swarm of bodies, subject to a transverse movement in straight lines like projectiles, and continually encountering each other on their way. The second line of research in question is the study of bodies subject to rapid movement round an axis, but immersed in a medium which is itself movable like water, but not in a rotary but merely in a flowing motion. The whole series of investigations which started by defining vortex or whirling motion as distinct from transverse, flowing, or projectile motion, and from vibratory to-and-fro motion, was initiated by Helmholtz in 1857 in a purely mathematical paper, and then applied and greatly extended by Sir William Thomson in the conception of the vortex atom. The third branch of research had its origin in experimental investigations carried on for many years on peculiar lines, and quite independently, by Faraday; it was put into mathematical language by Clerk Maxwell in his celebrated treatise on electricity and magnetism which appeared in 1872. It will be my object to show in how far these different investigations have confirmed and developed the kinetic view of natural phenomena. But before doing this it will be well to realise what specific problems presented themselves to theoretical physicists when once the undulatory conception of light had taken hold of their minds; what peculiar difficulties were involved; and into what distinct new lines of reasoning they were conducted.

24. Vortex motion.

25. Faraday's researches.

We saw above that when the gravitational explanation of a large class of phenomena had a century earlier gradually gained ground, a great variety of researches was suggested by it, and new lines of reasoning opened