *asthma, the formation of tubercles on the lungs,* and *adhesion of the membrane of the lungs.*

16) Twisting of the Arms — 30, 40, 50 *times.*



17) Eight-movement of the Hand — 20, 30, 40 *times.*



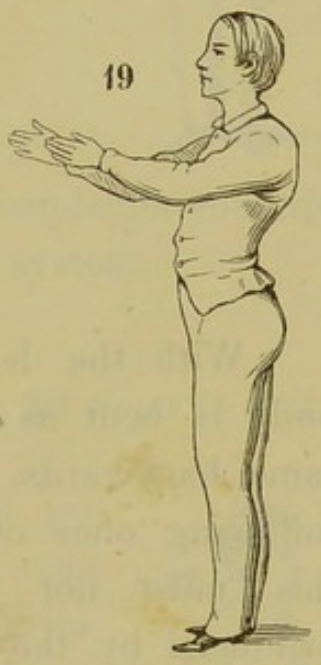
18) Bending and Stretching of the Fingers — 12, 16, 20 *times.*

The movement No. 16 is that produced in boring a hole with a gimblet, but with out-stretched arms. No. 17 will be best executed by the hands' describing in the air the figure eight (∞) horizontally. In No. 18 the fingers are stretched out as much as possible, and then tightly clenched, forming a fist.

In the two first movements the rotator muscles of the arm and hand are active, and the finger muscles in the third. They promote a *free action of the joints of the arm, the wrist,* and *the fingers,* and are besides useful against *paralysation* of the above-mentioned muscles, *contractions* of the wrist

and finger joints (particularly as fore-runners of gout); and at the same time as aids in cases of different forms of cramp, *epilepsy*, *St. Vitus's dance*, and the *writing-cramp*. If such an end is to be attained, these movements may be repeated three or four times a day, if no pain is felt therefrom. They also serve as a remedy against *affluence of the blood, and pain or nervous affections of the head or breast.*

19) Rubbing the Hands together — 40, 60, 80 *times backwards and forwards.*


19

A well-known movement. When the palms of the hands are vigourously struck together the movement becomes quite an energetic one for the exercise of nearly all the arm muscles, especially the flexor muscles, and those of the fore part of the chest. In the first place this motion is useful in as much as it contributes its quota to the amount of *universal exercise* required; and then also as a preservative against *paralysation* of the muscles employed, and as a means *of quickly warming the hands*: and thus, with certain foot movements (to be mentioned by-and-by), as a remedy against *affluence of the blood, and nervous affections of the head.* It can be also used against *the same complaint of the inner organs of the chest.* But in this case the energetic striking together of the hands, which rather strains the muscles of the chest, should give place to a quiet rubbing together of the same, which being

longer performed, the operation gains in amount what it loses in intensity.

20) Bending of the Body forwards and backwards — 10, 20, 30 *times each way.*

With the legs fixed and their muscles rigid, the body is bent as far forwards as possible, and then the same backwards. This movement, as well as the other following ones of the trunk, must be performed gently: this must not be forgotten. The forward motion is produced by the muscles of the fore part of the abdomen, and the backward one by the extensor muscles of the back. By this means a very healthy influence is exercised on the organisation of the abdomen, when sluggish or suffering from *constipation*, and a lively strengthening effect produced on the lower muscles of the back — a preservative against *paralysation* of the same.

21) Sidewards movement of the Body — 20, 30, 40 *times to and fro.*


21

The trunk is moved directly sidewards to the right and left, but without effort.

The muscles active in this operation are especially the side and back muscles of the abdomen, as well as the muscles between the ribs. This movement exerts a favourable influence on the circulation of the blood, and on the mechanism *of the organs of the body on either side*, particularly the *liver* and *milt*, and is therefore to be especially recommended for all complaints consequent upon a derangement of the *port-vein* system.

22) Twisting of the Body — 10, 20, 30 *times to and fro.*


22

The trunk maintains its upright position and turns on its own axis the same distance on each side, the legs being immoveable and the back well stretched.

The lower back muscles and those of the hips are thereby principally employed. By this movement a mechanic straining and stretching of the fore coat of the stomach on the opposite side takes place, causing the intestines to be moved about from one side to the other gently *kneaded* — so to say — thus promoting the

action of the organs of the trunk: and besides serves as a preservative against a *disabled state of the muscles employed*, and especially what is called a *paralysation of the spinal marrow*.

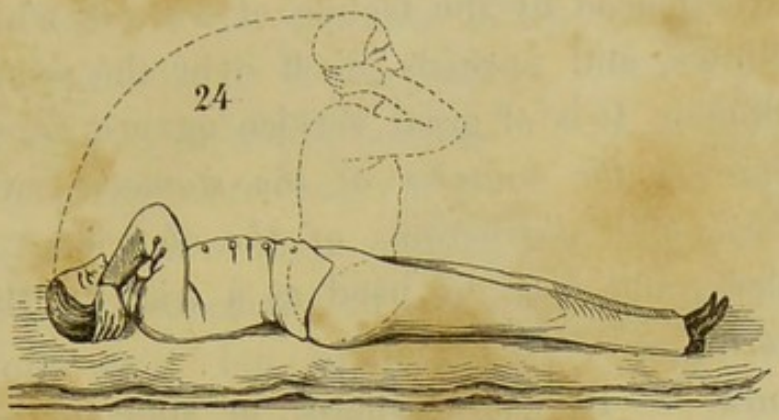
23) Circular movement of the Trunk — 8, 16, 30 *times.*

23

The trunk, turning on the hips, describes a circle as large as possible in circumference from left to right and from right to left. This takes place by means of the muscles lying about the hips. The abdominal muscles are also thereby set in a sort of see-saw, alternate motion. This motion gives a *universal impulse to the digestive organs*, and is therefore to be recommended in cases of *their sluggishness*, and the many evils consequent thereupon. If it is practised principally *to relieve the bowels*, the best way will be thus: that the hinder half of the circle to be described with the head and trunk go from right to left, and that the accent be laid upon this part of the movement. This see-saw stretching of the muscles of the abdomen acts most favourably in forcing down the contents of the great gut.

This movement strengthens all the *muscles about the hips;* and, by the operator's becoming gradually accustomed to a circular movement of the trunk and head, it serves as an aid in cases of *nervous giddiness.* Should there be a *great* tendency to giddiness, this movement must at first be practised sitting.

24) Raising of the Trunk — 4, 8, 12 *times.*



The body must be in a horizontal position. As the employment of a sofa or a bed is not at all times convenient, in the illustration we have represented a doubled carpet. Two cushions, one under the head and the other under the hips, would do just as well: neither one way nor the other requires much trouble. The movement itself consists in a simple raising of the trunk to an upright position without moving the legs. Many will not at first be able to accomplish this without the aid of a block of wood or a heavy cushion, which, being laid across the legs about the ankle, serves as a compensation weight. By-and-by this becomes unnecessary. At first the arms should be crossed over the breast. If this succeeds the hands may then be placed behind the head, as in the illustration. If it is desired to render the movement still more difficult, dumb-bells may be used, the hands being then held close down to the body.

This is a movement setting powerfully in motion all the muscles of the abdomen, but especially those of the fore part, whose activity, and the straining they undergo, exert a decidedly direct influence on the functions of the body, but which are however just those that are in so many cases so much neglected. After a repetition of the motion from

four to eight times, the beneficial influence of it will be already experienced by the feeling of warmth which immediately follows, and spreads itself over the whole region of the abdomen. It is of great service against *weakness, or paralysation of the muscles of the stomach,* and for all forms *of chronic obstructions of the abdomen*, and their consequences; and may be used as a trial for the radical cure of hernia.

Remark. — In cases where, in spite of the facility afforded by the laying of something over the lower part of the legs, the movement is still too difficult — and further, in such cases where great caution must be observed in habituating one's self to the movement and in the passing through the different stages of it (as in hernia), and for women who have already had several children (and who therefore generally have the abdominal muscles rather slacker) — it would be found better to place the upper part of the body in a slightly elevated position — not quite horizontal as in the other cases: in such a manner the raising will be greatly facilitated. A sofa can be very easily arranged for the purpose.

25) Circular movement of the Leg —
4, 6, 8 *times with each leg.*

The leg, fully stretched, describes a circle as large and as high as possible, from the front backwards, coming down again to its former position by the other leg, which now performs the same movement in its turn; and so this goes on alternating. The trunk should be kept as much as possible immoveable As, however, the centre of gravity is continually changing, a many-sided play of the muscles is the consequence. Not only the allotment

(raising) muscles of the legs, but also the whole of the muscles of the trunk, particularly of the back and loins, are set in active motion. The movement serves *to render freer the play of the legs in their sockets*, if impeded; and especially in cases of *rheumatic gout*, but of course only where no trace of inflammation any longer exists. It is also a prevention against *paralysation* of the muscles employed, and is of service *where the head or breast requires to be relieved**).

