

## Lectures on Anatomy and Physiology as Applied to Practical Nursing.\*

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### LECTURE III.

From a mechanical point of view, there are few things in nature more remarkable than the method in which the muscles of the human



Fig. 27.—Muscles of the forearm showing how they end in tendons.

body are arranged, and the perfect adaptability of the means to the purpose, in every instance. For example, the muscles on the limbs are arranged in bundles, lengthwise, because their contraction has to lift and move the long bones; the muscles of the heart pass

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round and round the organ in layers, the separate fibres being interlaced with each other, so that by their contraction they close its cavities and thus squeeze the blood contained in those cavities into the blood-vessels; while the muscles of the intestine are arranged in two layers, one set of fibres running lengthwise along the intestine, while another set are disposed circularly round and round the gut, that is to say, at right angles to the first layer of muscles. The object of this arrangement can easily be understood. The contraction of the longitudinal fibres draws up the intestine and shortens its length, while the circular fibres, of course, by contracting, close the cavity of the gut. Under the combined movement, therefore, of the two layers of muscle, the contents of the bowel are pushed and drawn along the canal. It is very important to remember this movement, and that the action of the muscles in the stomach and intestine takes place, so to speak, in waves; the contraction, commencing at the upper part of the gullet, and gradually passing along the stomach and the whole course of the bowel. This movement is termed the *peristaltic* action of the intestine, and when we come to consider the various diseases to which the digestive tract is liable, and especially the work which its several parts have to fulfil, we shall see again the great importance of this combined muscular movement.

Perhaps, the simplest way to illustrate the grouping of the muscles of the body, and the special manner in which they perform their functions, will be to consider the muscles of the arm, which are well shown in the accompanying photograph (Fig. 27). It will be observed that every muscle makes a separate bundle, which is surrounded, strengthened, and kept apart from other muscles by a firm white fibrous coating called *fascia*. Each muscle, in theory, moves independently of every other, although in practice many muscles are usually called into action by the brain in order to execute the simplest movement. The other point to which attention may be called is the wonderful simplicity with which Nature adapts every means to the special object to be attained. In the upper arm and the thigh, for example, the large bundles of muscles, which have to exert great strength, begin and end by being inserted into ridges of bone, so that their movements affect the bones directly. But where great facility of movement, rather than great strength, is required, such, for example, as in the action of the hands and fingers, the muscles which perform the necessary work taper off, as is shown in the accompanying illustration (Fig. 28) into fine fibroid tails, or *tendons*,

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