In duplicate movements, the will power of the patient is used in resisting or performing under resistance, movements of flexion, extension, circumduction, etc. These movements also require an operator, but Dr. A. Zander has invented a series of machines by which flexions, rotations, vibrations, etc., can be administered without the necessity of an operator. An institution in which these machines form the exclusive treatment has been founded in New York.

Simple active movements are made without either assistance or resistance. The simple and duplicate movements together with the various positions have been grouped and classified and named in the Swedish medical gymnastics.

The word "exercise," as usually employed would include only light and heavy gymnastics, walking and athletics.

In light gymnastics, movements are arranged in series with perhaps light dumbells or clubs. Muscular developement is quickly produced by these movements. Archibald MacLaren, of Oxford, found while training a squad of officers as instructors to the British Army, that "the muscular additions to the arms and shoulders, and the expansion of the chest, were so great as to have been absolutely ridiculous and embarrassing, for before the fourth month several of the men could not get into their uniforms, jackets and tunics without assistance. In a month more they could not get into them at all. One gained five inches in chest girth." In this connection it may be well to state the fact that in most leg movements the body acts as a heavy weight, and the exercise is as severe as if a hundred pound dumbell were attached to the foot the patient being on his back.

The use of fixed apparatus for suspension and support, horizontal and parallel bars, introduces another principle into gymnastics. The extremities are made the fixed points and the origin of the muscle is thus made its insertion. An application of the principle is well shown in the system of pully weight developing machines, worked out so fully by Dr. Sargent, of Harvard. By them, isolated groups of muscles can be exercised in such a way that by varying the weights used, the dose can