William Harvey (1578–1657)

In their account of blood circulation, early Greek physicians believed that blood only flowed through the veins and that the arteries served only as air ducts since they were empty of blood in corpses (Asimov, 1964). Later discoveries indicated that both were conductors of blood, and that each was connected to the heart, but there was no evidence of any connections between the arteries and veins so the possibility of a circuitous blood flow pattern was dismissed. Galen (129–200), of ancient Rome, thought that the heart may have tiny perforations that allowed blood to flow between arteries and veins in back and forth movements. Much later Hieronymus Fabrizzi (1537–1619) discovered valves in the veins that would not allow a reversal in the direction of flow. Galen's hypothesized back and forth movement, therefore, could not occur (Fabrizzi did think that the back flow was merely delayed). Harvey, a student of Fabrizzi, took up the matter. He clamped an artery and found an increase in blood build up in the vein near the heart on one side and, on the other side, build-up occurred when blood was prevented passage through a vein. Blood flow was of one direction—from the heart through the arteries and back to the heart though the veins. To further his conclusion that the heart acted as a pump in the recirculation of blood, Harvey calculated how much blood was pumped in an hour and concluded that the weight of the blood would be three times greater than the person whose blood it was; impossible! The blood must be returning, circuitously, to the heart after egress and the veins must somehow connect with the arteries (the connecting capillaries were discovered in 1660 with the advent of the microscope).

With his convincing arguments favoring the pumping activity of the heart, Harvey had prepared the way for a centuries-long debate in biology between mechanists and vitalists. For the mechanists, there was nothing fundamentally different between the living and the non-living. It was expected that living organisms would be found to be just highly complex machines. In opposition to this, the vitalists rejected the possibility that something that was not living could be informative regarding that which was living. Inanimate matter and animate matter were inherently different and there must, therefore, be two kinds of natural law—one for the living and one for the non-living.

References

Asimov, I. (1964). *A short history of biology*. Garden City, NY: The Natural History Press.