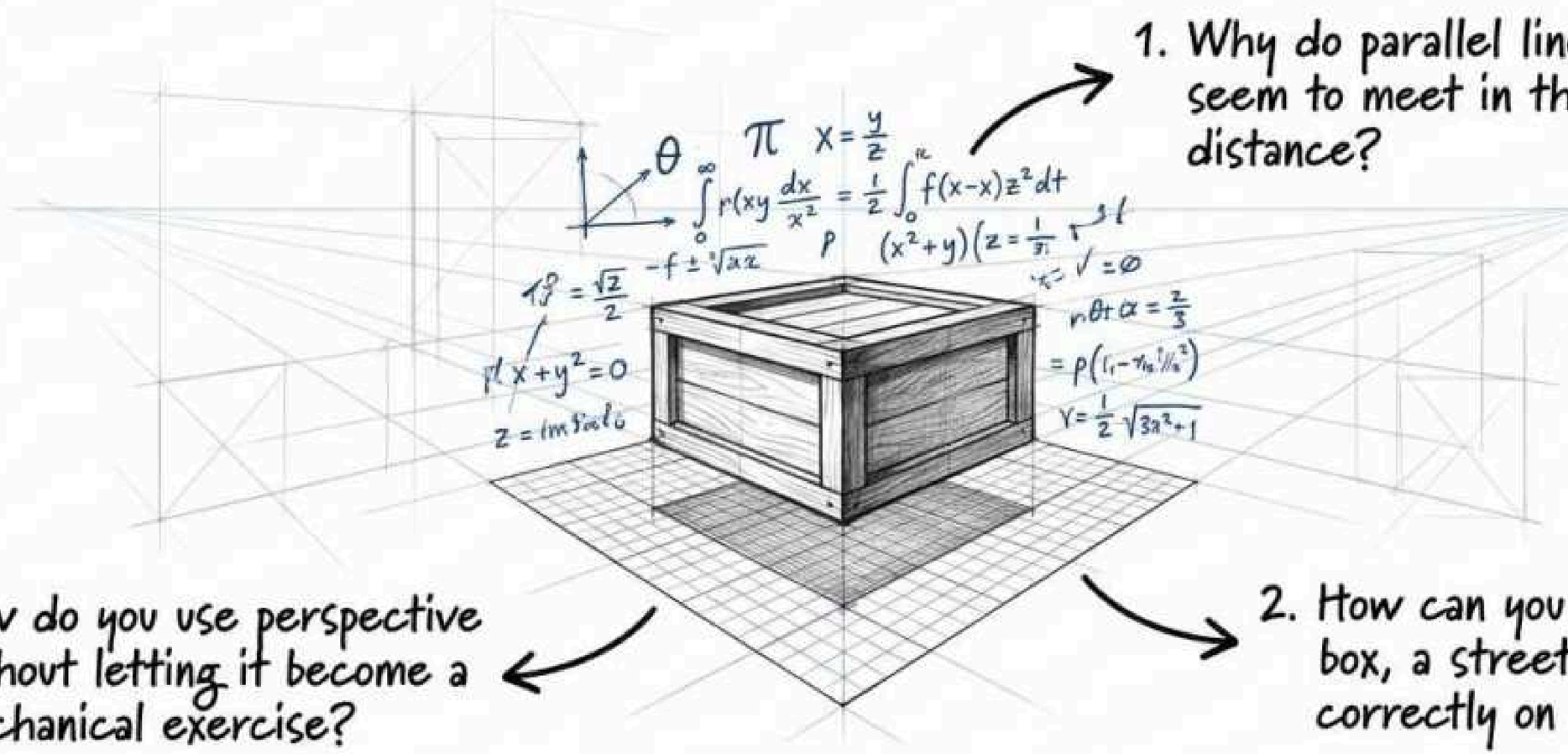
Perspective: The Geometry of Sight

¶ 5.1



1. Why do parallel lines seem to meet in the distance?

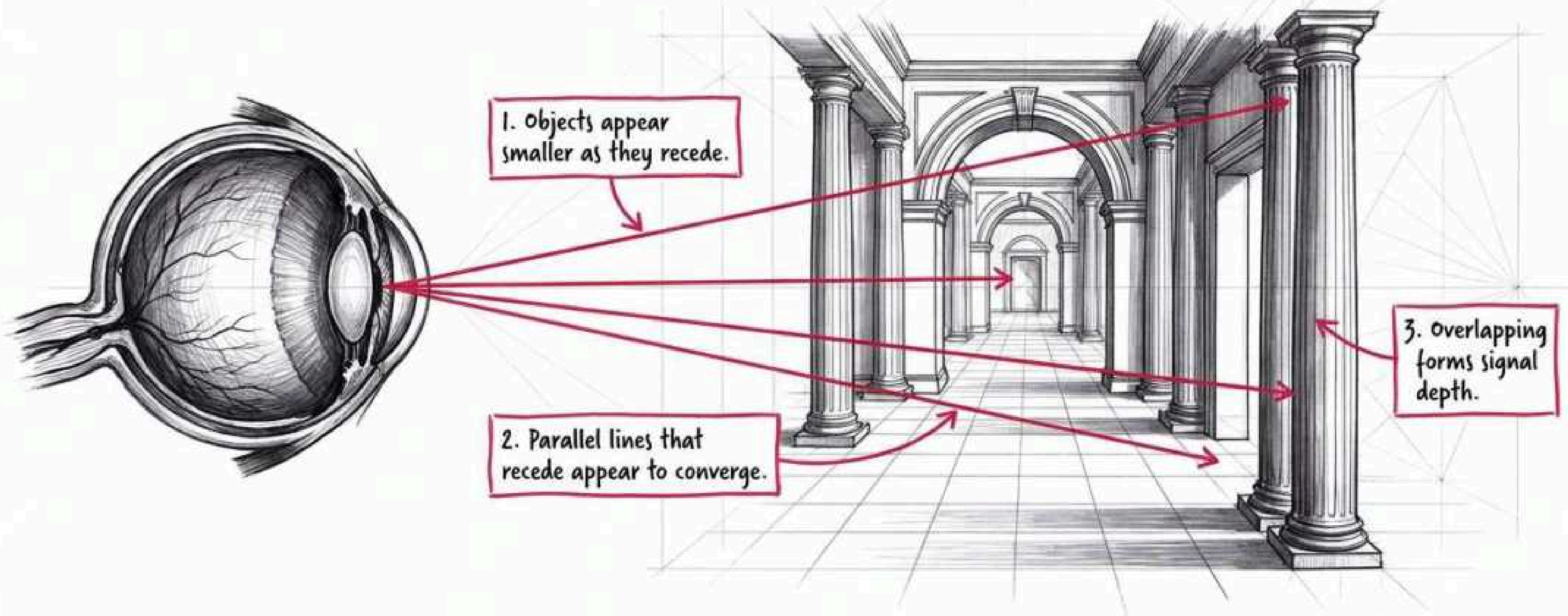
2. How can you place a box, a street, or a room correctly on a flat page?

