in their results in favor of fluidity, as well as continuous variability in the figure, and divisibility of the outer ring. The permanence of the whole is considered by Peirce as dependent upon the influence and position of the satellites, because without this dependence, *even with inequalities in the ring*, the equilibrium could not be maintained.

The Satellites of Saturn.

The five satellites of Saturn which have been known longest were discovered between the years 1655 and 1684 (*Titan*, the sixth according to distance, by Huygens; and four by Cassini, viz., *Japetus*, the outermost of all, *Rhea*, *Tethys*, and *Dione*). These were followed by the discovery, by William Herschel, in 1789, of two, *Mimas* and *Enceladus*, situated nearest to the planet. Finally, the seventh satellite, *Hyperion*, the last but one according to distance, was discovered almost simultaneously by Bond, at Cambridge (U. S.), and by Lassell at Liverpool, in September, 1848. The relative magnitudes and relations of distances in this partial system have been already treated of. (*Cosmos*, vol. i., p. 97; vol. iv., p. 105–118.) The *periods of revolution* and the mean distances, the latter expressed in fractional parts of the equatorial radius of the primary, are, according to the observations instituted by Sir John Herschel at the Cape of Good Hope,* between 1835 and 1837, the following:

Satellites according to the Order of their Discovery.	Satellites according to their Distances.	Period of Revolution.				Mean Distance.
		d.	h.	m.	s.	
f	1. Mimas	0	22	37	22·9	3·3607
g	2. Enceladus	1	8	53	6·7	4·3125
e	3. Tethys	1	21	18	25·7	5·3396
d	4. Dione	2	17	41	8·9	6·8398
c	5. Rhea	4	12	25	10·8	9·5528
a	6. Titan	15	22	41	25·2	22·1450
h	7. Hyperion	22	12	?		28·0000?
b	8. Japetus	79	7	53	40·4	64·3590

Between the first four satellites nearest to Saturn a remarkable relation of *commensurability in the period of revolution* presents itself. The period of the third satellite (*Tethys*) is double that of the first (*Mimas*); that of the fourth (*Dione*) double that of the second (*Enceladus*). The close-

* Sir John Herschel, *Results of Astron. Observations at the Cape of Good Hope*, p. 414–430; the same, in the *Outlines of Astr.*, p. 650, and upon the law of distances, § 550.