

maintains that "all comets which are without a solid nucleus (on account of their extremely small density) have no solar heat, only the temperature of cosmical space."* If we take into consideration the numerous and striking analogies of the phenomena which, according to Melloni and Forbes, luminous and non-luminous sources of heat present, it appears difficult, in the present state of our physical reasoning, not to assume that processes go on in the Sun itself which simultaneously produce radiant light and radiant heat by vibrations of the ether (waves of different lengths). The darkening of the Moon by a comet, stated to have taken place in the year 1454, which the Jesuit Pontanus, the first translator of the Byzantine author, George Phranza, believed that he had discovered in a monkish manuscript, has long been mentioned in many astronomical works. This statement of the passage of a comet between the Earth and Moon in 1454 is quite as erroneous as that asserted by Lichtenberg of the Comet of 1770. The Chronicon of Phranza first appeared complete at Vienna in 1796, and it is said there expressly, that in the year of the world 6962, while an eclipse of the Moon took place, *a comet like a mist appeared and came near to the Moon quite in the ordinary manner, according to the order and circular orbits of the heavenly luminaries.* The year of the world (=1450) is incorrect, as Phranza says distinctly the eclipse of the Moon and the appearance of the comet were seen *after* the taking of Constantinople (May the 19th, 1453), and an eclipse of the Moon actually happened upon the 12th of May, 1454. (See Jacobs, in *Zach's Monatl. Corresp.*, bd. xxiii., 1811, p. 196-202.)

The relation of Lexell's Comet to the satellites of Jupiter, and the perturbation which it suffers from them without influencing their periods of revolution (*Cosmos*, vol. i., p. 110), have been more accurately investigated by Leverrier. Messier discovered this remarkable comet as a feeble nebulous spot in Sagittarius upon the 14th of June, 1770; but eight days after, its nucleus shone as brightly as a star of the 2d magnitude. Before the perihelion passage, no tail was visible; afterward it developed itself by slight emanations scarcely one degree in length. Lexell found for his comet an elliptic orbit, and the period of rotation of 5.585 years, which Burckhardt confirmed in his excellent prize essay. According to Clausen, it had approached the Earth upon the 1st of July, 1770, to a distance of 363 times the Earth's ra-

* *Cosmos*, vol. iii., p. 36 and 37.