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A FEW WORDS

ON THE

Curative Power of Systematized Exercises;

OR THE

MOVEMENT CURE.

BY

CHARLES PHILLIPS COLLINS, M.R.C.S.L.

"No body can be healthful without Exercise." — BACON.

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PREFACE.

HAVING been for ten years engaged in the practical and theoretical study of Ling's System of Movements, I have become fully convinced of its value in a therapeutic point of view. It is now nearly thirty years since it was first introduced into this country from Sweden; and like all truths, it has in the interval been making slow but steady progress. During the eight years that I was the disciple of Professor Georgii in London, I had many opportunities of witnessing, and indeed of assisting in, the cure of numerous cases of chronic diseases solely by means of the Movement System applied in a regular and methodized order.

Ling's System is one which may be considered as an invaluable auxiliary to the ordinary and established mode of medical treatment, not as a project which is intended

in any way to supersede it. Accepting this treatment as a principal speciality in chronic diseases, I do not intend to exclude in my practice other rational and established methods of cure.

The advantage of Exercise, based on a knowledge of Anatomy, Physiology, Pathology, &c., had been entirely overlooked until Ling's time. It is true that Exercise had always been, and is now, considered by medical men of the highest standing as a valuable aid in restoring health after a long course of illness; but to Ling alone is due the credit of applying it as a means of cure. In establishing myself in this great centre of industrial and commercial life, I trust I shall have many more opportunities of testifying to the excellence of this particular mode of treatment.

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94, *Bloomsbury, Manchester.*

THE MOVEMENT CURE.

ALTHOUGH the method of treating disease by Medical Gymnastics is new to us of the nineteenth century, yet such was not the case with the Ancients, for they looked upon Exercise as a very efficient means of alleviating human suffering. At Athens, the Greeks had large buildings, called Gymnasia. These were five in number,—the Academy, the Lyceum, and the Cynosarge; Aristotle taught in the first, Plato in the second, and Aristothanes in the third; —the remaining Gymnasia being devoted exclusively to exercise; and thus they provided pabulum both for the body and the mind. The Ancients divided their Gymnastics into three kinds, namely, Gymnastic Militaria, Gymnastic Medica, and Gymnastic Athletica. Gymnasia were first established at Lacedæmon, but they afterwards became common in all parts of Greece, whence the institution was transferred to Rome, where it was improved upon. With the decline of Greece, the Gymnastic art likewise degenerated, until it became the sole business of professional Athletæ. We are told by Plato that a short time prior to Hippocrates, one Herodicus first introduced this art into medicine; and that his successors, as well as the Romans, convinced of its

usefulness, applied themselves assiduously to improve it. This great philosopher further adds that Gymnastics were made a part of medical treatment as a means of counteracting the bad effects of increasing luxury and indolence. They were gradually reduced to a regular system; public buildings, called Gymnasia, were erected, and officers appointed to superintend them. Hippocrates gives instances where he treats of exercise in general, and of walking in particular, as to their effect upon the health; also as to the results effected by horse exercise, leaping, rolling in the sand, inunctions, frictions, &c. But inasmuch as physicians did not adopt all the Gymnastic exercises into their practice, they came to be divided between them and the professors of military and athletic exercises, who kept schools, &c., the number of which greatly increased in Greece. The military and athletic exercises were soon adopted by the Romans, and were advanced by them to the acme of perfection, until the decline of the Empire involved the Arts in the ruin thereof, and among them others, the science of Medicine and Gymnastics, the latter having in the sequel become dissevered from the former, with which it had always been previously identified,—a position which unhappily it has never since been able to recover.

Swinging seems to have been used by Celsus and Celius Aurelianus to procure sleep; and its influence, in a limited form, is shown by the rocking of the cradle in the case of infants. It obviously affects the circulation, especially that of the brain,

and indirectly the bladder, stomach, intestines, and cutaneous circulation. If, with the ordinary swing, the velocity be increased, and its motion suddenly reversed, copious discharges from the above mentioned organs will frequently follow. It has been used to some extent in Lunatic Asylums, in cases of mental disorder. At the Cork Asylum, machines were constructed for this purpose, of which Dr. Burrows remarks :—

"They (the machines) should not be employed early in the disease, at least until the violence of the mental attacks have subsided; nor in young plethoric persons, when there is a tendency to determination of blood to the head. The motions ought to be commenced gradually till carried to the degree of velocity desired. When sleep is the object, a slow and continued action of the machine, without affecting the stomach if possible, is necessary. When its full motion produces great prostration of strength, and lowers remarkably the circulation and animal temperature, advantage has been obtained from it. In the intermitting form of mania, it has sometimes checked an approaching paroxysm; and in the more continued cases it has broken the concatenation of morbid ideas."

Yet, in the words of this Physiologist, and of others equally eminent, "its application requires great caution, pathological observation and experience, in order to avoid the most dangerous consequences from it, as to deserve the opinion already expressed concerning it."*

"The father of English medicine," Thomas Sydenham, thought very highly of horse exercise in cases of consumption and hypochondriasis, and

* I believe, however, this mechanical treatment has been since abandoned, some very disastrous consequences having followed its injudicious application.

recommended it in most cases; indeed, he solemnly affirmed that it was as effectual a remedy in these disorders as bark in intermittents. Volumes might be filled in recording the sayings of eminent medical men of the present day. Here follows a quotation. Dr. Williams, in his "Practice of Medicine," thus speaks of ordinary exercise:—

"Exercise varies in effect according to its kind. Walking, though it gives some action to most of the muscles of the body, chiefly exercises those of the lower extremities, and, by increasing the circulation and perspiration especially in this direction, tends to drive the blood from the head and chest, and to relieve congestion in those cavities. Riding on horseback causes more exertion to the loins, and by the regular movements which it communicates to the viscera of the abdomen, pelvis, and thorax, promotes circulation and functional activity in them. It is not equally effectual with walking in equalising the circulation in the head and extremities, and in cold weather it often especially causes headache; but this may generally be prevented by taking means to keep the feet warm. Some sort of exercise, which includes alternate stooping and raising the body, such as are involved in digging and other occupations of the garden, are servicable in promoting the action of the bowels and kidneys. This remark applies to various games of bowls. Rowing has the advantage of very generally and uniformly exercising the muscles of the whole body; but, unless practised with moderation, the simultaneous pressure it exerts on every part may prove injurious by overstraining the organs of circulation and respiration; and many instances have come under my own observation of the evil consequences of boat-racing."

