paint a scene that exists only in his imagination, he cannot paint a Dürer 'section' simply by tracing points. He must have rules to guide

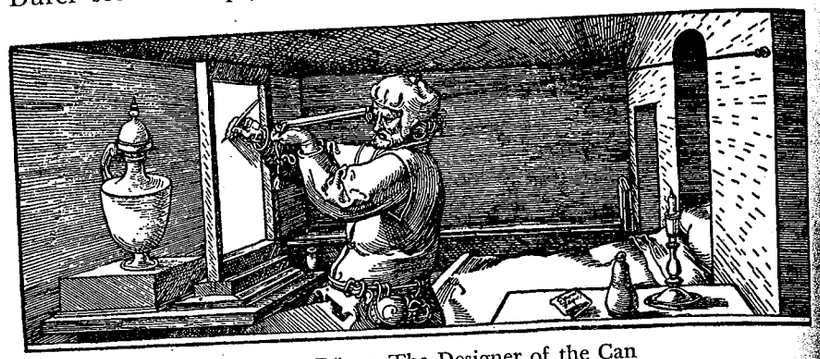

Figure 21. Dürer: The Designer of the Can

him. And so the writers on perspective derived from the principle of projection and section a set of theorems that comprise the system

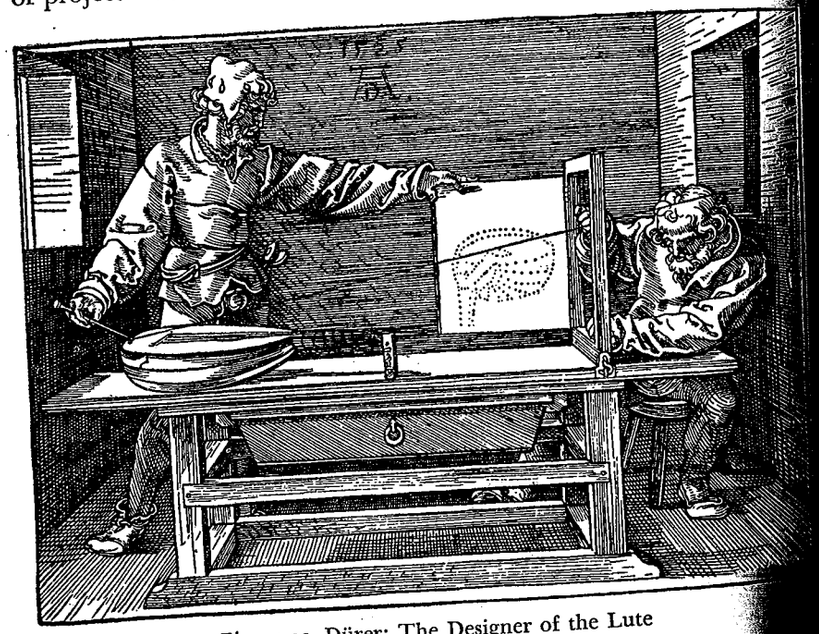

Figure 22. Dürer: The Designer of the Lute

of focused perspective. This is the system that has been adopted nearly all artists since the Renaissance.

What are the principal theorems or rules of the mathematical science of perspective? Suppose the canvas is held in the normal vertical position. The perpendicular from the eye to the canvas, or an extension of it, strikes the canvas at a point called the principal vanishing point (the reason for the term will be apparent shortly). The horizontal line through the principal vanishing point is called the horizon line because, if the spectator were looking through the

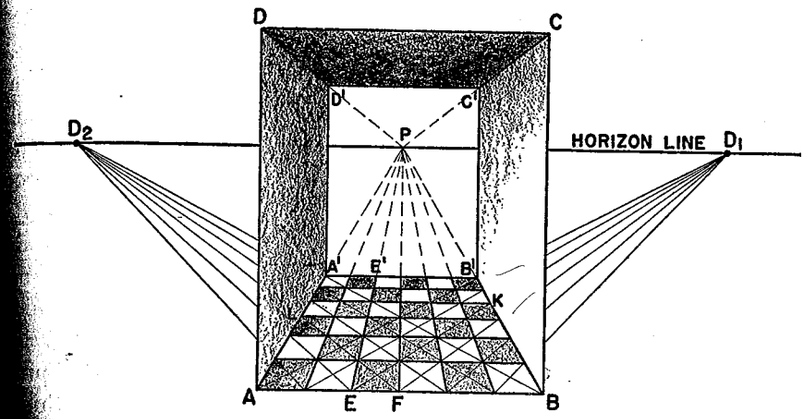

Figure 23. Sketch of a hallway according to the focused system of perspective

canvas to open space, the horizon line would correspond to the rational horizon. These concepts are illustrated in figure 23. This figure shows a hallway viewed by a person whose eye is at point O (not shown) which lies on a line perpendicular to the page and through the point P. P is the principal vanishing point and the line D_2PD_1 is the horizon line.

The first essential theorem is that all horizontal lines in the scene that are perpendicular to the plane of the canvas must be drawn on the canvas so as to meet at the principal vanishing point. Thus lines such as AA', EE', DD', and others (fig. 23) meet at P. It may seem incorrect that lines which are actually parallel should be drawn to meet. But this is precisely how the eye sees parallel lines, as the familiar example of the apparently converging railroad tracks illustrates. It is perhaps clear now why the point P is called a vanishing point. There is no point corresponding to it in the actual scene, since the parallel lines of the scene itself do not meet.