How Brunelleschi "Discovered" Linear Perspective

Smart History

Representing the Body / Representing Space

What renaissance artists had clearly achieved through careful observation of nature, including studies of anatomical dissections, was a means to recreate the 3-dimensional physical reality of the human form on 2-dimensional surfaces. In part, the key to this achievement lay in understanding the underlying, hidden structure of the human body which then enabled the artist to produce realistic representations of what he saw on the flat surface of a wall in the case of frescoes or on a wooden panel or paper in the case of drawings.

If artists in the 15th century had learned to portray with faithful accuracy the human form through careful observation and anatomical dissection -- a similar inspiration occurred to those seeking a corresponding dramatic reality in the representation of physical space. A means was devised early in the 15th century for translating the reality of 3-dimensional natural phenomena onto 2-dimensional surfaces, producing virtually realistic copies. A correspondence was thus made possible, through mathematics, between the representional reality of the artist and the physical reality of nature.

Brunelleschi's Experiment

The first to carry out a series of optical experiments that led to a mathematical theory of perspective was the Florentine architect and engineer Filippo Brunelleschi.

Source URL: http://smarthistory.khanacademy.org/Brunelleschi.html
Saylor URL: http://www.saylor.org/courses/arth206/ (Art History 206)

Attributed to: SmartHistory

His most stunning accomplishment, in fact, is the stupendous dome which crowns the cathedral in Florence, a work which occupied him intermittently from 1417 to 1434.

The technical difficulties involved in erecting the new dome underscore an important aspect of his talents: he was a daring innovator, with a solid knowledge of mathematics and mechanics. Perfectly in keeping with Brunelleschi's interests are experiments he is reported to have performed on the subject of mathematical perspective. Antonio Manetti, Brunelleschi's biographer, writing a century later, describes one of these experiments, in which Brunelleschi painted an exact copy of the Baptistry in front of the famous cathedral in Florence on the surface of a small mirror -- on top of its own reflection. To demonstrate the fact that this was indeed an exact replica that would fool the eye, Brunelleschi drilled a small hole in the mirror and then stood directly in front of the Baptistry, looking through the peephole to see the real building. He held up a mirror in front of the panel which blocked the view of the real building, but now reflected the painted version of the same scene. By moving the mirror in and out of the way, Brunelleschi could show that he had indeed produced an exact copy of the 3-dimensional, octagonal building on the two dimensional surface of his mirror.

But now, working with the 2-dimensional version, it was possible to analyze its structure mathematically -- and as Brunelleschi found, there was a mathematical key, not only a central vanishing point which you can see in the graphic below -- a vanishing point which was defined exactly opposite to Brunelleschi's own position standing in front of the Baptistry, but this point also determined the horizon line, The horizon not only passes through the central vanishing point, but is also the line on which the two-point perspective defined by the oblique vanishing points also falls -- namely the lines defining the perspective of the Baptistry itself.

What is clear is clear from Manetti's description is that the panel constructed by Brunelleschi was made by careful mathematical calculation.

Source URL: http://smarthistory.khanacademy.org/Brunelleschi.html
Saylor URL: http://www.saylor.org/courses/arth206/ (Art History 206)

Attributed to: SmartHistory