dissociation of the electrolyte, was not the consequence, but the accompanying feature or condition, of the existence of an electric current in a solution. Clausius first expressed this distinctly in 1857, and Helmholtz repeated it in 1880. The conception was thus introduced that in certain (not in all) solutions of chemical compounds dissociation might exist independently of an electric current, and that the latter, if introduced, only directed the already dissociated and wandering molecules (ions), freeing them at the same time of their electric charges.[1] This conception, though at first violently

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breaking-up of chemical compounds not so much through the presence of other chemical agencies as through altered physical conditions, such, notably, as heat, evaporation, and condensation. "Deville's observations on dissociation . . . have a very direct bearing on the kinetic theory of gases, and it is a fact of interest in the history of science that Deville did not recognise the validity of that theory. Our estimate of the ingenuity, skill, and patience shown in his experimental work, and of the genius and sound judgment which directed his theoretical conclusions, is perhaps raised when we recollect that he was neither led in the first nor biassed in the second by ideas derived from the kinetic theory, and his hostile, or at least neutral, attitude towards it gives perhaps greater value to the evidence that his work has contributed to its soundness" (A. Crum Brown, 'Ency. Brit.,' 9th ed., article "Sainte Claire Deville").

[1] I have already mentioned (vol. i. p. 435, note) that Clausius, when introducing his kinetic theory and distinguishing between molecules and atoms, could refer to several eminent chemists who had independently arrived at similar ideas by quite different trains of reasoning. Again, when introducing, in 1857, his theory of dissociation by solution, he could refer to similar anticipations. Williamson had said already, in 1850 (Liebig's 'Annalen,' vol. lxxvii. p. 37), at the meeting of the British Association in Edinburgh: "We are led to the conclusion that in an aggregate of molecules of every compound there exists a continual exchange of the elements contained in it. Suppose, for instance, that a vessel with hydrochloric acid were filled with a great number of molecules of the compound ClH, then the view at which we have arrived would lead us to the supposition that every atom of hydrogen does not remain in quiet juxtaposition with an atom of chlorine, with which it is combined, but that there is a continual exchange of places with other hydrogen atoms" (Clausius, 'Mechanische Wärmetheorie,' vol. ii. p. 167, Braunschweig, 1879). For an illustration of the theory of Clausius modified to meet more recent conceptions, see O. Lodge's 'Modern Views of Electricity,' 1892, p. 83, &c.