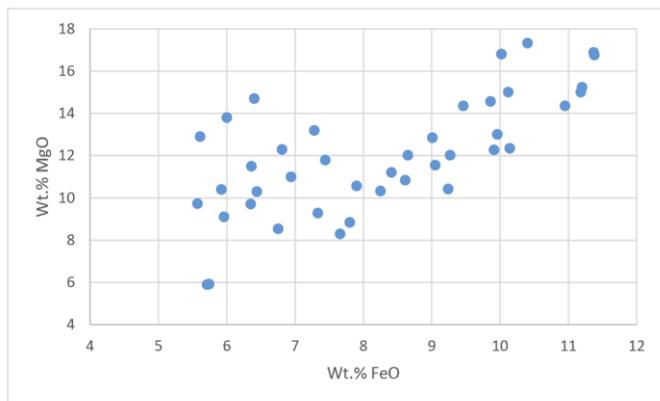# Some Tips Using Adobe Illustrator®
by John D. Winter

This guide is intended as a companion to another guide, *"Making a Figure Using Adobe Illustrator,"* also available on my web site. The Illustrator "Toolbar" is shown on the right. You select your working tools from it (it can be made to appear as a single or double column). Tools with tiny black triangles in the lower-right corner have multiple sub-tools (*Alt-click*).

We shall attempt to make a graph, and put some drawings in the graph area. Excel makes fair graphs, but not very appealing and they are difficult to customize. We will take an Excel scatter graph and fix it up a bit. I realize that Illustrator has its own graph-making functions, but this exercise addresses the techniques of drawing, text, moving, and copying elements that may be applied to a broader range of drafted images, including stratigraphic sections, map legends, etc.

To begin, create an Excel graph, select it and Copy it to the clipboard. Then open a new Illustrator document and paste in the graph. Or you can create a graph from scratch in a new Illustrator document. My pasted Excel graph looks like this:

To begin tracing a graph, select the *rectangle* tool (8th icon down in the toolbar) and drag a large rectangle exactly over the graph margin from Excel. Then choose the Selection tool (top black arrow icon) and select the rectangle you made. The **Stroke and Color palettes** (top ¾ of Fig. 2) allow you to control some important features of any *selected* object (in this case your rectangle). The features of your rectangle may be different at the moment, but the object to which Figure 2 refers has a *purple* stroke (the bounding line of the rectangle) and a *transparent* (indicated by a diagonal red line) **fill** (the color of the area within the bounding line). I labeled the Fill and Stroke icons in Fig. 2. You can select the fill or the stroke icon in **Color palette** (or in the toolbar) and change the color of either by selecting any color you like from within the **Color palette**. If a palette is not available, it may be on an inactive tab of another palette (as in the Gradient palette at the top of Fig. 2) or the palette may be hidden. Show hidden palettes using the **Window** menu at the top. Let's change the thickness ("weight") and color of our rectangle. When tracing an object I like to use dramatic colors to distinguish my work from the original. You can change the colors back to plain black later. With the rectangle itself selected in the workspace, click on the stroke-color square icon in the Color palette. Then select a color in the rainbow area at the bottom of the palette. White and black are always available above the rainbow area, and transparent is always available as well. To make our rectangle stroke red (if it isn't already so) simply click somewhere in
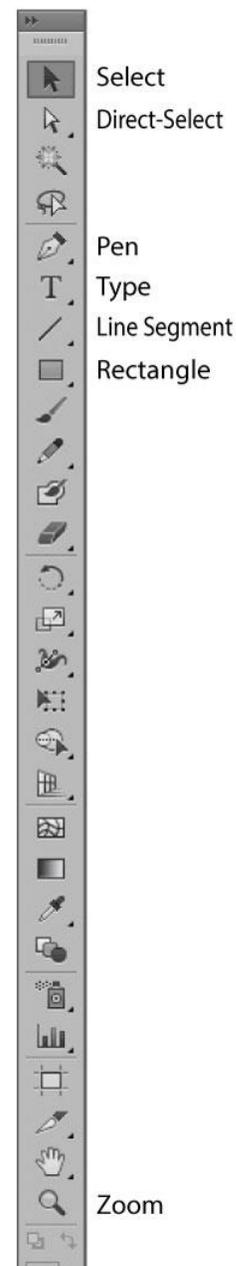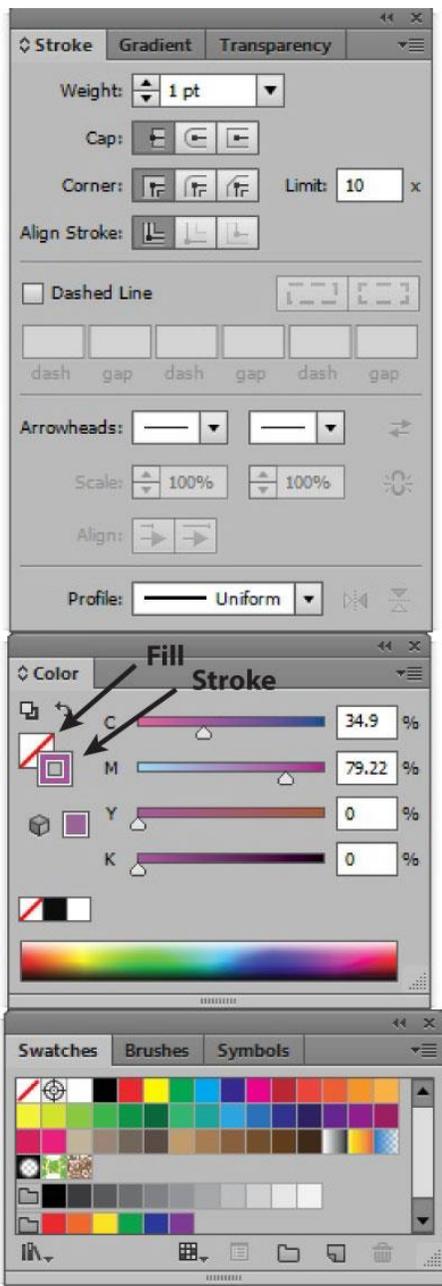
Figure 2. The Stroke, Color, and Swatches Palettes.

