

Notes On The Measurement Of Proportion And Form

Andrew Newland

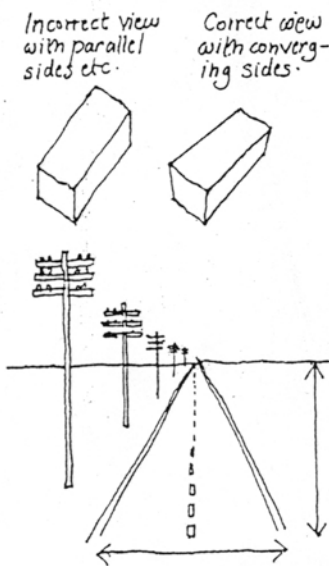
TEACHING ART & DESIGN

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The Picture As An Illusion Of Reality

The first thing to be made clear about drawing from observation, is the difference between the subject itself, and the picture made of that subject; the real subject is usually three dimensional, whereas the picture will be a two dimensional representation of that subject on a flat surface. This flat surface is often referred to as the 'Picture Plane'.



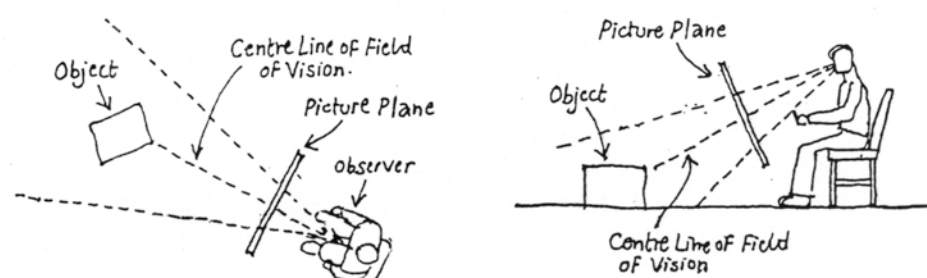
Very often our knowledge of the reality of objects affects the way we try and represent them. Because we know that the top of the box has in reality right angled corners and parallel sides, there is a natural tendency to draw it like that. In fact a more correct observation of the box would probably be rather different. It is therefore necessary sometimes to try to forget our preconceived notion of shapes, and to draw more objectively. In a simple phrase: 'Draw what you see, not what you know'.

In the example of the view along the road, there are two major differences between this drawing, and the actual real life place. Firstly, in reality the sides of the road do not angle inwards. To make a drawing we have to work out what angle the lines will appear to be at on the picture plane. Secondly, in real life the distance to the horizon is not the same as the width of the road. This effect on the proportions is known as 'Foreshortening'.

The Picture Plane

Before attempting to work out the proportions and angles of shapes on the picture, it is necessary to understand where exactly your picture plane is. It is simply, at right angles to the direction in which you are looking, or to be more precise at right angles to the centre line of your 'Field Of View'. This applies to both horizontal and vertical directions. In other words if you look diagonally across an object, your picture plane will also be placed diagonally (at a right angle to the direction of view). If you look downwards your picture plane will be angled downwards accordingly (at a right angle to the direction of view).

The picture plane can be compared to the position of the film in the back of a camera (which is known as the focal plane). The film will always be at a right angle to the direction in which the camera lens is being pointed.

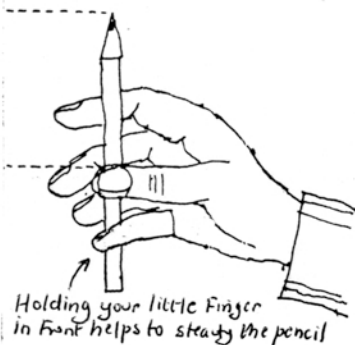
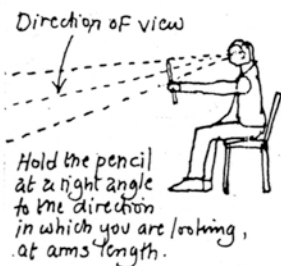


It is a good idea to set up your drawing so that it is, as far as possible, parallel to the picture plane. An artist's easel is very good in this respect. Artist's donkeys are also good in that the drawing board is supported in an upright position directly in front of the person drawing. If you have neither of these try to support the drawing board or sketchbook with your other hand. If sitting at a table, move back and support the board on your knees. If you leave your drawing on the table top you will be getting a foreshortened view of it from a low angle; this will probably result in your making the drawing elongated from top to bottom without realising it. Always at least face the subject directly, irrespective of the angle of your desk, otherwise the estimation of angles is made more difficult.

Measuring Proportion

Obviously if the drawing is going to 'look right', we have to be careful how we measure the proportions of objects as seen on our picture plane. Anything can be used to measure with, but since most drawing is done with a pencil, this is the most convenient thing to use. You will find it easier to use just one eye for measuring and to close the other.

