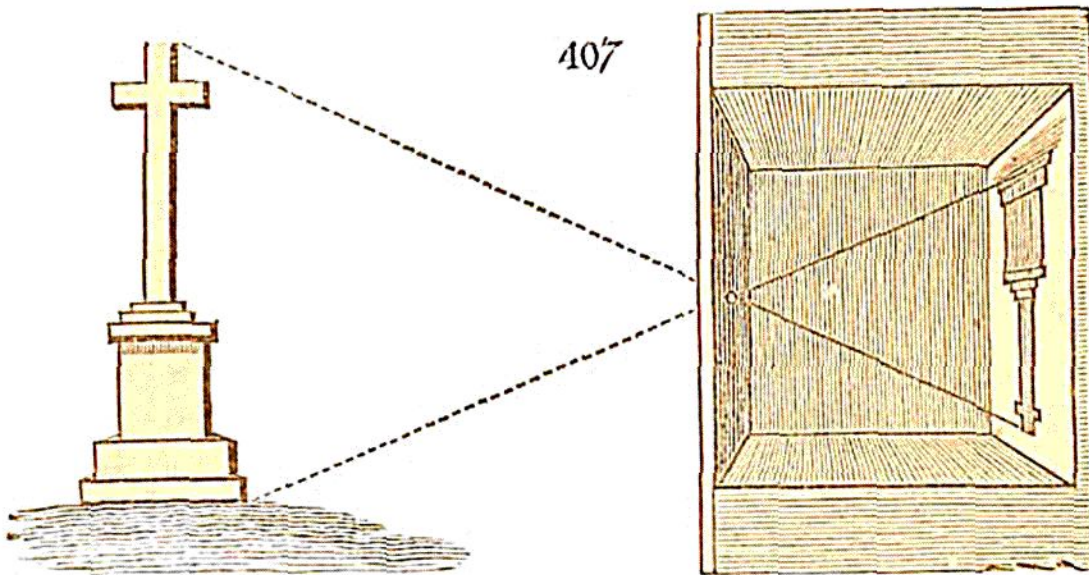


each ray will, in that case, illuminate a different part of the wall, and that the whole external scene will be there faithfully represented; for the several illuminated points, which constitute these images, preserve among themselves the same relative situation which the objects they represent do in nature; although with reference to the actual objects they have an inverted position. This inversion of the image is a necessary consequence of the crossing of all the rays at the same point; namely, the small aperture in the shutter, through which they are admitted.



One inconvenience attending the limiting of the illumination of each point of the wall to that of a single ray, in the mode last pointed out, is that the image produced must necessarily be very faint. If, with a view of remedying this defect, the aperture were enlarged, the image would, indeed, become brighter, but would at the same time be rendered more indistinct, from the intermixture and mutual interference of adjacent rays; for all the lines would be spread out, the outlines shaded off, and the whole picture confused.

The only mode by which distinctness of image can be obtained with increased illumination, is to collect into one point a great number of rays proceeding from the corresponding point of the object to be represented. Such a collection of rays proceeding from any point, is termed, in the language of optics, a *pencil of rays*; and the point into