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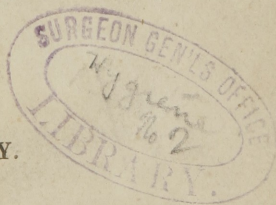
The Philadelphia Medical Society,

FEBRUARY 19, 1831.

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ORATION.

Gentlemen,

It is with unaffected diffidence that I attempt to discharge the duties of the appointment with which you have honoured me. This trust has been hitherto conferred on members of our society alike distinguished for their learning and eloquence. To the themes on which they have so eloquently descanted, I could not hope to add either new embellishments or illustrations.

I must therefore beg your permission to wander from the oft trodden track, to select from the innumerable objects for meditation which our profession affords, one which will be worthy of your attention, and of the occasion which has called us together.

The subject on which I propose to address you concerns our own well-being. It has reference to the preservation of *health*, which is justly said to be the source of all earthly blessings. Without it, life would be insipid and valueless.

“He that has thee
Has little more to wish for; and he that
Is so wretched as to want thee, wants
Every thing with thee.”

To detail all the causes which contribute to the destruction of health would occupy a space beyond that which is allotted to me in this address. Among them, however, there is none

in refined society more operative than indolence and inactivity. He who yields to these indulgences, either does not understand, or disregards the laws which govern his economy. Such a course will prove alike injurious to his health and to his morals.

“ Who does not act is dead ; absorpt entire
In miry sloth, no pride, no joy he hath.”

Long inaction will deprive the muscles of their strength and suppleness—the nerves of their sensibility—the senses of their delicacy—the moral and intellectual faculties of their purity and energy. While the indolent voluptuary becomes the victim of chronic diseases, of gloomy thoughts, and of wasting ennui, the temperate and industrious devotee of active business generally enjoys good health, happy reflections, and untiring strength. A stranger to disease, he reaches an advanced age, possessing a degree of bodily vigour and comfort unknown to the listless and intemperate.

Escaping the infirmities of age, he sinks without suffering under the weight of years, by a gradual and successive extinction of the functions of those organs which are essential to life.

In urging the necessity of exercise, we should not be less careful to repair exhaustion by salutary repose. The locomotive muscles, when fatigued by long exertion, become incapable of new labours, until the fibres of which they are composed are repaired by the necessary degree of relaxation.

It is indeed thus with all the organs which tend to favour and to maintain our relations with external objects. Our eyes will soon become wearied by tracing the lights and shades of the most perfect painting, or indeed by contemplating any object, however interesting and seducing, and will seek relief by turning in new directions. By repose, either thus obtained, or from the restoring influence of night and sleep, these organs will again be able to examine the same objects with a degree of eagerness and delight not surpassed by the

first view. The same law governs the senses of hearing, of smelling, of taste and of touch. No organ, excepting those immediately concerned in supporting life, can sustain a continuity of action. Both physical and moral repose are always salutary when the laws of wisdom or of nature regulate its duration. It is only when indulged in to excess that it becomes hurtful, and interferes with the sanative operations of the economy. A wise providence has therefore decreed, that alternate action and repose is essential to the maintainance of health.

“ Weariness

Can snore upon the flint, when resty sloth
Finds the down pillow hard.”

A legislator of antiquity, as celebrated for wisdom as for rigid morality, believed that the happiness of man depended as much on the development of his physical, as intellectual faculties. Influenced by this opinion, he caused a system of gymnastics to form the basis of a national education. It is mainly, however, to the medical philosophers of other times, that we are indebted for the existence of institutions which are calculated to perfect all the faculties which form the attributes of man. Regular exercise, and a temperate regimen will guard us against the encroachments of disease, invigorate the understanding, and encourage pure and elevated sentiments.

The declaration is as trite as it is true, that exercise promotes virtue, and subdues the storms of passion. Fatigue invites sleep, which is the true preventive of those moral evils which cannot be checked by ordinary remonstrances. This is particularly the case at that age when reason is disposed to yield her empire to the impulse of unruly passions. It is thus that during sleep the fluids pour their refreshing currents to the fatigued extremities, adding to them new strength, while there

is a proportionate subtraction from other organs, by which their action is diminished and their orgasms are controlled.

In order to obtain the best effects from exercise, it is necessary to adapt the kind and degree of it to the age, sex, temperament and condition of the individual who seeks its influence. These points, however, will be noticed hereafter.

In recommending exercise, the taste and inclination should be, as far as practicable, consulted. It is indeed most true, that

“ the toil you hate
Fatigues you soon, and scarce improves your limbs.”