3. How do you use perspective without letting it become a mechanical exercise?

Perspective is the one part of drawing that is partly mathematics, so it rewards patient study. We will take it in small steps.

Three Facts of Vision

¶ 5.2

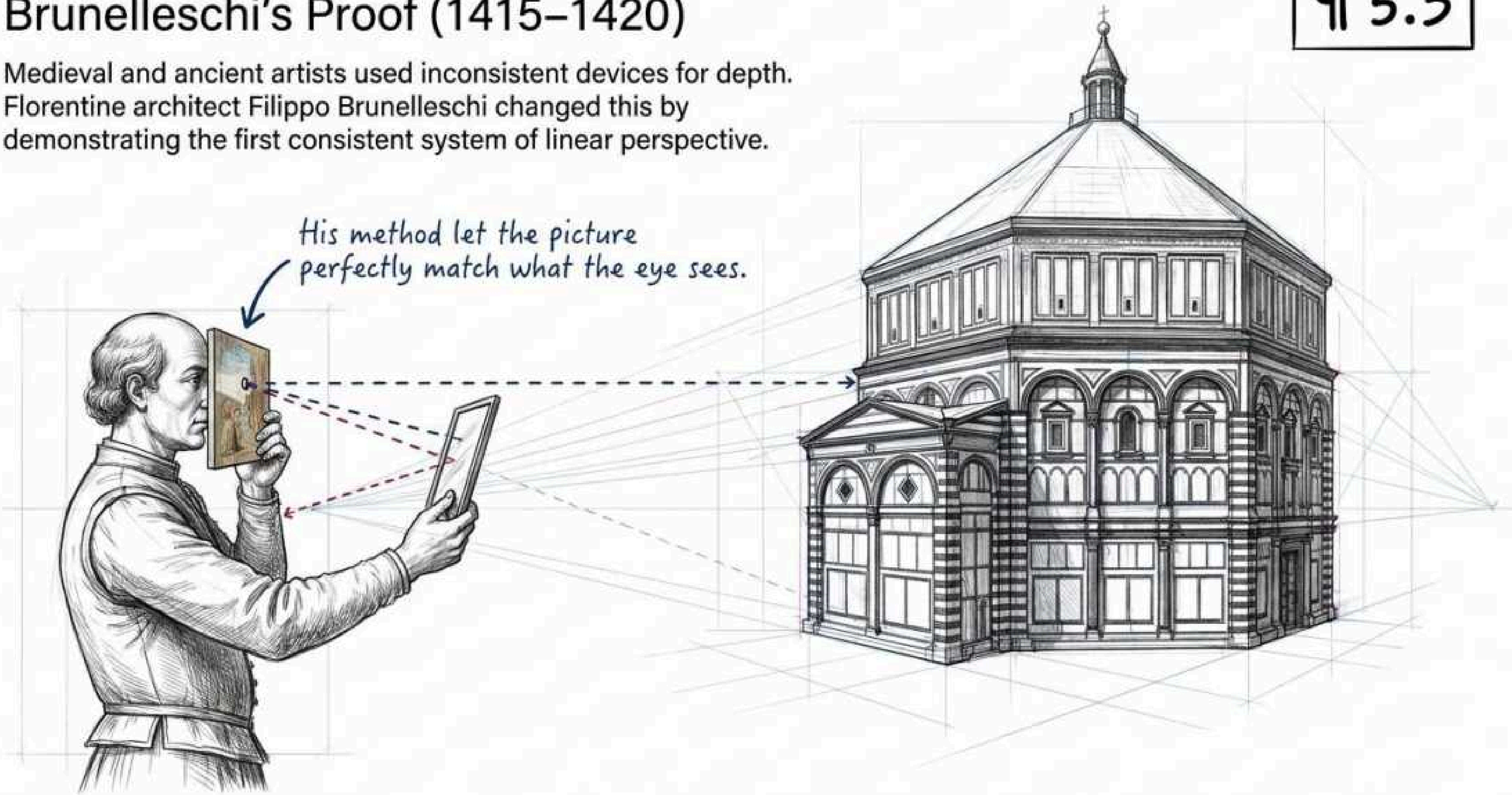


These effects are **not mysterious.** They follow from the geometry of light entering a single eye, and they can be predicted.

Brunelleschi's Proof (1415–1420)

¶ 5.3

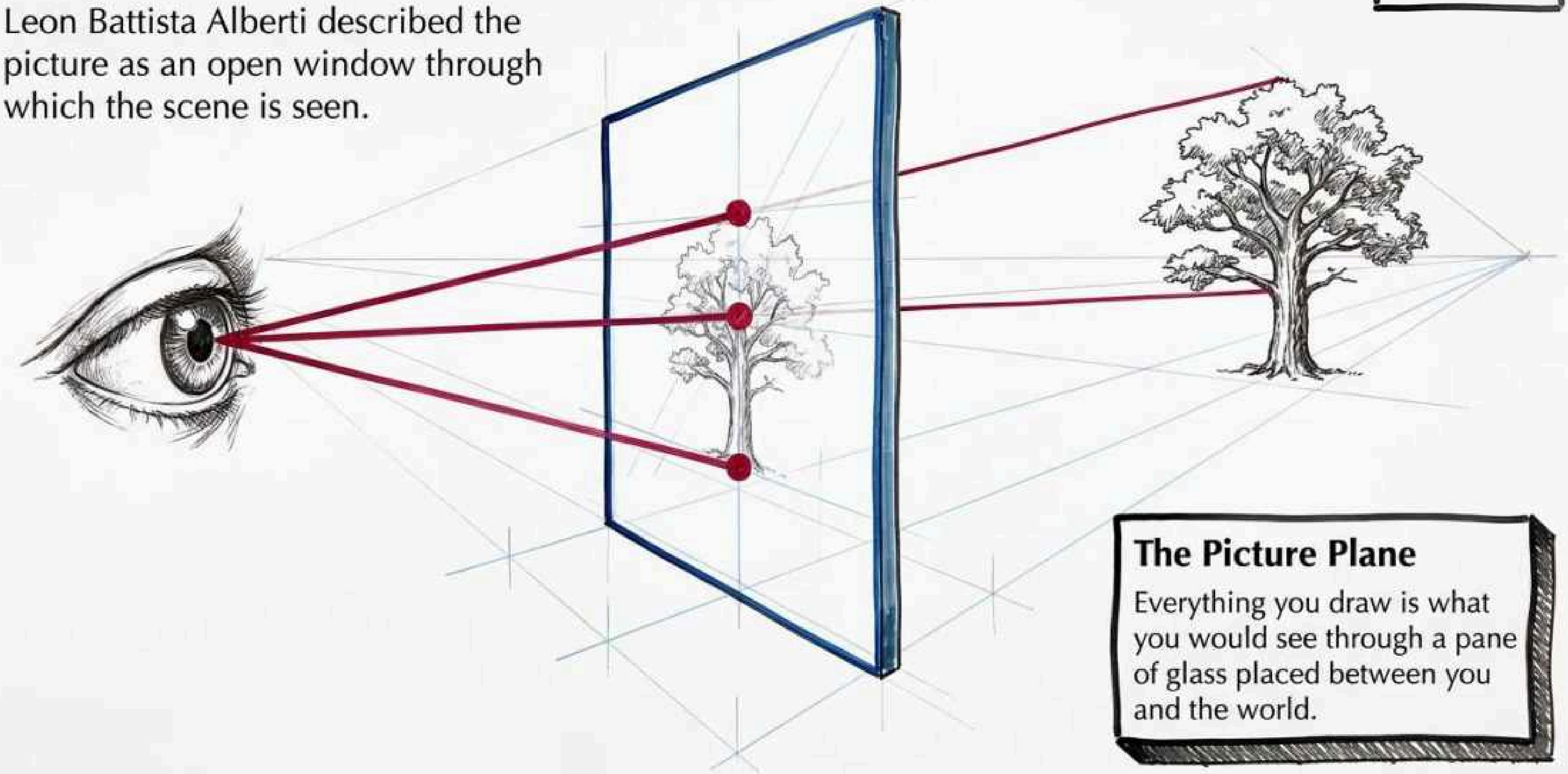
Medieval and ancient artists used inconsistent devices for depth. Florentine architect Filippo Brunelleschi changed this by demonstrating the first consistent system of linear perspective.



