

in the prisons of Russia—meditated on the real cause of the power which algebraical analysis possessed, on the reason why geometry proper was deprived of it, and what might be done to give it a similar generality. In pursuing this line of thought he was led to discover the cause of the existing limitation of purely geometrical reasoning in its rigidity, inasmuch as it was arrested as soon as its objects ceased to have a positive or absolute, that is a physical, existence.<sup>1</sup> Opposed to this limitation was the freedom of the analytical method, which, operating with indeterminate symbols, could, by letting them change gradually, include not only what was explicitly given, but also that which was merely implied; not only the finite, but likewise the infinite; not only the real, but likewise the fictitious or imaginary. In order to gain a similar generality in purely geometrical or descriptive science, a similar flexibility would have to be introduced. Poncelet was thus led to the enunciation of his celebrated and much-criticised “principle or law of continuity.”<sup>2</sup>

<sup>1</sup> See the “Introduction” to the 1st volume of the ‘*Traité des Propriétés projectives des figures*,’ pp. xi, xii. I quote from the 2nd edition of 1865. The 1st was published in 1822. The researches date from 1813, the year of Poncelet’s imprisonment. See “*Préface de la première édition*.”

<sup>2</sup> *Ibid.*, Introduction, p. xiv. On the principle of continuity in geometry, see an article in vol. xxviii. ‘*Ency. Brit.*’ by the Rev. Charles Taylor, and the references given therein; also Prof. E. Kötter’s Report on the “Development of Synthetic Geometry” in vol. v. of the ‘*Jahresbericht der Deutschen Mathematiker Vereinigung*,’ p.

122, &c.: “Originally the expositions referring to the principle of continuity were intended to occupy much greater space. . . . In consequence of correspondence with Terquem, Servois, and Brianchon, Poncelet desisted from the publication of it. . . . However cautiously Poncelet advanced his principle”—in the ‘*Essai sur les propriétés projectives des sections coniques*’ (presented to the Academy in 1820)—“it nevertheless aroused the doubts of Cauchy, who in his report on Poncelet’s paper warns against the too hasty application of the principle. Gergonne accompanied the reprint of this report with notes, in which he characterised