

erate degree of proficiency, remembering always that a few hours of exercise snatched at intervals from a week of sedentary labours, though they cannot make him equal to a Renforth or a Sayers, may yet render him and keep him an active healthy man.

Those who wish to pass beyond the limits that must restrain the ordinary amateur, and accomplish feats of special strength and endurance, must not only work but train for them; they must not only exercise their muscles but alter all their habits and mode of life. Training, though a word in very common use, is one whose significance is seldom properly understood. It is usually supposed to mean merely a series of exercises, but it includes a good deal more. The object of training is not only or even chiefly to increase strength, but to develop along with it the still more important requisites of elasticity and endurance so as to obtain the largest possible measure of each quality that can be had without deducting from either of the others. The problem is by no means a simple one. The human body considered in so far as it generates and transmits force, is a machine whose motions are wonderfully powerful, precise and complex. Physiologists have compared it to a steam engine, which it certainly resembles in many points of its economy. Like the engine it consumes fuel in evolving the physical forces, throws off the waste products of its action, and wears away its substance with its own exertions. But unlike the steam engine it repairs its own losses of substance, loses its powers by disuse and increases them largely by regular exertion. Upon these differences is based the whole art of the trainer, whose aim it is by a judicious regulation of diet and exercise to render the human machine capable of exerting in some particular direction, the greatest amount of force for the longest possible time. The theory of this art is simple enough, but (as is ever the case with simple theories) the application of it to practice is beset with a number of obstacles, to overcome which demands the possession of very varied and extensive knowledge.

A good trainer should have enough off-hand knowledge of anatomy and physiology to tell whether the parts of the machine that he takes in hand are of good quality and sufficiently well put together, and what stress of work they can stand without injury. A deformed limb or joint, all organic diseases and most functional ones, are enough to disqualify a man from undergoing the ordeal of training. The age of the pupil should fall within certain limits. Before the eighteenth or nineteenth year the frame is not sufficiently well knit and developed, the bones are not fully joined and hardened, and will yield injuriously under the pressure of severe and long continued exercise. After the fortieth the joints begin to stiffen, the muscles to lose tension and elasticity, and the tone of the vital forces, which measures the amount of animal stamina, to decrease. The early Roman legislators, although not scientific physiologists, knew these limitations by experience when they fixed the period for active military service between the ages of eighteen and forty. There are other points which are desired by the trainer though not of essential importance. For combining strength with endurance, a medium height of 5 ft. 7 in. to 5 ft. 10 in., with a