filled with a moving fluid, and the velocity of the flow—inversely proportional to the sectional area of the tubes—represented the intensity of the force at any point in space. He also showed how very much simpler the conception becomes, if the law of the acting forces is the experimentally established law of the inverse square of the distance.

This thought of "referring to the purely geometrical idea of the motion of an imaginary fluid"[1] was the beginning of the now universally adopted view of a very large class of phenomena, and it was at the same time a great step in the development of the kinetic or mechanical view of natural processes. These lines or tubes of force,[2] with which all space surrounding magnets or electrified bodies was supposed to be filled, enabled Maxwell further to give a definite representation of that peculiar state of matter of which Faraday had very early formed an indefinite conception, and which he called the "electrotonic state." Thomson had already in 1847[3] shown how the ideas of Faraday, who as early

**50. "Electrotonic state" of matter.**

[1] How little Maxwell originally intended to give a physical theory is seen from the concluding sentences of the introduction to his first paper (*loc. cit.*, vol. i. p. 159): "By referring everything to the purely geometrical idea of the motion of an imaginary fluid, I hope to attain generality and precision, and to avoid the dangers arising from a premature theory professing to explain the cause of the phenomena. If the results of mere speculation which I have collected are found to be of any use to experimental philosophers, in arranging and interpreting their results, they will have served their purpose, and a mature theory, in which physical facts will be physically explained, will be formed by those who by interrogating Nature herself can obtain the only true solution of the questions which the mathematical theory suggests."

[2] Faraday had already in 1852 spoken of shells and tubes of force, and invented the term sphondyloid to denote the portion of space enclosed between such shells of force ('Exp. Res.,' vol. iii., No. 3271).

[3] In 1847 ('Cambr. and Dubl. Math. Journal,' reprinted in 'Math. and Phys. Papers,' vol. i. p. 76) Thomson wrote that Faraday's theory of electrostatic induction