CHAPTER 2

LEARNING TO USE CONTOURS

CHAPTER OVERVIEW

This chapter assumes that you are familiar with the key terms listed in the glossary and with the general procedure for using Contours that was discussed in Chapter 1. This chapter explains how to select Contours from the Finder and run it, then describes how to use Contours functions.

GETTING STARTED

You start Contours by double-clicking its icon from the Finder.

The first thing most users would like to do from here is to choose the `Open` command from the File menu. This command brings up the standard file dialog box, so you can choose the raster file you would like to plot.

After you select the required file, another dialog box prompts you for some information about your file and how you want your contour plot to display. You must specify :

- dimensions of your raster image
- the level of magnification of your image
- the number of contour levels used in calculations for your contour plot
- the origin or which part of your image you would like to plot
- the maximum and minimum data values in your entire plot

After you supply the required information, Contours defaults to displaying a linear contour plot of your raster file.
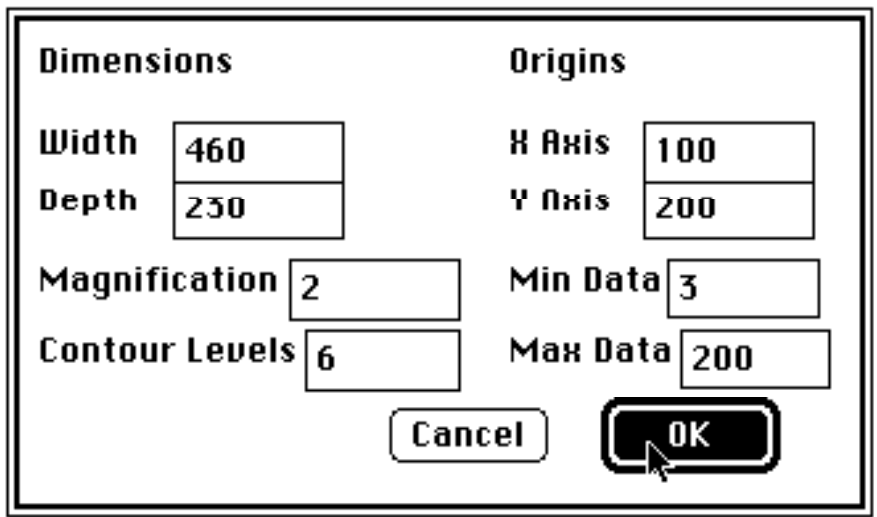
USING CONTOURS

Displaying Different Types of Plots

Once your desired contour plot is displayed on the screen, you can manipulate your contour plot in several ways. You can choose between the following three modes of displaying your contour plot:

Display Type	Function
Linear contour plot	The default mode. It displays the raster file as a set of contour lines.
Shaded plot	This displays various shaded intensities of your raster file. To switch to a shaded plot, choose the `Shade` option from the Plot menu.
3D surface plot	This creates a three-dimensional image. This mode is described later in this chapter.

A sample of a linear contour plot is shown in Figure 2.1. From the linear plot, which is the default display, you can easily convert the plot to a shaded plot, which displays various shaded intensities of your raster file. A sample of a shaded plot appears in Figure 2.2. To switch to a shaded plot, choose the `Shade` option under the Plot menu. The last mode of plotting is 3D surface plotting, described fully later in this chapter. Figure 2.3 shows a 3D surface plot.