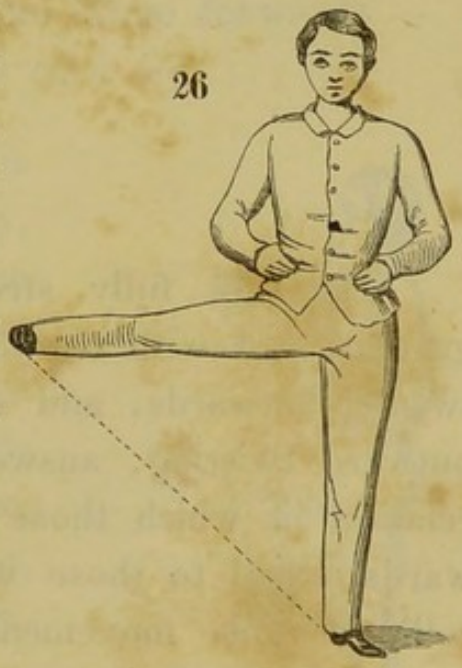
25

26) Sideward movement of the Leg —
6, 10, 16 *times with each leg.*

The fully stretched right leg is raised sidewards, in doing which, in order to make it as complete as possible, the accent should be laid upon the upward movement, but without any violent effort. After doing this a few times with one leg, the other should take its turn.

The movement is operated more especially by the side muscles of the hips and trunk. The

26



*) *Ableitungsmittel*, translated, *relieving, relief, &c.* is literally *carrying-off means;* that is relieving the respective parts of the body of superfluous blood, juices, &c., by promoting their passing off or out of the body.

practical use of it is the same as that of the No. 25, only that here, by virtue of its more violent and exciting shaking effect upon the regions of the liver and milt, it is of great service in cases of *obstruction of the port-vein system*. It is to be avoided by females.

27) Twisting of the Legs — 20, 30, 40 *times with each leg.*

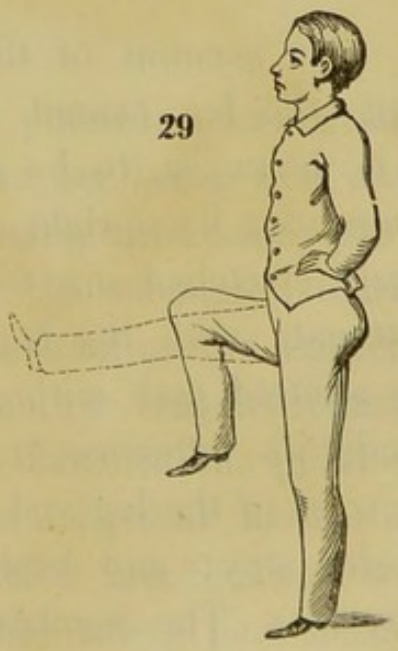
The leg, fully stretched, slightly raised from the ground, and with the toes turned upwards, is vigorously twisted outwards, and so that the accent is laid on the outward twisting, answering to the normal predominant relation in which those muscles which twist the leg outwards stand to those with cause the inward twisting, or rolling. This movement is more easily and completely executed if each leg performs its whole task without the interruption of alternating with the other. The muscles in operation here are the rotator and extensor muscles of the leg. The application is the same as that of No. 25.

28) Drawing the Legs together — 4, 6, 8 *times.*


28

The legs are placed at a moderate distance apart, the body resting on the well-turned out toes. The legs are then drawn together by sliding them along the ground (still on the toes), the knees remaining stiff. This is a very energetic movement for the muscles of the upper part of the thigh, and for those of the calves, and finds its application as a preventitive against a *paralysation* of the muscles mentioned, and as a means of *relieving* the head and chest.

29) Bending and Stretching the Knee forwards — 6, 8, 10 *times with each leg.*


29

The leg, bent at the knee, is gently raised in front of the body, and then with a tension of all the muscles, stretched out vigourously at full length. This is performed by each leg alternately. The greatest number of the flexor and extensor muscles of the leg and foot, including those in the pelvic cavity, are thereby set in active motion. The movement serves *to render freer the joints of the knees,* in cases of painless stiffness, and *prevents their becoming*

paralysed; as a stimulant for the circulation of the blood in the lower organs of the trunk, especially in cases of *hemorrhoidal obstructions;* and as a means of *relieving* the upper parts of the body.

30) Bending and Stretching of the Knee behind — 10, 12, 16 *times with each leg.*

On account of the organisation of the joints of the hips, the leg cannot be raised so high behind as before. It is, however, to be raised as high as possible (the body preserving its upright position), then bent, and then vigorously stretched out to its full length. It is better not to alternate with the legs, but that each should accomplish its allotted task without interruption. This movement extends its influence over most of the extensor and flexor muscles of the leg and foot, as No. 29, but in a partly opposite way; and besides that, exercises the lower back muscles. The combined effect of these two movements is to set in active motion all the extensor and flexor

muscles of the leg. The exercise serves *to render freer the joints of the knees*, and is of service in cases of incipient *paralysis of the spinal marrow, or of the muscles of the feet;* as well as being a remedy against *affluence of the blood, and irritation of the nerves of the head and breast.*

31) Bending and Stretching of the Foot —
20, 30, 40 *times with each foot.*

A powerful and complete as possible raising and sinking of the point of the foot, the leg being held forward and the knee rather stiff. The movement takes place simple by means of the ankle joint. In connexion therewith there may also be an energetic bending and stretching of the toes, which however, of course, require plenty of room in the shoes. The simple raising of the point of the foot may be also alternated with a circular motion of the same. The muscles thereby active are those of the shin and calf, and the muscles of the lower part of the thigh and of the foot. The movement serves *to render*

freer the action of the joints of the ankle, the tarsus, and *the toes;* as a means *of relief for the other parts of the body,* and against *paralysation* and *slighter contractions of the foot.* It is also a good means *of warming the feet.*

32) Raising of the Knee — 4, 8, 12 *times with each knee.*

32

The leg, firmly bent at the knee is raised so high that the knee is brought as near as possible to the breast. On the raising a strong accent must be laid. The upper part of the body should be kept as immoveable as possible, in spite of a great disposition to bending forward, which is liable to show itself. If the joints of the hips are quite free, and the allotment muscles of the legs have attained a full average amount of power, the movement then becomes so perfect that the knee lightly touches the breast without any perceptible bending forward of the trunk. But here the average amount regulated by the circumstances of each individual must not be exceeded, as there exists a great difference in persons as to their capability of performing this motion. All violent effort must be avoided, and each will attain his aim most completely by being satisfied with doing his best. The movement succeeds best by changing the legs. This is a very energetic exercise for all the allotment muscles, and especially for those in the lower part of the abdomen, also powerfully acting mechanically from two directions — from within and without — upon the whole of the organs of the abdomen, beneficially invigorating and promoting the functions of the same. It is therefore to

be especially recommended for all chronic complaints proceeding from or connected with *sluggishness or obstruction of those functions;* viz., *obstruction of the port-vein system, weak digestion* (especially of the small gut, declaring itself by an unpleasant feeling generally an hour and a half or two hours after the meal), *constipation, flatulency* (this movement has an especially powerful, immediate action against flatulency), *hypochondria* proceeding from the abdomen, *hysteria, interruption of the hemorrhoidal flux, and of the monthly courses,* so-called *mucous and bladder hemorrhoids, chronic mucous fluxes of females, &c. &c.* This exercise is also calculated to produce a quickly fatiguing and sleepy effect if such be desired.

But this must be kept in mind, that the most immediate working of this movement is a heating one; and its use must therefore be dependent upon this consideration, and regulated accordingly. Where any inflammation is present in the region of the abdomen, or in cases of disposition to bleedings, or the existence of hernia, it is to be totally avoided. By women, where there is a disposition to orgasm, and in connexion with heating medicinal-water cures (internal or external), it is to be used with caution. For girls it should be allowed only as an exception.

33) Sinking and Raising of the Trunk —
8, 16, 24 *times down and up.*

With the heels close together, the body is raised on the toes, and then let down as low as possible, the trunk retaining its upright position: the raising of the same then follows under the same conditions. At first the maintenance of a perpendicular position of the trunk is


33

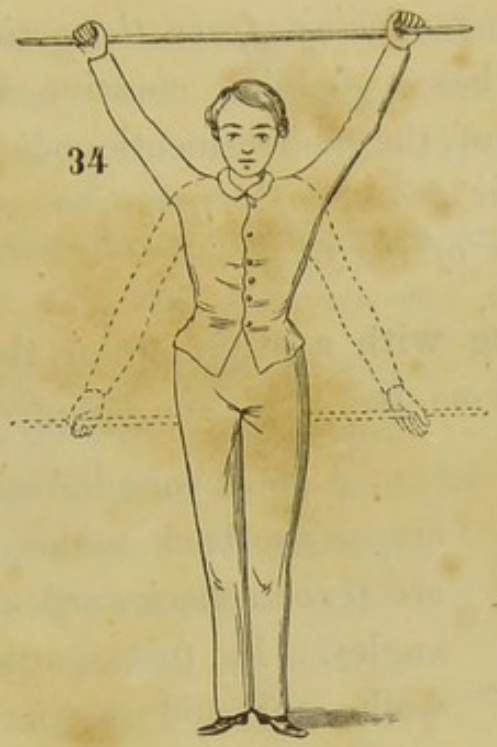
attended with some difficulty, as there is involuntarily a greater or less disposition to bending forwards, caused by the changing of the centre of gravity; but this is soon overcome by a little attention and practice.

The extensor muscles of the knees, and the muscles of the calves and toes, take the most active part in this exercise; at the same time, by the exertions made to maintain the trunk in an upright position, it acts in a not unimportant manner upon the lower muscles of the back. It is also effective for *rendering freer all the joints of the leg and foot*, and further as a strengthening remedy against *paralysation of the lower extremities* of the body, and as a means *of relief for the upper parts.*

Now follow a series of compound movements, i. e., movements in which the activity of the muscles is not confined to one particular limb or part of the body, but where the action is at the same time extended, in various degrees, over many parts or even the whole body.