The good effects of these every-day athletic exercises might be dwelt upon *ad infinitum;* but the above shows a few of the good results which ordinary Gymnastics can produce. But how much more

can be attained by movements or exercise founded on a knowledge of the wants of the human frame! We can seldom prescribe such severe exercise as digging or rowing for invalids, for the exertion of raising a spade might sometimes prove too much for them. In Ling's system, all the beneficial results of digging, and of every other healthful exercise, can be obtained by a patient with the most delicate frame, at a small expense of vital force, while at the same time his bodily vigour continues to increase. Walking, again, cannot always be used in the case of delicate invalids;—not that it is absolutely injurious in itself, but that it exhausts the vital power, and the patient, instead of afterwards experiencing a sense of strength, has the consciousness that he only feels all the weaker. And why is this? Because the vital or nervous force may become exhausted in the same manner as the blood is: the weakness he feels is not necessarily muscular,—nay, that system may be strengthened, but it is at the expense of some organ which has been deprived of its due or requisite share of nerve or blood stimulus, and thus the harmony of the organism has been destroyed.

Dr. Williams proceeds:—

"Moderate and sustained exercise in the open air, by walking, &c., excites into activity most of the functions of the body, especially the circulation and respiration, and those other functions intimately connected therewith—namely, secretion and the production of animal heat;—and provided the fatigue or exhaustion resulting from the excitement be adequately removed by sufficient rest and sustenance, the vital functions gradually gain vigour by

activity, and the structures concerned in their support acquire a fuller and healthier development. The muscles, especially the heart, manifest an increase of health and firmness: and the blood vessels are improved in tone, so that they distribute vigorously and equalise the flow of blood, and prevent partial congestions and obstructions; and the blood itself, thus energetically carried through the organs and textures, undergoes the complete series of changes of nutrition, purification, and arterialization, by which its integrity is maintained, and by which it is adapted to sustain the several functions of the body. The appetite, the digestive powers, the intestinal action, the warmth of the surface and the extremities, the spirits and temper, are all generally improved by regular exercise. But much of these beneficial effects depend on the judicious manner in which exercise is *suited in kind, time, and degree*, to the strength, habits, sex, occupation, age, and other circumstances of the individual."

Here we have the opposite extreme, the truthful and scarcely ever failing results of neglect of exercise :—

"The want of exercise is capable of exciting as well as predisposing to disease. Thus internal congestions, disordered and deficient secretions, general plethora, over nourishment of adipose tissue, and wasting of muscles, besides various evil consequences of their morbid conditions, may result from this cause when in prolonged duration. If combined with other disturbing causes, it is a still more ready and common cause of mischief. Some organs suffer more particularly from a sedentary mode of life. For example, the liver, in consequence of the increased task of decarbonization of the blood which deficient respiratory exercise throws upon it; the brain, from its direct and free communication with the centre of the circulation, which exposes it to an accumulation of blood when the distant circulation fails; hence bilious disorders, dyspepsia, hemorrhoids, headaches, giddiness, &c."

This is most certainly true. We see every day around us lamentable instances of disease, which

have advanced so far that scarcely any remedial agent can act beneficially. Yet many Anglo-Indians (bilious and dyspeptic) have been cured by this treatment of Ling's, after all other systems had failed, and have returned to the country of their adoption, only in too many instances to resume the same mode of living which tended to bring on their disease. It must not be inferred from these remarks that I suppose all Englishmen in India to live irrationally; but it must be allowed that many do; and I believe that Europeans might, generally speaking, in spite of the increased heat of temperature, &c., live as long in the East as in the mother country, were they to follow more the dictates of reason.

Peter Henry Ling, born in 1766, in Sweden, was the founder of the present system of Curative Exercises. In early life he was noted for great intellectual power, great firmness and determination in the prosecution of any particular pursuit, which, when he had once entered upon, he rarely gave up. He was at the same time of a gentle disposition, and full of the Scandinavian romance of his native country. Of his early life it is necessary to say but little. After passing his examinations at the Universities of Lund and Upsala, he set out on his travels, visiting England and other countries, and afterwards taking an active part in the naval engagement off Copenhagen, in April, 1801. About this time he suffered severely from a rheumatic affection in his right arm, and this he cured by means of fencing, in which art he soon became a proficient.

That he was a man of no ordinary talent, his poems alone will prove, if there were nothing else. He contributed largely to the national poetry of his country, his "Asar" being considered one of the finest productions in the Swedish language.

Ling afterwards directed his attention to Gymnastics, and devoted his whole energy to the formation of a new and complete system, based on the laws of motion, and on the fact of the human frame being in itself a perfect entity. He considered the human body as an organism perfect in itself, made up of lesser organic structures, each having its own especial function, yet contributing in the aggregate to the perfection and stability of the whole organism; that there are three agencies continually acting on the body — the *Dynamical* (influential agency of the mind), the *Chemical agency*, and the *Mechanical agency*; that in health all these agencies perfect their respective parts, while harmony exists throughout the whole, but that in disease this harmony is destroyed; and that each of these agencies exerts a power in restoring the frame to its normal condition. Thus Ling gave to the mechanical agency that importance which it properly merits. As chemical effects proceed from within outwards, so, he averred, do mechanical effects proceed from without inwards. Many examples of this last law may be seen every day. Were it otherwise people would not faint or die from a severe blow to the trunk or limbs, which blow has often not disorganized the tissues to the extent that we should have expected. The mechanical

agency may be indeed considered as one of the most efficacious that we are possessed of, and is equalled by no other system in restoring that harmony which in disease has been lost.

