

them, self-luminous fixed stars revolve round one common center of gravity, which is not filled with visible matter; while in our solar system *dark* cosmical bodies rotate around a self-luminous body, or, to speak more definitely, around one common center of gravity, which lies at different times either within or without the central body. "The great ellipse which the Earth describes round the Sun is reflected in a small perfectly similar one, in which the central point of the Sun moves round its own and the Earth's common center of gravity." In general notices like the present, we need hardly enter into any special consideration of the question as to whether the planetary bodies, among which we must class *interior* and *exterior* comets, may not be capable, at least in part, of generating some special light of their own, in addition to that which they receive from the central body.

We have hitherto acquired no direct evidence of the existence of dark planetary bodies revolving round other fixed stars. The faintness of the reflected light would prevent their ever being visible to us, if, as Kepler conjectured (long before Lambert), such bodies actually revolve round every fixed star. If the nearest fixed star, *α Centauri*, be 226,000 times the Earth's distance, or 7523 times the distance of Neptune; if a very distant comet, that of 1680 (to which has been ascribed, although on very uncertain data, a revolution of 8800 years), is twenty-eight times the distance of Neptune from our solar system when in its aphelion, then the distance of the fixed star *α Centauri* is still 270 times greater than the distance of our solar system from the aphelion of the most remote comet. The light of Neptune is reflected to us from a distance thirty times greater than our distance from the Sun. If, by the future construction of more powerful telescopes, three additional planets should be recognized, each situated at about 100 times the Earth's distance from the other, even this would not amount to the eighth part of the distance intervening to the aphelion of the comet referred to, or to the 2200th part of the distance* which the reflected

* See *Cosmos*, vol. i., p. 109, 148, where I based my calculations on the distance of Uranus, which then constituted the extreme known boundary of the planetary system. If we assume the distance of Neptune from the Sun to be 30.04 times that of the Earth, the distance of *α Centauri* from the Sun would still be 7523 times that of Neptune, the parallax being assumed as $0'.9128$ (*Cosmos*, vol. iii., p. 191), yet the distance of 61 Cygni is nearly two and a half, and that of Sirius (with a parallax of $2''.230$) four times that of *α Centauri*. The distance of Neptune from the Sun is about 2484 millions of geographical miles, and