

## OUR LIFE

of the question of their vital activity, their functions; and even in this direction he proceeded by the same comparative method, taking for his principal study the animals which approach nearest to man. Whatever he learned from these he applied directly to man. He recognized the value of physiological experiment; in his vivisection of apes, dogs, and swine he made a number of interesting experiments. Vivisection has been made the object of a violent attack in recent years, not only by the ignorant and narrow-minded, but by theological enemies of knowledge and by perfervid sentimentalists; it is, however, one of the *indispensable* methods of research into the nature of life, and has given us invaluable information on the most important questions. This was recognized by Galen seventeen hundred years ago.

Galen reduces all the different functions of the body to three groups, which correspond to the three forms of the *pneuma*, or vital spirit. The *pneuma psychicon*—the soul—which resides in the brain and nerves, is the cause of thought, sensation, and will (voluntary movement); the *pneuma zoticon*—the heart—is responsible for the beat of the heart, the pulse, and the temperature; the *pneuma physicon*, seated in the liver, is the source of the so-called vegetative functions, digestion and assimilation, growth and reproduction. He especially emphasized the renewal of the blood in the lungs, and expressed a hope that we should some day succeed in isolating the permanent element in the atmosphere—the *pneuma*, as he calls it—which is taken into the blood in respiration. More than fifteen centuries elapsed before this *pneuma*—oxygen—was discovered by Lavoisier.

In human physiology, as well as in anatomy, the