The local effects of exercise may be understood by observing the phenomena which occur during the active movements of a limb. The temperature of it is sensibly increased, and it is expanded by an additional influx of blood. If the exercise be long continued, a sensation of numbness and weariness is felt, followed by pain and difficulty in the contraction of the fatigued muscles. If it has been carried to excess, or has been disproportioned to the vital energy of the member, inflammation and an interruption to its regular functions may be the consequence. It has been also remarked that when the muscles are overstretched or excessively fatigued, they diminish in size and lose their strength. These phenomena have been frequently observed in limbs which have been violently drawn in attempts to reduce old dislocations, in pedestrians who have over-exerted themselves in protracted journeys, and in horses who have ‘broken down’ in their rapid course.

If, on the contrary, the movements in the first instance be moderate, and only repeated after certain intervals of repose, the members thus exercised will gradually increase in size and energy of action.

“ Begin with gentle toils; and as your nerves
Grow firm, to hardier by just steps aspire :
The prudent ev’n in every moderate walk
At first but saunter; and by slow degrees
Increase their pace.”

Every organ of the body may be thus benefited by a system of exercises which will have a general operation.

The proper stimulants of the *internal* organs are intimately connected with their organization. Thus, aliments placed in the stomach exercise the digestive faculty. In the same manner impressions made on the brain, through the medium of the senses, influence the intellectual and locomotive faculties. The nutritive functions can be influenced, however, in no small degree, by indirect means, and by none so beneficially as by active muscular movements.

If exercise be taken after digestion has been performed, it awakens its natural wants, or in other words, excites the appetite. It was thus that the unsavoury black broth of Sparta was seasoned, and suited to the tastes of her hardy and virtuous sons. It is therefore with much reason that exercise before eating has been regarded in all ages as the most proper stimulant of the functions of the stomach. All other provocatives of the appetite prove, in the end, highly injurious, by awakening a desire for more food than the organ has ability properly to digest. Gastric embarrassment, sluggish movements, and dull perceptions, are in general the results of this mode of living.

Violent bodily movements or severe mental labour immediately after a full meal, interrupts the performance of the digestive functions. It is indeed a law of the animal economy, that when much of the vital energy of the body is directed to one organ, there is a corresponding diminution in the action of the others. Thus, when the muscles are actively moved, or the mind intensely occupied, the digestive powers of the stomach are suspended. Evidence on this point may be found in abundance.

It is stated by Dr Harwood that after two dogs had been fed to satiety, one was put on the chase, the other was left to repose. After a certain period, both were killed and opened. The

stomach of the one which had been fatigued was found empty ; the food having entirely passed, unaltered, into the small intestines, but no part of it had been taken up by the lacteals. In the stomach of the other, which was left in a state of repose, the food was for the most part altered by the action of the stomach—the chyme was passing into the duodenum.

Mental activity controls the functions of the stomach to an equal extent. During the period of deep thought, the vital energy of the body is so entirely directed to the brain, that not only the stomach, but the extremities experience a diminution of excitement, as is proved by their coldness and insensibility. This condition of the brain will so affect the stomach and intestines, as even to suspend the operation of active medicines. Doctor Rush states, that during the revolutionary war, he knew officers who were unexpectedly drawn into battle after having taken drastic cathartics, and yet suffered no inconvenience from them until the excitement of it had passed away. I have known too distressing sea-sickness promptly relieved by the mental anxiety produced by an engagement between vessels of war. The stimulation caused by this sublime spectacle, produced a revulsion from the stomach to the brain, and thus relieved the one of the irritation accompanying this distressing disease, and the other from that depressed state indicated by languid feelings and obtuseness of intellect.

These considerations should influence us, as physicians, to endeavour to quiet the apprehensions of our patients, with regard to the termination of their diseases. Greatly excited or alarmed patients cannot generally be successfully treated. Medicines prescribed for patients so affected, will not produce their ordinary effect.

To accomplish perfect digestion, the force of the economy must, for a time, be concentrated on the stomach, and cannot be diverted from it, without interrupting, in some degree, its functions. If persons devoted to labours of the mind expe-

rience improvement in their digestion by moderate exercise, it is because the gastric functions are not so much injured by these movements as they would be by intellectual exertion. In order, however, to afford the stomach every advantage in the performance of its functions, both mental and bodily, repose should be indulged in for a short period after a full repast.

Active exercise may be advantageously taken after the stomach has converted the food into chyme. It promotes, at this time, the passage of the nutritive materials along the mucous surfaces—awakens the action of the absorbent vessels—prevents the prolonged abode of aliment upon the lining membrane of the intestines, and allays that morbid sensibility which so often affects those who devote themselves to intellectual labours.

