APPENDIX.

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The second proposition of the 12th book is a similar and still more striking instance, which appears to strengthen and confirm the explanation just suggested in the case of Prop. I. Book III. This proposition (Prop. II. Book XII.) 'Circles are to one another as the squares of their diameters,' is also evidently a proposition of a primary and important character because defining the nature of a fundamental relation between circles, and therefore here again we should expect a direct, positive, and simple treatment of the case, and, on the contrary, we again find the indirect negative treatment exhibited in a long solution of considerable complexity; the only characteristic difference between the treatment in this case and that of Prop. I. Book III., is that in this, the construction, like the solution to which it belongs, is complex and only indirectly related to the proposition, whereas, in the former instance, the construction is simple and directly related to its proposition. But the particular mode of the reasoning, for the illustration of which this proposition appears to have been selected, is in itself of a very refined and instructive character. In the kindred science of 'Number and Quantity,' calculations of great importance are derived from and based upon the quantitive equivalent of this proposition : for example --- 'Legendre's Numerical and Trigonometrical Propositions' concerning the quantitive relations of polygons and the perimeters of circles.* It may be also useful to

* We may remark here the confusion liable to arise from using the same expression 'geometrical' which is applied to the propositions of the science of Form and Magnitude, for those of the science of Number and Quantity. To these last some of Legendre's propositions belong exclusively, whilst others are of a hybrid character. It is true these sciences have a common boundary where they approach each other very nearly, but it is a stumbling-block in the way of the student to find them thus mixed together without indication as to their distinct and different characters. ĉ