FIGURE 2.1 GOES HERE

Figure 2.1. Sample Linear Contour
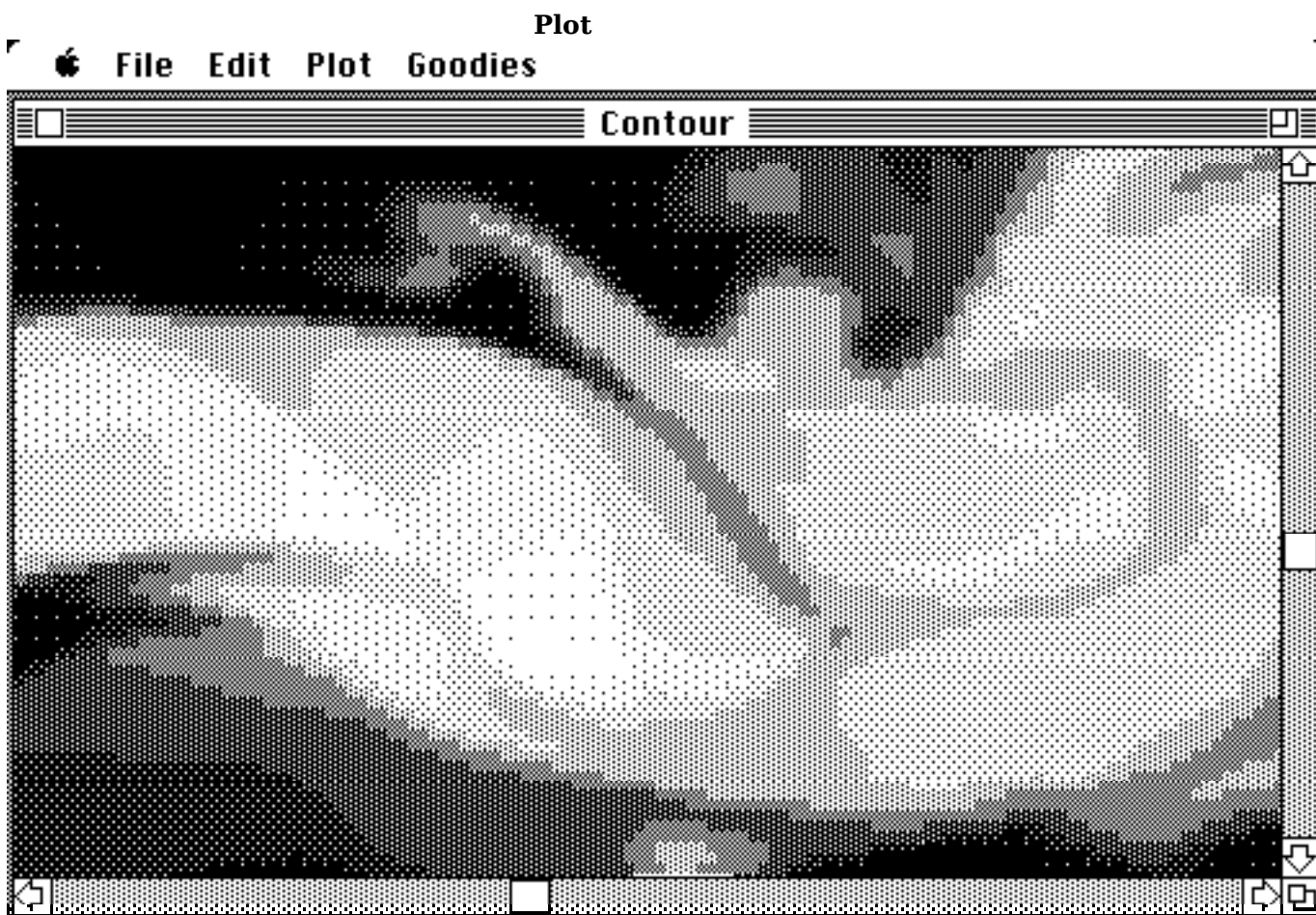
Plot
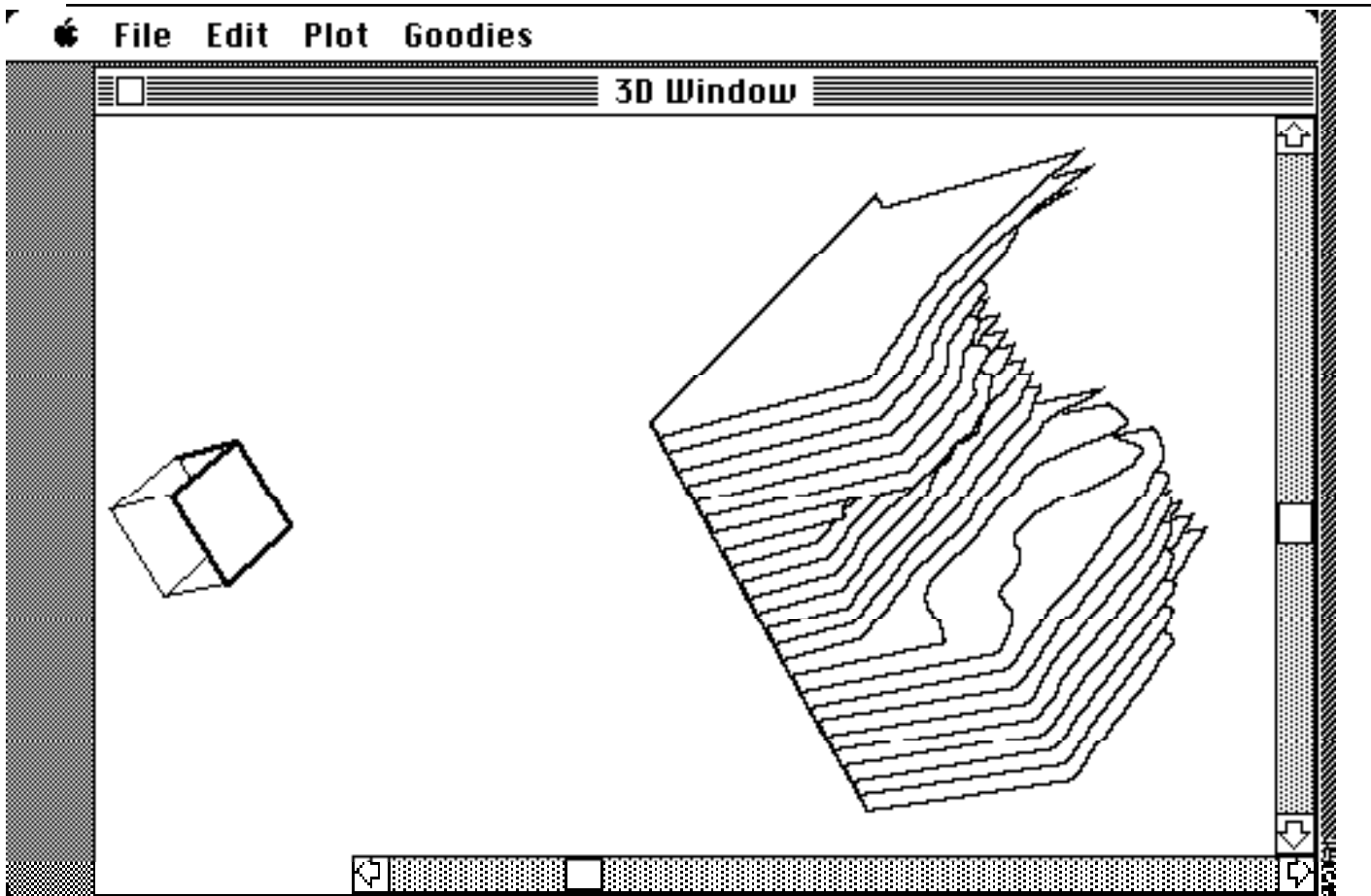