Interstitial absorption is also rendered more energetic by active exercise. This is proved by the rapid disappearance of adipose matter during excessive labour, or by the ordinary process which is styled '*training*.' The fat and serous fluids are absorbed, but the volume of the muscles is greatly increased. It enlarges also the *nerves* of locomotion. This is said to be very apparent in certain animals remarkable for their muscular energy.

The effect of active exercise on the circulation is to accelerate its movements. The rapid and forcible contractions of the muscles require that an additional quantity of arterial blood should be distributed to them; the muscles in their turn express more perfectly the venous blood from their tissues, and thus communicate to it an increased velocity. The muscular parietes of the heart, like all other muscles, are increased in strength and volume by violent exercise. The cause of the compact and well developed state of the muscles of those who take active exercise, and of the soft and less voluminous condi-

tion of these organs, in those who 'slug their lives away' in indolence and inactivity, are thus satisfactorily explained.

The influence of active movements on respiration and the temperature of the body, is too familiarly known to require of me even a passing notice. Laborious exercise will diminish all the interior secretions, with the exception of that of the synovial membranes, which is manifestly augmented. This is a happy provision of the economy, to guard against the ill effects of friction of the articulating surfaces of the bones. It is not thus with the secretions which pass to the surface of the body. The cutaneous exhalations, for example, are always vastly increased by active muscular motion.

According to the laws of exercise, the organs of sense and of intellect require it for their improvement, not less imperiously, than other parts of the body. Long continued action of the muscles would diminish the acuteness of the senses, were it not from the circumstance, that both are often operated on simultaneously, by which both are mutually benefited. There is no doubt, however, that the organs of sensation would acquire a more marked improvement, provided their education was more exclusive. This truth might be enforced by proofs drawn from comparative anatomy.

The emotions of the mind are influenced by the same laws. We are benevolent or avaricious, righteous or wicked, courageous or cowardly, just in proportion as we exercise these several operations of the mind. 'Man learns to be courageous, circumspect, ambitious, just, or benevolent, as he learns to sing, to calculate, to measure, to speak, and to reflect. When often exposed to danger he learns to meet death without fear, to become indifferent to the agents of destruction'.*

* A view of the Elementary Principles of Education, founded on the nature and study of Man, by G. Spurzheim, M.D.

No man ever had his moral feeling improved by frequenting scenes of debauchery, nor his religious propensities exalted by listening to denunciations against professors, or to harangues against the scheme of salvation. For this reason man may be strengthened in virtue or in vice, by education, as readily as he can be instructed in any ordinary branch of learning.

The advice which Hamlet gave to his mother, to

“ Assume a virtue if you have it not,”

is based on sound physiological views; and affords one among a thousand other instances, of Shakspeare’s intimate knowledge of the operations of the human mind.

The manner of exercising the reasoning faculties must be familiar to you all, as you have daily opportunities of witnessing the process, and of deliberating on its results. Few indeed have been able to exercise their faculties advantageously, who have been deprived of the advantages of early and constant training.

The direct effect of mental exercise on the brain is the same as on all other organs. It is subjected to the same laws of organization as the arms or legs. Intellectual exertion invites an increased influx of blood to the brain, with a consequent increase of nutrition. The size of an organ, it is true, is not always in proportion to the exercise to which it has been subjected. The muscles often acquire an agility and energy, and the brain an activity, which is independent of size.

Though moderate, active exercise promotes the nutrition of all the organs, it is on the agents of locomotion that it is most observable. When we resort to means to invigorate the body, we should not rely on any one form of muscular motion. They should be so varied as to bring into operation every muscle of the body. No garters, girdles, belts, or corsets should be suffered to confine or embarrass the natural movements of the muscles. Girdles, or Russian belts were supposed to have the effect of preventing the occurrence of hernia. This is an

error, because they neither press over the inguinal nor femoral openings. They may indeed contribute to produce this disease by uniting with the deep inspiration which is taken at the commencement of violent exertion, to compress the viscera towards the inferior part of the parietes of the abdomen. These belts are only useful to persons who ride rapidly on horseback, by preventing severe shocks to the abdominal viscera.

Every kind of dress which closely compresses the muscles prevents that influx of blood to them, which is so essential to their growth and strength. Muscles may be diminished to one sixth of their ordinary magnitude, by the long continued pressure of bandages. Soldiers and sailors have been known to render themselves invalids by practising this art. It is in this way young ladies so enfeeble the muscles of their backs by corsets, that they cannot maintain their spines in an erect position. Curvature of the vertebral column, with the destruction of symmetry and health, is the consequence of imprudent use or abuse of the corset. Those who have taken violent exercise should guard against a sudden suppression of perspiration. Instead of taking off a part of the dress, as is often injudiciously done at such times, additional covering should be put on.

