is still more or less accustomed to think in the manner of Newton's view of nature, in which the supposition of forces acting at a distance appears as the most simple view: we feel it difficult to step out of this circle of ideas."[1] Nevertheless, the country itself which produced

[1] Kundt, 'Die neuere Entwicklung der Electricitätslehre' (Berlin, 1891, p. 35). This habit is probably more marked on the Continent than in England. In this country the later developments of Laplace's astronomical view of nature have remained unknown except to a few scientific specialists. Through Faraday's influence, and in consequence of the backwardness which the English school of science exhibited early in the century in assimilating Continental ideas (see p. 232, note), theoretical views on electricity as well as on other forms of energy were formed and taught more in conformity with experimental observation. I am not aware that Weber's theory was expounded in any English text-book or handbook before Maxwell referred to it as the view to which Faraday and he himself were opposed. In fact, the astronomical view of molecular physics is almost entirely of foreign growth. In England "action at a distance" is now stigmatised as a pernicious heresy (Tait, 'Properties of Matter,' 2nd ed., 1890, Introduction) or as unthinkable (O. Lodge, 'Modern Views of Electricity,' 1892, p. 386, &c.) Abroad weighty authorities have pronounced against the astronomical view of nature as final or even helpful in the present stage of physical and chemical science. Helmholtz, who was trained in it, gradually emancipated himself, probably under the influence of physiological studies; so did Kirchhoff, who in his lectures on Electricity (edited by Planck, 1891) hardly mentions Weber's law, though he had previously, in 1857, based an elaborate and valuable investigation upon it ('Ueber die Bewegung der Electricität in Drähten,' 'Gesammelte Abhandlungen,' p. 131, &c.) Still more marked is the aversion to the attitude or habit of thought which belongs to the astronomical view of nature on the part of those who approached physical problems from the side of chemistry. Hittorf (quoted by Lehmann, 'Molecularphysik,' vol. ii. p. 456) explains the opposition of Berzelius to Faraday's electrolytic law and to his other results from the fact that they stood in direct opposition to that view "which at the end of the last century had been introduced into chemistry through the success of Newton's law in astronomy, and under the influence of Laplace on Lavoisier and Berthollet," and sees the importance of his own laborious researches in the demonstration "that the mysterious potential energy cannot in the case of uncombined chemical substances be explained by the work of attractive forces," and "that a confession of ignorance in such matters is more conducive to progress than the assertion that every process in nature is essentially a phenomenon of attraction in the Newtonian sense." Of Ostwald's endeavours to liberate theoretical views in chemistry from the tyranny of the older hypotheses I shall have frequent occasion to speak. His discourse 'Die Energie und ihre Wandlungen' (Leipzig, 1888) contains an expression of opinion similar to those quoted here.