34) Circular movement with a Stick — 4, 12, 16 *times backwards and forwards.*

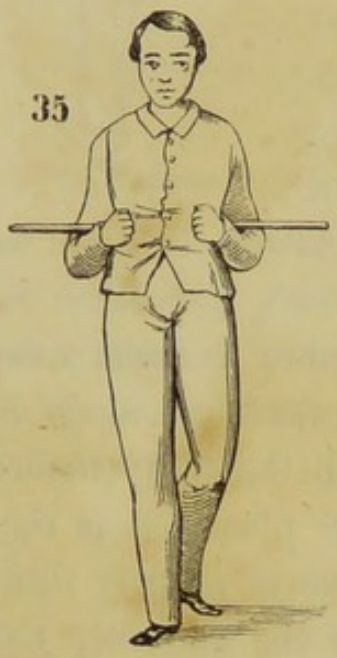
For this purpose a rounded stick is necessary, which must be at least as long as to reach from the ground to the axillary cavity (arm-pit) of the person who is to use it. He takes hold of it near the ends, the backs of the



hands being turned upwards, and describes a circle over his head backwards, and then brings it forward again in the same manner, letting the stick touch the body before and behind. The principal thing to be observed is that the arms be not bent at the elbows. This is at first difficult, because in most persons, the joint of the shoulder has lost its normal freedom of movement from want of use. But by degrees this hindrance will yield to practice, and then the distance between the hands can be proportionately diminished till that is no longer possible. The illustration represents this point, that is, as a general rule, and beyond which it is difficult to go. By the forward and backward movement there arises a soft rocking to and fro of the trunk, causing the movement to be considered as a compound one. The principal effect is produced upon the muscles of the shoulders, next come the arm muscles, and then those of the lower part of the back and of the abdomen. The movement is a most

effective one for *rendering freer the action of the shoulder joints*, and has a helping curative working in cases of *paralysation* of the above-mentioned muscles, *for the completeness of the process of respiration*, and as a stimulant *for the functions of the abdomen.*

35) Walking with a stick under the Arms — *from ten to fifteen minutes.*

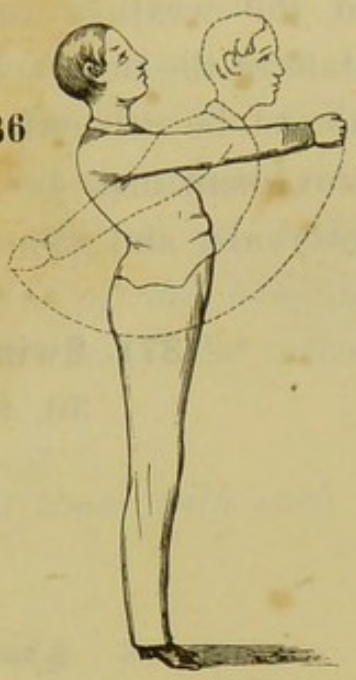

35

A short rounded stick is put straight across the back under the arms, which are thrown backward, and bent at right angles. In this manner the operator walks up and down the given time, preserving as much as possible the upright position of the body. One principal point is the drawing of the shoulders back and down at the same time. A good carriage is thus promoted, and that position and bearing of the arms and shoulders which it is difficult always to preserve if the exercise is not performed with something to hold. The attention is to be directed exclusively to the upright bearing of the body while thus in motion.

The aim of the movement, at the same time that it contributes to the strengthening of the muscles of the shoulder, back, and foot, is to promote and confirm an habitually noble and healthy carriage. It is therefore designed as as remedy against a *one-sided, loose, and unsteady carriage of the back, and in general of the whole body.* This bad habit often shows itself in young people who are growing fast, and its effects are then most pre-

udicial (defective growth, faulty formation of the chest, &c. &c.), extending their influence over the whole after life. This movement has further no especial working.

36) Swinging the Arms backwards and forwards — 30, 60, 100 *times to and fro.*

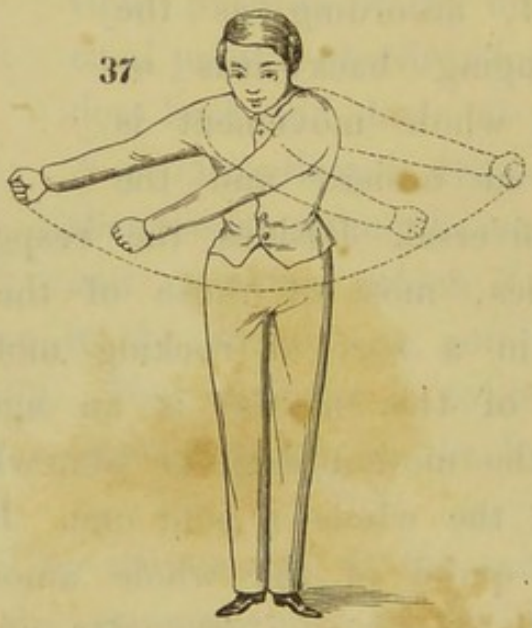


36

The arms are stretched out (but not stiffly), with the fists closed, and then thrown forcibly backwards and forwards in *allegro* time. The trunk must not remain stiff, but rather yielding upon the hip joints, in such a manner that, acting as a balance, it is now bent a little forward, now a little backward, according as the arms are swinging backwards or forwards. The whole movement is thereby rendered easier, and the effect more universal. Besides the respective arm and shoulder muscles, most of those of the abdomen and back are set in a sort of rocking motion. The immediate effect of this motion is an agreeable feeling; and although the motion itself is somewhat violent, its influence is on the whole a mild one. It forms, firstly, a pretty good quota of the whole amount of exercise required, and is a *powerful promoter of the circulation of the blood.* It is also of essential service in cases of *paralysation of the muscles of the arm, back and abdomen*, as well as *sluggishness and interruption of the functions of the abdomen in general;* and is recommendable on account of its mild working in especial cases, and particularly at the commencement of a series of gymnastic

exercises. Although the movement is not what you may call heating (in spite of the impulse given to the blood), yet it may be advantageously used for *warming* the trunk, arms, and hands. It has a favourable effect as a stimulant at those times of bodily and mental *lassitude* which now and then arrive, in consequence sometimes of a change of the weather or of the seasen, or of a disorganised state of the nervous system of the abdomen, and which are not to be otherwise explained. If thought necessary, this movement may be executed 200, 300, 400 times at short intervals, and then at last the enemy will be vanquished.

37) Swinging the Arms sideways — 30, 60, 100 *times to and fro.*



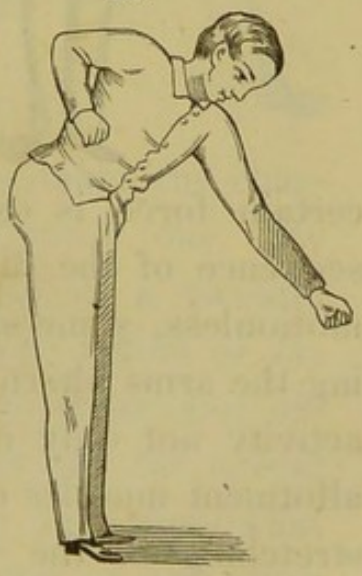
A movement very like the foregoing, principally differing in the direction. Both the arms are here moved to one side, but in other respects, in the same manner as in No. 36. The upper part of the body is bent forward a little, but only enough to give free action to the arms, wnich are swung to and fro perpendicularly in front of

the body. Also here must the trunk be quite free, and moveable on the hip joints: it has a similar rocking motion to that in No. 36, but sideways, always in opposition to that of the arms as they move to and fro.

Among the muscles set in motion are the muscles of the fore part of the breast, and instead of the muscles of the fore part of the abdomen, those of the sides of the abdomen. The effect, therefore, of this movement is *more the stimulating of the regions of the liver and milt*, and is, on that account, of use as a remedy against *obstruction of those organs*. By the bending of the body forward, a *strengthening of the muscles of the back* is effected. This movement has, for the rest, the same qualities and uses as No. 36.

