Perspective Basics

Horizon Line

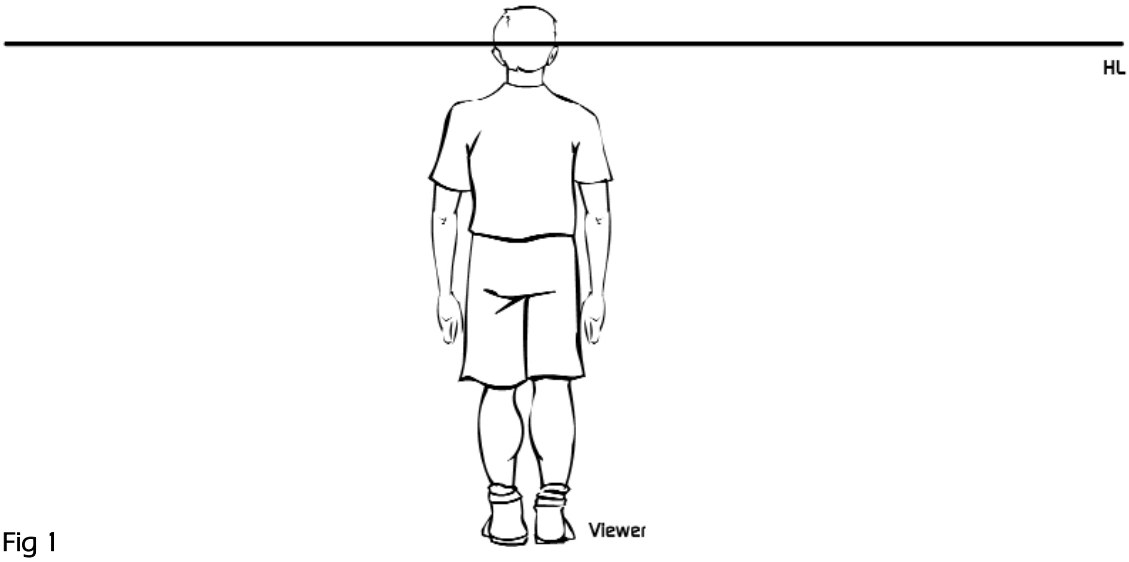


Fig 1

No matter where you go on this plain, you can rest assured knowing that if you look out ahead of you there is a **Horizon Line** or **HL** for short. It is always there, cutting through the horizontal center of your vision (eye height) whether you are on the beach and can see it or if it is obscured by mountains, trees, fog, houses, buildings or smog. Every person, large or small will see the HL cut through their center of vision. Thus, every spatial drawing should always begin with **HL** as it's the most important part of this type of drawing.

