

BOOK X.

THERMOTICS.—ATMOLOGY.

CHAPTER III.

THE RELATION OF VAPOUR AND AIR.

Sect. 4.—Force of Steam.

THE experiments on the elastic force of steam made by the French Academy are fitted in an especial manner to decide the question between rival formulæ, in consequence of the great amount of force to which they extend; namely, 60 feet of mercury, or 24 atmospheres: for formulæ which give results almost indistinguishable in the lower part of the scale diverge widely at those elevated points. Mr. Waterston¹ has reduced both these and other experiments to a rule in the following manner:—He takes the zero of gaseous tension, determined by other experimenters (Rudberg, Magnus, and Regnault,) to be 461° below the zero of Fahrenheit, or 274° below the zero of the centigrade scale: and temperatures reckoned from this zero he calls “G temperatures.” The square root of the G temperatures is the element to which the elastic force is referred (for certain theoretical reasons), and it is found that the density of steam is as the *sixth power* of this element. The agreement of this rule with the special results is strikingly close. A like rule was found by him to apply generally to many other gases in contact with their liquids.

But M. Regnault has recently investigated the subject in the most complete and ample manner, and has obtained results somewhat different.² He is led to the conclusion that no formula proceeding by

¹ *Phil. Trans.* 1852.

² *Mém. de l'Institut*, vol. **xxi.** (1847). M. Regnault's Memoir occupies 767 pages.