

umpire between Aristotle and Galen ;" or rather, he might have said, to see how, in the promotion of science, sense and reason, observation and invention, have a mutual need of each other.

We may observe further, that though Harvey's glory, in the case now before us, rested upon his having proved the reality of certain mechanical movements and actions in the blood, this discovery, and all other physiological truths, necessarily involved the assumption of some peculiar agency belonging to living things, different both from mechanical agency, and from chemical ; and in short, something *vital*, and not physical merely. For when it was seen that the pulsation of the heart, its *systole* and *diastole*, caused the circulation of the blood, it might still be asked, what force caused this constantly-recurring contraction and expansion. And again, circulation is closely connected with respiration ; the blood is, by the circulation, carried to the lungs, and is there, according to the expression of Columbus and Harvey, mixed with air. But by what mechanism does this *mixture* take place, and what is the real nature of it ? And when succeeding researches had enabled physiologists to give an answer to this question, as far as chemical relations go, and to say, that the change consists in the abstraction of the carbon from the blood by means of the oxygen of the atmosphere ; they were still only led to ask further, how this chemical change was effected, and how such a change of the blood fitted it for its uses. Every function of which we explain the course, the mechanism, or the chemistry, is connected with other functions,—is subservient to them, and they to it ; and all together are parts of the general vital system of the animal, ministering to its life, but deriving their activity from the life. Life is not a collection of forces, or polarities, or affinities, such as any of the physical or chemical sciences contemplate ; it has powers of its own, which often supersede those subordinate relations ; and in the cases where men have traced such agents in the animal frame, they have always seen, and usually acknowledged, that these agents were ministerial to some higher agency, more difficult to trace than these, but more truly the cause of the phenomena.

The discovery of the mechanical and chemical conditions of the vital functions, as a step in physiology, may be compared to the discovery of the laws of phenomena in the heavens by Kepler and his predecessors, while the discovery of the force by which they were produced was still reserved in mystery for Newton to bring to light. The subordinate relation of the facts, their dependance on space and time, their reduction to order and cycle, had been fully performed ; but the