

Of this principle of projection, which Poncelet at once introduces in the more general form as conical or central projection, two signal applications existed in the treatises on Conic Sections handed down from antiquity, and in the practical methods and Rules of Perspective invented by Lionardo da Vinci and further developed by various geometricians. The results, which lay scattered in many books and memoirs, Poncelet collected in a systematic form, bringing them, by the application of the law of continuity, under a few general and eminently useful points of view or principles. By the method of projection or perspective he "transformed figures which are very general into others which are particular, and *vice versa*." He established the principle of "homology" in figures, and by showing how figures apparently very different could be described by the process of projection from the same original figure, he showed that there existed a peculiar relation among figures—viz., their "reciprocity."¹

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Method of
projection.

et par une marche uniforme, on ne tarde pas à reconnaître que cela tient uniquement à l'usage qu'elles font de la projection."

¹ The properties of figures, called by Poncelet "homology" and "reciprocity," refer to the correspondence of certain elements of one figure to those of another figure. In the case of "homology," we have to do with corresponding points or corresponding lines—*i.e.*, with the correspondence of the same elements. In the case of "reciprocity," we have to do with correspondence of points or lines in the one figure, with lines or points in the other—*i.e.*, with the correspondence of different elements. The idea of placing

figures in an homologous relation was got by the device of making two planes, which contained figures in perspective, fall together into one plane; upon which the section of the two original planes became the "axis," and the eye-point the "centre" of homology—all situated in one and the same plane. Poncelet had already conceived of the possibility of reducing the two planes in Monge's 'Descriptive Geometry,' which represent the plan and elevation of a figure in one plane, on which the elevations were marked by what are now called "contour lines." The idea of the correspondence of figures by what is called "reciprocity" was sug-