Alberti's Window (1435)

¶5.4

Leon Battista Alberti described the picture as an open window through which the scene is seen.

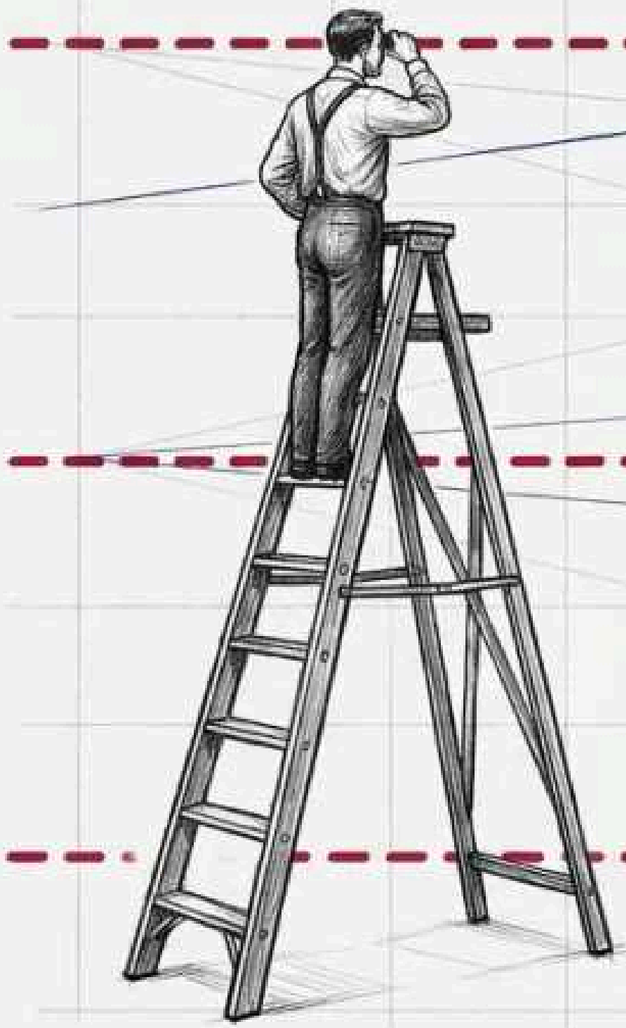


The Picture Plane

Everything you draw is what you would see through a pane of glass placed between you and the world.

The Horizon Line is Your Eye Level

¶ 5.5

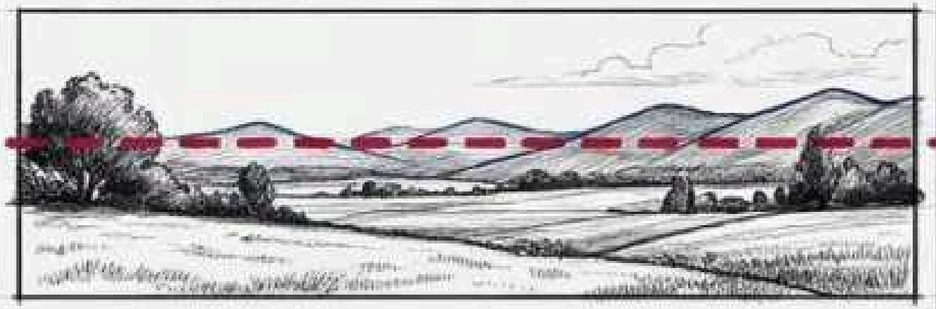




↑ Anything above this line, you look up at.



↓ Anything below it, you look down at.



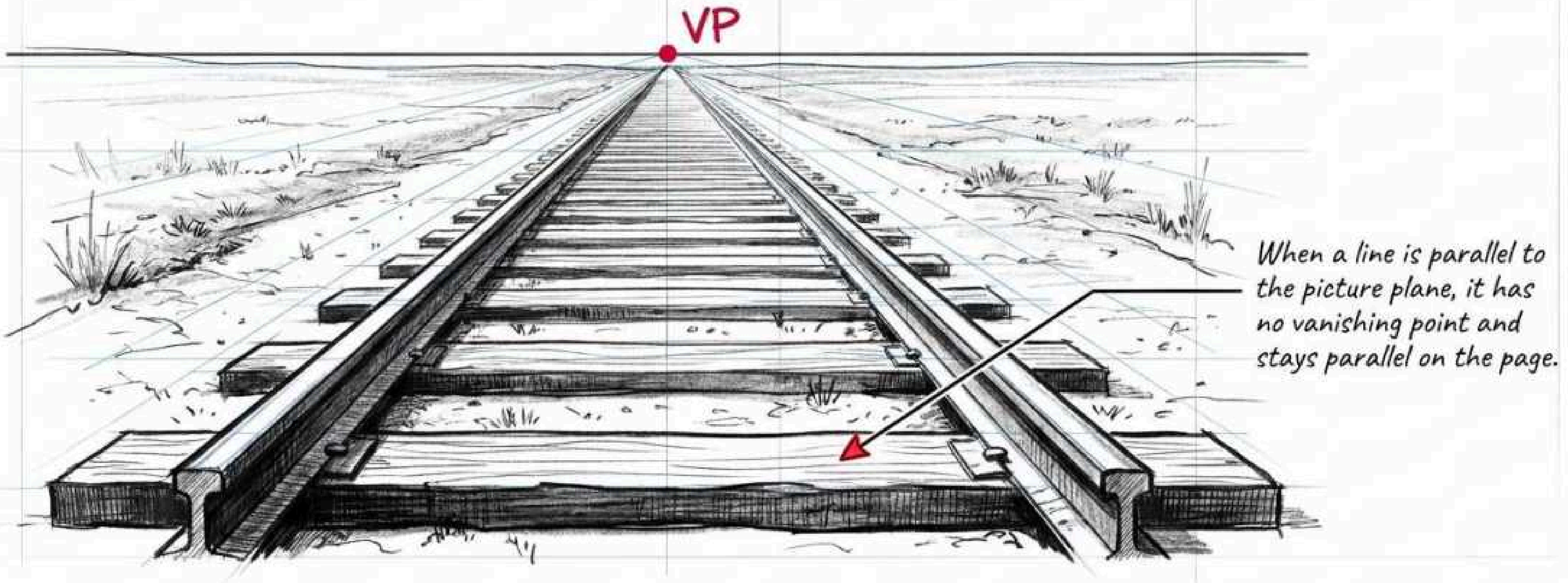


The Vanishing Point

¶ 5.6

A point on the horizon where parallel receding lines appear to meet.

