method for determining the combining weights of elements or their simple multiples, they did not draw the natural consequences as to the physical constitution of bodies in the gaseous state which followed from these and other facts which had been known before. It had been known since the time of Boyle and Mariotte that equal volumes of different gases under equal pressure change their volumes equally if the pressure is varied equally, and it was also known through Gay-Lussac himself that equal volumes of different gases under equal pressure change their volumes equally with equal rise of temperature. The like behaviour of equal volumes of different gases towards pressure, temperature, and chemical combination suggested to Avogadro, and almost simultaneously to Ampère, the very simple assumption that this is owing to the fact that equal volumes of different gases contain an equal number of smallest independent particles of matter. This is Avogadro's celebrated hypothesis. It was the first step in the direct physical verification of the atomic view of matter, and if maintained by further experience, it was destined to be one of the most important proofs of this view. But this assumption or hypothesis had to be reconciled with facts. It was, for instance, observed that a given quantity of hydrochloric acid gas occupied the same

29. Avogadro's hypothesis.

showed the real meaning and importance of Avogadro's hypothesis. A good exposition of the difference of opinions which were held at that time will be found in A. Wurtz, 'La Théorie atomique,' p. 55, &c. See also Prof. Bedson's 'Memorial Lecture' on Lothar Meyer (1896), in the 'Journal of the Chemical Society,' p. 519, &c., and especially the graphic description by L. Meyer himself of the meeting held in September 1860 at Carlsruhe for the purpose of ventilating these important theoretical questions (L. Meyer's translation of Cannizzaro's 'Sunto di un corso di filosofia chimica,' in Ostwald's 'Classiker der exacten Wissenschaften,' No. 30, Appendix, p. 58).