The following is a sketch of Ling's Theory of the Human Organization :—

"The vital phenomena may be arranged in three principal or fundamental orders :—1. *Dynamical Phenomena*, manifestations of the mind, moral, and intellectual powers. 2. *Chemical Phenomena*, assimilation, sangnification, secretion, nutrition, &c. 3. *Mechanical Phenomena*, voluntary and organic; respiration, mastication, deglutation, circulation, &c.

"The union and harmony of these three orders of phenomena characterize a perfect organization, and every vital act is accomplished under their combined influence.

"The different share these phenomena take in a certain vital act gives it its peculiar character. If any serious derangement occurs in any of these phenomena, the result is always a disturbance of the vital functions, which we call disease.

"The state of health depends accordingly on the equilibrium and harmony that ought to exist between the functions of those tissues or organs in which these three orders of phenomena occur.

"When this harmony is deranged, in order to re-establish it, we should endeavour to increase the vital activity of those organs whose functions have a relation to that order of phenomena whose manifestation is decreased or weakened."

We need but look around us to see instances of the influence of the mechanical agency on the various tissues of the body in health. The immediate effect of ordinary exercise is to increase the parts exercised, and this is in accordance with one of nature's admirable laws,—that living bodies (within certain limits) increase in size in proportion to the exertion

that is required to be made, so that a part increases not only in strength and fitness, but also in calibre. An individual engaged in some unusual avocation, in which muscular power is required, every day becomes not only improved in strength, but the muscles increase rapidly in size and vigour, so as soon to surpass those of the body which have been less employed. The beneficial effects do not rest here; all other parts of the body sympathize with the improving condition of that part which is principally exerted; the circulation, being stimulated by exercise, gains new vigour, and propels the blood with greater force into all parts of the system; and all the functions are carried on with increased activity. Improvement in the general health is soon manifested, and the mind (being at the same time judiciously cultivated) acquires strength and becomes capable of greater and more prolonged exertion.

Ling did not confine himself to the Therapeutical part of Gymnastics, but gave his mind also to the study of Pedagogical, Military, and Æsthetical Gymnastics. To show how his views have been recognized in various parts of Europe, it is sufficient to say that there are upwards of fifty institutions on the Continent, supported either by Government or private individuals. The Swedish Government has long supported a central institution at Stockholm, which is under the able presidency of Professor Branting, who was one of the two to whom Ling bequeathed the task of carrying out and enlarging his system, the other being Professor Georgii, of London.

The Prussian Government introduced the system some years since into Germany, and at Berlin there are three institutions for the cure of chronic diseases upon Ling's system, and one (furnished by governmental grant) for training the army in the Rational, Military, and Educational Gymnastics. It has in fact in both those countries been introduced into their armies and schools. In Russia, there is a provisional institution, the Government having given 10,000 silver roubles for the purpose.

The movements are divided into two classes, called active and passive; and Ling has given us the following analysis of their physiological effects :—

"1. That the effects of these movements may be transferred to any part or organ of our organism.

"2. That the strength of the movements may be modified and regulated from the most feeble to the powerful.

"3. That passive movements generally affect the sensitory or excito-motory phenomena of the nervous system and of the absorbents; and, increasing thereby the absorption, advance the retro-metamorphosis (waste) of the organic textures (shorten the periodical cycles of duration of the nucleated cells constituting the tissues).

"4. That active movements augment the activity of the arteries and the innervation of the motory nerves.

"5. That they increase the animal heat.

"6. That they advance and support the progressive metamorphosis (repair) of the tissues (increase the deposition of nucleated cells to constitute new tissues).

"7. That the effects of the movements and manipulations are not only continuous during the periods of application, but are lasting in their results on the body."*

* Professor Georgii's pamphlet.

Many persons may feel inclined to say that all this sounds very well, but that they would like further evidence than mere statements, however philosophical they might appear to be. Ling, during his lifetime, tested all these movements therapeutically, either on himself or on others, before giving them to the world; and it was from the effects that they produced on the system that he augured their usefulness. In early life, it was thought that he would fall a victim to pulmonary consumption, as did his mother at an early age; but by movements applied to his own frame, and in accordance with his knowledge of their effects, he warded off the disease to which at one time he had a predisposition, and lived to a ripe old age. He found that some movements acted as stimuli; some as sedatives; some produced giddiness; others nausea; some produced profuse perspiration; some raised the animal temperature, whilst others lowered it; some accelerated the action of the pulse, while others depressed it. The knowledge of these effects enabled him to reduce them to a system, by which it would become a valuable aid in the cure of disease.

"As regards the influence of the mechanical agency (active and passive movements, &c.), their applications are founded on one of the fundamental principles of our organism. The Law of Movement is a natural law. No chemical act can be effected within the organism without the participation or assistance of the mechanical acts, which are expressed by voluntary and involuntary movements; and the whole frame is organized accordingly. So, for instance, oxydation of the blood (chemical act) cannot take place without the movements of the thorax by the

action of the expiratory and inspiratory muscles (mechanical acts). Digestion, assimilation, &c. (chemical acts) cannot properly be performed without the propelling movements of the stomach and intestines, the pressure of the abdominal muscles, &c. (mechanical acts). The blood cannot be thrown to every part of the organism, here to be purified, there to nutrify, stimulate, &c. (chemical acts) without a proper performance of the alternating movements of contraction and dilation of the heart (mechanical acts). The whole organism is a most wonderful machine in which motion produces motion. The conditions of molecular changes are thus ensured. The machinery repairs itself; it is stimulated to action, and communicates an increased action."*

To remove congestion of any organ or part of the organism, these exercises are found unequalled, inasmuch as they are made to act as derivatives;—that is, draw the blood from a part where it is in excess, and conduct it to another where there is a deficiency. This is not difficult of comprehension when we consider that no muscular contraction can take place in any part without a corresponding rush of blood. Ling aptly, indeed, declared movements which acted derivatively to be equal in effects to that of bloodletting, without any of its lowering consequences; for a local congestion might be relieved, and yet the system spared the loss of a drop of blood.

