

to another where it is lower. . . . The production of moving force is therefore due in steam-engines, not to a real consumption of caloric, but to a transference from a hot body to a cold body.”¹

If it is the object of physical science to describe the processes of nature completely and in the simplest language, we have here an instance of a description of a very general property in very simple language, and in terms which reduce it to a measurable quantity. Without this, progress is impossible. It is not likely, however, that Carnot saw the full significance of his simple statement, how in it he had introduced into physical and mathematical science the great question of the availability of the forces of nature, as Mohr and Mayer in Germany, and Faraday and Grove in England, somewhat later, dwelt on the correlation or interchangeability of those forces. The two ideas were separately developed. When they came together in one mind, when Thomson fully realised the importance and meaning of both—as he undoubtedly did earlier than any other natural philosopher—he at once established the great doctrine of the dissipation, also called degradation or depreciation, of energy. But it required some modification of Carnot’s enunciation of this general property before it could be put into its modern form. This modification was preparing itself in Carnot’s own mind, as his papers, posthumously published, have revealed to us.² What required to be modified was the word

17.
Carnot introduces the idea of “availability.”

18.
Thomson introduces the idea of “dissipation.”

¹ Carnot, ‘Puissance motrice,’ ed. 1878, pp. 5 and 6.

² His notebook contained the following entry (‘Puissance motrice,’ ed. 1878, p. 90): “Lorsqu’une hypothèse ne suffit plus à l’explication des phénomènes, elle doit être abandonnée. C’est le cas où se