In the limited space allotted to this address, I cannot particularly describe the various salutary exercises which are ordinarily recommended. After briefly noticing them, I shall invite your attention more particularly to their effects on the system. Of those which give motion to the muscles of the lower extremities, there are none more healthful than walking. The attitude of the body should be a slight inclination forwards, but not to the grotesque and fashionable extent which is now so generally adopted, and in which the position is as unnatural as it must be painful, and not at all calculated to afford the muscles of locomotion the best opportunity to perform their offices with energy.

Dancing is a most useful exercise, and not the less so from being agreeable. It is defined to be a series of harmonious movements, influenced by the sound of musical instruments. This accomplishment has found grave advocates in all ages. Even Socrates so warmly approved of it, as to take lessons himself at an advanced period of his life. Locke in his treatise on education recommended children to be taught this exercise as soon as they are capable of learning it. 'Nothing,' he observes, 'contributes so much to a becoming confidence and behaviour, or raises them sooner to the conversation of those above their age. For though dancing is merely an outward gracefulness of motion, it gives children manly thoughts and a proper carriage.'

At different periods this accomplishment has undergone strange modifications. The dance of the Hebrew idolaters, or Spartan warriors, though it may resemble the hup-se-saw practised in a neighbouring county, can have but little similitude to the ambling and seesaw movements of a modern belle, or to the more voluptuous displays of those who figure professionally in the opera. Their effects, however, are the same. They occasion a prodigious development of the muscles of the lower limbs and inferior parts of the trunk, while those on the superior part of the body, arms and forearms, are small and feeble. This exercise, if alone pursued, gives to men forms which nearly approach to those of women. Their pelvis appears enlarged from the great development which surrounds it—their neck is small—their arms round and feeble—their shoulders narrow and slightly covered with flesh. It is therefore important, in order to maintain just and harmonious proportions, that youth should associate with this exercise others which should influence the muscles of the shoulders and upper extremities. In adopting a course of exercise, we should select those, which in succession call into operation all the muscles of locomotion. Or, when it is desirable to

remedy bodily defects, arising from the debility of a particular class of muscles, we may by a cautious and gradual exercise of them restore the part to its wonted vigour.

“ Few bodies are there of that happy mould,
But some one part is weaker than the rest ;
The legs perhaps, or arms, refuse their load,
Or the chest labours. These assiduously,
But gently, in their proper arts employed,
Acquire a vigour and a springy activity
To which they were not born.”

The practice of running, leaping, hopping, and the chase, were favourite sports among the ancients, and well calculated to invigorate the muscles of the lower extremities. When one of them is imperfectly developed, from any cause, exercising it exclusively, as may be done by hopping, will invite into it a freer influx of blood with a corresponding increase of strength. These exercises seem well suited to youth and childhood.

The limited and moderate movements of the present style of dancing—the elevation and gaiety of spirits which it occasions, are well calculated to counteract the hurtful effects of the sedentary occupations of young ladies. The excitation which it communicates to the viscera has a most salutary influence in establishing that function on which female health depends. Waltzing often proves healthful, but should be commenced in moderation, and never carried to the extent of producing vertigo.

Running, which gives a severe shock to all the viscera, has an especial influence in developing the respiratory apparatus. We should be particularly careful, however, in taking this exercise, to avoid violent efforts at the commencement. If at first we run for a long period at our topmost speed, the pulmonary cells may become so distended as to rupture and occasion spitting of blood. In running, as in all other severe exercises, the chest is rendered immovable by the fixed con-

traction of the muscles of respiration, and by the occlusion of the glottis, which suspends expiration until it is overcome by the previous contraction of the diaphragm.

The chase is an agreeable, and to some extent, a healthful recreation, but is not well adapted to infuse great strength into the muscular system. It rather forms a kind of habit to endure fatigue, than to afford the ability to triumph over resistances. To acquire great strength and development of the muscles, they must be addicted to frequent vigorous action, with intervals of rest. The legs of an old hunter bear no resemblance in point of size to those of the professional dancer. In the former they are often small and covered with varicose nodosities. For the same reason the legs of the veteran infantry soldier are not developed equal to those of the sailor, whose profession requires of him more violent exertion while going aloft, with more frequent opportunities of repose.

