

have their origin in analogous kinds of motion (currents). It is reserved for future ages to make great discoveries in reference to these subjects. Light, and radiating heat, which is inseparable from it, constitute a main cause of motion and organic life, both in the non-luminous celestial bodies and on the surface of our planet.* Even far from its surface, in the interior of the earth's crust, penetrating heat calls forth electro-magnetic currents, which exert their exciting influence on the combinations and decompositions of matter—on all formative agencies in the mineral kingdom—on the disturbance of the equilibrium of the atmosphere—and on the functions of vegetable and animal organisms. If electricity moving in currents develops magnetic forces, and if, in accordance with an early hypothesis of Sir William Herschel,† the sun itself is in the condition of “a perpetual northern light” (I should rather say of an electro-magnetic storm), we should seem warranted in concluding that solar light, transmitted in the regions of space by vibrations of ether, may be accompanied by electro-magnetic currents.

Direct observations on the periodic changes in the declination, inclination, and intensity of terrestrial magnetism, have, it is true, not yet shown with certainty that these conditions are affected by the different positions of the sun or moon, notwithstanding the latter's contiguity to the earth. The magnetic polarity of the earth exhibits no variations that can be referred to the sun, or which perceptibly affect the precession of the equinoxes.‡ The remarkable rotatory or oscillatory motion of the radiating cone of light of Halley's comet, which Bessel observed from the 12th to the 22d of October, 1835, and endeavored to explain, led this great astronomer to the conviction that there existed a *polar force*,

* Compare the fine passage on the influence of the sun's rays in Sir John Herschel's *Outlines of Astronomy*, p. 237: “By the vivifying action of the sun's rays, vegetables are enabled to draw support from inorganic matter, and become, in their turn, the support of animals and of man, and the sources of those *great deposits of dynamical efficiency which are laid up for human use in our cov' strata*. By them the waters of the sea are made to circulate in vapour through the air, and irrigate the land, producing springs and rivers. By them are produced all disturbances of the chemical equilibrium of the elements of nature, which, by a series of compositions and decompositions, give rise to new products, and originate a transfer of materials.”

† *Philos. Transact.* for 1795, vol. lxxxv., p. 318; John Herschel, *Outlines of Astr.*, p. 238; see also *Cosmos*, vol. i., p. 189.

‡ See Bessel, in Schumacher's *Astr. Nachr.*, bd. xiii., 1836, No. 300, s. 201.