In a given case of disease, movements of an active, passive, or mixed nature are prescribed, and they can be varied to an infinite extent, so as to act very energetically, or very mildly. They may be adapted either to a strong constitution or the most

* Professor Georgii.

feeble. The results of the treatment are not violent or sudden, but generally slow and progressive; thus there is a gradual return to harmonious vital manifestations.

The group of diseases for which the system has been found most beneficial, is a very large one. In many cerebral and nervous diseases it stands pre-eminent, — to wit: in Paralysis, Epilepsy, Spinal Irritation, Chorea, Hysteria, Nervous Debility, Headaches, Giddiness, Determination of Blood to the Head, &c.; in many diseases of the bronchial tubes, — Asthma, Chronic Bronchitis, Chronic Laryngitis, Clergymans' Sore Throat, Early Tendency to Phthisis.

In the primary stages of Consumption the disease may be arrested, and even in the later stages relief afforded. This will appear feasible when we consider what the results are which in this disease we generally desire to obtain. The success attending this mode of treatment in Pulmonary Consumption is most satisfactory: it tends to remove all local irritations and congestions that predispose to the formation of tubercle, and diminishes that condition of the animal economy which tends to lower the nutritive process, and leads to the deposition of imperfectly organized products; it also hastens the removal of those already deposited, and, in fact, removes most of the troublesome symptoms in a great measure. It is but too palpable that movements directed to increase the capacity of the chest, must not only

tend to benefit the circulation, but cause also the blood to become more perfectly arterialized. In the course of a few weeks, with the ordinary run of patients, the chest will frequently increase from one to three inches in circumference, and the breathing power be proportionably raised, and this, too, without any violent exertion, but by simple and gentle, but well-directed movements. The advantage of the system is that, however weak and ill a patient may be, the movements may be regulated accordingly; and in proportion as the patient gains in strength, so in the same ratio the movements are increased in power. In the growing youth of either sex, the vital capacity of the chest can be increased, so that the lungs may have full freedom of action. A narrow chest and malformed thorax, often, especially in young persons, predispose to consumption. This susceptibility may, by the rational application of this system, be removed; indeed, in the so-called prophthisical state, I consider this treatment in the light of a specific; and no parent should hesitate in at once having recourse to it, offering as it does such powerful remedies; for by neglecting to do so, they often see their offspring drop away one after another, victims to that fell destroyer, Consumption.

In affections of the digestive apparatus:—Indigestion, Constipation, Chronic Diarrhœa, Hypochondriasis, Piles, &c., as also in Diseases of the Heart, Hypertrophy, Atrophy, Fatty Degenera-

tion, Diseases of the Liver, and Scrofula, it offers many valuable and curative resources.

In Curvatures of the Spine, the Movement Cure is the only rational mode of treatment. We cannot reasonably expect a curvature of twenty or thirty years' standing to be cured; but when the deviation is more or less recent, a complete cure can be effected, the spine being entirely straightened as well as strengthened, and that, too, in a space of time comparatively short, all without the aid of machinery. Even in cases of long standing, much good may frequently be effected by improving the general health, regulating the several functions and secretions, and imparting tonicity to the muscles of the back. The only treatment which can be called scientific in distortions of this character, is that of increasing the power of the muscles on the side opposite to the curve, whether it be in the dorsal or lumbar region, and which muscles have, in the first instance, given way and allowed the spine to bend beneath the superincumbent weight. Steel stays of more or less complicated mechanism, and all other contrivances for straightening and supporting the spine, are worse than useless: they are positively injurious; as, on their removal, allowing the spine to have become straight by dint of pressing and screwing, it has only been accomplished at the expense of ruined health and constitution; the muscles, wasted away and wholly incompetent to support the spine in the new position which it has been made to acquire,

has ever after to be supported; and the patient is compelled to wear these inconvenient and often dangerous props for the remainder of his days—short though the span may be.

In the following diseases, some of which depend on a faulty or diseased state of the blood, the system of Ling's is found of great value, viz.:—Rheumatism, Gout, Stiff and Anchylosed Joints, Relaxed Ligaments, Chlorosis, Anemia, Amenorrhea, and other Affections of the Periodical Secretion, General Debility, &c.

The Movements, as before stated, are either Active or Passive, or a combination of the two.

The Active Movements consist of *Flexions and Extensions, Abductions and Adductions of the Limbs, Twistings and Bendings of the Trunk*, and so on. These movements are such as depend on the patient's own volition, more or less regulated and controlled by the operator.

The Passive Movements, on the contrary, are such as do not depend on the patient's volition, but are performed by another person or operator. They consist of *Friction, Percussion, Vibration, Kneading, Pressure, Rotation, Ligature, &c.*

The Mixed Movements are made up partly of Active and Passive Movements; the patient performs a certain movement with his trunk or limbs, and during the process the operator resists such movement, but ultimately permits its accomplishment. Thus there is a mutual resistance between the operator and the patient. This action may be

reversed, the operator making a certain movement with the patient while he resists its performance. This describes the active portion alone; to complete the movement, it is necessary that the operator should at the same time communicate a vibratory or other passive motion to some organ or part of the patient's body.

