

But this scientific progress in medicine, fruitful of benefit to the community, lays a burden of obligation. The empirical part of medicine is at once the most easy and the most difficult thing to teach. The preparation for learning it requires but little training in other subjects. Its facts lean on nothing but themselves.

With the scientific part of medicine it is different. That is based upon initiatory studies. Medicine historically traced, we find first drawing help from the simplest and nearest at hand of these adjuvant studies. First she bent to the study of the gross form of the parts and organs of the body. The gross form of these is significant chiefly where they are machinery for application of mechanical powers. The greater part of the corporeal machinery is, however, not destined for such work, but has its purpose in processes chemical, thermal, and electrical, to which—marvellous appendage—mentality is adjunct. Medicine, in the course of the seventeenth and eighteenth centuries, sucked dry for the most part what the study of the gross form of the body's parts could yield her. She then turned to study of microscopic form—examined what Bichat first named the tissues, the fabrics of the body. In so doing she came upon a great generalization, the cell-doctrine, discovering an essential and visible similarity of microscopic structure in all that has life, differentiating it from all which has not life.

But even before the advent of the cell theory, medicine had begun to ask of chemistry what it could give her. With the discovery of oxygen and of the nature of combustion the links between biology and chemistry began to be tightly drawn. The young Oxford physician, Mayon, had performed the fundamental experiments on respiration and had discovered oxygen more than a century before Priestley and Lavoisier, but the time was not ripe until the stupendous work of Lavoisier had founded modern chemistry. The cell-theory was from the first not only morphological, but physiological. It meant for the application of chemistry to biology that the chemistry of the body or of one of its organs was a chemistry resultant from a thousand tiny living furnaces, individual seats of oxidation, deoxidation, polymerization, hydrolysis, and what not.

Not only that, but the living laboratory of the cell itself manufactures even the medium in which the cells themselves exist: the saps and juices of the body. And we are beginning to know, thanks to pathology, that every species of animal produces an internal medium specific to itself. Further, your distinguished physiologist here, Professor Macallum, who has so revealed the distribution of the chemical elements within the cell, tells us that the internal medium which the cells of even the highest animal forms produce as appropriate for themselves, still