38) Sawing movement — 10, 20, 30 *times with each arm, up and down.*

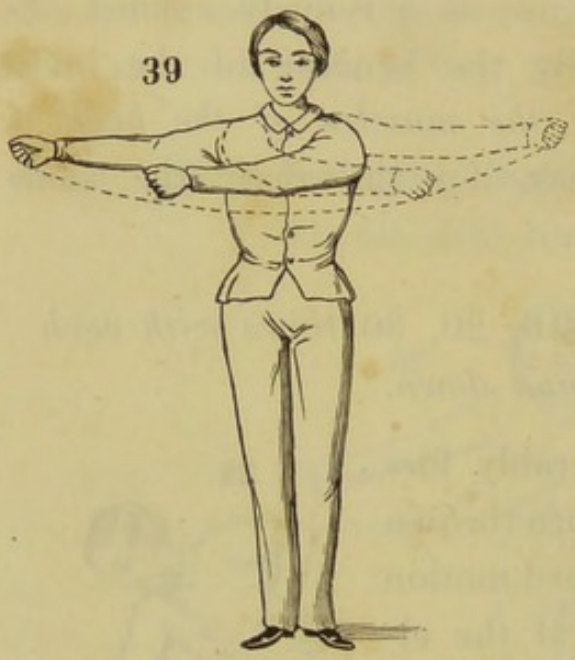
38



The body is bent considerably forwards, and then each arm in turn thrown vigorously forward: the backward motion is combined with a bending at the elbow. One arm is thrown forward, as the other is drawn back. This movement succeeds very well, if you imagine you have something before you in the required direction that you would like to strike away with one hand, at the same time that you would draw it towards you with the other. A great number of muscles are thereby exercised — nearly all those of the arm shoulder and back; and the movement contributes much to the amount of necessary *universal action*, and is good

against *paralysation* of the above mentioned muscles; and, by virtue of the effect of its rocking motion upon the chest and abdomen, against such complaints as are a consequence of *obstruction of the juices*, and *sluggishness of the functions* of the organs in those parts, and particularly as a means of *discussing glandulous tumors, &c., in the breast and abdomen.*

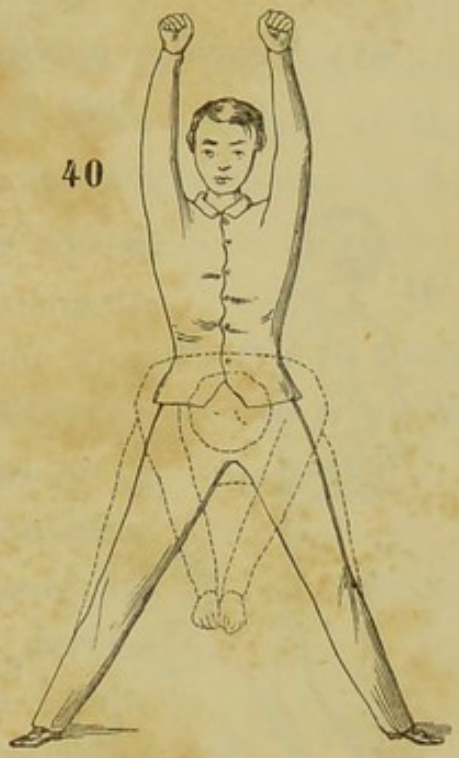
39) Mowing movement — 8, 16, 24 *times to and fro.*


39

The body preserves its upright position, and the feet remain immoveable. The arms stretched forward in a horizontal position then describe a semi-circle to the right and then to the left. The accent must be laid equally upon the movement to the right and that to the left. One should imagine one's self mowing right and left, in which motion a certain force is exerted in the act of swinging. In consequence of the directions given above, to keep the body motionless, some slight opposition is experienced in swinging the arms alternately to each side, which causes a lively activity not only of the muscles of the shoulders and the allotment muscles of the arms, but also a sort of see-saw stretching of the whole of the muscles of the trunk, leg and foot. The movement has therefore an invigorating influence upon the limb-moving muscles of the whole body, and is of great service in cases of a *general muscular weakness*, and *of paralysation of the spinal marrow*, in

that period of the complaint when a certain bluntness of feeling, and an extraordinary unsteadiness upon the feet are the first symptoms which attract the earnest attention of the patient.

40) Chopping movement — 6, 12, 20 *times.*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The legs are stretched out sideways, not too far; the hands are then raised above the head, and then brought swingingly down together, as if with the intention of chopping in two some certain block of wood lying between the feet. The legs must be flexible in the knee joint, so that the movement may be freer. The allotment muscles of the arm, the whole of the fore and the hinder muscles of the trunk, as well as most all of the leg and foot muscles are brought into play by this movement, which thus takes the character of *an energetic* and somewhat *fatiguing one.* By virtue of its peculiar qualities it is useful in a twofold manner: as a means of *promoting the freer action of the organs of the abdomen,* in cases *of sluggishness and obstruction* of the same, and as a *stimulant for the nerves of the spinal marrow*, even when already in a somewhat advanced state of *paralysation.* But as one or the other aim is to be attained, so must the employment of the movement be modified. In the first case — stimulation of the action of the organs of the abdomen — the principal stress must be laid upon the movement at the

moment the arms and the upper part of the body are brought downwards; in the second case as the body regains its upright position, turning on the hip joints.

In cases of a disposition to a flow of blood to the head or breast, as also (for many reasons) for females, this exercise is to be avoided.

41) Trotting movement on one spot — 100, 200, 300 *times with each foot.*

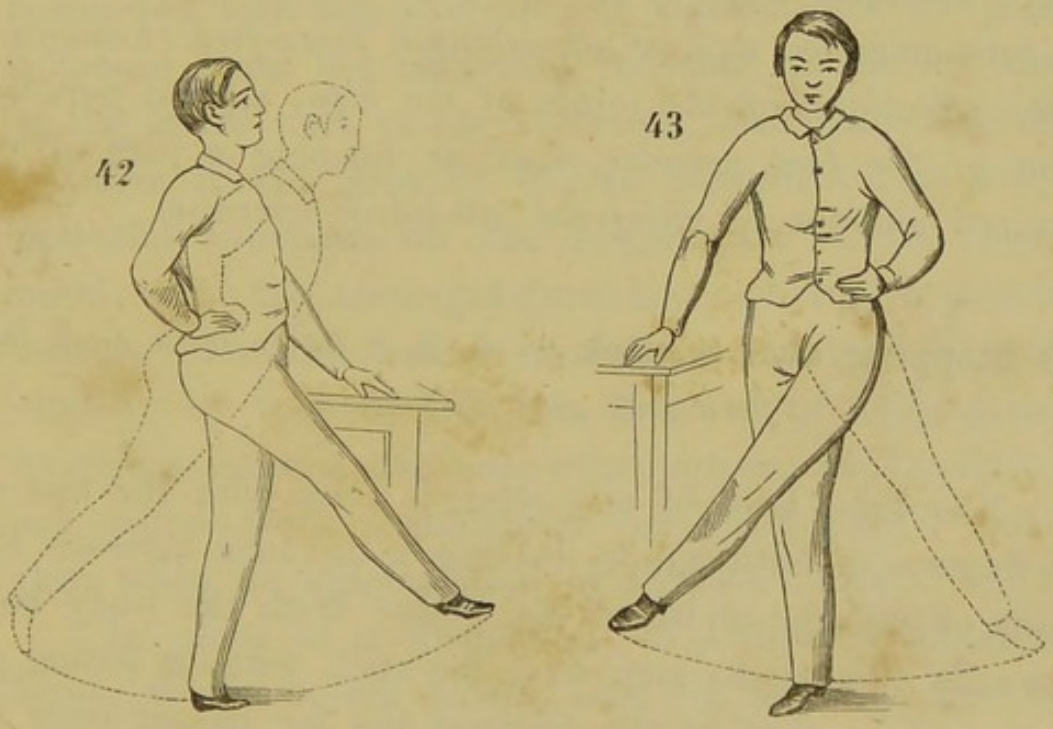

41

This is the common motion of trotting, except that here the performer does not advance, but remains always on the same spot, for which reason the body maintains its upright position, instead of being bent as in running forward; and here also the movement is performed on the *points of the toes.* This latter condition must be observed, because by coming down on the whole sole of the foot the shaking of the body so caused would be communicated to the head in many ways disagreeably and prejudicially. The joints of the knee and ankle must be quite free and elastic, for only by this means can be promoted that soft and wholesome shaking of the body which, after the setting in motion of the leg and foot muscles, is the aim of the movement. The degree of intensity of the movement can be regulated at will, by raising the foot to any desired height.

Where it is desirable to bring about a *softly fatiguing, sleep-causing feeling*, and to promote *the circulation of the blood in the abdomen, the relieving of the bowels, and the carrying off of humours, &c., from the head and*

chest, this movement is very applicable; as also in cases of *paralysation of the muscles of the foot*, and where a disposition *to having cold feet* exists. By means of its shaking motion — which draws the blood towards the lower parts of the body, and which is for the greatest part concentrated on the abdomen — this movement is especially adopted *to the bringing again into order hemorrhoidal fluxes and the monthly courses of females* which may have got out of order by obstruction. But at the same time attention must be paid to the remarks to be found in the special rules hereafter given.

42) Swinging the Leg forwards and backwards } 8, 16, 24 *times to and fro with each leg.*
43) Swinging the Leg sidewards }



The operator lifts one foot, the toes pointed upwards, about two inches from the ground, and throws it with an energetic swinging movement straight forwards and

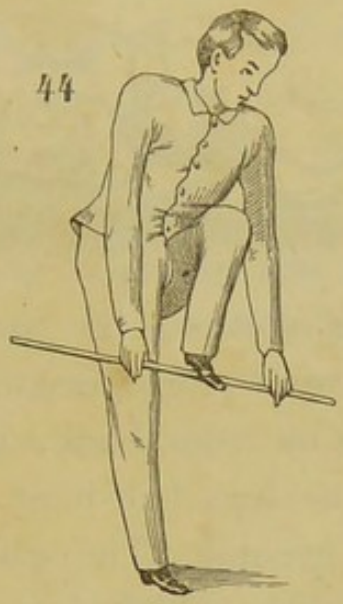
then backwards — to the right and then to the left. At first, till he has learned to keep his balance, this will require the aid of a table or chair to lean upon. But he should endeavour to do without this aid as soon as possible, because otherwise a great part of the effect of the compound working is lost. This very endeavour to keep one's balance and the upright position of the body calls into action many of the muscles, and is one of the aims of the movement.