Figure 2.2 Sample Shaded Plot

Figure 2.3 Sample 3D Surface Plot with Rotation Cube at the Left

Using the linear and shade plotting modes, you can manipulate your images by applying several Contours commands. To use these commands:

1. Select a region on the contour plot. To do this, click and drag a rectangular region in the same manner as drawing programs like MacPaint or MacDraw. If you do not select a region, Contours assumes you have selected the entire raster image.

2. Choose a menu command (`Zoom In`, `Zoom Out`, `Copy`, `Print`, or `Save`.) Each of these commands is described in the following sections.

Zooming In and Out

After you select the area you want to zoom or expand, choose the `Zoom In` command from the Goodies menu.

To zoom out, click on a point in the contour plot on which you want to center your new reduced plot. Then choose the `Zoom Out` command from the Goodies menu. See Figure 2.4 for an example of how the selection appears as you choose `Zoom In`.

You can also zoom in and out by specifying the absolute magnification in the `Redraw` command located in the Goodies menu. This is described in detail in Chapter 3.
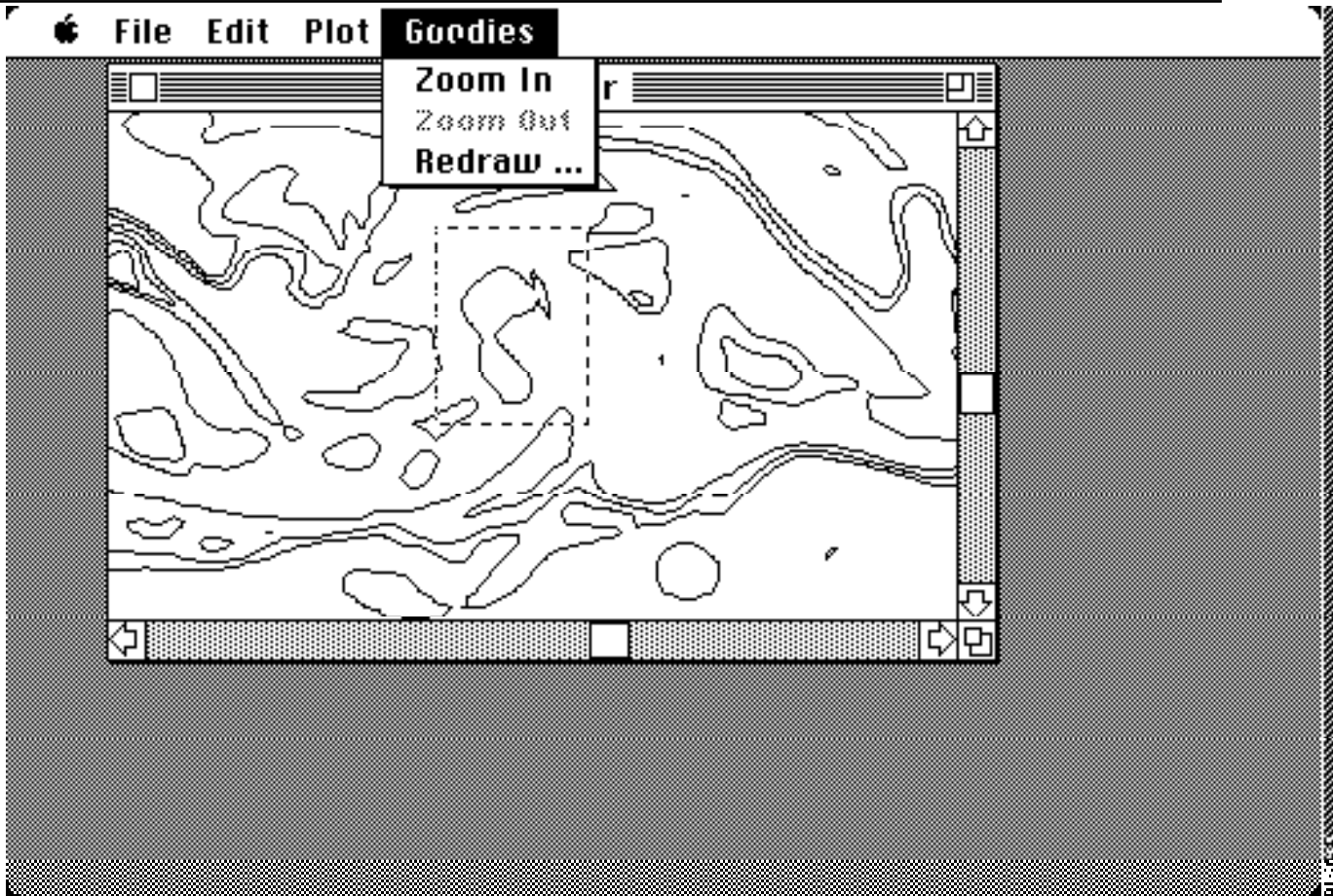
Figure 2.4. Using the Zoom In Command on a Selection of a Plot

