As the altered position of the major axis is capable of exerting only a very slight influence upon the temperature of the Earth, so likewise the *limits* of the probable changes in the elliptical form of the Earth's orbit are, according to Arago and Poisson,* so narrow that these changes could only very slightly modify the climates of the individual zones, and that in very long periods. Although the analyses which determine these limits accurately is not yet quite completed, still so much, at least, follows from it, that the eccentricity of the Earth's orbit will never equal those of the orbits of Juno, Pallas, and Victoria.

10. *Intensity of the Light of the Sun upon the Planets.* —If the intensity of light upon the Earth is taken as =1, it will be found to be upon the other planets as follows:

Mercury	6·674	Jupiter.....	0·036
Venus.....	1·911	Saturn	0·011
Mars	0·431	Uranus.....	0·003
Pallas	0·130	Neptune ...	0·001

In consequence of the very great eccentricity of their orbits, the intensity of light on the following planets varies in

Mercury,	in perihelion,	10·58;	in aphelion,	4·59;
Mars	"	"	0·52;	"	"	0·36;
Juno	"	"	0·25;	"	"	0·09;

while the Earth, owing to the slight eccentricity of its orbits, has in perihelion 1·034, and in aphelion 0·967. If the sun light upon Mercury is seven times more intense than upon the Earth, it must also be 368 times more feeble upon Uranus. The *relations of heat* have not been mentioned here, because they are complicated phenomena, dependent upon the existence or non-existence of an atmosphere surrounding the plan-

it conveys to the Earth are the same while in the one hemisphere or the other, north or south."

* Arago, *op. cit.*, p. 300–204. "L'excentricité," says Poisson (*op. cit.*, p. 38 and 52), "ayant toujours été et devant toujours demeurer très petite, l'influence des variations séculaires de la quantité de chaleur solaire reçue par la Terre sur la température moyenne parait aussi devoir être très limitée. On ne saurait admettre que l'excentricité de la Terre, qui est actuellement environ un soixantième, ait jamais été ou devienne jamais un quart, comme celle de Junon ou de Pallas." "As the eccentricity always has been, and always will be, very small, the influence of the secular variations of the quantity of solar heat received by the Earth upon the mean temperature would appear also to be very limited. It can not be admitted that the eccentricity of the Earth, which is actually about $\frac{1}{60}$, has ever been, or ever will be $\frac{1}{4}$, as that of Juno or Pallas."