Both movements require the working of the muscular parts all round and from all sides of the hips, but have also an effect upon all the muscles of the back up to the nape of the neck, and upon the whole muscular systems of the legs and feet; for the leg, apparently so immoveable, has enough to do maintain the equilibrium of the body, menaced from so many sides. The two movements are recommended against *chronic and fever-free rheumatic-gouty affections of the joints of the hips*, against *paralysation of the foot muscles*, and as forming a part of the required amount *of universal (all-sided) exercise*.

44) Stepping over a stick — 4, 6, 8 *times with each leg, forwards and backwards.*

You take hold of any straight stick with the tips of the fingers of both hands, leaving a distance between the hands of full the width of the body. With the body bent forwards you try to step over the stick without letting go of it; and so that at the moment the leg passes over its lower part remains quite perpendicular, i. e., forms a right angle to the stick. When both the legs have had their turn forwards, do the same backwards. This movement is

certainly somewhat difficult, and even not possible for some persons at first, but only after long practice; while for others it is quite impossible.

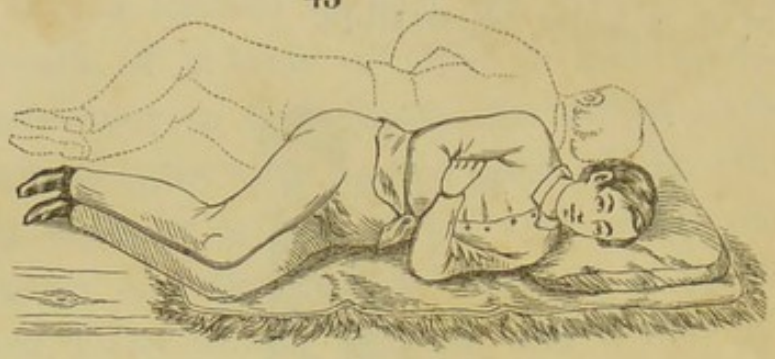


Without speaking of the unimportant secondary motion connected with this exercise, it concentrates its principal influence upon the allotment muscles of the leg situated in the lower part of the abdomen, which are here drawn together in the greatest degree possible. This acts as a powerful stimulant on the lower part of the intestinal canal, viz., the strait-gut (rectum) and the hemorrhoidal vessels. For this reason this movement may be well included, by way of trial, in the list of daily gymnastic exercises, against *obstinate constipation,* and against what are called *blind hemorrhoids* (or blind piles), but only then when no inflammation or irritation exists.

In cases of a disposition to a flow of blood to the head, where hernia exists, and by females, this movement is to be avoided.

45) Turning of the Body — 30, 40, 50 *times to and fro.*

45



With something soft to lie upon (which needs be only as long as down to the knee), and a pillow for the head, you lie down on your back, with the arms folded across the breast, the legs half-bent at the knee, and the feet resting on the ground. The whole body then makes a simple turning motion which brings it on to the arm, shoulder, and the side of the hip joints — then back again, and then the same to the other side. The movement must be a complete change from a back to a side position, so that it forms a semi-circle.

The aim of the motion is not so much exercise of the muscles — for here there is no particular use of them, and the amount is unimportant, which is the reason that this movement has nothing straining or fatiguing — as a rocking, *alternating change of position of the more easily moved inner organs*, especially *the abdominal intestines.* Such a change of position may, however, be, in a simple, manner a means of causing many a cure, or at least of aiding in doing so, as every physician knows: so, for instance, for a more regular distribution of blood in all such cases where *the over-stocking and obstruction of the circulation of the blood in the organs of the lower part of the abdomen* requires remedy, as in cases *of*

hemorrhoidal tumours (not yet inflamed, but already perhaps in an advanced state), *of contraction of the urinary bladder*, which stands in connexion with the above; or *overstocking of blood in the abdomen before the monthly courses of females, giving cause to fear a too great bleeding, &c. &c.* It is further of use against *a swelling of the intestinal*, or the present of wind in it (wind-colic); and *for the reduction of strangled hernia, &c. &c.*

As this movement does not aim at radical cures, but only at an alleviation, it is not intended that it should be placed on the list of every-day exercises, but only used according as the want of it is felt.

V. Prescriptions for Special Cases.

In order to ensure and facilitate a judicious application of the rules for the practice of gymnastic exercises in particular cases, as far as is possible and expedient, we shall, in this section, give a list of prescriptions for the principal cases in which they are to be used, and those oftenest occurring, which belong to the department of practical in-door gymnastics. These may in general serve as a common model and base for all further cases. And yet it must be remembered in regard to the prescriptions here mentioned, that they are only for supposed cases, and that if they are to be put into practice, individual circumstances must always be well taken into consideration. And also let it never be forgotten that the exercises intended for the attainment of some particular cure are not to be understood as if one could, by their help alone, in all cases attain and settle all; but that they are to be considered only as an *essential part* of the general means of cure — as the most conformable ways and means, under all circumstances, by which the sanitary effect of exercise for practical ends can be gained and turned to account.

By the placing together of particular movements in these rules, their order is so arranged as is best suited for the changing of the operative muscles, that is to say, so that one set of muscles shall not be brought into play so many times running as to cause an undue excitement of the same. It is therefore advisable when particular cures are desired, not to confine one's self exclusively to those movements calculated to bring them about, but to go through now and then other movements also, less essential, and in this case acting only in an indirectly curative manner, but which also help to complete the determined amount of universal action*). The following particularised rules may, therefore, in this respect be considered as a common model for further groupings of the same sort.

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*) These *completing movements* are so much the more to be recommended, because generally where certain cures are aimed at, much depends upon the vigorous action of the whole functions of life, which is brought about by universal muscular activity, and although in these cases it is principally intended to act upon a particular part, yet this particular movement acquires greater intensity, and approaches nearer to a state of completeness in proportion as the universal action is more or less intense or complete: the same as in a machine composed of a number of wheels, each single wheel turns faster in proportion as the motion of the whole machine is accelerated. That this rule holds good for the human system is taught by the laws of physiology. We cannot therefore approve of that principle of the Swedish gymnastic system by which it is endeavoured to concentrate the essential motions as exclusively as possible upon one point, a proceeding which is put forward as one of the advantages of that system. It is a false economy. The amount of bodily activity which of itself, and up to a certain point, may be increased, is not, even taking a low standard, so scantily measured out as we should be obliged to admit, if we were to take it for granted that the principle is correct. A muscle working in common with other muscles, particularly with those with which it has an affinity, develops a much greater amount of activity, and can maintain hat activity longer and more easily than if it operated alone.

In order to facilitate the application of these prescriptions, we have thought it advisable to add to each single movement the figures indicating the number of times it should be repeated. At the same time it will be thereby seen where for this or that particular cure a change in the given general rule is here or there necessary. After some of these movements will be seen a B, which is used to indicate where, between this exercise and the next, we recommend the deep breathing mentioned *page* 27, No. 7. This breathing is to be repeated six or eight times.

With respect to those prescriptions aiming at exclusively special and local cures, where the essential motion is found more than once on the list — e. g. in prescriptions Nos. 4, 5, and 6 — it is advisable to confine one's self at first to performing it only once, till the body, and particularly the operative muscles have by use become familiar with it, and there is no longer any fear of their undue exitement.

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1) Prescription for the relief of undue affluence of blood to the Head and Breast.

Twisting of the Arms, No. 16. (30, 40, 50.)
Eight-movement of the Hand, No. 17. (20, 30, 40.)
Bending and Stretching of the Fingers, No. 18. (12, 16, 20.) B.
Circular movement of the Leg, No. 25. (4, 6, 8.)
Raising of the Leg sidewards, No. 26. (6, 10, 16.)
Not to by practised by females.
Twisting of the Legs, No. 27. (40, 50, 60.)

Rubbing together of the Hands, No. 19. (40, 60, 80.)
In the modified form (*p.* 45.)
Drawing together of the Legs, No. 28. (6, 12, 16.) B.
Bending and Stretching of the Knee forwards, No. 29. (6, 8, 10.)
Bending and Stretching of the Knee backwards, No. 30. (10, 12, 16.)
Bending and Stretching of the Foot, No. 31. (30, 50, 60.)
Sinking of the Trunk, No. 33. (8, 16, 24.) B.
Swinging the Leg forwards and backwards, No. 42. (8, 16, 24.)
Swinging the Leg sidewards, No. 43. (8, 16, 24.)
Trotting movement, No. 41. (100, 300, 500.) B.
Sinking of the Trunk, No. 33. (8, 16, 24.)

If after the performance of the above, their powerful relieving effect, recognised by the warmth of the feet, &c. &c., is in any particular case not considered sufficient, the simplest way is to resort to the plan of beating the feet. For this purpose you take a short stick or piece of wood, and strike the soles of the shoes alternately till the feet begin to tingle. This is the best and an infallible remedy for obstinate coldness of the feet.

2) Prescription for promoting full and regular breathing, and as a remedy against narrowness of the Chest, incipient consumption, asthma, &c.

Raising of the Shoulders, No. 3. (30, 40, 50.)
Circular movement of the Arm, No. 4. (8, 12, 30.)
Raising of the Arm sidewards, No. 5. (10, 24, 40.) B.
Drawing back the Elbows, No. 6. (8, 12, 16.)
Stretching the Arms downward behind, No. 7. (8, 12, 16.) B.
Striking out the Arms sidewards, No. 10. (10, 20. 30.)
Striking out the Arms upwards, No. 11, (4, 8, 12.) B.
Bending of the Trunk sidewards, No. 21. (10, 16, 24.)
Swinging the Arms apart, No. 15. (12, 16, 24.) B.
Circular movement of the Trunk, No. 23. (6, 10, 16.)
Circular movement with a stick, No. 24. (8, 20, 30.) B.

