Geometry of Perspective Drawings
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Christ Handing the Keys of the Kingdom to St. Peter
Oblique Perspective in Chinese Drawings

Oblique perspective: projection onto a plane that is neither parallel nor perpendicular to the original plane. Involves both projecting and dilating the image, which therefore is not strictly realistic (though often appear to be.) This is corrected by using multiple perspective rays to create multiple vanishing points. Used extensively in Asian art, especially in landscapes.
Shadow Casting

Though use of shadows in art has dated back to the Egyptians and earlier, it was formally developed for use in art by Biagio Pelacani da Parma and Leo Battista Alberti.

For curved and irregular objects, Pelacani and Alberti found that they could cast the shadow of the object onto a surface and trace it back to its source to find the perspective. This was an improvement over traditional construction, which required more reference points and rays of construction the more irregularly shaped an object was.
Desargues’ Theorem

- By using Desargues Theorem, you can draw an object in correct perspective.

- “If the three straight lines joining the corresponding vertices of two triangles $A B C$ and $A' B' C'$ all meet in a point (the perspector), then the three intersections of pairs of corresponding sides lie on a straight line (the perspectix). Equivalently, if two triangles are perspective from a point, they are perspective from a line.”
Filippo Brunelleschi (1377-1446)

- Inventor of perspective
- Peepshow Perspective viewing
  - A little painting and a mirror looking through the site line to see the painting that is facing away from you
  - Looking through a small hole
  - Observer would view the painting through a mirror
  - Eye opposite of vanishing point
  - Then someone would remove the mirror revealing the real building, this was done to show how accurate the painting was.
  - Goal was not only to give a convincing image of perspective, but wanted to give a correct representation of the object.
Thommaso Cassai, also known as Masaccio (1401 – 1428) one of the first great painters of the early Renaissance period, was the first artist who demonstrated full command of the new rules of perspective;

Masaccio is seen now as being the initiator of the new style of Florentine Realism.

In 1427 Masaccio painted his very famous Holy Trinity for the Santa Maria Novella church in Florence.
Leon Battista Alberti (1404-1472)

- Author of *On Painting*, written in 1435, with the goal of outlining the rules needed to apply geometric ideas to correctly portraying three-dimensional scenes in the two-dimensional plane.
- He was able to generalize the ideas and allowed for current and future artists to apply and further develop his approach.
- He hoped to relate the development of painting in Florence with his own theories on art.
Tile Floor with Alberti’s Construction

- Find the central point that is the vanishing point, then draw a horizontal line that passes through the vanishing point (this line is parallel to the bottom of the paper).
- Equally divided the “floor” of the plane, where the points converge at the vanishing point.
- To find the view distance, draw another vanishing point out of sight, this is to show the parallel spacings between the tiles.
Vanishing Point

The spot on the horizon line to which the receding parallel lines diminish. As things get further away, from us, they seem smaller and closer together. When they get far enough away, distances become ever tinier and so form a single point.
Pompeiian mural of the pageant of Orestes, 2nd century AD
One Point Perspective and Two Point Perspective

One Point Perspective - We say that a perspective drawing is in one point perspective if (a) there is only one vanishing point to which lines that are part of the drawing coverage, and (b) those image lines that converge represent lines in the real world that are orthogonal to the picture plane.

Two Point Perspective - Two point perspective (drawing, photography) with vanishing points V1 and V2 lies on a semi circle with endpoints V1 and V2. The plane of the semicircle is perpendicular to the picture plane.
Albrecht Dürer (1471-1528)

- Early developer of perspective in art
- Projected image onto a glass plane with a grid - gives firm location to each feature of the painting, allowing for proper placement relative to each other
School of Athens (Example of Fully Developed Perspective in Paintings)
Post-Renaissance

While the Renaissance focused on realism, later movements actually abandon precision in perspective for artistic license. Ex: Vincent van Gogh and Frida Kahlo. But some, such as MC Escher, strategically used perspective to depict non-realism.
'Bedroom in arles' by Vincent van Gogh
Bibliography


