stants may most conveniently be reserved for secular inequalities and inequalities of long periods.

MM. Lubbock and Pontécoulant have made the mode of treating the Lunar Theory and the Planetary Theory agree with each other, instead of following two different paths in the calculation of the two problems, which had previously been done.

Prof. Hansen, also, in his *Fundamenta Nova Investigationis Orbitæ veræ quam Luna perlustrat* (*Gothæ*, 1838), gives a general method, including the Lunar Theory and the Planetary Theory as two special cases. To this is annexed a solution of the *Problem of Four Bodies.*

I am here speaking of the Lunar and Planetary Theories as Mechanical Problems only. Connected with this subject, I will not omit to notice a very general and beautiful method of solving problems respecting the motion of systems mutually attracting bodies, given by Sir W. R. Hamilton, in the *Philosophical Transactions* for 1834–5 ("On a General Method in Dynamics"). His method consists in investigating the *Principal Function* of the co-ordinates of the bodies: this function being one, by the differentiation of which, the co-ordinates of the bodies of the system may be found. Moreover, an approximate value of this function being obtained, the same formulæ supply a means of successive approximation without limit.]

9. *Precession. Motion of Rigid Bodies.*—The series of investigations of which I have spoken, extensive and complex as it is, treats the moving bodies as points only, and takes no account of any peculiarity of their form or motion of their parts. The investigation of the motion of a body of any magnitude and form, is another branch of analytical mechanics, which well deserves notice. Like the former branch, it mainly owed its cultivation to the problems suggested by the solar system. Newton, as we have seen, endeavored to calculate the effect of the attraction of the sun and moon in producing the *precession of the equinoxes;* but in doing this he made some mistakes. In 1747, D'Alembert solved this problem by the aid of his "Principle;" and it was not difficult for him to show, as he did in his *Opuscules*, in 1761, that the same method enabled him to determine the motion of a body of any figure acted upon by any forces. But, as the reader will have observed in the course of this narrative, the great mathematicians of this period were always nearly abreast of each other in their advances. —Euler,[10] in the mean time, had published, in 1751, a solution of the

[10] *Ac. Berl.* 1745, 1750.