

are separated by two *intermediate elementary* conditions, of which the one, water, approximates most nearly to the heavy earth, and the other, air, to the lighter element of fire.*

Considered as a medium filling the regions of space, the ether of Empedocles presents no other analogies excepting those of subtlety and tenuity with the ether, by whose transverse vibrations modern physicists have succeeded so happily in explaining, on purely mathematical principles, the propagation of light, with all its properties of double refraction, polarization, and interference. The natural philosophy of Aristotle further teaches that the ethereal substance penetrates all the living organisms of the earth—both plants and animals; that it becomes in these the principle of vital heat, the very germ of a psychical principle, which, uninfluenced by the body, stimulates men to independent activity.† These visionary opinions draw down ether from the higher regions of space to the terrestrial sphere, and represent it as a highly rarefied substance constantly penetrating through the atmosphere and through solid bodies; precisely similar to the vibrating light-ether of Huygens, Hooke, and modern physicists. But what especially distinguishes the older Ionic from the modern hypothesis of ether is the original assumption of luminosity, a view, however, not entirely advocated by Aristotle. The upper fire-air of Empedocles is expressly termed *brightly radiating* (*παμφανόων*), and is said to be seen by the inhabitants of the earth in certain phenomena, gleaming brightly through fissures and chasms (*χάσματα*) which occur in the firmament.‡

The numerous investigations that have been made in recent times regarding the intimate relation between light, heat, electricity, and magnetism, render it far from improbable that, as the transverse vibrations of the ether which fills the regions of space give rise to the phenomena of light, the thermal and electro-magnetic phenomena may likewise

* Aristot., *De Cælo*, iv., 1, and 3-4, p. 308, and 311-312, Bekk. If the Stagirite withholds from ether the character of a fifth element, which indeed is denied by Ritter (*Geschichte der Philosophie*, th. iii., s. 259), and by Martin (*Etudes sur le Timée de Platon*, t. ii., p. 150), it is only because, according to him, ether, as a *condition of matter*, has no contrary. (Compare Biese, *Philosophie des Aristoteles*, bd. xi., s. 66.) Among the Pythagoreans, ether, as a fifth element, was represented by the fifth of the regular bodies, the *dodecahedron*, composed of twelve pentagons. (Martin, t. ii., p. 245-250.)

† See the proofs collected by Biese, *op. cit.*, bd. xi., s. 93.

‡ *Cosmos*, vol. i., p. 153.