In such cases where an inequality exists between the breathing organs of the two sides of the chest, instead of the common equal breathing being practised always there where a B is printed, the operator should sometimes make use of the unequal breathing movement, No. 8, *page* 39.

For that form of asthma which proceeds from relaxation and enlargement (emphysema) of the cellules of the lungs (which may be easily recognised by a medico-physical examination), when the breathing movement is being performed, the stress must be laid upon it at the moment of exhaling. On this account all those different operations by which a powerful exhaling is promoted, as by loud speaking, reciting, laughing, and singing (especially the *portamento*, or gradual crescendo), are highly recommended.

3) Prescription against sluggishness and obstruction of the functions of the Abdomen in general, and against the numerous complains therefrom arising; such as obstruction of the port-vein system, a weak digestion; habitual constipation, with its consequences — head-ache, hemorrhoidal disorders, abdominal hypochondria, hysteria, and melancholy, &c. &c.

Movement of the Trunk forward and backward, No. 20. (10, 20, 30.)
Sideward movement of the Trunk, No. 21. (20, 30, 40.)
Circular movement with a stick, No. 34. (4, 12, 16.) B.
Turning of the Trunk, No. 22. (8, 16, 24.)
Bending and Stretching of the Knee forwards, No. 29. (4, 6, 8.)
Circular movement of the Trunk, No. 23. (8, 16, 20.) B.
* *Sawing movement*, No. 38. (10, 20, 30).
Raising of the Trunk, No. 24. (4, 8, 12.)
Raising the Leg sidewards, No. 26. (6, 10, 16). Not for females.
* *Chopping movement*, No. 40. (6, 8, 12.) B. Not for females.
Throwing the Arms backwards and forwards. No. 36. (20, 40, 60.)
* *Raising the Knee*, No. 32. (4, 10, 16.)
Swinging the Arms sidewards, No. 37. (30, 60, 100.) B.

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*) The exercises with an asterisk are to be repeated only half the number of times, or even less, in cases where this prescription is put into practice while employing any exciting or heating medicinal-water method of cure.

* *Stepping over a stick*, No. 44. (4, 6, 8.)
Not for females.

Trotting movement, No. 41. (100, 150, 200.) B.

An effective aid for stimulating the functions of the abdomen is a *kneading* of the same. This should be performed in a position in which the muscles of the abdomen are as little stretched as possible — while lying easily on the back, for instance; and the best time would be in the morning a little while before rising. You place the thumbs far back close under the ribs, and the remaining fingers are spread out over the soft surface of the fore part of the stomach. You then begin a vigorous kneading process with each hand alternately: this should be continued for some minutes. A still more powerful stimulant is that produced by *forcibly pressing* both hands upon the surface of the abdomen and then suddenly removing them, thereby causing a rebounding of the elastic coats of the stomach and the intestines within. For those pains in the stomach, where no inflammation exists, such as spasms, vapour colic, &c., a simple *rubbing* of the stomach with the open hand affords great alleviation.

Also *the position in bed* demands some consideration for those who suffer from chronic diseases of the abdomen. Lying *on the back*, which on account of the greater freedom afforded to the respiratory organs, is the most healthy position, is also the best for other reasons; viz., because in this situation the abdominal organs suffer the least injury from pressure, and because the body does not so readily fall into that doubled-up position as when lying on the side. In cases where abdominal organs situated at the side, such as the liver or milt, suffer from a predominant chronic complaint, in the first case the lying

on the *right* side is to be particularly avoided, and in the second the lying on the *left*. Persons who suffer from abdominal complaints should always avoid *crossing the feet* when long sitting.

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4) Special prescription for obtaining relief in the Bowels.

Swinging the Arms forwards and backwards, No. 36. (20, 40, 60.)
Swinging the Arms sideways, No. 37. (20, 40, 60.) B.
Raising the Trunk, No. 24. (4, 8, 12.)
Sawing movement, No. 38. (10, 20, 30.)
Circular movement of the Trunk, No. 23. (8, 12, 16.)
Chopping movement, No. 40. (6, 8, 12.)
Not for females.
Raising the Knee, No. 32. (6, 12, 20.)
Swinging the Arms forwards and backwards, No. 36. (30, 60, 100.)
Swinging the Arms sideways, No. 37. (30, 60, 100.) B.
Trotting movement, No. 41. (100, 200, 300.)
Circular movement of the Trunk, No. 23. (8, 16, 30.)
In its modified form (*page* 48.)

By a too hard and dry stool, the most innocent and quickest means, and the most generally to be recommended, is the *pretty free use of the clyster* with *lukewarm water*.

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5) Prescription for remedying an obstructed state of the hemorrhoidal*) fluxes and the monthly courses of females.

Mowing movement, No. 39. (6, 10, 6.)
Swinging the Arms forwards and backwards, No. 36. (20, 30, 50.)
Striking out the Arms downwards, No. 12. (10, 20, 30.)

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*) The expression *hemorrhoids* is taken, in ordinary life, in a too comprehensive and therefore too undefined sense. In the first place, that affection called hemorrhoids (i. e. the formation of tubercles, dry irritation or bleeding of the anus) must be divided into two principal parts, according to their causal connexion: 1. *Primary hemorrhoids*, which exist without any perceptible trace of any other complaint, and in which case, by a general over-filling of the blood vessels (often only a slight disturbance of the balance between the reception of bodily material and its consumption) or a laxity of the coating of the veins, the blood, in consequence of the upright position of the human body, settles in the lower blood-vessels of the trunk; and this sort might therefore be simply called *sinking* hemorrhoids. 2. *Secondary hemorrhoids*, which are the reflex of another complaint, the settling of the blood in the anus being then caused by obstruction of the circulation, and interruption of the functions of other, often distant parts, such as the liver, milt, heart, lungs, &c. In cases of primary hemorrhoids the difference is, as a general rule, adjusted by a coming away of blood from time to time, by which means the complaint at last disappears. Only where this is not the case — *where this discharging of blood in primary hemorrhoids, which has become a necessity for the system, does not take place, thus causing, by its reflex influence, other complaints* — only for this case is the above prescription intended. For secondary hemorrhoids the attention must naturally be directed to the removal of the cause, which may in one case be widely different from that in another case.

For inflamed hemorrhoidal tubercles, or a disproportionate discharge of blood in the case of either a hemorrhoidal flux or the monthly courses of females — no kind of movement should be used as a remedy, but rather, on the contrary, repose becomes a necessity.

Here the shaking should be allowed to exert its influence, but only as far as the head can bear it.

Trotting movement, No. 41. (100, 150, 200.) B.
Sawing movement, No. 38. (10, 20, 30.)
Raising the Knee, No. 32. (4, 8, 12.)
Swinging the Arms sideways, No. 37. (20, 30, 50.)
Stepping over a stick, No. 44. (4, 6, 8.) B
Not for females.
Swinging the Legs sidewards, No. 43. (8, 16, 24.)
Raising the Knee, No. 32. (4, 8, 12.)
Trotting movement, No. 41. (150, 200, 300.)
Stepping over a stick, No. 44. (4, 6, 8.)
Not for females.

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6) Prescription against unhealthy, weakening, often-occurring pollution.

Circular movement of the Arm, No. 4. (8, 12, 20.)
Raising the Arms sideways, No. 5. (10, 20, 30.)
Drawing the Elbows back, No. 6. (8, 12, 16.)
Striking out the Arms forwards, No. 9. (10, 20, 30.)
Striking out the Arms sidewards, No. 10. (10, 20, 30.)
Striking out the Arms upwards, No. 12. (4, 8, 12.) B.
Chopping movement, No. 40. (6, 12, 20.)
The stress to be laid on the upward movement.
Sawing movement, No. 38. (No. 10, 20, 30.)
Swinging the Arms together, No. 14. (8, 12, 16.)
Swinging the Arms apart, No. 15. (8, 12, 16.).
Sinking the Trunk, No. 33. (8, 16, 24.)
Mowing movement, No. 39. (8, 16, 24.) B.
Rubbing the Hands together, No. 19. (40, 60, 80.)

Chopping movement, No. 40. (6, 12, 20.)
Stress on the upward movement.
Swinging the Arms sidewards, No. 37. (30, 60, 100.)
Sawing movement, No. 38. (10, 20, 30.) B.

In obstinate cases we should recommend, besides the above, a *sitting bath* before going to bed — one of a temperature of from 10° to 12° Réaumur, and lasting six or eight minutes: or a retaining but therefore *not* abundant application of the *clyster*, of the same temperature; and instead of lying on the back, to adopt the habit of alternating with the sides.

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7) Prescription for the radical cure of rupture of the coat of the Stomach (abdominal hernia), and particularly inguinal hernia.

Bending the Trunk backwards and forwards, No. 20. (10, 20, 30.)
Striking out the Arms backwards, No. 13. (8, 12, 10.)
Raising the Trunk, No. 24. (6, 10, 16.)
Mowing movement, No. 39. (8, 12, 20.)
Turning the Trunk, No. 22. (10, 20, 30.)
Swinging the Arms backwards and forwards, No. 36. (30, 60, 100.)
Raising the Trunk sideways. The situation is similar to that of No. 44., only that the trunk is turned sideways at an angle of forty-five degrees, and then raised 4, 6, 8 times on each side). But this motion is not to be performed directly at first with the others, but only when the raising of the body straight up (No. 44.) has become easy by practice.

