a *power* of the temperature can represent the experiments. He also finds that the rule of Dalton (that as the temperatures increase in arithmetical progression, the elastic force increases in geometric progression) deviates from the observations, especially at high temperatures. Dalton's rule would be expressed by saying that the variable part of the elastic force is as a^t, where t is the temperature. This failing, M. Regnault makes trial of a formula suggested by M. Biot, consisting of a sum of two terms, one of which is as a^t, and the other as b^t: and in this way satisfies the experiments very closely. But this can only be considered as a formula of interpolation, and has no theoretical basis. M. Roche had proposed a formula in which the force is as a^z, z depending upon the temperature by an equation[3] to which he had been led by theoretical considerations. This agrees better with observation than any other formula which includes only the same number of coefficients.

Among the experimental thermotical laws referred to by M. Regnault are, the Law of Watt,[4] that "the quantity of heat which is required to convert a pint of water at a temperature of zero into steam, is the same whatever be the pressure." Also, the Law of Southern, that "the latent heat of vaporization, that is the heat absorbed in the passage from the liquid to the gaseous consistence, is constant for all purposes: and that we obtain the total heat in adding to the constant latent heat the number which represents the latent heat of steam." Southern found the latent heat of the steam of water to be represented by about 950 degrees of Fahrenheit.[5]

Sect. 5.—*Temperature of the Atmosphere.*

I MAY notice, as important additions to our knowledge on this subject, the results of four balloon ascents made in 1852,[6] by the Committee of the Meteorological Observatory established at Kew by the British Association for the Advancement of Science. In these ascents the observers mounted to more than 13,000, 18,000, and 19,000 feet, and in the last to 22,370; by which ascent the temperature fell from 49 degrees to nearly 10 degrees below zero; and the dew-point fell from 37° to 12°. Perhaps the most marked result of these observations is the following:—

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[3] The equation $z = \frac{t}{1 + mt}$.

[4] See Robison's *Mechanical Philosophy*, vol. ii. p. 8.

[5] Ib. p. 160.

[6] *Phil. Trans.* 1853.