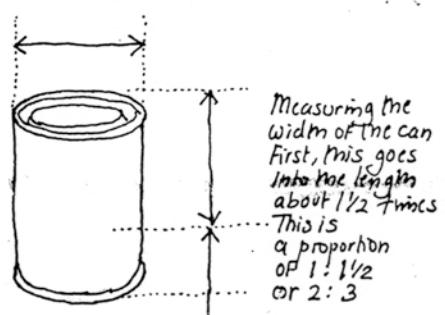
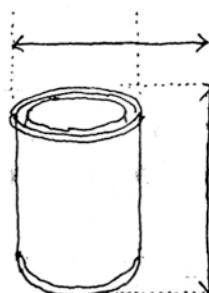
If you hold your pencil up in front of you, and move it towards you and away from you, the pencil appears to get bigger and smaller than the objects behind it. In theory, we could use this to vary the size of the picture we are going to make, as if we were moving the picture plane towards you, or away from you. In practice however this would be rather awkward to do, since it would be difficult to be sure of always getting the pencil the same distance from your eye. Instead, always hold your pencil with your arm held out straight in front of you. In effect you are holding your pencil on the picture plane. The jointing of your arm ensures that the distance to the eye is always about the same. The other thing you must do is to try and sit straight in the chair, because if you lean forward it will make the pencil appear bigger against the background. If you are standing up, try to make sure you always stand in the same spot.



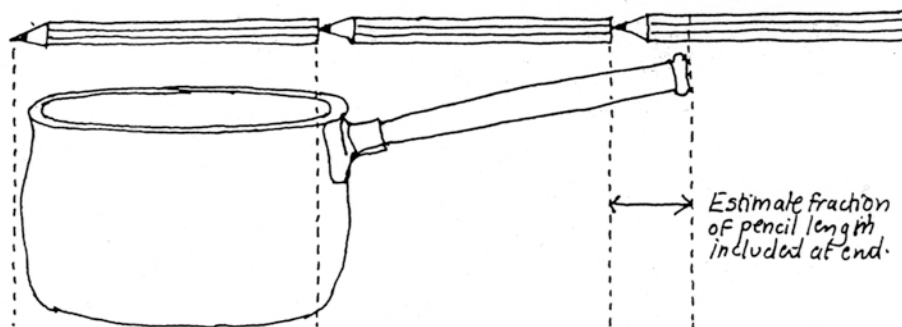
To measure with the pencil, hold it with your fingers behind it, and the thumb in front. In this way it is possible to slide the thumb up or down without letting go of the pencil. Put the point of the pencil against one end of the distance to be measured, and slide your thumb until the upper edge is aligned with the other end of the distance to be measured. Keep holding your thumb in this position.

One method of using this measurement, is to transfer it directly to the paper. If it looks too small you can double it (as long as you do the same for all other measurements). However, this limits you to working at one of several set scales of enlargement. A much better method is to compare this measurement with another on the object to work out the proportion. As long as the proportion is maintained, the picture can be made as large or small as required. This gives much more flexibility in fitting the picture to the space available.

The second measurement you compare with may be bigger or smaller than the first one. If it is smaller, try to estimate how much smaller; for example, is it two thirds or three quarters of the first measurement. If it is larger, see how many times the first measurement will go into it, by sliding the pencil along but keeping the thumb in its original position. Make a note of how many times the original measurement goes into this new one, for example one and a half times, or one and a third times.

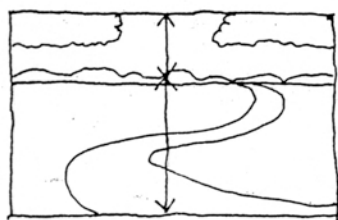


In the case of large objects your pencil will probably not be long enough. In this case measure how far one pencil length will come to, and try to remember as accurately as possible this point on the object. Slide the pencil across so that the top end of it is now in this position. In this way work out how many lengths of the pencil would go into the distance being measured. It will probably not work out exactly to whole pencil lengths, in which case estimate what fraction of the pencil is included at the end. For example it might come to two and a quarter pencil lengths.



In time, with practice, you will become more skillful in measuring proportion by eye, and you will be able to some extent to dispense with measuring using a pencil. Even so there will be probably be many occasions when it would be wise to use it to check your drawing.

'Landscape' 'Portrait'



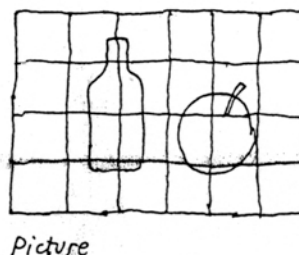
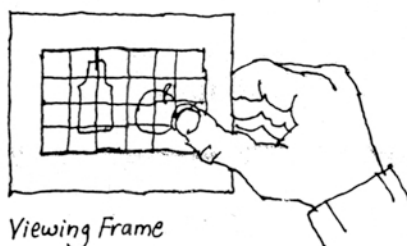
In a complex subject it is sometimes difficult to decide where to start in measuring proportions. The most sensible thing is to start by measuring the overall proportions of the subject, and then making sure that these fit the space available for drawing. It will also tell you which is the best way up for the paper, horizontal (known as 'Landscape Format'), or vertical (known as 'Portrait Format'). Having done that, look for some part of the composition which divides it into two large areas, either vertically or horizontally. For example in a landscape find the position of the horizon; to do this compare the height below the horizon line, with the height above the horizon line. Continue to divide the picture area up into progressively smaller areas by positioning more lines by the same method.