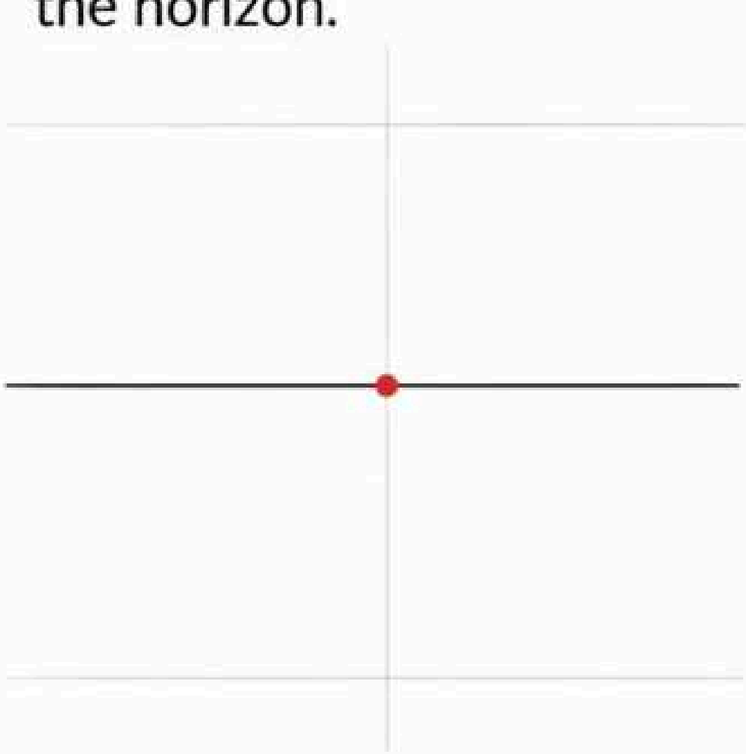
All lines in the same direction, if parallel to each other, share the same vanishing point.



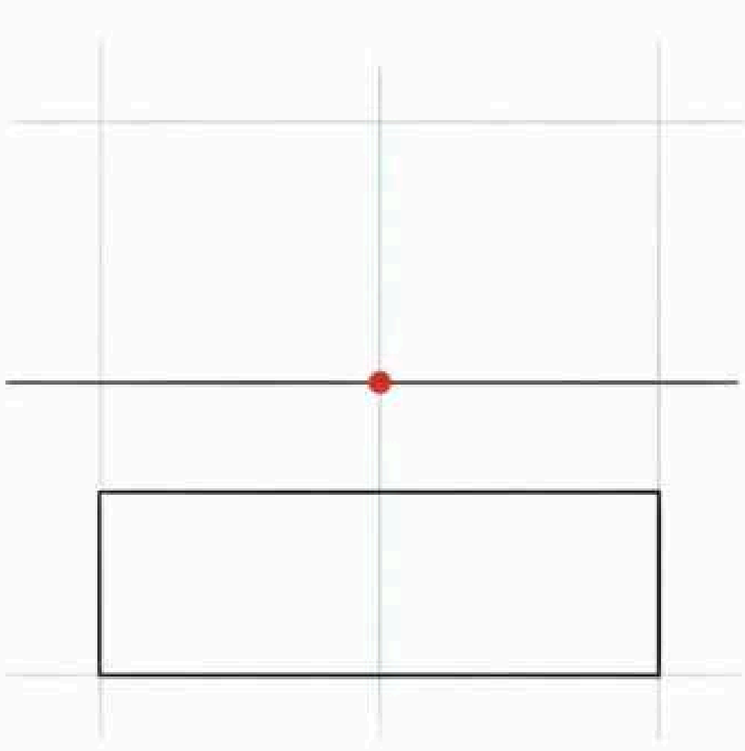
One-Point Perspective

¶ 5.7

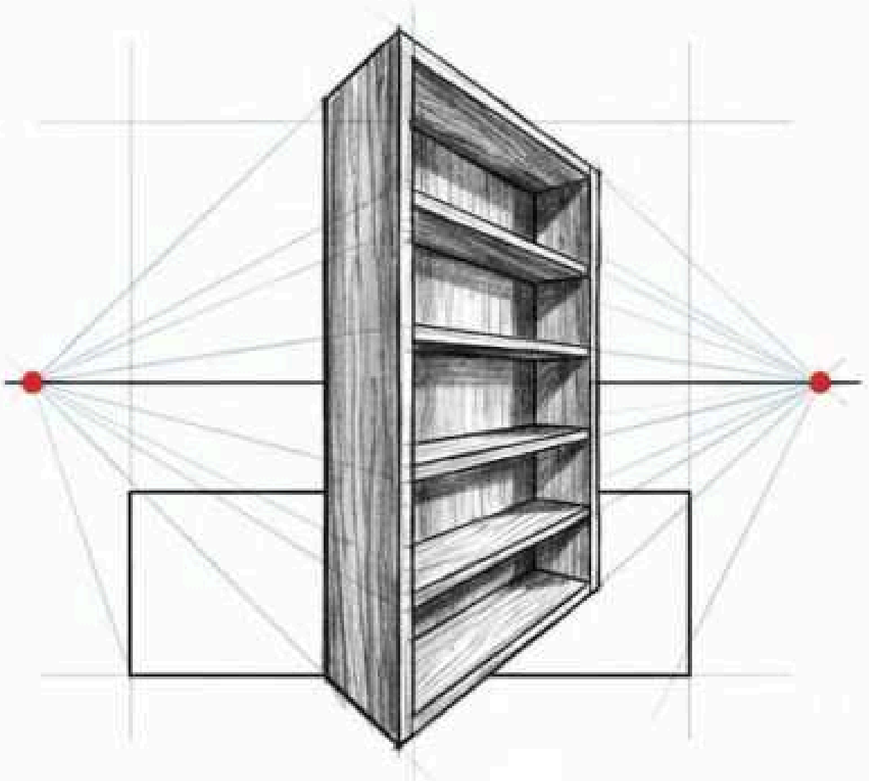
Used when you face a surface head-on. The front face remains a flat rectangle, while all receding edges run to a single vanishing point on the horizon.



