

since from long inaction or some other cause its fibres have become in us incapable of contraction. Did *we* ever use that muscle? And, if so, when? If we never used it, why was it placed in our bodies? Once more: You all know that while we, in common with all land animals, breathe with lungs, the whole family of fishes breathe with gills. In our body there is a large artery called the *pulmonary*, which carries the blood from the heart to the lungs to be aerated. In fishes there is a corresponding artery called the *branchial*, which carries the blood from the heart to the gills for the same purpose. But the gills are much further from the heart and nearer to the head than are the lungs; it is therefore easy to distinguish by its position a rudimentary branchial from a rudimentary pulmonary artery, and rudimentary gills from rudimentary lungs. Now it is a fact that at a certain stage of the development of an individual man, or of any other individual land animal, they have each and every one of them, both men and animals, rudimentary gills and rudimentary branchial arteries. These undeveloped organs are of course of no use to man or any other land animal; why, then, do they find a place in their bodies? Such anomalies as these might be mentioned by scores.

I have said that the great value of the study of medicine is not the cure or even the prevention of disease, but the liberation of the human mind, and you may now catch a glimpse of one way in which it effects this liberation. The fear of disease and death forces man to seek means whereby these may be warded off; this search leads, along with much else, to the study of human anatomy; in studying anatomy we encounter the anomalies to which I have just referred and innumerable others like them; in order that light may be thrown upon these apparently meaningless freaks of nature, general or comparative anatomy must be and is studied; a knowledge of this leads to such results as I have set forth.

(2) The second series is the Histological, a large subject, upon which only a few words can now be said. You are, probably many of you, aware that each one of our bodies is built up of millions and millions of cells. These cells are not by any means all alike; every organ, each tissue, has its own kind of cell of which it is

constituted, so that in the human body there are not only many hundreds of millions of cells, but there are several hundred different kinds of cells. As we descend the series of organic forms from man, the highest to the very lowest, we find that the lower we go in the scale, the fewer different kinds of cells the animal has, until we come to the very lowest of all animal forms, and we find that of these each one is composed of a single cell. Here, then, is another marvellous series: First, animals consisting each of a single cell; then animals consisting each of a number of cells, but all the cells of the same kind; then animals consisting of two kinds of cells; then of a larger and larger number of cells and of kinds of cells; until we ascend to man, whose body contains a greater number of different kinds of cells than that of any other creature.

But now comes a curious fact: Man's body (as well as the body of every living creature, animal or vegetable) *begins* its individual life as an animal of one cell. This cell is multiplied by growth and division, and, after a certain amount of development has taken place, instead of one there are many cells all of one kind; then some of the cells grow (as it were) apart from the rest, and we have many cells of two kinds; as the embryo develops, we have both a larger and larger aggregate number of cells, and a larger and larger number of kinds of cells, until we have at last the immense number of cells and of kinds of cells found in the full-grown man.

So here again we have two series corresponding with one another; the infinite series, namely, of the different animal forms from the unicellular to the most multicellular, and the series through which the individual man passes from his origin as a unicellular living form to his million-celled maturity.

(3) The third series to which I wish to direct your attention is the Chemical. One of the first things we learn when we begin the study of medicine is that life is almost entirely a chemical progress; that the body consists entirely of chemical molecules; that these are constantly breaking down and as constantly being renewed. We are, in fact, each one of us, from moment to moment, not metaphorically, but actually, constantly dying, and as constantly being recon-