the red area of the rainbow-like color selection area. If you like, you can fine-tune a selected color choice by either dragging the triangular markers above the rainbow in Figure 2, or by typing a value between 1-100 at the right end. Figure 2 assumes that you are working in CYMK colors, but you can change this to RGB, Grayscale, etc. by clicking the black wedge at the right end of the *Color* tab bar at the top of the palette.

Make the stroke a vivid red and the fill transparent (click the fill icon in Fig 2 and then the red diagonal line above the rainbow area). Find the *Stroke* palette (top of Fig. 2) and make the stroke weight (line thickness) equal to 2-point by clicking on the up or down arrow to the left of the Weight menu box. You should now see your Excel graph bounded by a thick red outline. You can move or resize the rectangle to accurately fit your graph by dragging on the appropriate "handles" when you select the rectangle.
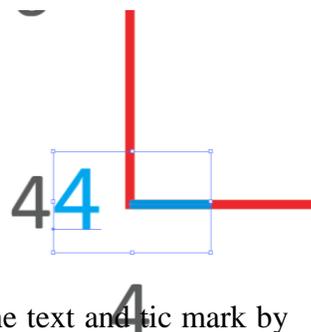
Now select the *Zoom* tool (magnifying icon near the bottom of the toolbar) and drag a zoom rectangle over the lower left corner of the graph to enlarge your work area and make the next step more accurate. Select the *Pen* tool (icon 5) and click it once exactly on the left margin of the rectangle and a modest distance from the lower-left corner. Hold down the *Shift* key and click again a very short distance into the rectangle to make a tic-mark for the y-axis. The *Shift* key restricts drawn lines to horizontal, vertical, or 45°. For a simple straight line you could also use the *Line Segment* tool. Now select the tic-mark with the selection tool, and *Shift-drag* it down until it lies on the lower margin of the rectangle at the lower-left corner. Shift-dragging keeps the tic mark aligned so that your drag is perfectly vertical (you will not want to keep this tic mark, but it helps with later spacing). Change the stroke color to a light blue to keep track of it.

Select the *Text* tool (T icon) and position it just outside the lower-left corner of the rectangle to make the first graph y-axis tic label. Click and type a number (I typed 4 to match my pasted graph). You modify the font, size, and other characteristics of the type in the Character palette (Fig. 3). You can also change the color using the Fill icon in the Color palette. Yes, text colors are *fill* colors in Illustrator. You can make the stroke a different color to

create outline effects. Make your number the same blue (fill) as your tic mark (stroke). If you don't like the position of your text, click and drag it with the *Selection* tool to a better position.

Next pick the *Selection* tool, and drag it over the new number, and the lower left corner of the rectangle. By dragging you select every object that the drag marquee touches, which in this case is everything you have drawn (plus the Excel graph if you used one). To *de-select* only the rectangle, *Shift-click* the rectangle outline. *Shift-click* somewhere in the Excel graph to de-select that
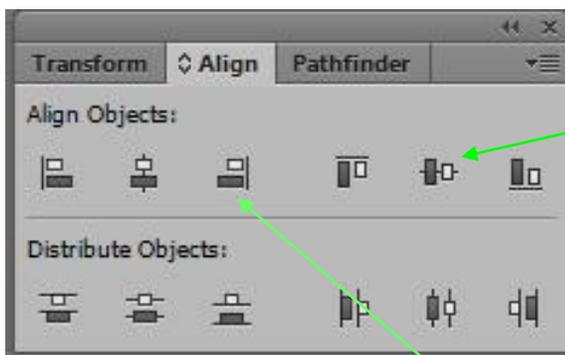

