

missible, as for instance, the inverse simple ratio of the distance, a considerable quantity of calculation is found to be necessary in order to trace the results, and especially the perturbations in the two cases. The perturbations in the supposed case have not been calculated; such a calculation being a process so long and laborious that it is never gone through, except for the purpose of comparing the results of theory with those of observation, as we can do with regard to the law of inverse square. We can only say, therefore, that the stability of the system, and the moderate limits of the perturbations, which we know to be secured by the existing law, would not, so far as we know, be obtained by any different law.

Without going into further examination of the subject, we may observe that there are some circumstances in which the present system has a manifest superiority in its simplicity over the condition which would have belonged to it if the force had followed any other law. Thus, with the present law of gravitation the planets revolve, returning perpetually on the same track, very nearly. The earth describes an oval, in consequence of which motion she is nearer to the sun in our winter than in our summer by about one-thirtieth part of the whole distance. And, as the matter now is, the nearest approach to the sun, and the farthest recess from him, occur always at the same points of the orbit. There is indeed a slight alteration in these points arising from disturbing forces, but this is hardly sensible in the course of several ages. Now if the force had followed any other law, we should have had the earth running perpetually on a new track. The greatest and least distances would have occurred at different parts in every successive revolution. The orbit would have perpetually intersected and been interlaced with the path described in former revolutions; and the simplicity and regularity which characterizes the present motion would have been quite wanting.