Station Point

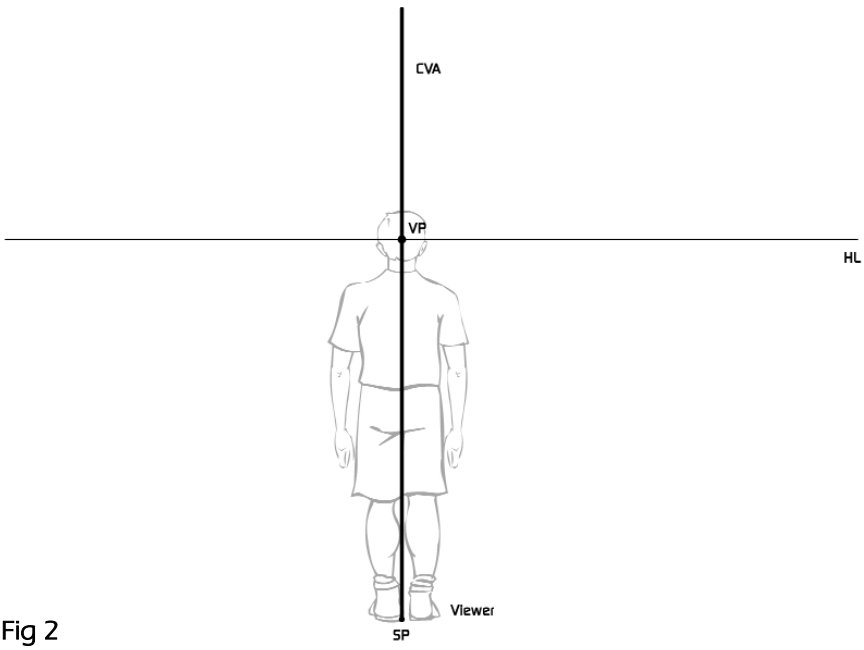


Fig 2

The **Station Point**, or **SP** is created at the point where your feet come in contact with the ground plane. If you were drawing a view from the top of a building the station would include your eye height to the roof plus the height of the building. If you were laying in the street on your stomach your station point would be your eye height to the ground, probably the length of your your face. Amazingly, your HL would always remain in the horizontal center of your vision. Without a station point, you would have a hard time defining the ground plane and the height of the horizon line.

the Central Vertical Axis and Vanishing Point

If you have a horizontal line running through your center of vision, it only makes sense that that you would have a vertical line doing the same. You are going to have to bear with me on this one though because unlike the HL, the CVA is imaginary and can't really bee seen, but it's very necessary. This invisible line is called the **Central Vertical Axis** or **CVA**. As you can see in figure 2, the HL and the CVA intersect at the absolute center of your vision if you are looking straight ahead This intersection point leads us to what we call One Point Perspective and all objects that are parallel to the viewer and the groundplanewill recede to this point.

