ON THE

LIGHT AND LUMINOUS MATTER

OF THE

"LAMPYRIS NOCTILUCA,"

OR

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LIGHT kindles up the external world, and gives it a tongue to speak. It invests objects with a living character. Its rainbow-mantle clothes vegetation with all its beauty and enchantment, and the gems of the mineral kingdom reflect its prism's ray. In the absence of this power the beings of the vegetable kingdom languish, turn pale, and die, and even the province of zoology would sustain a shock which would shake it to its centre—would unnerve it.

On the question of the nature of light, two distinct and contrary opinions have prevailed, and are sustained by their respective adherents,

—that of Newton, who considered light as material, and consisting of particles, exceedingly minute, cast off from the luminous surface—while the other view of it, as held by Descartes and Euler, and maintained ingeniously enough by Drs. Young and Higgins, regarding light as a mere quality, infer it to be the result of the vibrations of a subtle medium pervading space, excited by a ray of the luminous body falling on it. As merely prefatory, it would be both indiscreet and unwise to enter upon the merits of this controversy; but I think it must be clear to all who have studied the question, that the entire phenomena of light are most favourable to the former view, and it would not be difficult to determine to which side the balance of probability would incline.

It appears, from the history of creation recorded in the Genesis, that light was summoned into being, in relation to our globe, at a very early period of the hexäemeron, and it may have been even localized in the orb of the sun, to attest the "evening and the morning," described by the diurnal revolution of the earth

on its axis. It is true, it was not until the *fourth* day that the sun and moon were visible from the earth, and then the alternation of day and night, and vicissitude of the seasons, were established as they now stand; because, until the firmament was circumfused around the globe, and the separation of the waters took place, the earth must have been enveloped in a dense shroud of vapour, which the solar ray could not pierce. Besides all this, prior to the creation of vegetation, there could be no such thing as "*seasons*," because these periodic vicissitudes refer to vegetation, &c. and this connection alone constitutes them such. In like manner, at this early period of creation there was no animated form to which "days and years" could properly apply as a measure of age; accordingly, it was not until "the earth brought forth grass," and under the tact of the omnipotent fiat, became instinct with the glow of botanical glory, that these measures of time were introduced into the system. But light might have been otherwise localized or diffused on the first day of creation, to witness the

sublime progress of creative omnipotence. It might have been scattered over the confused elements of chaos, to promote their organization and separation. In a localized form, light might have risen over the axal revolution of the earth, and described the terminal line of light and shade in periodic times—and it might not have been transferred to the splendid central station it now occupies till the fourth diurnal revolution; and therefore it is evident, that though the earth might, on the first day, have begun to move on its axis, and the evening and morning, in relation to this revolution, be thus described, it might not have begun to move in the plane of the ecliptic till the fourth day of this sublime creative order, when the transference of light took place; and then we are told, by the sacred Historian, that the luminaries of heaven, "the greater to rule by day and the lesser to rule by night," divided the day from the night, and were "for signs and for seasons, and for days and for years." The firmament had now been established, and "divided the waters which were under the firmament from

the waters which were above the firmament." The transfer of light to its station in the centre of the system had taken place; and our world, which before had only moved on its axis, began its march in the plane of the ecliptic, obedient to the laws discovered by Kepler, and stipulated by the combined powers of the attraction of gravitation, and a projectile force perpendicular to that of the sun. "The sun and moon were now lights in the firmament, to give light upon the earth,"—and the alternations of day and night, and vicissitude of the seasons, were firmly established. Days and years, and signs and seasons, were now provided for. When creation stood a finished monument of creative power, wisdom, and goodness, and had emerged from the fiat of omnipotence in all the "majesty of loveliness,"—we are told "the morning stars sang together,"—perhaps this magnificent expression is something more than orientalism. It may be thus understood:—when the earth took its station in the sky—no discord was introduced into the celestial systems—the stars still moved isochronous in their orbits, describ-

ing the lines assigned to them, and, agreeable to the laws of Kepler, preserving equal eras in equal times, which find their measure and expression in the vibration of a musical string.

Well might the "stars sing together," as they rose over the morning of a finished creation—and well might those who witnessed the glorious scene, and all the grandeur and beauty of its moving machinery, echo in loud acclaim from their celestial stations—"It is finished."

The sources of light are very various. Light is copiously dispensed by the sun and in the reflected moon-beam. Each star has its twinkling light—each planet of the system its borrowed ray. But light may be produced or elicited, not immediately or directly connected with the solar ray. The luminosity of the sea seems connected with the presence of luminous insects—as, the cancer fulgens, limulus, &c. Electric exhibitions have often the accompaniment of light, and even the *torpedo*, when touched by metallic conductors, and the circle is interrupted, will emit a spark of light. Some varieties of fluor spar emit light when heated,

as when powdered fluate of lime is thrown on a heated plate, or projected on a surface of hot oil of olives. The *chlorophane*, even by the heat of the hand, yields a fine green light. Dr. Brewster has given us an interesting paper on the Phosphorescence of Minerals by Heat.* Thus, the petalite is *blue* and very bright—the green telesie is also *blue* and pretty bright—compact fluor is a fine *green*—phosphate of lime is *yellow*—arragonite and harmotome, *reddish yellow*—rubelite, *scarlet*. *Tungstate of lime* was brilliant like a burning coal, and *anatase* seems peculiar, appearing suddenly like a flame, with speedy extinction. Mr. Skrimshire has given us a list of substances that emit light on being brought within the circuit of the electric current —as alum, sugar, chalk, &c. The curious phenomena connected with phosphorescence seems to have been first described by Benvenuto Cellini about the beginning of the 16th century; and, in 1663, the Hon. Mr. Boyle

* Dr. B. has also favoured us with a list of several fluids that become luminous when heated.

observed, that when the diamond was slightly heated, rubbed, or compressed, it emitted light. Some diamonds emit light in darkness—Canton's phosphorus, and the Bolognian stone, are phosphorescent when heated; and I find that a very beautiful phenomenon is presented if powdered Canton's phosphorus be strewed over a surface of mercury, and touched by the metallic poles of the voltaic circle—it becomes most beautifully luminous. Decayed wood, the potatoe, the "tremella meteorica," and some fish, as the *mackerel*, *whiting*, &c. exhibit light. Several plants emit light occasionally—a lambent light is seen sometimes to flicker on the Indian cress. Even in mines, plants, particularly those of the rhizomorpha, are found to be luminous. Mr. James Ryan* informed me, some years ago, that he had met with luminous plants in mines. The counsellor of mines, Mr. Erdmann, thus describes the luminosity of the

* This Gentleman received £100, and the Gold Medal from the Society of Arts, for his new method of ventilating Coal Mines, by insulating, &c. the coal field.

rhizomorpha, in one of the coal mines near Dresden:—" I saw the luminous plants here in wonderful beauty; the impression produced by the spectacle, I shall never forget. It appeared, on descending into the mine, as if we were entering an enchanted castle; the abundance of these plants was so great, that the roof, walls, and pillars, were entirely covered with them, and the beautiful light they cast around almost dazzled the eye. The light they give out is like faint moonshine, so that two persons near to each other could readily distinguish the outlines of their bodies. The light appears to be most considerable when the temperature of the mines is comparatively high."

Percussion and friction are common sources of light. When fulminating mercury is struck by a hammer on an anvil, light is evolved. The simple fracture of a lump of sugar in the dark, gives out light—the collision of flint and steel, or an alloy of iron and antimony on steel —fragments of quartz—the rattan cane, &c. Light was developed in the Fall of the Glacier of Weisshorn, and during the fall of the trees in