These movements are given every day in the form of a prescription, which consists of from six to sixteen separate movements, each given for some definite purpose, and the whole arranged in such a manner that the action of one may not interfere with that of another. The prescription is changed, if deemed necessary, in about a month or five weeks from its commencement, after the movements have produced a certain effect, or earlier according to circumstances.

Of the action of certain movements, a few words may be said. Friction, when judiciously applied, is productive of great benefit. According to its strength, it may produce merely slight venous absorption on the surface, or, increased in vigour and combined with pressure, it will act on deeper-seated structures, stimulating the branches of nerves, and distributing around the necessary materials of assimilation. Applied to the region of the abdomen, it stimulates the venous and lymphatic systems and relieves pain. We have evidence of the latter in the fact that experience teaches us to rub a part vigorously when it has received a severe blow, the friction invariably relieving the pain by stimulating the absorbents, &c.

Sir Benjamin C. Brodie, in his work on Diseases of the Joints, speaking of the anchylosis resulting from inflammation, says :—

"After the inflammation has subsided, if we find the mobility only in a slight degree impaired, we may leave it to itself safely. If there be considerable stiffness, at a later period, friction with the hands will be productive of great advantage. The friction, however, should be employed with caution, as, when used too freely, it sometimes occasions a return of the inflammation."

Again, he says :—

"Friction is sometimes of very essential benefit, but not unless it be employed to a considerable extent. It is, however, a remedy only applicable under certain circumstances. We must always bear in mind that friction is useful in relieving some of the effects of disease, not the disease itself; and those who recommend it without attention to this principle in these and other cases, will often find it to be productive of very injurious consequences."

This, like every other remedy, may be carried to such an extent as to produce injury; but, as Sir B. Brodie says, "it is exceedingly beneficial."

Vibration and Percussion.—The former is useful in many ways. It can be directed to any part, and acts as an absorbent and stimulant to molecular action; besides which it relieves fulness and congestion by hastening the capillary circulation. When directed to any of the nervous centres, it acts as stimulant. Thus, applied to the solar plexus, it has an influence of a stimulating character on the digestive apparatus, &c. Vibration and Percussion are both absorptive and stimulating. When applied to any part of the body, the venous absorption is

carried on with greater activity; and when applied to the chest, they stimulate the muscles concerned in respiration.

Pressure.—All the functions of secretion and excretion are vigorously promoted by pressure. In affections of the liver, it stimulates that organ to increased action.

Ligature is useful as a promoter of venous absorption; it is highly efficacious in cases of sprains. The mode of procedure consists in applying a ligature or tourniquet sufficiently tight around a limb or other part; this stops the venous flow, but is not made sufficiently tight to affect the arterial circulation in the larger trunks. After a space of time, varying from two to five minutes, it is removed, and the venous current is re-established. The part peripheral to the ligature will be seen suffused with a deep blush; the superficial vessels, having been greatly distended, now contract rapidly on their contents; the circulation of the capillary network is accelerated, and the blood is rapidly carried off to the relief of deeper-seated structures.

Rotation acts as a derivative or stimulant; it causes an increased secretion of the synovial fluid when this is deficient, as is the case with stiff and partly anchylosed joints; increases the mobility of a joint when this is limited, &c., and is a mechanical stimulant to local capillary circulation.

With so many muscles in the human body, and with so many different ways of acting by means of the different levers afforded by the limbs, there

must necessarily be a great variety of movements: this we find to be the case, for they are many hundreds in number. The accompanying wood-cuts will show a few of them, also their mode of action.

Fig. 1 is an example of a Passive Movement.

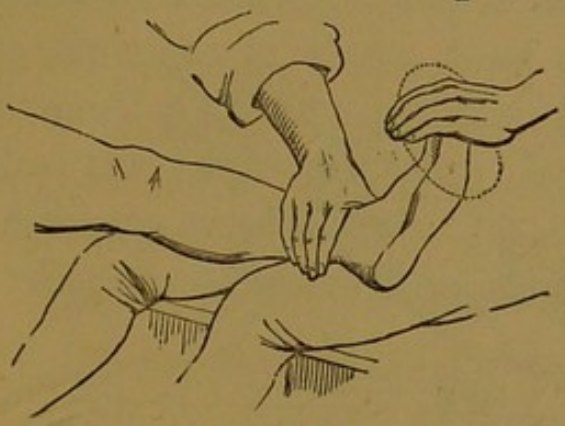

Fig. 1.

The patient is in a reclining posture, his hands placed on his hips, and his whole body in a state of rest. An operator, seated on one side of him, has one of the patient's legs resting on the anterior surface of his thighs. With one hand placed on the lower part of the leg, close to the ankle joint, he fixes the whole leg; and with the other hand, applied with the palm resting lightly on the ends of the toes of the same foot, he makes a circular or rotatory motion, describing in fact a cone, the apex being at the ankle joint, and the base at the toes. This is repeated a number of times, first from right to left, and then from left to right; the patient leaving his ankle joint as passive as possible.

This movement is capable of removing congestions of the head and viscera. In cold feet it has all the advantages of a warm foot-bath, without any of the drawbacks of the latter, inasmuch as its effects become permanent after a few repetitions; acts also in a salutary manner on the mobility, as

well as the synovial secretion, of the joint. It is highly advantageous in Paralysis. The passive manipulation is generally terminated by an active movement of flexion and extension, the operator giving a certain amount of resistance.

