

the organ or limb itself, to the manifestation of power called for in overcoming the greatest resistance.

Every part of the body is made up of cells, small ultimate portions which are continually changing, particles which have their cycle, birth, life and death, and whose constant change is essential not only to our activity and well-being but to existence itself. With every breath, every muscle contraction, every heart-beat, every thought, cells die and are dismissed by the various tissues of which they had formed a part. Picked up by the ever-moving blood-current, they are hurried on to the organs of elimination and removed from the system as cast-off material. By the digestion of food other cells are being fitted to take the place of those that served their day and were cast off. Taken up by the same blood-current, these new cells are being carried to every part of the body, and each tissue takes up its portion and adapts it to its own purposes. The cessation of this change of new material for that which has fulfilled its period of service means death; its activity means life. The greater the rapidity of the change within physiological limits the more active and effective the life. The more work is done in muscle, and gland, and brain, the more cell change must take place, and hence will result more rapid circulation and respiration, for the blood must course more energetically to bring new material to the needy tissues, and to carry away the worn-out cells; also the lungs must be more active to eliminate the effete matter brought to them by the blood, and to supply oxygen to be carried to all parts of the body.

These are the simple facts underlying the great physiological law of increase by use and decrease by disuse.

The system of bodily training employed by the Greeks, unguided as it was by any ray of physiological knowledge, accomplished its object empirically. By the observation of results they were directed in the selection of the movements which were chosen to form their system of gymnastics. They observed that the strength of the body was in proportion to muscular development, and that muscular development was conditioned upon activity. They did not know that every part of our complex organism is made up of little cells, every one of which has its own cycle of existence, and

that (generally) strength and vitality are in proportion to the youth of these cells, to the frequency with which they are changed, by shortening their life history, their removal, and replacement by others. They knew nothing of the increase in the circulation of the blood by which the worn-out cells were hurried away to the eliminatory organs, and by which fresh supplies were brought back to build up depleted tissues; nor that these changes occurred with greatest activity in those parts where there was greatest exertion.

They observed that growth and development followed use, and that the energy begotten in the part was in proportion to the energy called for in the exercise. Though they observed that the breath came quicker as the exercise called for greater effort, yet they could not know that this occurred in order that the lungs might do their share of the work—implied in more rapid cell-changes—by getting rid of the effete materials which were being hurried to them by the ever-moving blood-current, nor that in this very effort the lungs themselves were conforming to the universal law, that increase of power results from increase of effort. Nor could they know that this increased circulation necessitated greater heart activity, and a consequent growth in cardiac power. Though they knew that increased activity was accompanied by increased moisture upon the surface of the body, and that this increased moisture was a means of improving health, and especially of improving the softness, elasticity and complexion of the skin; yet they could not know that this escape of moisture occurred through the blood parting with some of its fluid constituents, and that by an unvarying physical law the heat of the body was thus lowered and impurities removed from the system.

Thus, by observation alone, must they have chosen such exercises as were best adapted to fit their youth for the duties of that day, such as were helpful in individual culture, excellence and distinction. With such a system as was suitable for the strong youth of noble birth, they were well content; no provision was made to help those of unsound constitution and imperfect growth.

Our knowledge of physiology enables us to propose something better. Skill is called into exercise not only in providing for the improvement of those who are well-favored, fleet and healthy, but