

20.
His influ-
ence on
Carnot.

not find it necessary to enter upon any theory of the nature of heat, the analogy with the flow of water from higher to lower levels would naturally present itself. For his purpose this analogy had no importance. For the purposes of Sadi Carnot, who noticed that upon the difference of temperature depended not only the flow of heat, but also the work it might eventually do, the same analogy seemed all-important. "We may," he says, "justly compare the motive power of heat with that of a fall of water: both have a maximum which cannot be exceeded. The motive power of a fall of water depends upon its height and the quantity of the liquid; the motive power of heat likewise depends on the quantity of caloric employed and on what we will take the liberty of calling the height of its drop—that is, the difference of temperature of the bodies between which the exchange of caloric has taken place."¹ In this analogy two further assumptions seem to be implied: First, that the work capable of being done is in direct proportion to the difference of levels of height or of temperature; secondly, that the quantities with which we operate, of water or of caloric, remain the same, before and after the fall. Neither of these inferences is necessary; neither is permissible. Carnot does not adopt the first inference,² but he does adopt the second,³ though he significantly remarks that the

¹ 'Puissance motrice du feu,' ed. 1878, p. 15.

² "Dans la chute d'eau, la puissance motrice est rigoureusement proportionnelle à la différence de niveau entre le réservoir supérieur et le réservoir inférieur. Dans la chute du calorique, la puissance

motrice augmente sans doute avec la différence de température entre le corps chaud et le corps froid; mais nous ignorons si elle est proportionnelle à cette différence" (ibid., p. 15; compare also pp. 38, 39).

³ "La production de la puissance