Fig. 2.—This illustration also indicates a Passive

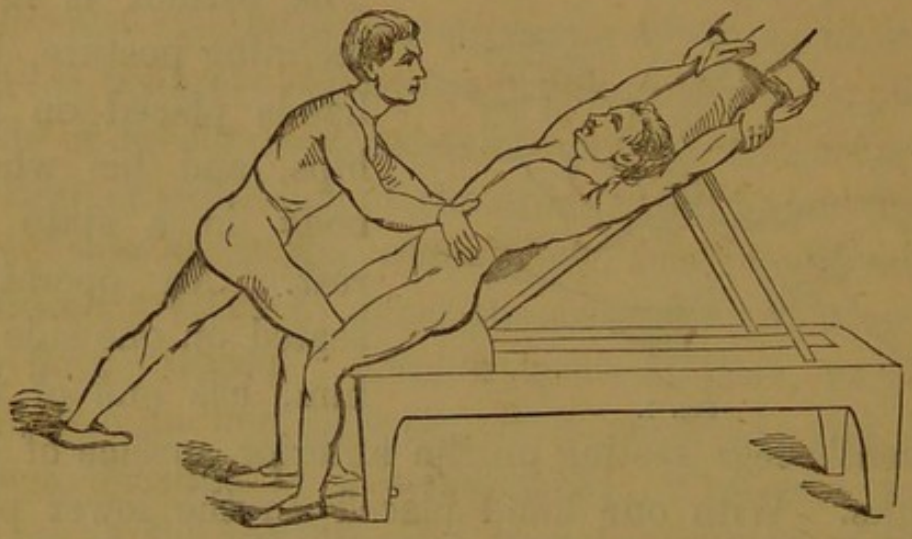

Fig. 2.

Movement. The patient reclines on a seat with a moveable back, which is lowered to the required level. The arms are extended upwards parallel with each other, and in the same line as the head, and there retained by an assistant stationed behind, until the end of the movement, for the purpose of keeping the abdominal muscles on the stretch. The operator, standing in front of the patient, places the palms of his hands on each side of the abdomen, under the false ribs, and then makes a number of quick concentric passes, or frictions, combined with slight pressure over the whole area of the abdomen, passing from above gradually downwards. This is

repeated three or four times, and is terminated by making with each hand a friction (somewhat resembling the figure 7) along the course of the colon, or large intestine.

The immediate effect is that of a sensation of heat over the abdomen. It stimulates the intestines by causing a larger amount of arterial blood to circulate in them, thus acting on the secreting properties of the mucous membrane, and aiding the peristaltic action. It is very efficacious in obstinate constipation.

Fig. 3.—Passive Movement. The patient is in semi-recumbent posture; head reclining back; the hands lying passively at the sides; the feet placed close together, with the soles resting on the edge of a stool, which is brought sufficiently near to permit the knees to be bent at a right angle; the knees separated from each other, and allowed to fall outwards by their own weight. Perfect relaxation of the abdominal walls being thus secured, an operator, standing on the right side of the patient, places the ulnar edge of the palm of his right hand beneath the false ribs of the left side (left

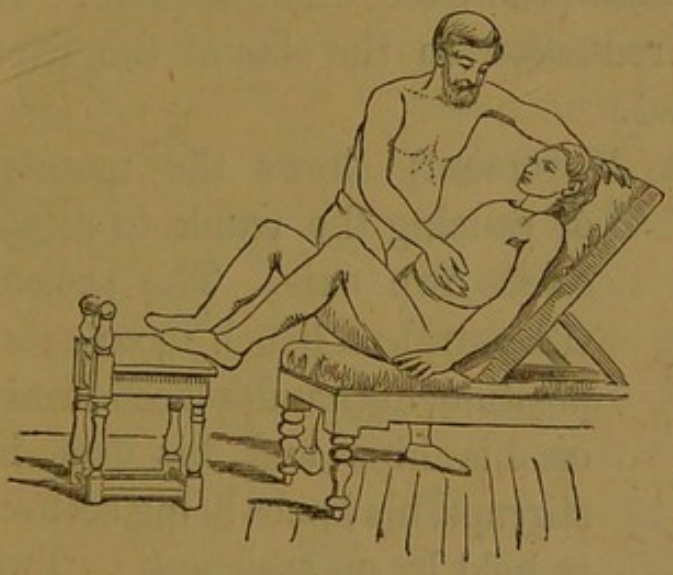

Fig. 3.

infra-costal region), and makes or communicates a trembling or vibratory motion to the stomach. This is continued a few seconds, and then ceases, when it is again repeated after a short interval.

It imparts an increased absorptive power to the stomach, and causes a diminution of the gastric juice, and is thus of great service in chronic gastritis, &c.

A movement of the same nature may be applied under the right false ribs; the operator in this case standing on the left side of the patient, and using his left hand. When combined with slight pressure, its effect is to stimulate the liver when inactive. It will also cause a reduction in the size of the liver when hypertrophied.

Fig. 4 (Passive Movement) shows the manner of causing the trunk to rotate on its own axis. The patient sits astride a bench in an erect position, his hands placed firmly on his hips and his feet in stirrups, his knees being securely held by an assistant. Two operators standing behind place each a hand on one of the shoulders of the patient, and rotate him a given number of times in each direction; the patient giving himself entirely up to the operators—making no exertion beyond the effort of throwing his chest out and keeping his head erect. The rotations are repeated

Fig. 4.

from fifty to sixty times, according to the circumstances of the case.

It acts powerfully on the abdominal viscera, imparting thereto an alternate pressure or kneading. It also acts on the anterior and lateral walls of the abdomen, which are each in their turn subjected to tension. It is beneficial in sluggishness of the large intestines, &c.

The four following figures are examples of movements of a combined character, both patient and operator taking an active part therein.