The Picture Plane and the Cone of Vision

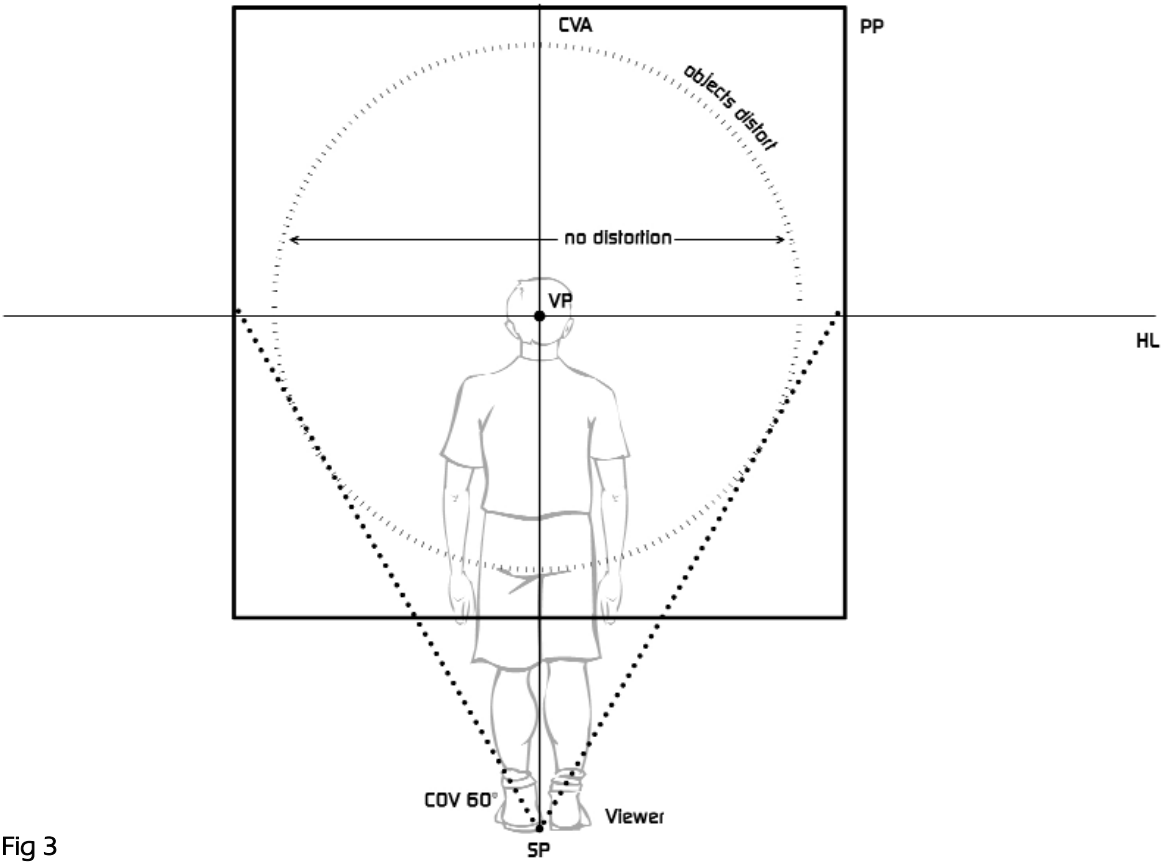


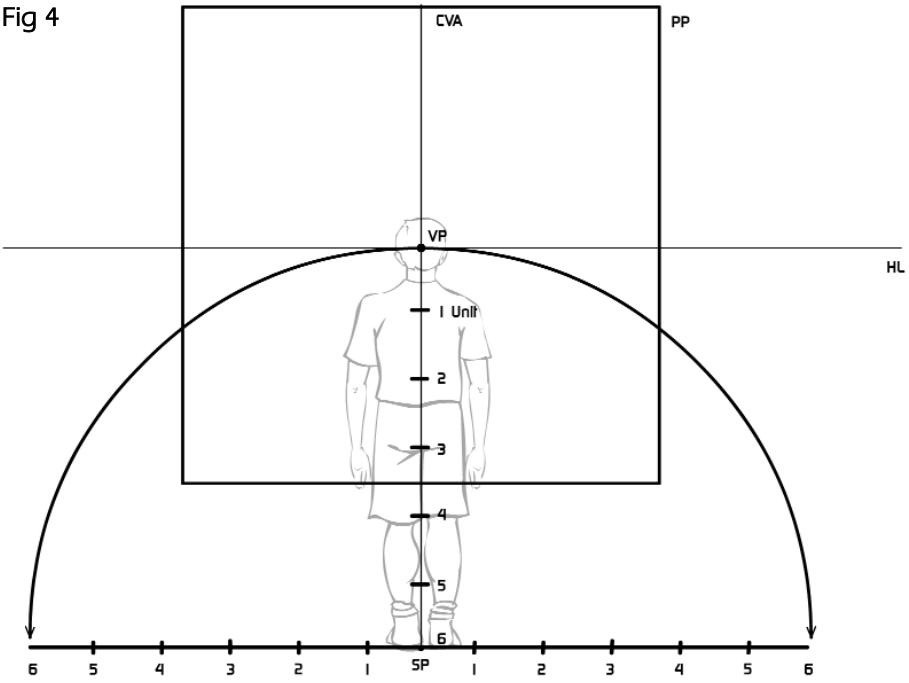
Fig 3

The **Picture Plane** or **PP** is the edge of your vision, but not the edge of your drawing. You can easily find your picture plane by holding your arms at your sides and turning your palms upward. Wiggle your fingers. You can't see them right? You will have to move your hands upward to see them. The point at which your fingers enter the field of vision is the edge of the PP.

Now, just because objects are in the visual field does not mean that they will be in focus. Our range of focus is even more limited than our Picture Plane. Hold your arms straight out from your sides and look straight ahead. Move your arms inward until they enter the visual field. Don't look at them directly, just through your peripheral vision. They will be out of focus at this point. Now move them closer together until they are in actual focus. Notice how close they are together. They are now in your **Cone of Vision** or the limited focusing range of the human eye. This range can be shown as a angle which radiates from the eyes at sixty degrees or less. In a drawing, the **COV** can be shown by creating a 60 degree angle radiating from the SP, see figure 3. Objects within the COV will be in focus or appear without distortion in the drawing. Conversely, as objects get further out of the COV, they will appear more distorted when they are drawn.

