

Chapter 2

On the Causes and Principles of Movement

It is certainly astonishing that the cause provoking something as obvious and always perceptible by our senses as is movement be so hidden and ignored. Firstly, it is not known whether the effective principle of movement is something material or entirely immaterial. It is also disputed whether the physical *primum movens* must be immobile and at rest or whether it provokes movement in other bodies by its own agitation. It is also hotly discussed whether some bodies can move by themselves or whether anything which moves must rather be propelled by a distinct and separate motor. Certainly, as we finally think, it is obvious that some bodies are impelled by a distinct and external motor. So all the objects which are carried, struck or projected are obviously moved forwards by an external impelling subject. But are all the other objects which move in the world equally propelled by an extrinsic principle and cause? This appears certainly to be impossible and incredible since heavy bodies and animals seem to move by themselves, i.e. by an intrinsic cause and principle. Although there are many who say that they are moved by an external cause, the shortcoming of their explanation is obvious. When the cause which does not exist at all or is extinct and does not act, however, impels a heavy object, who does ever conceive that this cause propels the heavy object by its physical action? To claim that the motive virtue thus produced is left by the cause in the heavy body and the subsequent movement down is carried out by its action comes to deny that the heavy bodies are impelled by an external cause. Therefore, the motive force created or left which is intrinsically connected to the heavy body itself is unquestionably the same which immediately impels down the heavy body by itself and its physical action. In animals the *primum movens* appears to be the spirit or another animal force. This cause is internal rather than external and separate, and moves itself together with the organs of the animal. It is commonly said that, if mover and moved were the same, agent and patient would not be distinguished from each other nor builder from built, nor power from act. But this is not an obstacle. To all these objections it can be answered with Aristotle that ignoring the evidence that heavy objects and animals move by themselves and searching for an explanation of this fact are nonsense and it appears that the

objections proffered can be easily refuted. Indeed the agent and the patient, the builder and the built are actually distinct in some handicrafts. The same is true in some motions such as projection and percussion. But in the operations of nature agent and patient most often are not distinct. As the same animal substance builds, increases and moves the substance of the animal, the substance of a heavy body migrates and moves downwards impelled by itself. When acting, it is altogether in the act and in the power. The agent and the patient are distinguished only relatively and by the mind rather than by the substance. In order to discover the origin of this confusion, it must be noted that the insufficiency of the language gave a handle to making mistakes. As the most learned Gassendi remarked, we speak of moving, which is the action of the agent, and of being moved, which means being subjected to movement. No neutral word is known for motion, which, for the same operation, would indicate the action as well as the fact of being subjected to the action. If common speaking, of which it is the power, and normal language had to prescribe laws for the philosophers, certainly anything which is moved, to express that it is subjected to the action, would have to be moved by a mover as an active cause. But, on the other hand, it appears from the truth as opposed to the philosophers that also the ones who obey nature's laws correct the common and usual way of speaking, introduce new words and despise the common ways of speaking. Actually, however, there are many words which indicate together the action and the fact of being subjected to it, i.e. the movement carried out by itself. Such are: operation, course, ascent, descent and many of the same kind. All of them suggest that the operations are generated by themselves. Neither in artificial operations is the agent always distinct from the patient as is the workman from his house. Both often exist in the same subject, such are choirs, army, automaton. In these indeed the same men are the material of the army and of the choir, and also the acting agents. They make war, dance and play music in the choir. In a clock also the same machine is the material and altogether the moving principle thanks to which the hours are marked and the other subsequent ingenious motions are carried out. In all these examples or at least in the *primum movens*, i.e. in the animal spirits and in the machine, the agent is distinct from the patient by reasoning only but not by the substance. The same substance is altogether in the power and in the process of these motions. Therefore, it is false to say that everything which moves in nature is impelled by a distinct and separate motor.

The other question is as to whether the principle and direct physical cause of natural movement is totally immaterial, deprived of any magnitude and size. This seems completely impossible. If indeed motion is an action, this action cannot occur without physical contact. One could not understand at all that something which is absolutely indivisible and which cannot be applied nor touched, would grasp or impel such body as must be moved. Therefore, it is deduced that the physical mover which must exert a direct and actual physical action on a body which has some volume cannot be deprived of dimensions. Consequently, it is some material object which moves bodies by its physical action of direct contact.

Finally, one wonders whether the cause and moving principle must also be in movement or actually be absolutely at rest. According to Plato, the latter seems

impossible and incomprehensible. If two bodies, one causing a movement and one which must be moved, touch each other and the one causing the movement is absolutely at rest, nobody will conceive that the other will be impelled by it unless the moving body displaces the other by exerting some effort by its agitation. Then this motive virtue would be like asleep or dead and would be unable to impress any movement in the other body. But of course no natural and physical action can be conceived without displacement, except if somebody reckons with moral motion (like that attributed by Aristotle to the heavenly motors which move for desire and love) which reasonably cannot carry out a physical action or a motion.

Borelli's On the Movement of Animals - On the Force of
Percussion

Borelli, G.A.

2015, XXXVIII, 220 p. 7 illus., Hardcover

ISBN: 978-3-319-08496-1