The art of fencing had its origin among the gladiators. Though appropriated in the first instance to pernicious ends, yet the exercise has been always regarded by medical philosophers as well suited to strengthen the arms and shoulders, to develop the thighs and legs, and thus to relieve internal congestions. There is no exercise which acts more simultaneously and energetically on the whole muscular and organic masses. In fencing, as in all violent exercises which awaken a rivalry between contending individuals, the muscles receive from the brain, which is stimulated by the desire of triumph, an unusual nervous influx, which increases bodily vigour to an extraordinary degree. By this accomplishment not only the muscles, but hearing, sight and judgment are exercised. Those who practise much, however, have the right side of the body more developed than the left. Besides enlarging the muscles of the extremities, fencing gives great suppleness to the joints—extension to the thoracic cavity, and contributes in an

efficacious manner to correct those awkward attitudes which often prove so pernicious to health.

The Greeks and Romans attached the highest value to the exercise of swimming. They seemed to regard it as a primary step in education, and not less essential than a knowledge of the alphabet. If it were wished to characterise an ignoramus, they would say that he could neither read nor swim.

Swimming establishments were attached to their gymnasia, and according to Pliny, to many of their private houses. There is a school of this kind in Paris, where the water is maintained at a sufficiently elevated temperature, to be used in the coldest weather. Why could not a swimming school be established in this city on similar principles?

A swimmer acquires great muscular strength, as well from the exercise, as from the fluid in which he is immersed. In these movements there is extension, flexion, abduction and adduction of the limbs—there is dilatation of the chest, and a constant contraction of the muscles on the posterior part of the neck, with the view to raise the head and to sustain its weight. As soon as the swimmer enters the water, the capillary circulation and the temperature of the body are diminished over its whole external surface—the exterior vessels are found contracted—the blood is driven from it by the action of cold and by the pressure of the fluid—the pulse is small and contracted, and respiration is embarrassed. These phenomena prove that the vital strength is concentrated upon the organs which are the principal seats of life. As soon as he issues from the water, the excess of the preservative movement is immediately manifested, energetic reaction appears, and a free expansion of the vital strength is liberated. The capillary circulation and animal heat becomes even more considerable than before the immersion, the phenomena of life are more active, and the muscles more vigorous. This is almost the only active exercise which can be taken during intense

heat without exhaustion from excessive perspiration. Besides the influence which these movements have on the muscles generally, they are particularly adapted to invigorate those of the back and neck, and thus overcome the awkward disposition to stoop.

Skating is a favourite exercise in some parts of this country, and in the north of Europe. Though this accomplishment was unknown to the ancient Greeks and Romans, yet there is nothing in their gymnastics which displays more ease and elegance of movement, or is better adapted to invigorate the muscles. Thus, variety of movement is infinite ;

“ They sweep,
On sounding skates, a thousand different ways,
In circling poise, swift as the wind.”

In our efforts to glide, to poise, and to move in circles, almost every part of the body is brought into action. On account then of its general influence on the muscles, it may be ranked among the most invigorating of exercises. The temperature in which it must be taken, will render it inapplicable to invalids and convalescents.

Wrestling and boxing held a high rank among the gymnastic exercises of antiquity ; but being sometimes the cause of serious accidents, they have not been generally approved of by physicians.

The quoit, nine-pins, and ball, all afford useful motion to the muscles of the body, as well as to those of the extremities. The loud appeals to the players exercise the voice, and the animated jests which usually accompany them, afford gaiety of spirits and laughing, than which there is nothing even in gymnastics, which agitates the organs more healthfully.

The play of billiards does not afford sufficient exercise to invigorate the muscles. It is best suited to the condition of invalids, or of convalescents, who, either from feebleness or from the freshness of the atmosphere, cannot with safety leave

their apartments. The flexion and extension of the arms—the alternate curvature and straightening of the chest, slightly increases the strength of the muscles of the back and extremities. It improves the accuracy of vision, affords no obstacle to animated conversation, and encourages a degree of pleasantries which always has a salutary influence on the digestive apparatus. For this reason it has a decided advantage over those sombre games in which the body is immovable, and the intellect occupied with dry and fatiguing reflections.

Exercise of the vocal organs contributes greatly to the support of health. Tissot recommended reading or singing in a high tone, to those who were unable to take exercise, in consequence of feebleness or disease of the lower extremities. It is astonishing, said Plutarch, how beneficial is a free exercise of the voice to the health. The same opinions have been expressed by Hippocrates, Celsus, Aetius, as well as by many modern physicians.

By these exercises the muscles which move the respiratory organs become invigorated—the lungs and chest are expanded—the inspirations become freer and deeper, and the contractions of the diaphragm more forcible. These exercises, besides strengthening the voice, have a friendly influence on the digestive apparatus. The mechanical shocks communicated to the viscera, by the inordinately strong contractions of the diaphragm, augment their energy, and promote a more prompt absorption of the alimentary matter from the mucous surfaces. There is an intimate relationship established between the stomach and lungs through the medium of the pneumogastric nerve. When the stomach is affected with chronic inflammation, a dry cough is provoked which affords an evidence of the existence of a morbid sympathy between them. Public speaking, reading with an elevated voice, laughing, and singing, have the same effect, differing only in degree.