Figure 3. The Character Palette.

as well. You will be left with only the text number and the tic mark selected (your selection box with handles should surround only them). Alternatively, you could *click-select* the tic-mark and then *Shift-click* the number to add it to the selection. Practice with both options. My selection looks like this on the right (the black numbers are part of the original Excel graph). Notice the light blue selection box with the eight handles. You might want to play with resizing and rotating the selected elements. Don't like a change you made? ***Ctrl-Z undoes it.***

When you have both objects selected, find the *Align* palette (Fig 4) and align the text and tic mark by their center vertically (click the 5th icon in the top row). This may move your nicely-placed tic mark. If so, while still selected you may *Shift-drag* the pair to get the tic mark back to being coincident with the bottom margin of the rectangle. Shift-dragging moves your selection directly up-down or left-right.

Figure 4. The Align Palette.

Next we shall copy the text + tic-mark to create a series of labeled tics. Right-click the selected pair and choose **Transform > Move** (or click Object > Transform > Move) to bring up the move menu box. Set the *Horizontal* value to zero, and the *Vertical* value to 20 points. Then click the *Copy* box. This makes a new tic and "4" label directly above the first pair. Alternatively, *Shift-drag* both up a distance while also holding down the *Alt* key ("*Alt-Shift-drag*"). *Shift* again moves you directly up and *Alt* makes a copy. Then right-click the pair again and select **Transform > Transform Again** (or ***Ctrl*-D**) as many times as necessary to create all the labels you like. A quicker route is to select BOTH number-tic pairs and *Alt-Shift-drag* all four up, and repeat. You will eventually have a series of tics and a bunch of labels that all say 4 now. To change the values, select the text tool and click it over the wrong text and type to change it. Add 6, 8, 10, etc. This results in the correct values, but the wrong alignment in most cases. *Select*-drag over the left ends of all the text to select only them. Then click the **right-align** tool (3rd icon in the top row) in the *Align* palette (Fig. 4). With the text still selected, press the left keyboard arrow successive times to nudge the labels to where you want them. Then select that first tic mark at the lower margin of the box rectangle and delete it (because it is redundant with the enclosing box). If you are not satisfied with the spacing of your tic marks and labels you can space them more appropriately using the **distribute** tools (second row in the *Align* palette, Fig. 4). If you think your tic marks are too long or short, drag over them all to select the lot, and drag the middle handle of the bounding selection box to resize them all at once.

Practice with redistributing the text and tic marks, and then create a similar set of tick marks and labels along the bottom of the graph to label the x-axis. I prefer tic marks on all four sides of the rectangle. You can do this easily by selecting all the tic marks along the left side, for example, and then placing the selection arrow on any one selected mark and dragging the whole group, while holding down the *Shift* and *Alt* keys to the right side of the rectangle. Remember, holding the *Shift* key keeps the tics at the same vertical position, and the *Alt* key makes a copy of whatever is dragged.

Want to copy the graph symbols? *Alt-click* the *Rectangle* tool in the toolbar twice to change it to the *Ellipse* tool. Then *Shift-click-drag* a small circle. *Shift* constrains the proportions so you always get a circle (not an ellipse). Change the stroke weight, stroke and fill color as desired. Resize if you like by *Shift-dragging* a corner handle of the selection box. The *Shift* key seems complicated, but think of it this way: it **constrains** your actions. Dragging only goes vertically, horizontally, or 45° and it

constrains proportions when resizing. Move the finished circle to a graph point and then *Alt-drag* it to the other graphed data points.

In the graph you can now place symbols, etc. To demonstrate some of the powers of Illustrator, we can place some graphic elements. Use the *Pen* tool to draw some irregular ovoid areas. Practice either clicking the pen tool along a series of points or click-dragging to create smooth *beziered* curves. Always close your areas by clicking the last "anchor point" directly over the first one (the pen tool will add a small circle when you're at the correct position). You can further smooth a drawn "path" after it is drawn by selecting the path, and then clicking **Edit > Path > Simplify**, and choosing a level of fidelity to the original (I like 90-95%). This subject is covered more extensively in the Creating a Figure Using Illustrator tutorial.

Select the left area and fill it with a color you like from the Color Palette (Fig. 2). Make the stroke 1-point and black. Then select the other area and fill it with a contrasting color and the same stroke. With the second area selected, make sure it is on top of the stack of all the objects (in front of the others). To do this, click **Object > Arrange > Bring to Front** (or *Ctrl-Shift-*]). Select the Transparency tab (Fig. 2) and choose 60% opacity. This allows you to see through the front ovoid to see the boundary of the one behind it (as in Fig 6). Regrettably, Illustrator treats the fill and stroke together, so the stroke is now 60% transparent and not to our liking. You can clean it all up by doing the following:

Select the top (right) area and change the stroke to transparent (the red diagonal line in the *Color* palette).