The following must be strictly observed: 1. These exercises are in no case to be undertaken without the person's having first assured himself, after medical examination, of the nature of the rupture. 2. During the performance of the motions the rupture must be completely restrained by the truss; a rupture no longer to be completely restrained forbids all application of the method. 3. Redoubled attention must be paid to the movements being performed distinctly and easily, free from any jerking, and according to the directions given. 4. The movements must be equal (double-sided), as represented in the illustrations, even in the case of a simple rupture: for wherever a simple rupture exists there is almost always a second on the other side to be feared. On that account, to effect a cure demands an equal strengthening of both sides of the coat of the stomach. 5. The exercises must be persevered in for six or eight months. 6. After three months the progressively reached amount of motion must be repeated twice daily. 7. In cases of young people, or at least of those not in the decline of life, and where the evil is not too serious, there is every hope of a radical cure. 8. Is the end attained, to prevent a relapse the exercises should be repeated at least twice a week: this is, besides, good for the general health. 9. In cases of crural rupture (hernia femoralis) this method of cure is *not* applicable.

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8) Prescription against incipient paralysation of the Muscles.

As paralysation (or *laming*) of the muscles becomes the object of the doctor's treatment under as many different forms as the number of the various muscular systems

of the body, an essay on these especial relations will certainly not be expected here. That lies far beyond the limits and intentions of this work. A general rule for individualising the medico-gymnastic process in all occurring cases of that sort of complaint will be sufficient. Such a general rule we will endeavour to give in the next two prescriptions — the one intended as a remedy against an equally paralysed state of the arms, the other for the same case of the legs. In cases where any particular muscle or group of muscles is in a disabled state the gymnastic prescription must be so modified that those movements which set these muscles in active motion, shall be repeated three or four times as often as if they formed simply a part of the requisite amount of general exercise — and this at the expense of the other (completing) movements. In like manner, where one side is disabled, those movements practicable on one side should be much more intense on the disabled side, and proportionately less intense on the healthy one. When curative gymnastic exercises are intended as a remedy against this paralysed state of the limbs, they require, more then ever to be carried out *with the greatest attention and the full and powerful exercise of the will* — upon that depends the greater or less invigorating effect upon the disabled nerves. In cases of such a state of paralysation that the will is already powerless, and therefore the limb is quite motionless, the performance of some of the movements indicated must take place passively, i. e., by the aid of another person, to try and see if it be not possible after a while to bring about a passing over from a passive state to one of activity.

The method of cure practised for paralysation of the

muscles is essentially aided by certain *mechanical manipulations*. According as the affected muscle is more or less come-at-able, and more or less easily treated, these consist of a vigorous *handling, kneading, drumming* (with the edge of the hand), a *hard stroking* (with the stiffly stretched-out fingers), and a *soft stroking* (with the palm of the hand). The two last must be performed in the same direction as the flowing of the blood to the heart. It is a good plan to let these mechanical manipulations immediately precede the exercises, where their animating, invigorating effects render the desired aid in promoting the activity of the movements. They can also be gone through many times a day, but not to such a degree as to cause pain.

a) Against incipient paralysation of the Arm.

Raising the Shoulders, No. 3. (30, 40, 50.)
Circular movement of the Arm, No. 4. (8, 12, 20.)
Raising of the Arms sidewards, No. 5. (10, 20, 30.) B.
Drawing the Elbows back, No. 6. (8, 12, 16.)
Stretching the Arms downward behind, No. 7. (8, 12, 16.)
Sawing movement, No. 38. (10, 20, 30.)
Striking out the Arms forwards, No. 9. (10, 20, 30.)
Striking out the Arms sidewards, No. 10. (10, 20, 30.) B.
Striking out the Arms upwards, No. 11. (4, 8, 12.)
Striking out the Arms downwards, No. 12. (10, 20, 30.)
Striking out the Arms backwards, No. 13. (6, 10, 16.)
Twisting of the Arms, No. 18. (30, 40, 50.)
Eight-movement of the Hand, No. 17. (20, 30, 40.)

Bending and Stretching of the Fingers, No. 18. (16, 24, 40.)

Rubbing the Hands together, No. 19. (50, 80, 100.)

b) Against incipient paralysation of the Legs.

Circular movement of the Leg, No. 25. (4, 6, 8.)

Raising of the Leg sidewards, No. 26. (6, 10, 16.) Not for females.

* *Twisting of the Legs*, No. 27. (20, 30, 40.)

Drawing the Legs together, No. 28. (4, 6, 8.) B.

* *Bending and Stretching of the Knee forwards*, No. 29. (6, 8, 10.)

* *Bending and Stretching of the Knee backwards*, No. 30. (10, 12, 16.)

Sinking the Trunk, No. 33. (8, 16, 24.) B.

Raising the Trunk, No. 24. (4, 6, 8.)

Mowing movement, No. 39. (10, 20, 30.)

Chopping movement, No. 40. (8, 16, 24.) The stress on the upward movement.

Trotting movement, No. 41. (100, 200, 300.)

Swinging the Leg backwards and forwards, No. 24. (8, 16, 24.)

* *Swinging the Leg sidewards*, No. 43. (8, 16, 24.) B.

In case the performer find any difficulty in preserving his balance, the movements marked with an asterisk may be carried out in a lying position, the legs being moderately raised.

For the generality of those suffering from paralysation it would be advisable to undertake the above, or a similar day's task, at least at first, only with rather longer intervals of repose; or it might also be distributed over

different parts of the day: or it might even be allowed to arrange pauses between the repetitions of the same movement. In such cases great care must be taken to guard against that over-excitement of the nerves and muscles in operation which would be the consequence of impatient manner of proceeding.

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9) Prescription for the preservation of the Health in general.

This prescription is for such cases where no local cure is aimed at, but a regeneration of the whole constitution of the body — a preventitive, health-preserving aim — where therefore a certain requisite amount of general movement is the end to be attained; and on this account this prescription is of service against: *general weakness of the muscles and nerves, poorness of the blood (chlorosis), scrofulous diseases*, a disposition *to corpulency*, &c. &c.; as well as for *persons in general who enjoy but little active movement.*

a) For a Male adult.

Circular movement of the Arm. No. 4. (8, 12, 20.)
Striking out the Arms forwards, No. 9. (10, 20, 30.)
Striking out the Arms sidewards, No. 10. (10, 20, 30.)
Striking out the Arms upwards, No. 11. (4, 8, 12.) B.
Circular movement of the Trunk, No. 23. (8, 16, 30.)
Rubbing the Hands together, No. 19. (40, 60, 80.)
Raising the Trunk, No. 24. (4, 8, 12.)
Raising the Leg sidewards, No. 26. (6, 10, 16.) B.

Drawing the Legs together, No. 28. (4, 6, 8.)
Bending and Stretching of the Foot, No. 31. (20, 30, 40.)
Sawing movement, No. 38. (10, 20, 30.)
Raising the Knee, No. 32. (4, 8, 12.) B.
Swinging the Arms backwards and forwards, No. 36. (30, 60, 100.)
Sinking the Trunk, No. 33. (8, 16, 24.)
Swinging the Arms sideways, No. 37. (30, 60, 100.) B.
Chopping movement, No. 40. (6, 12, 20.)
Trotting movement, No. 41. (100, 200, 300.)
Mowing movement, No. 39. (8, 16, 24.) B.
Swinging the Legs backwards and forwards, No. 42. (8, 16, 24.)
Swinging the Legs sidewards, No. 43. (8, 16, 24.)

b) For an adult Female.

Circular movement of the Arm, No. 4. (4, 6, 10.)
Raising the Arm sidewards, No. 5. (5, 10, 15.)
Stretching the Arms downward behind, No. 7. (4, 6, 8.)
* *Bending the Trunk backwards and forwards*, No. 20. (5, 10, 15.)
Striking out the Arms forwards, No. 9. (5, 10, 15.)
Striking out the Arms sidewards, No. 10. (5, 10, 15.) B.
* *Bending the Trunk sidewards*, No. 21. (10, 15, 20.)
Swinging the Arms backwards and forwards, No. 36. 15, 30, 50.)
Bending and Stretching of the Knee forwards, No. 24. (3, 4, 5.)

Bending and Stretching of the Knee backwards, No. 30. (5, 6, 8.)

* *Turning of the Trunk*, No. 22. (5, 10, 15.)

* *Sawing movement*, No. 38. (5, 10, 15.)

* *Drawing the Legs together*, No. 28. (2, 3, 4.)

Swinging the Arms sidewards, No. 37. (15, 30, 50.)

Bending and Stretching of the Foot, No. 31. (10, 15, 20.) B.

* *Mowing movement*, No. 39. (4, 8, 12.)

* *Sinking the Trunk*, No. 33. (4, 8, 12.)

The movements with an asterisk are to be left out on the days of the monthly courses.

c) For persons of both sexes who are over sixty*).

Circular movement of the Arm, No. 4. (4, 6, 10.)

Circular movement of the Leg, No. 25. (2, 3, 4.)

Swinging the Arms together, No. 14. (4, 6, 8.)

Swinging the Arms apart, No. 15. (4, 6, 8.) B.

Bending the Trunk backwards and forwards, No. 20. (5, 10, 15.)

Rubbing the Hands together, No. 19. (20, 30, 40.)