I am aware that music has an influence on the economy

which is altogether independent of the exercise producing it. The sound falls on the exterior organ of hearing—its modulations are transmitted to the brain by the agency of the nervous apparatus in the labyrinth. From this point the sensations are irradiated by means of the nerves to the stomach, to the heart, and indeed to every other organ of the body. The effects which music produces, whether stimulant or sedative, will depend on the character or idiosyncrasy of the subject and the nature of the melody. History abounds in facts which attest its influence not only on man, but on the lower order of animals. The impression made by David's harmonious harp on the melancholy of King Saul is familiarly known to you all. The effects produced on popular assemblies in the United States and Great Britain by the simple national airs of those countries is very considerable, but nothing in comparison to the intense and abiding influence produced on the inhabitants of France and Switzerland by the *Marseillaise* and the *Ranz des vaches*. Both act powerfully on the feelings; the one as a stimulant, the other as a sedative.

If any of the exercises of the voice be immoderately prolonged, they produce dryness and pain in the larynx. I have even known the tonsil and maxillary glands to become swelled and inflamed when the exertion has been too long. On this account, patients labouring under chronic inflammation of the lungs and throat should particularly avoid all vocal exertion.

These exercises should be avoided immediately after repletion, as distention of the stomach causes a diminution in the capacity of the chest. The deep inspiration which is necessary to a forcible exercise of the voice is thus prevented. A tight cravat diminishes the force and compass of the voice. Before severe exercise of this kind is attempted, the cravat should be slackened, otherwise the force and harmony of the

voice will be interrupted, and the cephalic vessels may be ruptured by obstructing the return of blood in the veins.

Passive motion, such as riding in a carriage, the litter, swinging and navigation, principally benefit the organs of digestion. The limbs being condemned to repose, a foreign force alone shocks the animal machine, and agitates the different tissues. The muscles being exempt from contractions, do not divert from the viscera the juices destined for their growth. Under such circumstances the viscera seem to predominate over the external muscles; the laminated tissues develop themselves, and the fat accumulates in great quantities. It has been long observed that persons who ride much in carriages are generally remarkable for their *embonpoint*. We witness this effect produced on coachmen and stage drivers, when their health has not been injured by exposure to inclement weather, or by intemperate drinking.

While the function of digestion is sometimes enfeebled by active exertion, it is rendered more prompt and easy by passive exercise. The latter requires no expenditure of organic strength, nor diverts that which should be directed to the stomach. It promotes the peristaltic action of this viscus; conveys the chyme from it with more promptitude, and extracts more perfectly the nutritive juices from the alimentary matter.

The passive, like the active, exercises give rise to a manifest augmentation in the absorption which takes place from the mucous intestinal surfaces. It is chiefly in this way that a new method of curing dyspepsia proves beneficial.

Though both passive and active exercises prove salutary, yet neither should be indulged in to excess, to the exclusion of the other. If the latter be carried too far, the functions of the organs of nutrition become languid, and the limbs are deprived of their alimentary juices. If the former be too long con-

tinued, the powers of assimilation become active, but the muscles of locomotion are in a state of atrophy, and indisposed to action. The one disposes the body to wither, the other to obesity. It is therefore desirable not to carry either passive or active exercise to excess, and, if convenient, to alternate them. For this reason our physicians who are in full practice would enjoy more muscular vigour and better health, if they would use their gigs and carriages less frequently.

The mixed exercises, such as riding on horseback, unite the advantages of both orders of movements already noticed. The shock by a foreign power is received as in passive exercise, and the muscular exertion required to manage the horse, and to maintain a proper position on the saddle, may be denominated active. These movements are known to increase the sum of organic as well as muscular strength. The degree of excitement produced will depend on the more or less rapid movements and gaiety of the horse. Though this exercise may be rendered very violent and fatiguing, yet by riding at a moderate pace, it will be found well adapted to the valetudinarian. It fortifies all the organs of the human body, which renders it a most salutary practice for the feeble and convalescent. Equitation is the best exercise for men of letters, as the position and movement which it requires, expands the lungs, and removes the effects of hurtful attitudes maintained during the labours of the closet. There are no movements which are so well adapted to allay that nervous excitement which is so frequently observed in students after great mental exertion. This exercise, when indulged in to excess, is attended with some inconveniences, such as pains in the joints, varicose veins, hemorrhoids, &c.

