

Sect. 2.—Prelude to Dalton's Doctrine of Evaporation.

VISIBLE clouds, smoke, distillation, gave the notion of Vapor; vapor was at first conceived to be identical with air, as by Bacon.³ It was easily collected, that by heat, water might be converted into vapor. It was thought that air was thus produced, in the instrument called the *æolipile*, in which a powerful blast is caused by a boiling fluid; but Wolfe showed that the fluid was not converted into air, by using camphorated spirit of wine, and condensing the vapor after it had been formed. We need not enumerate the doctrines (if very vague hypotheses may be so termed) of Descartes, Dechales, Borelli.⁴ The latter accounted for the rising of vapor by supposing it a mixture of fire and water; and thus, fire being much lighter than air, the mixture also was light. Boyle endeavored to show that vapors do not permanently float *in vacuo*. He compared the mixture of vapor with air to that of salt with water. He found that the pressure of the atmosphere affected the heat of boiling water; a very important fact. Boyle proved this by means of the air-pump; and he and his friends were much surprised to find that when air was removed, water only just warm boiled violently. Huyghens mentions an experiment of the same kind made by Papin about 1673.

The ascent of vapor was explained in various ways in succession, according to the changes which physical science underwent. It was a problem distinctly treated of, at a period when hydrostatics had accounted for many phenomena; and attempts were naturally made to reduce this fact to hydrostatical principles. An obvious hypothesis, which brought it under the dominion of these principles, was, to suppose that the water, when converted into vapor, was divided into small hollow globules;—thin pellicles including air or heat. Hallèy gave such an explanation of evaporation; Leibnitz calculated the dimensions of these little bubbles; Derham managed (as he supposed) to examine them with a magnifying glass; Wolfe also examined and calculated on the same subject. It is curious to see so much confidence in so lame a theory; for if water became hollow globules in order to rise as vapor, we require, in order to explain the formation of these globules, new laws of nature, which are not even hinted at by

³ Bacon's *Hist. Nat.* Cent. i. p. 27.

⁴ They may be seen in Fischer, *Geschichte der Physik*, vol. ii. p. 175.