The Use Of Grids In Estimating Proportion

An alternative method is to use a simple grid. For example you could cut a rectangular hole in a small piece of card; the proportions of the hole being the same as for your piece of drawing paper. Then fix a piece of transparent plastic over the opening and draw onto this a simple grid of lines at regular intervals. Then divide your drawing up by the same number of horizontal and vertical lines. Hold the piece of card in front of you, and move it towards and away from you until the subject fills the frame. Then, keeping the card in this position, observe how the real objects correspond to the grid, and place them in corresponding positions in relation to the grid on your drawing.

If working in the studio you could set up a much larger grid that would be easier to use, made from a wooden frame with strings stretched across it that could be placed in front of the subject.

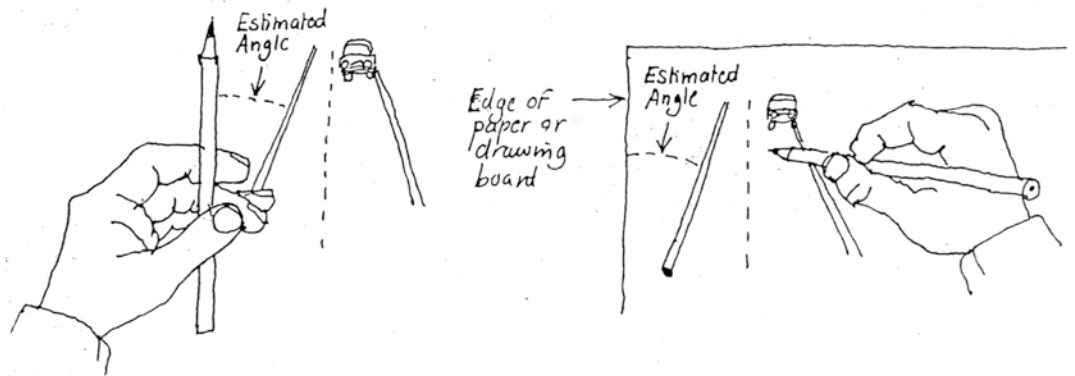
Grids are particularly useful when scaling up, for example enlarging from a small sketch onto a larger painting.



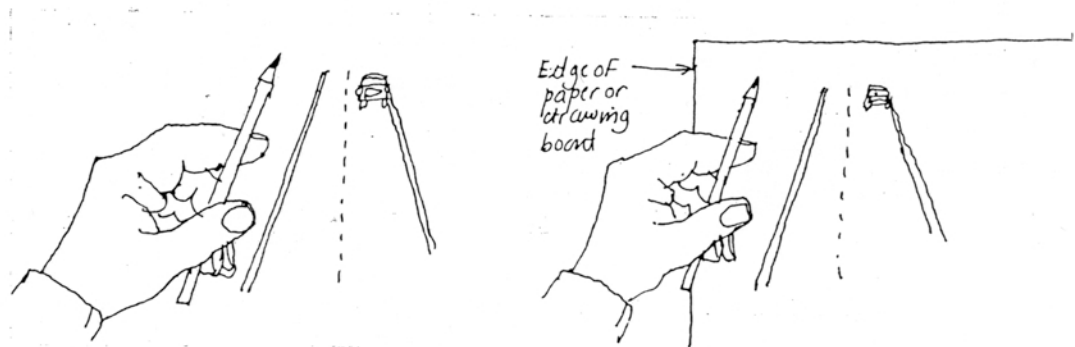
Estimating Angles Of Lines

Just as important as getting lines in the correct position, is getting them at the correct angle. Again we have to measure what the angle appears to be on the picture plane. To do this compare the angle of the line you are looking at with a horizontal or vertical edge. Hold your pencil in front of you by one end, placing it either in a horizontal or a vertical position on your picture plane, whichever is closer to the angle being measured. Be careful to first establish the horizontal or vertical accurately; it may help at this stage to completely ignore the subject itself as there is a natural tendency to try and align with it. It may help, in establishing an accurate horizontal, to use a ruler or similar long straight edge, held at both ends at arm length. By closing one eye it should be possible to see whether the angle being measured is closer to a horizontal or a vertical, and by how much it differs. For angles in between it may be necessary to compare it with both horizontal and vertical.

Remember what this angle looked like as accurately as possible, and draw a corresponding line on your drawing, this time referring to the horizontal and vertical edges of the paper.



If you want to check the accuracy of your line, you can do so as follows. Hold your pencil in front of you, and align your pencil with the angle as it appears to be on the picture plane. To do this imagine your picture plane as a window in front of you. You may rotate your pencil against the window, but you must not try to point it through the window. The natural tendency is of course to try to align the pencil with the actual angle of the real object in three dimensional space, but what we need to do is to align it with the angle it appears to make on our two dimensional illusion of reality. When you have done this, hold your drawing up behind the pencil and see if the two correspond. Take care not to move the pencil in the process.



In theory if you have been careful in estimating proportion and angles we should have an accurate objective drawing of the subject. However in practice it is useful to apply some knowledge of perspective to see if it all matches up.