emplified and illustrated at all ages and in all circumstances. If exercise be withheld from the child, the whole muscular frame is stunted and enfeebled. In the adult, inaction causes the muscles to shrivel and waste. If a limb only be kept inactive, its muscles wither, while the rest of the frame is vigorous and grown. A broken arm having been bound up and kept immovable, for a month or more, comes out at the end of that time, scarce the half of what it was, the muscles having wasted away and reduced to a few slender fibres. And hence the practice, in the city of London, of beggars manufacturing shrivelled arms and legs, and giving themselves out as disabled soldiers or sailors, in order the more effectually to excite the commiseration of the benevolent and charitable.—Particular avocations, too, levy an impost on certain muscles, and leave the others, in a great measure, unaffected; and the result is, that the former become strong and athletic and brawny, whilst the latter are weak and slender; as may be seen by contrasting the muscles of the arm of the blacksmith with those of the man who follows a sedentary occupation.

And what is the cause of all this? By motion, or the use of the muscles, the circulation is active and vigorous, the blood issues into every crevice or interstice of the fibrous substance the stimulating element is kept in full and efficient operation; and thus the muscles enlarge amain,—they are gradually and steadily developed. And this exercise not only exerts a powerful influence over the muscular, but over every other system of organs. It promotes, as we have just stated, circulation; circulation increases respiration; respiration, exhalation; and exhalation, digestion,—and all these again reciprocally operate upon the muscles—and the muscles, through the exciting stimuli, upon the cerebrum, the seat of thought.

But this law of contractility has its bounds or limits, and can only be maintained by the constant alternation of relaxation and rest. The very continuousness of this exercise is fatiguing and exhaustive. Let any set of muscles be placed in a state of severe tension, and retained in that position for a lengthened period, and soon will the most arduous toil be felt to be a pastime in comparison. You may easily put this fact to the test, by attempting to hold the arm extended at a right angle to the body for the short space of ten minutes. He whose muscles, if indeed capable of the exertion, do not feel sore with fatigue at the end of that time, may think himself peculiarly fortunate in possessing a powerful constitution.—What happens to an arm may happen to the whole body.—And if the entire muscular frame be overworked by efforts which are either excessive or prolonged, the result must be debility, trembling, exhaustion, faintness, and even death.—Let such overworking be habitual, and then we know, both in men and animals, that the most disastrous consequences will inevitably ensue.

It is clear, then, that the real health and strength of the muscles depend on the due alternation of contraction and relaxation, of activity and repose. A certain amount of exercise is indispensably necessary, and the greater the variety, the more beneficial will that exercise be. But relaxation is just as much needed as contraction, repose as activity; and this that the restorative power of the muscles, the *vis medecatrix naturae*, may be preserved, rallied and re-invigorated. In one word, if the muscular system of organs is to serve the great end of their being, they must be exercised, that is, the law of contractility must be rigorously attended to.

And here it may be asked, What are the rules that ought to guide us in this exercise, that it may be productive of its legitimate benefit? Keeping in view the conditions of muscular action as already set forth, it must, we think, appear obvious to all, that this exercise, as Combe expresses it, *spring from, and be continued under, the influence of an active nervous or mental stimulus.* This point scarcely requires illustration. Everybody knows how wearisome and disagreeable it is to saunter along, without having some object to attain; and how listless and unprofitable a walk taken against the inclination and merely for exercise is, compared to the same exercise made in pursuit of an object on which we are intent.—The difference is simply, that, in the former case, the muscles are obliged to work without that full nervous impulse which Nature has decreed to be essential to their healthy and energetic action; and that, in the latter, the nervous impulse is in full and harmonious operation. The great superiority of active sports, botanical and geological excursions, gardening, turning, &c., as means of exercise, over more monotonous movements is referable to the same principle. Every kind of youthful play and mechanical operation interests and excites the mind, as well as occupies the body; and, by thus placing the muscles in the best position for wholesome and beneficial exertion, enables them to act without fatigue, for a length of time; which, if occupied in mere walking for exercise, would utterly exhaust their powers. Hence it is that the elastic spring, the bright eye and cheerful glow of beings thus excited form a perfect contrast to the spiritless aspect of many of our boarding-school processions of girls; and the results, in point of health and activity, are not less different.

But, in the second place, we would remark that this exercise, in order that it may produce the desired effect, *should involve as much variety of movement as possible.* The sphere of action of each muscle is strictly local, and it is only by calling them all into play that a general effect can be produced. Thus, by much walking, we may greatly develope the muscles of the legs, and yet leave those of the arms and chest comparatively feeble; or, by wielding a ponderous hammer, or rowing a boat, we may greatly develope those of the chest and arms, and leave the legs weak, and their circulation languid. For the same reason, a slow formal walk, with demure look and motionless arms, is much less useful than a smart walk or run, in which we cannot refrain from exercising the arm and chest also. Exercise, therefore, is most beneficial when all the muscles are called into play.

The next rule for the regulation of exercise is, that *it should always be proportioned in amount to the age, strength, state of the constitution and former habits of the individual.* A person, accustomed to daily activity, will feel invigorated by a walk of four or five miles in the open air, whereas the same distance will weaken another who has not been in the habit of walking at all. But, instead of inferring from this, as is often done, that exercise in the open air is positively hurtful to the latter, reason and experience coincide in telling us, that he has erred only in overtasking the powers of his system, and that to acquire strength and activity, he ought to have begun with one mile, and to have gradually extended his walk, in proportion as the muscles become invigorated by the increased nutrition consequent on well regulated exercise. A person recovering from fever begins by walking across his room perhaps ten times in a day, and gradually extends to twenty or thirty times, till he gains strength to go into the open air.—On going out, a walk of ten minutes proves sufficient for him