It seems to be admitted by most writers on education and hygiene, that bodily and mental instruction cannot with propriety be separated. The wise men of antiquity deemed their union indispensable to the maintenance of that primitive

harmony which nature has established between all parts of the animal structure. These sentiments found advocates in all ages. In a letter on education addressed to Samuel Hartlib, *Milton* urges the establishment of gymnasia in connexion with the ordinary collegiate exercise, and adds, that “a complete and generous education is that which fits a man to form justly, skilfully, and magnanimously, all the offices, both private and public, of peace and war.”

More recently, M. Londe has remarked that “there is doubtless nothing more beautiful than to form the minds of children—nothing greater than to develop the heart by sage instruction and splendid examples—to give to their tender intellects the faculty of seizing the most delicate impressions, and of acquiring the greatest possible sum of knowledge; yet what can be more unwise than to give them the power of feeling, while you deprive them of the power of acting. Of what avail will it be to perfect their organs of sensibility, to exalt the principle of volition, if, from their languid organization, they fail in energy to obey their will.”

If then study, without active exercise, prevents those harmonious developments of the body which are essential to health, it is proper that the remedy should be placed beside the evil—the antidote with the bane. This can be effectually accomplished by associating gymnasia with our colleges and universities. Why is it that the venerable institution in which I have now the privilege of speaking, and which is tending so rapidly to perfection, has no provision made by which her promising youth may be healthfully exercised? The subject is now worthy the serious consideration of the enlightened professors and trustees who preside over her destinies. Until such arrangements can be made, her youth should be encouraged to practice in the gynasium* established by an enterprising

* Mr Reper's Gymnasium is at 274 Market Street.

citizen in a neighbouring street. Means are there provided for exercising all the muscles of the body, and so arranged as to be adapted to the strength of all ages and conditions.

An establishment provided with gentler means of exercise, is much required to invigorate the health and strength of our female youth. Such a system would tend materially to prevent the occurrence of dyspepsia, neuralgic pains, crooked spines, and a host of other ills, which

“ Make the roses in their lips and cheeks fade to paly ashes.”

Calisthenics, which are designed to exercise moderately the muscles of young ladies, have become the more indispensable, since the opinions of society forbid their indulgence in those free and innocent gambols which are so necessary to the healthful growth of their internal, as well as external organs. To the ingenious inventions of modern times are we indebted for a series of exercises perfectly adapted to their strength and condition, and which is well calculated to produce that gracefulness of motion which is so entirely dependent on an invigorated and harmonious development of the agents of locomotion.

Having classed the different exercises, and noticed their mode of action and influence on the economy, I will close this address by a few remarks on their adaptation to the several temperaments and conditions of the constitution.

Active exercises should be proportioned to the strength, not of the muscles particularly, but of all the organs. If, in feeble individuals, the muscles are exerted so as to produce great fatigue, such an obstruction of force from the vital organs may follow, as to prove fatal to their functions. It is, therefore, apparent, that those who have weak muscles united to great force of assimilation, have less to fear from active exercise, than those who are so organized as to have feeble powers of digestion united to considerable muscular energy. In all

cases, then, where the internal organs perform their functions feebly or imperfectly, the passive or mixed exercises are most suitable.

In the nervous temperament the brain exercises a predominance over all the other organs, including the nerves of locomotion and the senses. This condition of the system does not result from weakness of the nerves, as is often incorrectly stated, but from too much action in the central portion of the nervous system. How injudicious then is the common method of stimulation in this exalted state of excitation. To relieve this condition, the excitement must be diverted from the brain to the muscles, by active exercise.

Those of a bilious temperament should avoid all violent exercises, and particularly during warm weather; because in such persons, the digestive, circulatory, and secretory functions are usually performed with too much energy. Even violent exercise in the winter will sometimes prove injurious to them. This temperament strongly disposes to abdominal phlegmasia. Under these circumstances, the passive and moderately active exercises only, seem admissible.

Such as are of a lymphatic temperament, require for the preservation of their health, continued active exercise. The muscles being thus developed, the abundant juices which distend the white vessels become absorbed. As the vigour and hardness of the fibres increase, the serous and adipose plethora will be dissipated. In these cases, exciting the exhalents by means of a flesh brush, is found to prove beneficial. For the same reason, swimming has an injurious effect, as the cold medium in which the exertion is made, generally suppresses perspiration.