Changing Default Contour Levels

Contours defaults to linearly interpolating the number of contour levels between the
minimum and maximum data, all specified by you in the initial dialog box. To change the
default settings, you can choose the `Contour Levels ...` command under the Goodies
menu. In this dialog box, you can either respecify the number of contour levels to be used
and the minimum and maximum data or you can type in a series of number, each
representing a contour level (under the user specified mode). The dialog box is shown
below :

Copying and Printing

You can copy a plot into the Clipboard or print parts or all of the contour plot.

Simply select the `Print` command on the File menu or `Copy` command of the File menu. If
you select a rectangle, note that under the File and Edit menu, that the `Print` and `Copy`
commands have changed to `Print Selection` and `Copy Selection`, respectively. This is
because you are now using the selection mode and you will now only print or copy the
selected region when executing its respective command. On the other hand, if you do not
select a rectangle, executing the `Print` or `Copy` command prints or copies the entire image.

In either mode (selection or entire image), Contours makes your printout occupy as much
of the paper as possible; the software automatically calculates the integral magnification

that optionally fits the plot on the paper.

Immediately after copying an image into the Clipboard, you can execute another program (such as MacPaint or MacDraw) and paste your image into that program's document. Alternatively, you can paste it into a Scrapbook.

Saving Your Image

To save your entire image (either a linear plot or a shaded plot) in PICT format choose the `Save As` command on the File menu. This file format can be read by many Macintosh programs these commercial packages such as Superpaint, CricketDraw, or MacDraw, providing greater capabilities to manipulate your image to your satisfaction. Be warned, however, that may function very slowly on matrices with huge dimensions and can consume a great deal of memory because a contour plot can be a very complex image to manipulate.

Correcting Errors

To correct an error in your input data, respecify the information you entered (when you executed the `Open` command on the File menu) and redraw your contour plot anytime when you are using either the linear or shade plotting mode. To prepare a revised contour, simply select the `Redraw` command under the Goodies menu. You will be presented with a dialog box similar to that you used to create the original plot, except you cannot respecify the dimensions of your raster file.

The `Redraw` command is also a good way to allow you to zoom in and out when you know exactly what order of magnitude you would like to use for the contour plot. By respecifying the number of contour levels and the minimum and maximum values in the raster file, you can concentrate on a particular small range of values in your raster file that you want to visualize and scrutinize in a more in-depth manner. Changing the origin in this dialog box is an alternative to using the scroll bars to move through data quickly.