Step 1: Horizon + Point



Step 2: Flat Rectangle

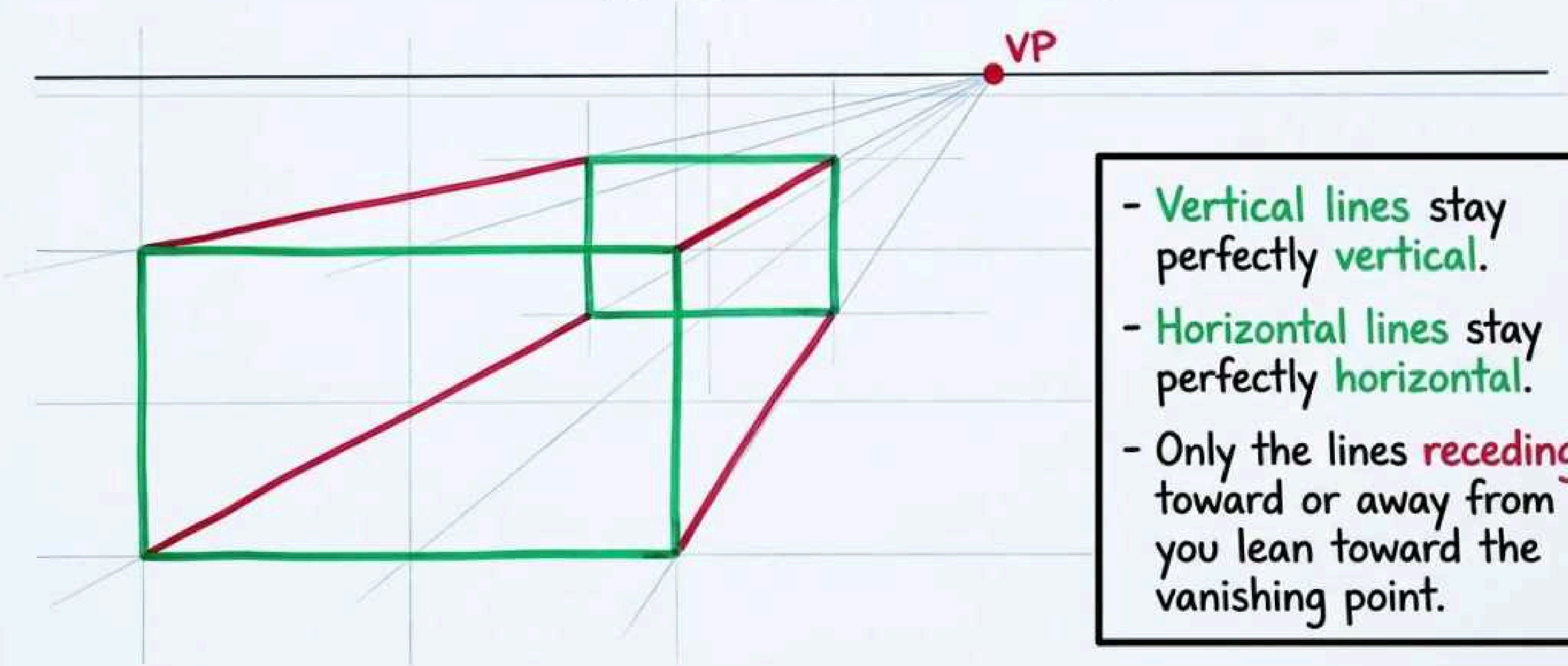


Step 3: Connect to VP

Defining Depth

¶ 5.8

To finish the box, decide how deep it goes and draw the **back edges parallel** to the front ones, stopping along the receding lines.

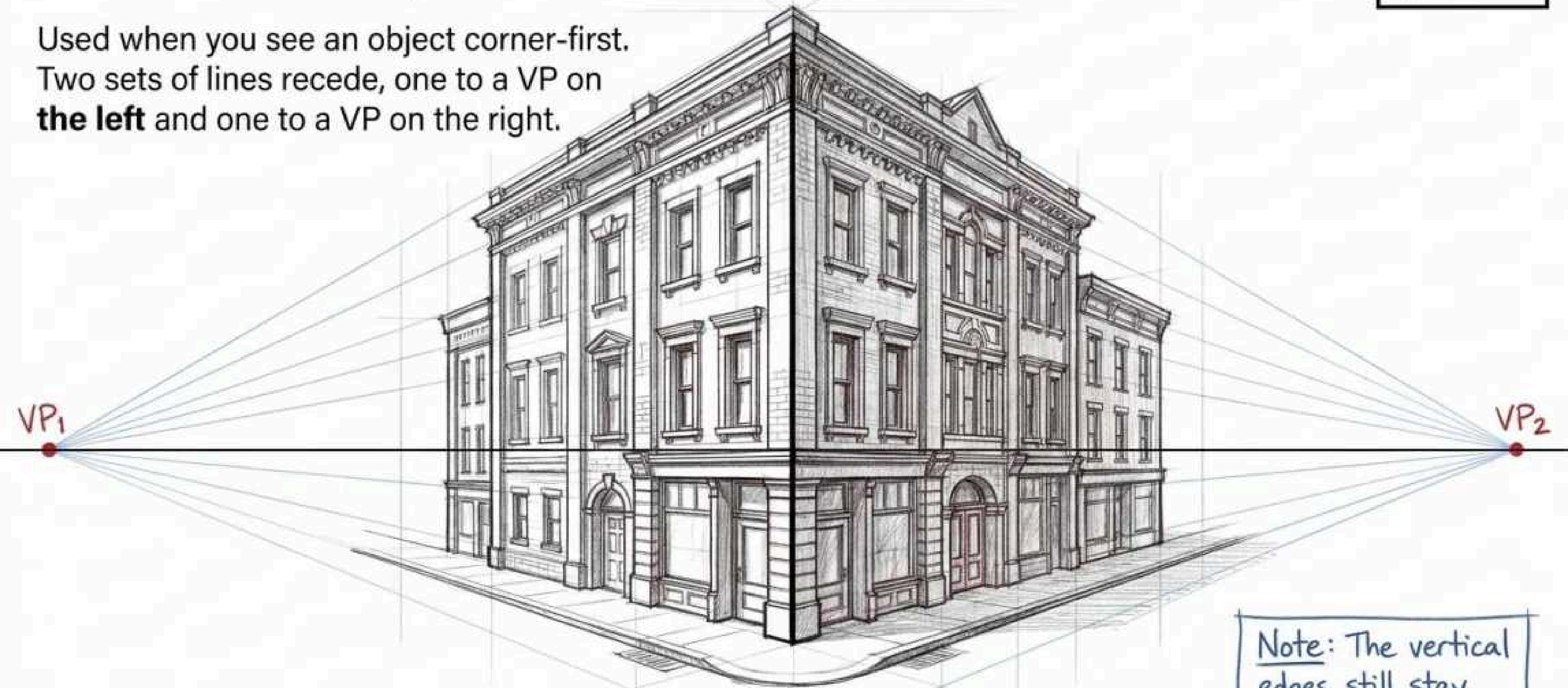


- Vertical lines stay perfectly vertical.
- Horizontal lines stay perfectly horizontal.
- Only the lines receding toward or away from you lean toward the vanishing point.