Fig. 5.—The patient stands erect with his legs and feet close together. Two operators, one on either side, place each one hand (covering each other) over the lower part of the abdomen, and the other in the same way on the back part of the patient's head and neck, the forearm resting between the shoulder blades. The patient, with his arms pendant, now bends his body forwards from the hips, the knees remaining extended. After bending down as low as he conveniently can, he is directed to resume his former position, in doing which he presses his head backwards and endeavours to bring the shoulder blades together. The operators produce a pressure, sometimes combined with vibration, over the abdomen, on which

Fig. 5.

they have each placed one hand, while with the other hands on the head and neck respectively, they offer a steady resistance to the patient during his efforts to raise himself. This movement is repeated three times. (Only one operator is represented in the wood-cut.)

It acts chiefly on the muscles which lie on each side of the spine (erector spinæ). It has also other effects on the viscera.

Fig. 6.—The patient reclines with the feet raised from the ground, and resting with the soles on the edge of the stool, and the knees together and flexed at a right angle, the hands firmly placed on the hips; the operator standing at the side of the patient, places his own hands with the palms turned towards the inner surface of his knees, which, while the patient resists him, he gradually separates. This portion of the movement being carried to its limit, the operator now opposes the efforts of the patient to bring his knees together again. Thus the abductor muscles are brought into play. To reverse the movement, the operator changes his hands from the inner to the outer sides of both knees, and offers partial resistance at the

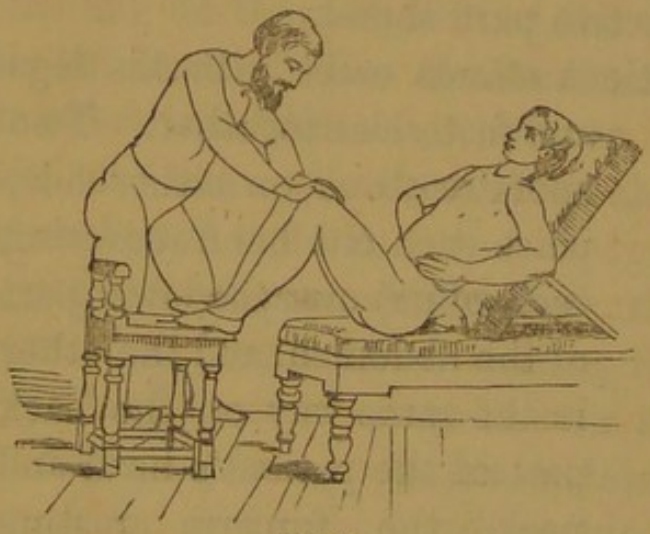

Fig. 6.

same time that he suffers the patient to separate them gradually, as far as the nature of the joint will permit; then, requesting the patient to oppose him, he by degrees brings the knees together again. This last movement acts solely on the adductor muscles. Each operation is repeated three times.

Fig. 7 represents a movement which is sometimes applied in cases of curvature of the spine,—suppose in the dorsal region,—and with the convexity to the right side. The patient is seated with his feet and legs separated, the left arm stretched upwards vertically, the body twisted to the left, and the knees firmly fixed by an assistant. He is made to bend forwards (with the trunk in the twisted position) in the direction of the right knee. An operator, standing behind, places his hand on the wrist of the outstretched arm, and makes a slight pressure downwards, forwards, and to the right, while at the same time he directs the patient to regain his original position. This is repeated three or four times.

Fig. 7.

It acts in a powerful manner on the muscles of the left side of the spine, which, in the first instance, have yielded, and suffered the spine to be drawn to the right side by the now more powerful muscles connected therewith.

Fig. 8.—The patient sits in a reclining posture,

with the arms extended horizontally, the hands being on the same level with the shoulders, the legs and feet separated. The operator, standing in front, places one hand behind each wrist of the patient, brings the arms gradually forward, until the distance between them is the same at all points; the patient in the mean time resisting. The muscles which approximate the shoulder blades are brought into play, as well as the extensors of the arm. The movement tends to expand the chest.

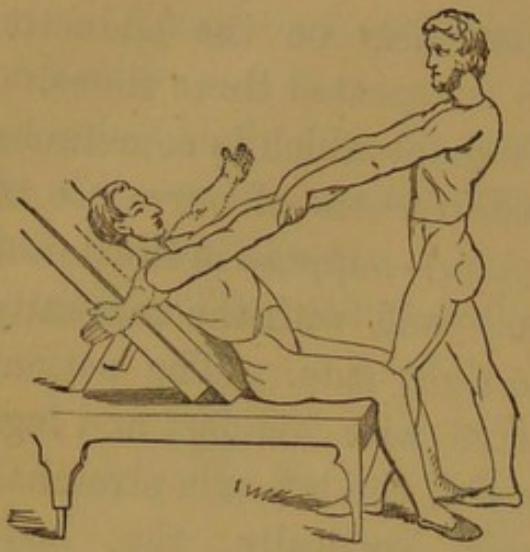

Fig. 8.

The movement may be reversed, the patient endeavouring to keep his arms in the concluding position of the last movement, while the operator, having his hands on the palmar surface of the wrists of the patient, separates them until they have regained the horizontal direction.

It acts on the muscles of respiration, more especially the pectorals.

Figs. 9 and 10 represent some of the active or "free exercises," performed by the patient alone and without the aid of apparatus, &c.

Fig. 9.—In this figure the patient is represented in an upright position, with the legs close together and the feet at right angles to each other, the arms

placed close to the sides, the hands with the palms flat to the thighs and the thumbs directed forwards. At the word of command, the arms are promptly flexed at the elbows and the hands raised to the shoulders. At the second word of command the arms are quickly extended either upwards vertically, outwards horizontally, forwards parallel, backwards or downwards. Each movement is repeated several times, and the great desiderata of precision and quickness are strictly enforced. Each extension is always preceded by the flexion of the forearm. Any number of persons can go through these exercises at the same time, so that they are adapted for schools, &c. After a certain degree of proficiency has been attained in the above, they can be varied. Thus, one arm extended vertically and the other horizontally, or the reverse; the right stretched forwards and the left backwards, and so on.