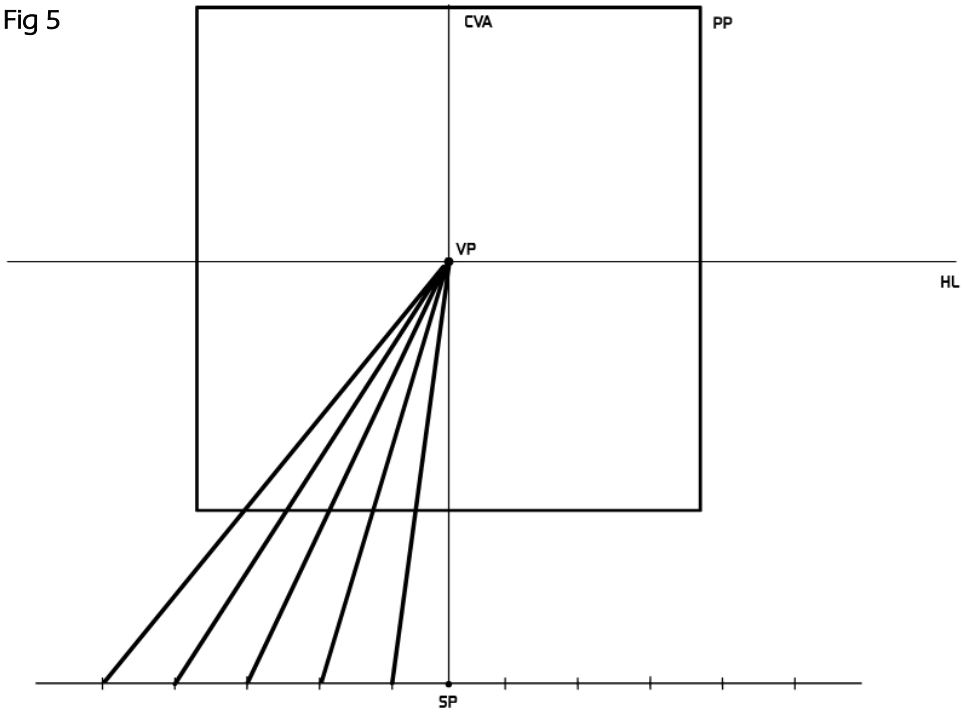
Finding Unit Heights

Fig 4



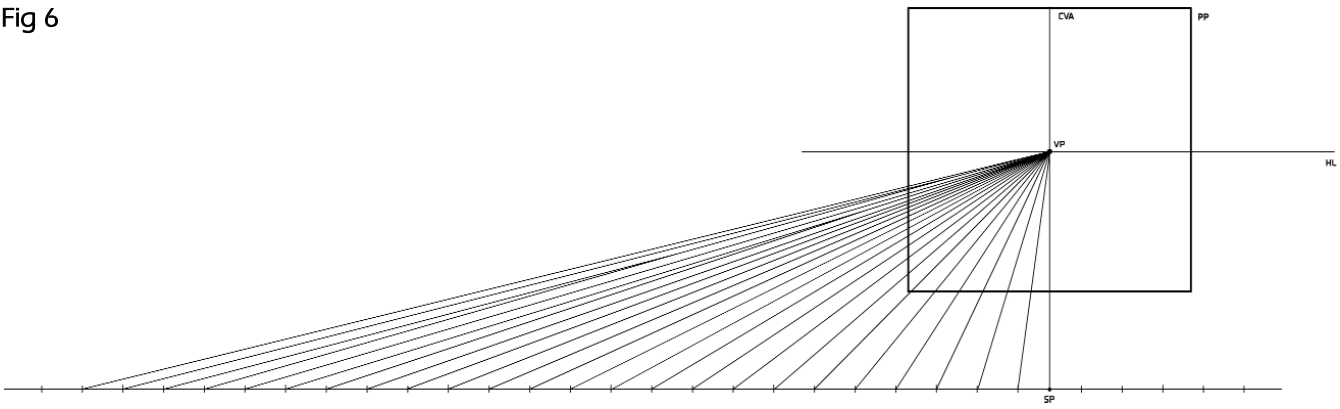
Determining the eye or camera heighth is a relatively easy process but none the less an essential one for your drawing. To find the visual height to the ground plane, mark off equal segments on the CVA. In figure 4, you can see that the eye height of the figure is six feet, or in this case units. If this big lug was standing on a ten foott ladder, his height would be added to the height of the ladder giving us 16 feet or units. Draw a line parallel to the HL, intersecting the SP. Draw out the units on this parallel line or take the distance with a compass and mark off the height on this new line.

Fig 5



In figure five, I have removed that big 6'4" guy to give a better view of what is going on. You can see that lines called rays have been drawn from the VP to the ticks on the ground line. These lines are called **Convergence Lines** because they recede or converge to the VP. Each one of these lines represents a unit of measure, in this case one foot.

