

24.
Electrical
and mag-
netic action.

of the last century, subjected the less universal terrestrial phenomena of magnetic and electric action to exact measurements, finding that a formula corresponding to the gravitation formula described them with surprising accuracy, with this remarkable difference, that here not only attractive but also repulsive forces, following the same mathematical relations as to mass and distance, came into play. To these confirmatory discoveries must be added the measurement of the intensity of radiations which proceed from centres, such as those of light and heat, made by various philosophers during the latter half of the last century. Newton, and his great successor Laplace more than a century after him, both favoured the emission or emanation hypothesis of light, and it was thus natural to fasten upon the analogy which existed between the intensity in which radiation, gravitation, and electric and magnetic action change with the distance from their respective centres. All these agencies came thus under the general conception of forces emanating from fixed centres, and spreading through space, in the proportion of the superficial area of the spheres described around their centres with increasing radii—*i.e.*, decreasing or becoming diluted in the ratio of the squares of these radii or distances. These analogies were indeed recognised to be very imperfect, inasmuch as light and radiant heat occupy a measurable time to spread from their centres, whereas the time occupied by the force of gravitation is

25.
Law of
emanations.

especially Miething, 'L. Euler's Lehre vom Aether,' Berlin, 1894. In the course of this century the mechanical theory of gravitation, including the attempts of Lesage, Euler, Huygens, and Newton him-

self, has again received attention through Faraday's, Maxwell's, and Hertz's electric theories, and Wm. Thomson (Lord Kelvin) has especially studied the ideas of Lesage. Of this more later on.