Two-Point Perspective

¶ 5.9

Used when you see an object corner-first. Two sets of lines recede, one to a VP on **the left** and one to a VP on the right.

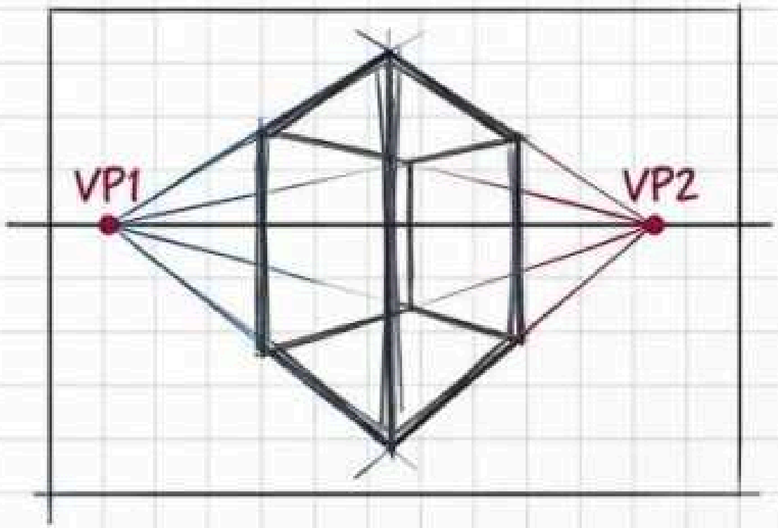


Note: The vertical edges still stay perfectly vertical.

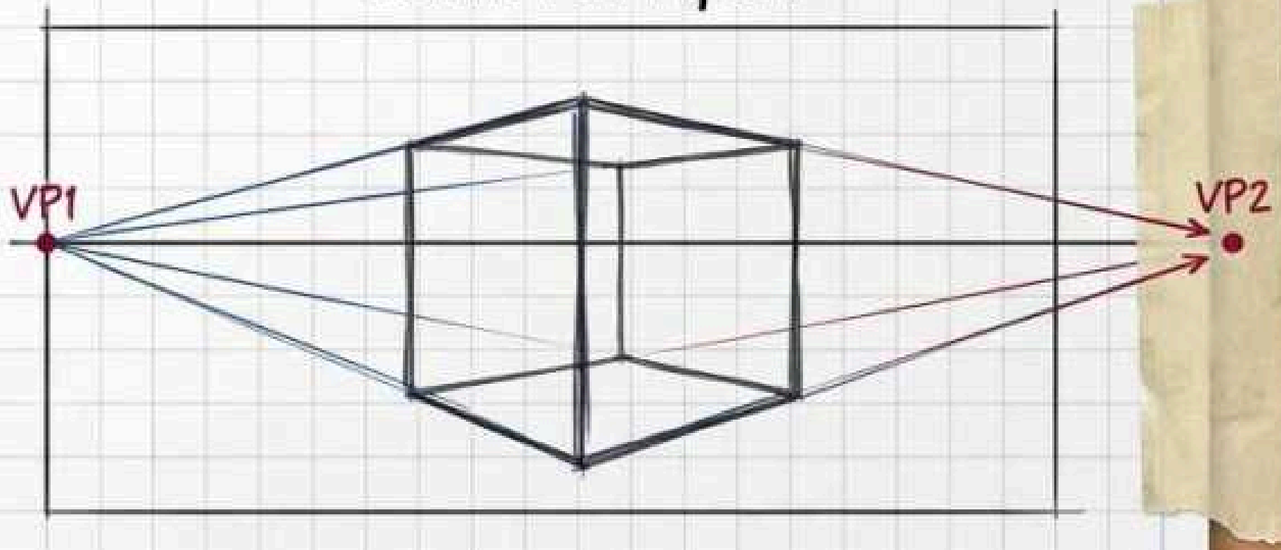
Placing the Points

Distance between points dictates distortion. Close points create an unnatural wide-angle warp. Far apart points create gentle, natural perspective.

Points Too Close



Points Far Apart



Pro-Tip: Tape a long strip of paper to your board so you can mark a far vanishing point off the page.

Three-Point Perspective

¶ 5.11

Adds a third vanishing point (above or below) for objects seen from a great height or from the ground looking up. Vertical lines now converge.



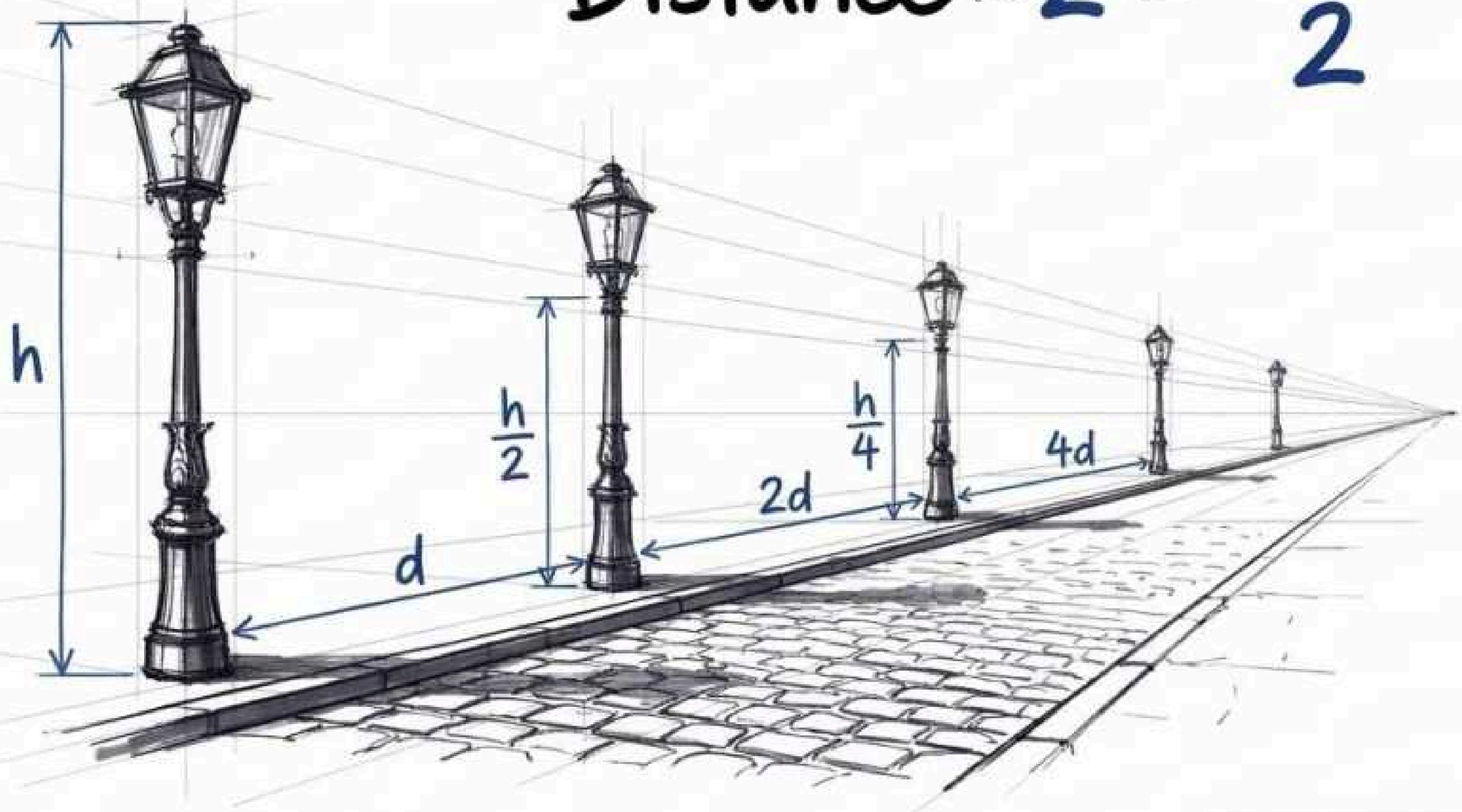
Caveat: Use it when you want drama, but most architectural sketches are fine with just two points.