Right-click the area and choose Object > Transform > Move. Set the *horizontal* and *vertical* offsets to zero, and click *copy* to make a duplicate of the area directly in front of the original.

Make the fill of this area transparent, and the stroke 1-point black. Set the *opacity* back to 100%.

Repeat the process for the left area, and move the new (transparent-fill & black-opaque-stroke) to the front of everything. This makes the boundaries of everything clear (as in Fig. 6).

Illustrator can be configured to take advantage of some nice geological fills (Litho_1 and Litho_2, as well as USGS Topo - all available from an older Illustrator (v. 11 and earlier I think) CD-ROM Swatch Library folder). If you have these, save them! They work in newer Illustrator versions. These fills are better for maps and geological columns than for graphs, of course, but these techniques are quite useful. The fills are line-drawing fills which are transparent between them. If you want to use them for black-and-white output, they work fine as given. You can make the fills coarser or finer by the following process. To make the fill finer, first select the object to fill and enlarge it (**Object > Transform > Scale** and picking a scaling factor such 200%). Then fill the expanded object with a Litho fill, and shrink it again to the reciprocal size (50% if you first expanded by 200%) being certain to check the *Patterns* box in the scale options menu. To enlarge the fills, do the opposite sequence.

You can combine color with the fills by making a duplicate of the filled object, and placing a color-filled copy directly behind the Litho-filled object. The color shows through the litho fill. As an
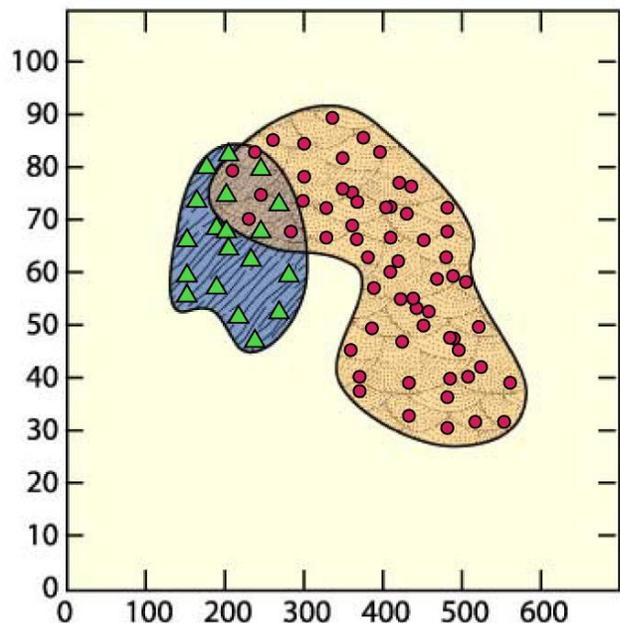

Figure 5. The final "product."

example, I created fills in the graph areas and ordered them front-to-back to make them work best. The result is shown in Figure 5.

You can insert an Illustrator drawing directly into a Word document. This is best done by converting the Illustrator drawing to a jpg file, using **File > Save for Web** (older versions of Illustrator use File > Export). Select **JPEG** and **High** (for the resolution), and then select the **Image Size** tab. Make your drawing about 1000 pixels wide (typically for printing), and then save the file somewhere. Be sure you have also saved the file as an Illustrator file, so that you can edit and modify it later. The JPEG is just another bitmap for printing. For computer-screen only images you could pick a lower resolution and save some disk space. Was there a large white border area? Select **File > Document Setup** and then **Edit Artboards**. Drag the outer corners in until the area around the image fits. Then click the Selection tool to return to the drawing and re-do **Save for Web**.

In Word, move the cursor to where you want the graphic, and drag a text-box the approximate width that you want the image to be. Text boxes are drawn with the A-box in the drawing palette. Next place your cursor in the text box and select **Insert > Picture > From File** from the menu. Select your jpg and in it goes. Select the text box and **Format** it. Be particularly sure to do **Layout > Advanced** and select the **Absolute Position** with respect to **Page**, both horizontally and vertically. Also choose the type of text wrapping you prefer. I like to get rid of the **Text Box > Internal Margins** and the **Line** margin of the text box as well. You can add a caption by selecting the graphic in the text box, hitting the right-arrow key, and hitting *Enter*. Then you can type in the text box below your image.

Just to give you an idea of what can be done, below is a graph figure from chapter 14 of my text. The data became complex and I decided to enclose each data set within a boundary area, then I deleted the data points themselves, color coding and retaining the areas to illustrate the overall trends.