

Reflections on the 200th Anniversary of the Second Law

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On June 12, 1824, Sadi Carnot published his book, “Reflections sur la puissance motrice du feu et sur les machines propres a developper cette puissance” [1] at the age of 27. At the time, he was a believer in the caloric theory of heat (he would later realize that heat and motion have an interconnection). Nonetheless, he rightly surmised that the highest possible efficiency of a heat engine occurs when it operates according to a cycle in which there is no conduction of heat among the various parts of the engine. In such a situation, the motive power is independent of the working medium and dependent only on the high and low operating temperatures of the engine.

Carnot’s only publication went largely unnoticed until after his death in 1832. But discovered it was, and while Carnot never articulated the Second Law, he nevertheless became acknowledged as its founding father.

The Second Law of Thermodynamics remains to this day a mysterious, inviolable, fundamental law of nature.

The talk will conclude with an example of how even quantum systems cannot escape the mandates of the Second Law.

[1] Sadi Carnot, “Reflections on the Motive Power of Fire,” edited by E. Mendoza, Dover Publications, Mineola, NY, USA (1960). ISBN 0-486-44641-7.