The Mathematics of Apparent Size

¶ 5.12

Size shrinks in a predictable ratio. Doubling an object's distance from you halves its apparent size; four times the distance shrinks it to a quarter.

$$\text{Distance} \times 2 = \frac{\text{Size}}{2}$$



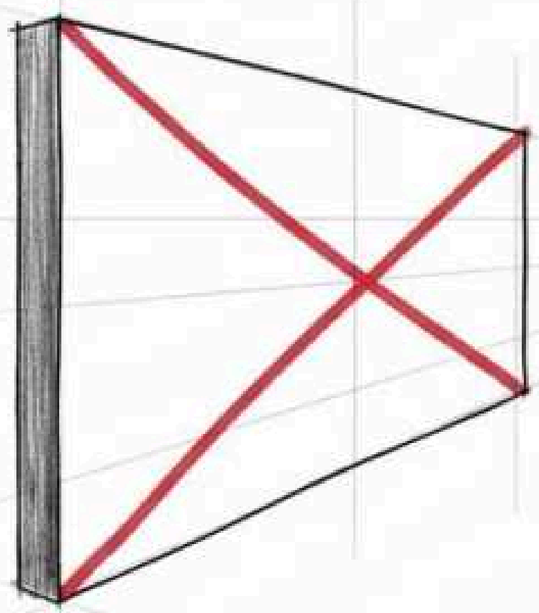
Equal spacing in the real world is not equal spacing on the page.

Dividing Receding Surfaces

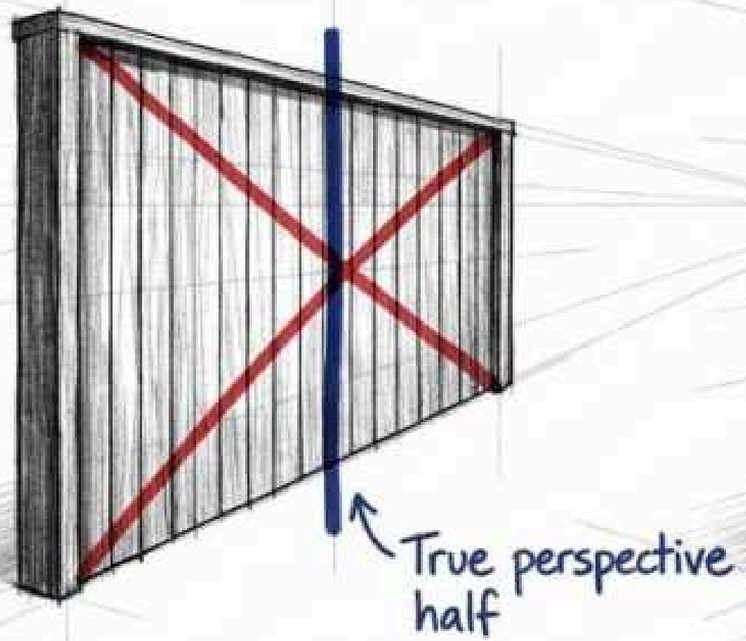
¶ 5.13

To divide a surface (planks, windows, floor tiles) into equal parts in perspective, draw a diagonal "X" across it. The center cross marks the true perspective center.

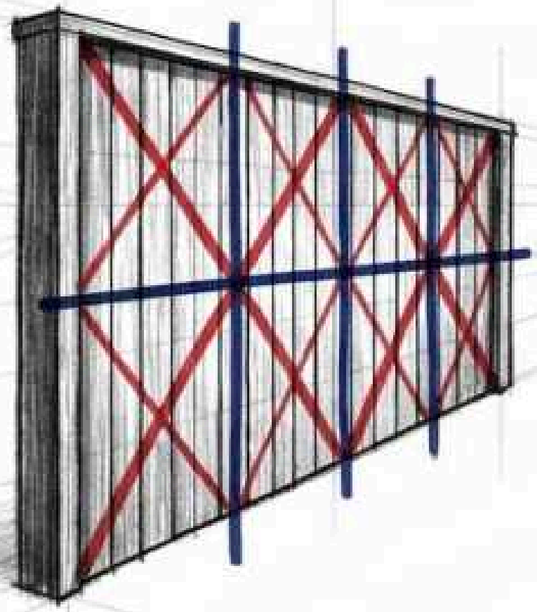
The Diagonal Crossing Trick



Step 1: The "X"