Twisting the Legs, No. 27. (10, 15, 20.) B.

Striking out the Arms sidewards, No. 10. (5, 10, 15.)

Striking out the Arms downwards, No. 12. (5, 10, 15.)

Striking out the Arms backwards, No. 13. (3, 5, 8.) B.

Sinking the Trunk, No. 33. (4, 8, 16.)

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*) Also age requires all-sided movement. He alone preserves his powers of motion — the principal agent in the whole process of life — who duly and rationally exercises them.

Swinging of the Arms forwards and backwards, No. 36. (15, 30, 50.)
Bending of the Trunk sidewards, No. 21. (10, 15, 20.) B.
Sawing movement, No. 38. (5, 10. 15).
Swinging of the Arms sidewards, No. 37. (15, 30, 50.)
Trotting movement, No. 41. (50, 100, 150.) B.

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10) Prescription for the development of the bodily powers of Children of both sexes.

From the age of five or six children may, in general, be considered as old enough to begin a regular course of these exercises. And particularly for educational institutions*), play-schools, &c., it would be a good plan

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*) We take this opportunity of pressing upon the consideration of directors of schools and institutions the following well-meant remarks. From the very necessary attention to the comportment, development, and health of the body which is now called for in the schools of the present day, arises the following rule: that no child should be kept in a sitting posture and mentally employed more than two consecutive hours. The general way of passing the ten minutes' or quarter of an hours' pause between each lesson (a custom in German schools) does not answer the end here aimed at as regards its effect on the health. We mean, that it would be best in accordance with the arrangement and aim of schools, if, after two hours' mental occupation, the quarter of an hour's pause were to be filled up with a regular and definite course of such movements, chosen in turn from the list of those recommended for children, and which might be performed either in or out of doors, whichever suited best. Either of the teachers, without being an accomplished gymnastic master, would be able to undertake the direction of the simple exercises. Only after such a thorough distraction can the children be unhesitatingly allowed to recommence their studies, then more profitable for them.

to include some such course of gymnastic treatment in the number of regular every-day occupations. If such a system were extended over the whole of the younger years of a child twice a week on an average would suffice for the performance of such a series, and then a part of the same also on days when otherwise the due amount of exercise would not be obtained.

In order that the children should perform these exercises properly, some grown-up person must be present at such times, and either him or herself go through each movement, or at least give the required directions and see them properly carried out. Besides this, children soon lose the necessary perseverance — the affair soon becomes a sleepy one, or is performed in a very slovenly way. It is an important part of educational talent to be able to captivate the attention of children, and keep it ever fresh and active, and to interest them for any thing: and in this case, it is only by their going through these motions with right good will, and the full exercise of their powers, that the full sanitary effects are to be obtained. The teacher should also be very attentive to see that the children, from the very first, acquire a habit of performing these movements in a *perfectly equal* manner, i. e., that they exercise both sides of the body with exactly the same intensity and as often one side as the other; and an observing eye will soon see what is the average amount of exercise suitable for each child. In nearly all people one side is brought more into action than the other: and in gymnastic or other exercises the weaker side is often spared, without the performer's thinking of it. This is a consequence of a want of proper bodily development, and in the case of children this is of great consequence, because

in the period of their growth now before them it may easily and imperceptibly lay the ground or be the first cause of some defect or deformity which afterwards becomes more and more developed. The only exceptions to this rule are those cases in which an inequality of the movements are necessitated by an already existing defective conformation. But then gymnastic exercises are only to be undertaken according to medical advice, and specially adapted to the individual.

The movements with an asterisk are to be omitted by girls.

Circular movement of the Head, No. 1. (5, 10, 15.)
Turning of the Head, No. 2. (3, 4, 5.)
Circular movement of the Arm, No. 4. (4, 6, 10.)
Raising of the Arms sideways, No. 5. (5, 10, 15.)
Drawing the Elbows back, No. 6. (4, 6, 8.)
Stretching the Arms downward behind, No. 7. (4, 6, 8.) B.
Striking out the Arms forwards, No. 9. (5, 10, 15.)
Striking out the Arms sidewards, No. 10. (5, 10, 15.)
Striking out the Arms upwards, No. 11. (2, 4, 6.)
Striking out the Arms downwards, No. 12. (5, 10, 15.)
Striking out the Arms backwards, No. 13. (3, 5, 8.) B.
Circular movement of the Leg, No. 25. (2, 3, 4.)
* *Raising of the Leg sideways*, No. 26. (3, 5, 8.)
Swinging the Arms together, No. 14. (4, 6, 8.)
Swinging the Arms apart, No. 15. (4, 6, 8.) B.
Bending the Trunk backwards and forwards, No. 20. (5, 10, 15.)
Bending the Trunk sideways, No. 21. (10, 15, 20.)
Twisting of the Arms, No. 16. (15, 20, 25.)
Eight-movement of the Hands, No. 17. (10, 15, 20.)

Bending and Stretching of the Fingers, No. 18. (6, 8, 10.)
Twisting of the Leg, No. 27. (10, 15, 20.)
Drawing the Legs together, No. 28. (2, 3, 4.) B.
Turning of the Trunk, No. 22. (5, 10, 15.)
Bending and Stretching of the Knee forwards, No. 29. (3, 4, 5.)
Bending and Stretching of the Knee backwards, No. 30. (5, 6, 8.)
Bending and Stretching of the Foot, No. 31. (10, 15, 20.)
* *Raising of the Knee*, No. 32, (2, 4, 6.) B.
Raising of the Trunk, No. 24. (2, 4, 6.)
Mowing movement, No. 39. (4, 8, 13.)
* *Chopping movement*, No. 40. (3, 6, 10.)
Sinking of the Trunk, No. 33. (4, 8, 12.)
Circular movement with a stick, No. 34. (2, 6, 8.)
Walking with a stick under the Arms, No. 35. Five, eight, and ten minutes long.

As the body, during the whole period of its growth, does not possess the muscular power enjoyed by man in his maturity, it has therefore more need of an interval of repose after active motion: and it is therefore a good plan, and one rendering the movements themselves of greater beneficial effect, to allow children to repose by lying down on the back a quarter of an hour or so after the exertions made during the performance of these exercises. To promote the good carriage and growth of children, this is to be especially recommended where they are obliged to remain a long time in a sitting posture, as happens in nearly all schools. If, after one or more hours' such sitting, an interval of repose is allowed, the teacher can then more justly require an upright sitting posture

on the recommencement of class; if not, he requires what is impossible.

II) List of those movements practicable in a Sitting or a Lying position, from which infirm and deformed persons can make a choice.

Each single movement is followed by either the letter *s*, or the letter *l*, according as each is adapted to the *sitting* or *lying* position.

Circular movement of the Head, No. 1. (10, 20, 30.) *s.*
Turning of the Head, No. 2. (6, 8, 10.) *s.*
Raising the Shoulders, No. 3. (30, 40, 50.) *s.*
Circular movement of the Arms, No. 4. (8, 12, 20.) *s.*
Raising the Arms sidewards, No. 5. (10, 20, 30.) *s.*
Drawing back the Elbows, No. 6. (8, 12, 16.) *s.*
Deep breathing, page 27 and No. 8. *s.*
Striking out the Arms forwards, No. 9. (10, 20, 30.) *s. & l.*
Striking out the Arms sidewards, No. 10. (10, 20, 30.) *s. & l.*
Striking out the Arms upwards, No. 11. (4, 8, 12.) *s.*
Swinging the Arms together, No. 14. (8, 12, 16.) *s. & l.*
Swinging the Arms apart, No. 15, (8, 12, 16.) *s. & l.*
Twisting the Arms, No. 16, (30, 40, 50.) *s. & l.*
Eight-movement with the Hands, No. 17. (20, 30, 50.) *s. & l.*
Bending and Stretching of the Fingers, No. 18. (12, 16, 20.) *s. & l.*
Rubbing the Hands together, No. 19. (40, 60, 80.) *s. & l.*

Bending the Trunk backwards and forwards, No. 20. (10, 20, 30.) *s.*

Bending of the Trunk sidewards, No. 21. (20, 30, 40.) *s.*

Turning of the Trunk, No. 22. (10, 20, 30.) *s. & l.*

Raising of the Trunk, No. 24. (4, 8, 12.) *l.*

Twisting of the Leg, No. 27. (4, 6, 8.) *s. & l;* with moderately raised leg.

Drawing the Legs together, No. 28. (4, 6, 8.) *s. & l;* with highly raised leg.

Bending and Stretching of the Knee forwards, No. 29. (6, 8, 10.) In a sitting posture, with the leg raised at right angles; lying, with the leg raised only a few inches.

Bending and Stretching of the Foot, No. 31. (20. 30, 40.) *s. & l;* with moderately raised leg.

Raising of the Knee, No. 33. (4, 8, 12.) *s. & l.*

Circular movement with a stick, No. 34. (4, 12, 16.) *s.*

Sawing movement, No. 38. (10, 20, 30.) *s.*

Mowing movement, No. 39. (8, 16, 24.) *s.*

Swinging of the Leg sidewards, No. 43. (8, 16, 24.) *l;* with the leg raised only a little.

Turning of the Body, No. 45. (30, 40, 50.) *l.*

In order rightly to judge of the effect of the performance of these movements in a sitting or a lying posture, this fact must be taken into consideration, that the simultaneous activity of the muscles of the back, or leg, or foot, which is produced when these exercises are performed standing, is in the former cases more or less wanting.