Fig 6

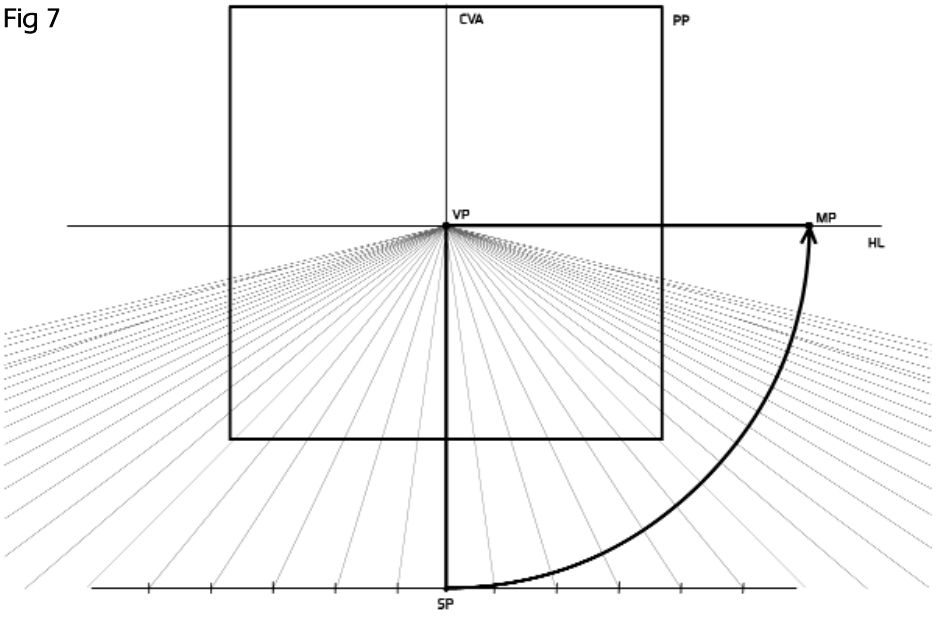


What is happening here is the beginning of a grid. To get the proper units and convergence lines continue to measure off tick marks along the ground line. Ultimately this grid will divide the image area into one unit segments. It can be used to check the sizes of objects in the drawing as compared to the same objects of actual size. For instance, if you were draw a room of specific dimension with furniture of associated dimension, a grid such as the one about to made would insure accuracy in the drawing.

The Median Point and One Point Perspective

With a little time, and perspective drawing takes a lot of it, you will have created as many of the convergence lines as you need. However, I am sure you are asking, how far back in the distance does a "unit" recede? I strongly suggest against guessing as you can jeopardize your entire drawing. The best way to understand and describe proper distance is to think in terms of perfect squares in space. In this case, we can find the distance of one unit by finding the **Median Point** or **MP** from the SP. The MP will ensure that all angles created in this drawing are a true ninety degrees. So how do you find a perfect square? I'm glad you asked...

Fig 7



In a **One Point Perspective**, **1PP**, drawing you can locate the MP by measuring the distance between the SP and The VP along the CVA. Then either Measure out the same distance along the HL or use a compass to arc and mark it. In other words the Median Point of a 1PP drawing is located at the same distance horizontally as the Station Point is from the VP. Because most of the human-made world relies on the 90 degree angle and everything else can fit into a box of some kind or another (Michelangelo carved his statues from blocks of marble, see where I'm going with this?) we can divide an angle in half using a 45 degree angle. This angle can now be derived from the MP. What we will do now is draw a line radiating from the MP to the the first tick mark we made a while ago as shown in figure eight.

The angle created at the Ground Line, Median Line intersection is 45 degrees. Where the Median Line intersects a convergence line makes up the back edge of a square.

If we drop in a line parallel to the horizon at this intersecting point we will have made a true square in space as you can see in figure nine. Notice that the Median Line is intersecting the other convergence lines, every intersection is defining a new square receding into space. You can now confidently apply more horizontal lines at these intersections and confidently know that you have made a “unit grid” which will describe distance and space as defined by the unit height you had designated.

As you can see in Figure 10 an entire grid can be created using the process we discussed above.