Step 2: Find Center

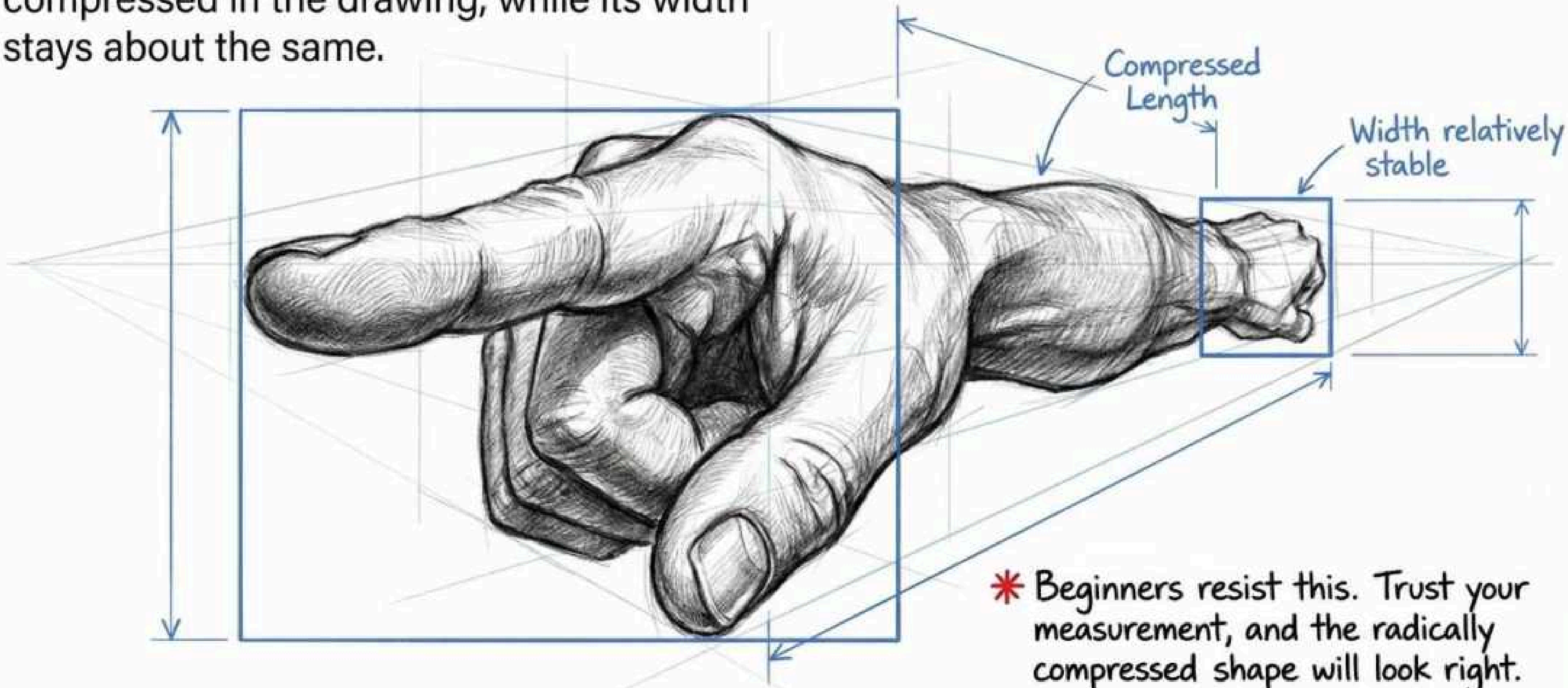


Step 3: Repeat

Foreshortening: Perspective on a Single Object

¶ 5.14

When a form points toward you, its length is compressed in the drawing, while its width stays about the same.

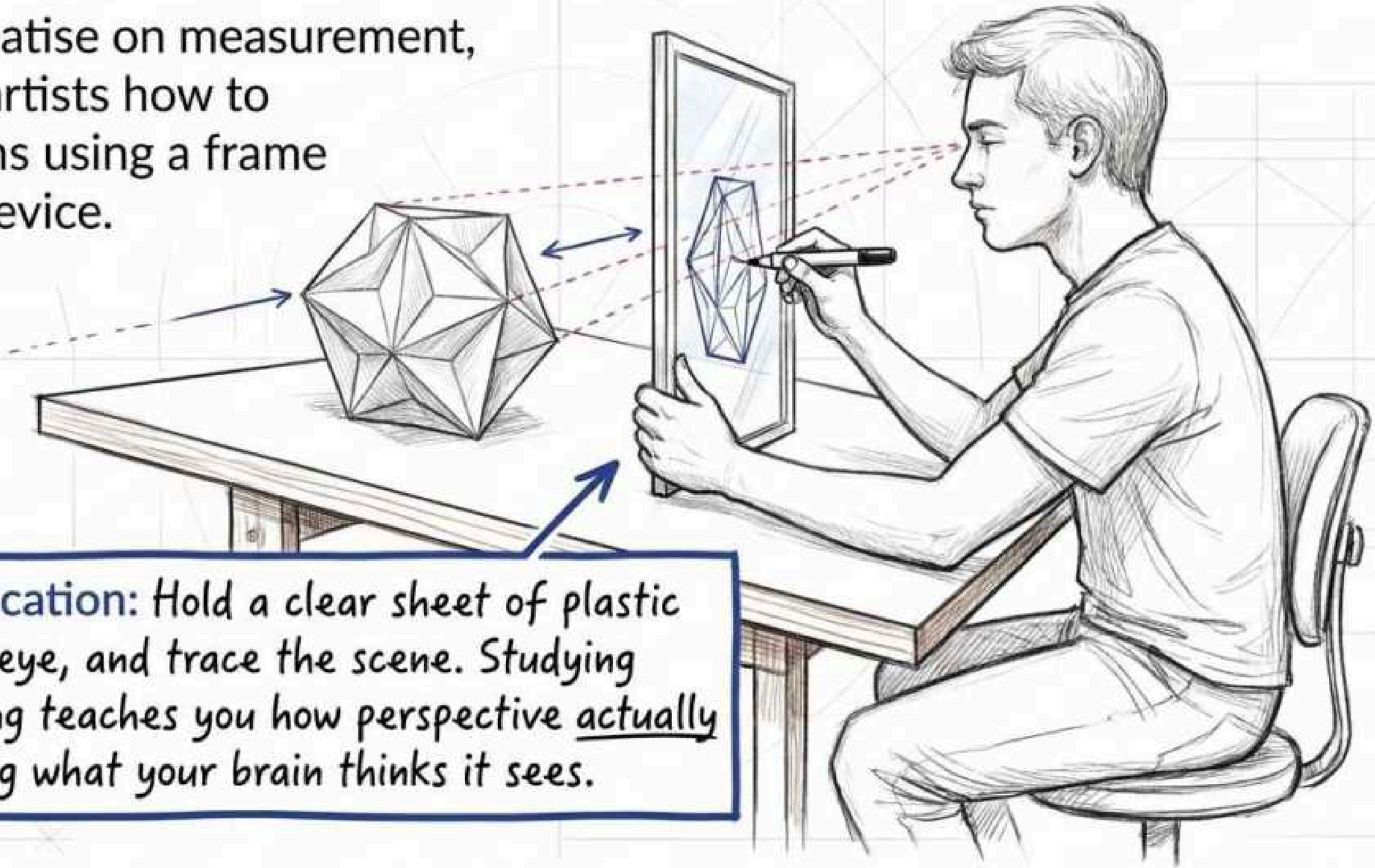


* Beginners resist this. Trust your measurement, and the radically compressed shape will look right.

Dürer's Tracing Device

¶ 5.15

In his 1525 treatise on measurement, Dürer taught artists how to construct forms using a frame and sighting device.



Modern Application: Hold a clear sheet of plastic still, close one eye, and trace the scene. Studying that flat tracing teaches you how perspective actually looks, overriding what your brain thinks it sees.

Aerial Perspective (Leonardo da Vinci)

¶ 5.16

Linear perspective is not the only way to show depth. Distant objects appear paler, bluer, and lower in contrast because of the intervening air.



Recap: The Complete System

¶ 5.17

Perspective rests on the horizon line and vanishing points. Together with apparent size, geometric division, foreshortening, and aerial depth, they form a complete system for translating 3D space to a 2D plane.



Next: Composition and the Figure

¶ 5.18

Technical Tools Mastered:

- ☑ Horizon & VPs
- ☑ 1, 2, & 3-Point Grids
- ☑ Scaling & Dividing
- ☑ Foreshortening & Aerial Depth

You now have the main technical tools. In Lecture 6, we learn to arrange them on a page to hold the viewer's eye, master human proportions, and build a plan for ongoing practice.