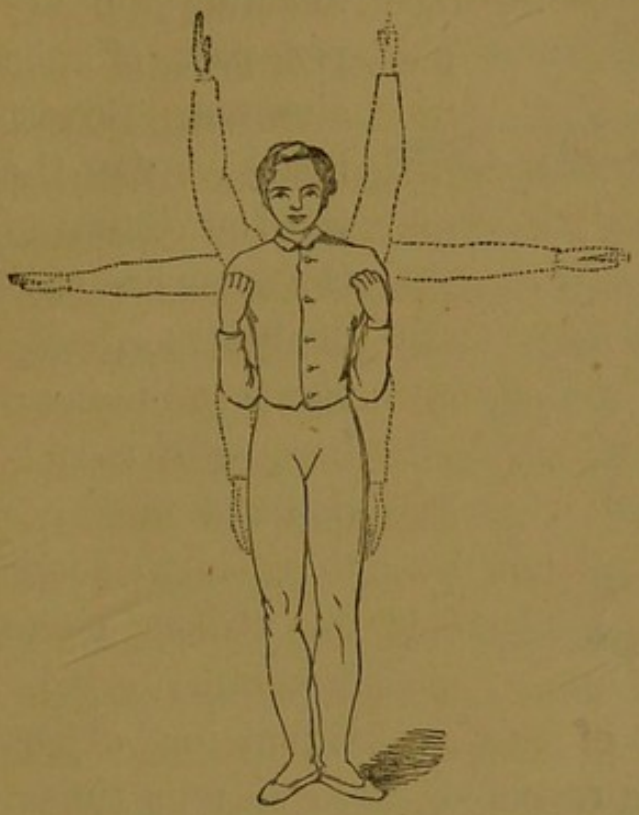

Fig. 9.

Fig. 10.—The position is the same as in Fig. 9. At a given order, the arms are flexed and the elbows

raised to a level with the shoulders, the hands on the same level, the fingers extended, and the thumb touching the upper part of the sternum (breast bone). At the word of command the arms are suddenly struck backwards in the same line, with a sudden and rapid action, as if about to strike some imaginary individual or object in the rear. This is repeated three or four times. The head must not be allowed to jerk forwards during the exercise, but must be kept perfectly still, as well as the whole body.

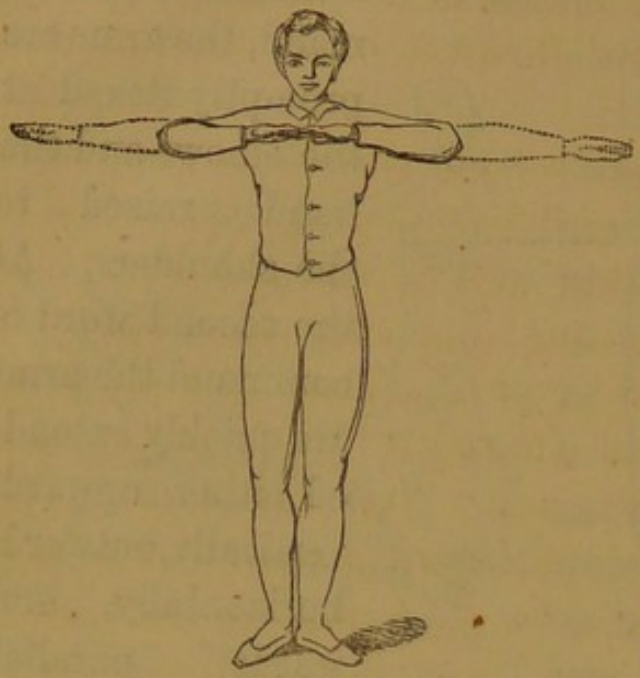

Fig. 10.

The invigorating effects of these movements can only be sufficiently appreciated by those who have had personal experience. They increase the strength of the muscular fibres of the arms and chest, and act very powerfully on the respiratory muscles, thereby giving additional capacity to the region of the thorax,—the lungs acquiring increased action, while, as a consequence, the blood becomes more highly arterialized.

The movements of the trunk and legs are very varied and numerous; and of course, in applying

these free exercises to the human frame, all parts and muscles are brought into play, so as to give harmonious development to the whole. Space is too limited to give illustrations of more of these free exercises.

Much more might be said which the compass of a small pamphlet will not permit, regarding the value, comprehension, and importance of this new mode of Therapeutics; and still more would be necessary in order to give a clear and somewhat correct idea of the whole of Ling's system, with its Theory and Practice. But sufficient, let me hope, has been elucidated to show the evil effects that arise from not training the human body on systematic principles,—not to speak of the ill effects resulting from what may be termed quantity and quality. The existence of either class of evils is quite sufficient to prove that physical training should form a part of the education of youth, as much as literary instruction, music, and the art of design, which, together with Gymnastics, formed, according to Aristotle, the four branches of Education considered essential in his day. In the words of Hufeland, "The propensity to bodily movement is in man as great as the propensity to eating and drinking. Harmony in the movements is the grand foundation on which health, uniformity of restoration, and the duration of the body depend."

The want of some rational system, which could be introduced into schools and other educational establishments, with a view to make Gymnastics

produce their proper results, has long been felt; by means of which system, the evils resulting from the deficiency of exercise for one sex, and the excess thereof for the other, might be obviated; and the beneficial effects which Gymnastics produce on the mind as well as on the body, might be secured for both. Since Ling's system has been made known, a new era in Gymnastics has commenced, and the gap in the present mode of education may now be filled up; answering, as the scheme does in every respect, to the expectations of the most sanguine. So that in future time Ling will be looked upon as one of the benefactors of his race, as one who, under great difficulties and self-denials, strove hard, and presented to the world a system with which no other system can vie in producing harmony of mind and of body.

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