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

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CHAPTER I.

The Bones.

The names and arrangements of the Bones. The Skeleton—how it is covered, and what purposes it serves. The Bones, their chemical composition, and microscopical appearance. Diseases of the Bones, their causation, progress, consequences, and the nursing needed at each stage. Injuries of the Bones, their results, and their necessary nursing.

In order most easily to understand our subject, it will be well to begin with the hardest tissues in the body—those which constitute what is called the *Skeleton*, that is to say, the framework upon which all the other components of the body are overlaid. These tissues consist of cartilages which are composed of a dense firm substance popularly known as "gristle," and of bones which are masses of cartilage hardened by being impregnated with what are called "earthy salts," and which are chiefly phosphate and carbonate of lime. They are animal tissues which have become, so to speak, petrified, and when these earthy salts are extracted, as they may be by the action of acids upon the bones, a model of the bone remains which is perfectly soft and flexible, and which is then found to consist of the animal matter of which cartilage is chiefly composed, and which, chemically, is closely analogous to the constitution of gelatine. We shall see, hereafter, that the proportion in which its mineral and animal constituents are found in the bones, at different periods of life, is of very great practical importance to us as medical men and nurses, but for the moment it is only necessary to remember the facts just given.

There are more than two hundred separate bones ordinarily reckoned in the human body, although the actual number of distinct fragments varies at different periods of life; many which are separate in youth becoming united altogether as age advances. Thus, for example, there are originally thirty-three separate parts in the vertebral or spinal column, and the upper twenty-four of these usually remain distinct and separate throughout life; but the twenty-fifth to the twenty-ninth unite in early life into one great bone, which is called the *Sacrum*, and the four remaining vertebræ usually unite to form the *Coccyx* or rudimentary tail. Again, in childhood, the skull contains twenty-two separate bones, but in grown-up people a number of these have coalesced. Twenty-four ribs form the walls of the *Thorax* or chest cavity, twelve on either side, and these are connected directly, or indirectly by *costal cartilages*, with the *Sternum* or breast bone. In the bones which form the shoulder, there are two always distinguishable, the *Scapula* or blade bone, and the *Clavicle* or collar bone. The *Pelvis* or hip bones, consists, of two separate parts, called the "innominate" in the adult, but in childhood each of these is separable into three—the *Pubis*, the *Ischium*, and the *Ilium*. Finally, there are thirty bones in each of the arms, and counting the *Patella* or knee-pan there are the same number in each of the legs, as shown in the accompanying illustration.

The figure of this skeleton should be noted very carefully, and the names of the different bones as given in the letterpress, learnt by heart, as we shall have frequent occasion, hereafter, to refer to them by their anatomical names.

All the bones are fastened together by cords, which are termed *Ligaments* or *Tendons*. Where the bones move freely over one another, as at the *Joints*, a coating of cartilage covers the surfaces which are in contact, and, as we shall see hereafter, plays a most important part in their easy movement over each other. The cartilages which thus form part of a joint are called *articular cartilages*, and their free surfaces which are in apposition with each other, are lined with a delicate membrane which is termed *synovial*, and which secretes a lubricating fluid, the *synovia*, or joint oil. Covering the bones, and closely attached to them in a manner which we will discuss later on, are masses of flesh which are termed *Muscles*, and which act precisely as a piece of elastic acts, that is to say, by expanding and contracting. Though the bones of the skeleton are all jointed strongly together by ligaments and cartilages, the joints are so movable, and the centre of gravity of the body when erect is so high up, that it is impossible to make a skeleton or a dead body support itself in an upright position. That position, easy as it seems to us, is the result of the contraction of a multitude of these muscles all opposing and

* These Lectures commenced on October 6th. Back copies of the Journal (post free 2d. each) can be obtained from the Offices.

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