Daily active exercise at all seasons, is found necessary to maintain the health of those possessing a *sanguineous temperament*. Such as possess it in a high degree, can endure almost every degree of fatigue with advantage. Were they to live

in a state of comparative repose, they would be liable to inflammation, plethora, aneurism, or hemorrhagy. To prevent the occurrence of these accidents the superabundant blood must be disposed of either by means of the lancet or by exercise. As bleeding only produces temporary benefit; permanent security should be sought for through the agency of active exercise, by which the blood is invited to the muscles, and their growth promoted. Persons having this temperament should abstain, however, from any very powerful efforts, because of their predisposition to the formidable diseases already named. Active movements in moderation are best adapted to them. Passive exercises are not suitable, since they are known to increase the powers of sanguification, which in such temperaments would prove hurtful.

The encephalic temperament, which is characterized by an exalted sensibility, by great delicacy of touch, by a thin habit, by an irritable temper, and by acute perceptions, requires much exercise. The degree and nature of the movements which such a case demands, must depend on its connexion with other temperaments, such as the bilious, the lymphatic, or the sanguineous. In the simple encephalic temperament, the action of the brain predominates over all other organs, and which can only be diminished by re-establishing an equilibrium by the means already indicated. The nervous susceptibility is always in an indirect ratio to the development of the muscles.

Persons who are compelled to use muscular labour, never complain of undue excitation of the nerves. The distress of mind—the moody melancholy connected with this temperament, is the exclusive possession of the idle, the devotee of pleasure, and the sedentary student. Individuals so affected can be effectually relieved by muscular exertion alone. The precepts of philosophy—the comforts of religion—nay the whole battery of the *materia medica*, will in such cases prove

entirely powerless. It is by increasing *exterior* action that we can permanently relieve the internal commotion.

The influence of muscular exertion on the brain was well understood by the physicians and poets of antiquity. Galen and others remarked, that the intellectual faculties were but imperfectly developed in those who appeared only anxious to increase the volume of their bodies, and the strength of their muscles. Hence they opposed, with much zeal, the practices of the Athletæ. Plutarch compared them, so far as intellect was concerned, to the columns of the Gymnasium; and the physician of Pergamus remarked, that they laboured like beasts to make blood and flesh; but they had no idea of the value of mind.

There are many instances, it is true, in which individuals celebrated for original and vigorous thought were remarkable also for great muscular power. Though Homer makes Ulysses the most intellectual of the Grecian warriors, he is yet scarcely less distinguished for the iron firmness and vigour of his frame. Few of the heroes, even of that age, possessed sufficient strength to overcome the steely energy of his bow. Mental and muscular strength are therefore entirely compatible, provided both systems have received an early and simultaneous education. Lycurgus was fully impressed with their importance. When he established games for the benefit of the youth of Sparta, he was not less mindful to encourage exhibitions which exercised the mind.

Severe, protracted and exclusive exercise, however, suspends the action of the brain and its functions, and deprives it of the fluids which were by nature destined for its nourishment. Hence the head of an Athletæ is unusually small when compared with the rest of his body. Great sensibility, moral tact, or aptitude for reflection is not to be found among those who are engaged in muscular labour, to the exclusion of all intellectual culture. Though it is an unerring rule of

our economy, that the more an organ is exercised, the more it is developed, yet it should be also recollected, that beyond a certain point, the action causing this development may be unhealthy. The fluxionary movement may be too powerful to be sustained by the organ to which it is directed. Under such a pressure, its functions may be irregularly performed, and alteration of structure may be the consequence.

That this is true, may be proved by observing the phenomena which occur in the economy during the process of intense thinking. The limbs and internal senses are in a state of repose—respiration is slow—the pulsations of the heart are feeble—the entire surface of the body is cold, showing that the capillary circulation and calorification are confined to the brain. The functions of the abdominal viscera are, at such periods, suspended.

Such being the state of interruption, I had almost said of oblivion of the functions essential to life, induced by profound meditation, it would seem impossible to persevere in it without inflicting irreparable injury on the constitution. If then the student wish to obviate the injurious effects arising from a superabundant flow of blood to the head, he must indulge in regular repose, and take moderate exercise, such as walking, riding in a carriage or on horseback. These exercises will be found sufficient to divert undue excitation from the brain, and to maintain the health and integrity of distant organs. Violent exertion may cause such a fluxionary movement to the muscles, with a corresponding feebleness of action in the brain, as will render it for a time unable to make accurate perceptions or powerful combinations. For this reason, then, the student cannot repair from his studies to exert his muscles to their utmost ability, and successfully resume them the same day. Moderate exercise is therefore most suitable to men of letters when engaged in profound investigations, because, like sleep, it is the only means of procuring

for the brain, without enfeebling it, the repose which it demands after prolonged labour.

These precautions, to men of letters, against violent muscular exertion, are only applicable to periods of intense study. At other times exercises of the most active kind may produce salutary results, by increasing muscular vigour, and by re-establishing that equilibrium of action on which health so essentially depends.

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