Fig 8

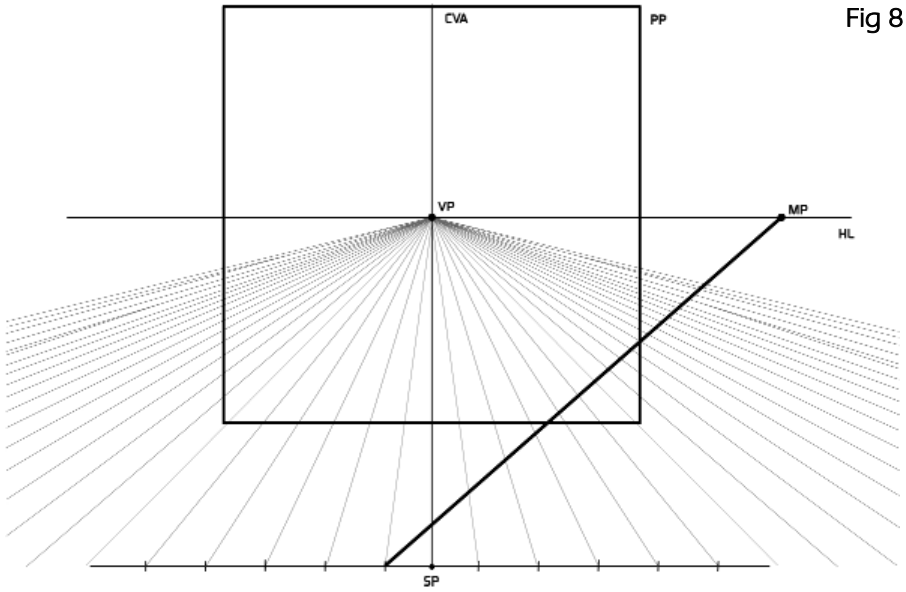


Fig 9

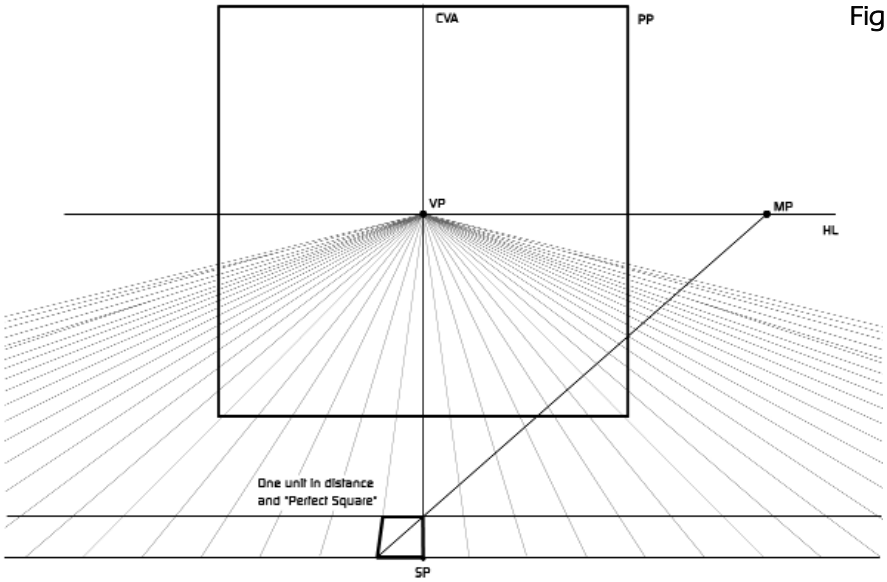


Fig 10

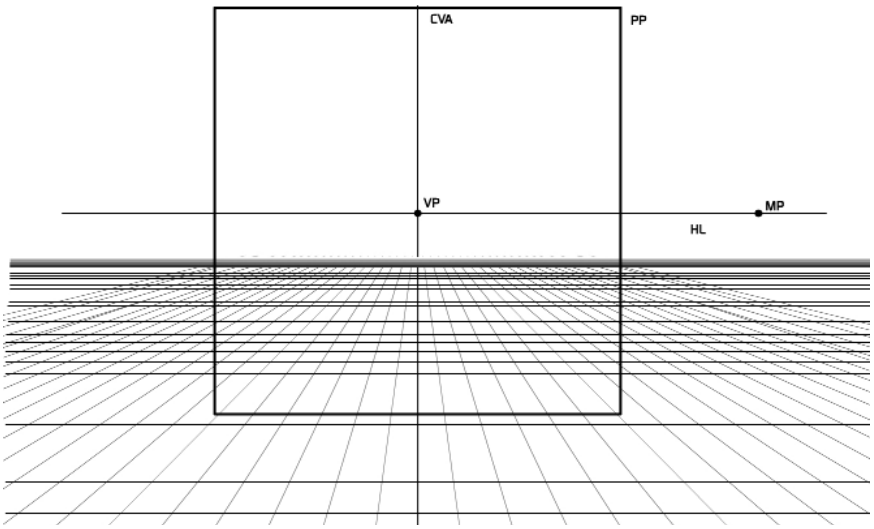
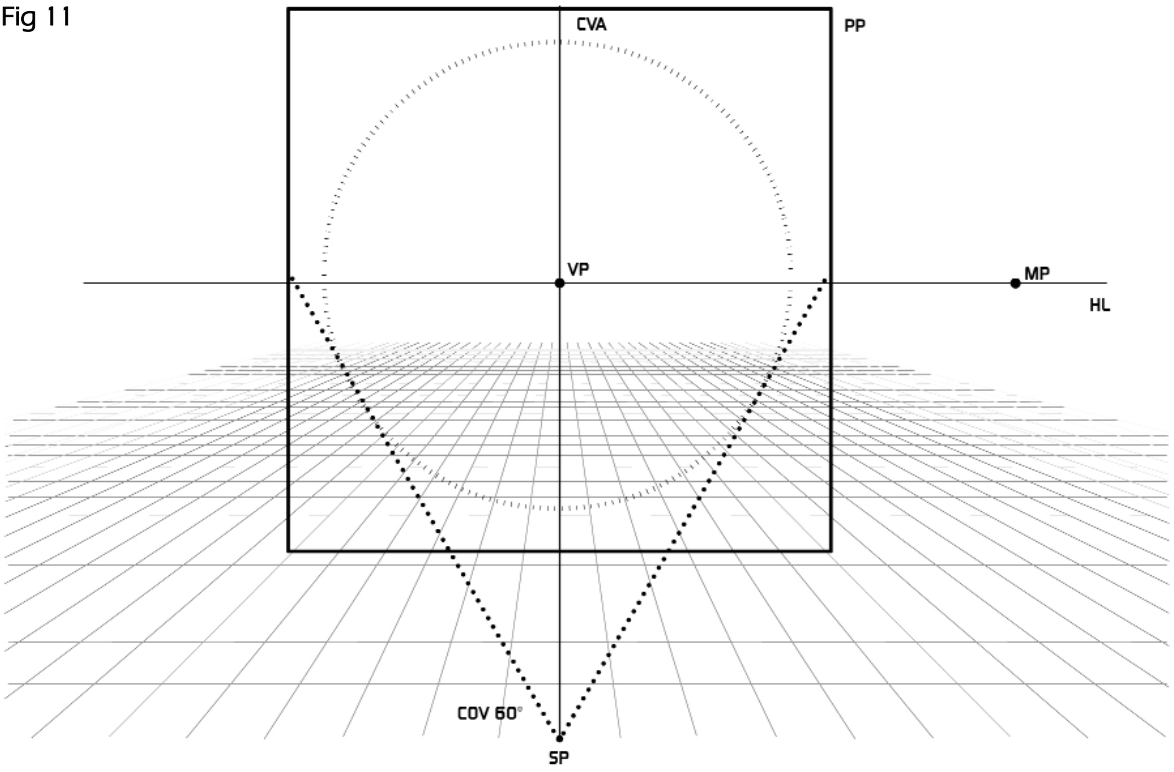


Fig 11



Notice that even though the grid was made correctly using the MP that many of the squares contained in the grid look weird and not like squares at all. Look especially at the outer edges not contained in the Picture Plane. Remember the COV and the distortion that happens to objects exiting or not located within the Cone of Vision. This distortion should be avoided as it makes the drawing look less real and at times amateurish. If you are experiencing distortion in your work but really want to show the objects in your picture plane, simply "take a step or two back" In other words, redraw your station point further from the vanishing point. Keep in mind that doing so will require the relocation and drawing of the median point, which probably means that you'll have to redraw your grid, which in turn means that you'll probably have to redraw every object on the grid....yeah it's a bit of a pain, however you will be happier with results of your drawing. The more you practice working with grids, the better you will be at drawing space and the objects contained therein.

(Who is this guy anyway?)