Displaying Multiple Images

After you have created and saved several Contours plots, you can display them simply by selecting the Open command on the File menu. The Macintosh treats the images as regular files, overlaying the images as shown in Figure 2.5.
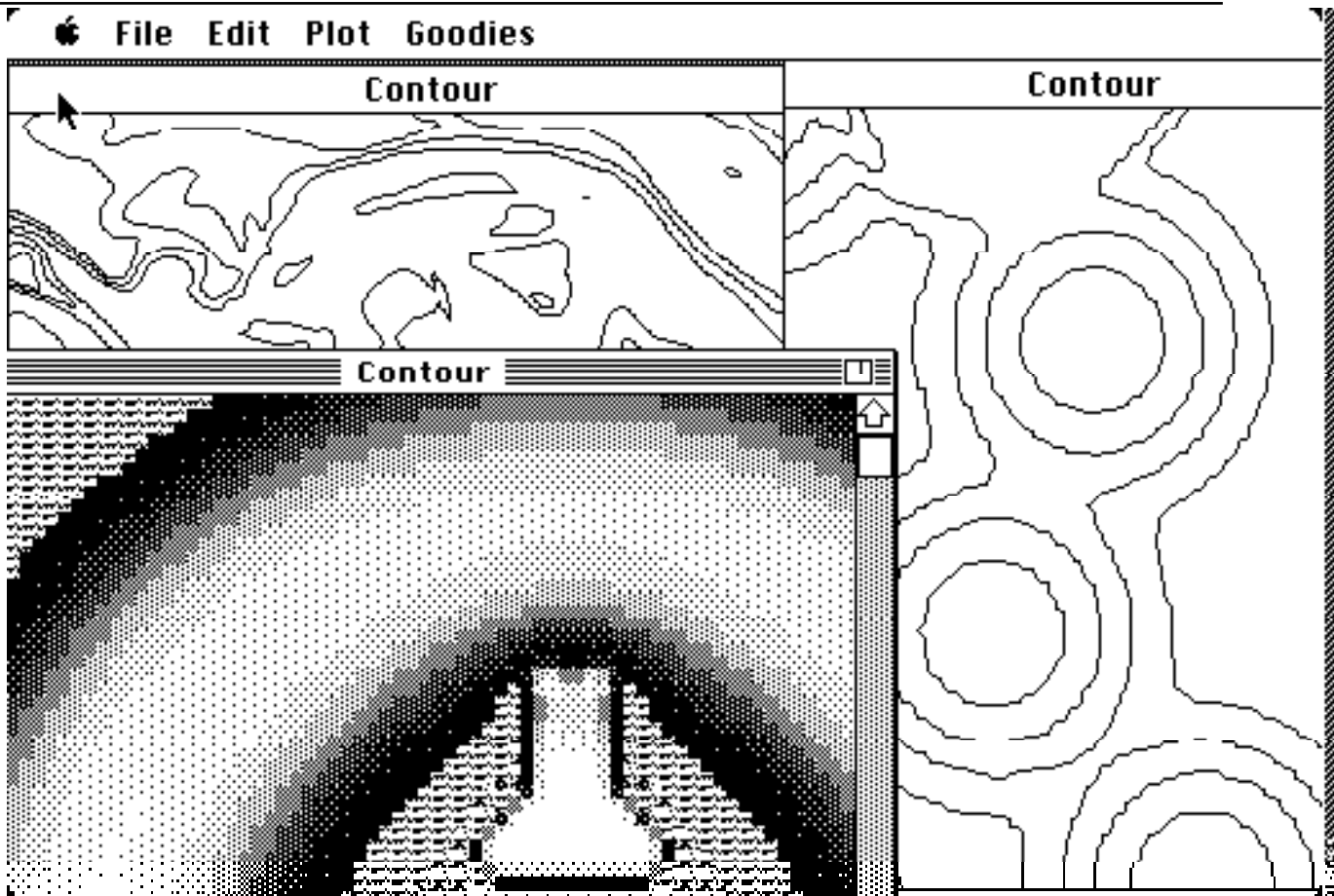
Figure 2.5. Displaying Multiple Images on the Screen

Displaying a 3D Image

To get a 3D surface plot of your image, follow this procedure:

1. Select a rectangle in the contour plot that you want to display in three dimensions.
2. Choose 3D on the Plot menu.
3. Immediately, a new window appears, and Contours creates a 3D surface plot of the section you selected.

When the plot is completed, you can see your plot from different angles by rotating it. On the extreme left of the 3D window, you can see three vertical scroll bars labeled x, y, and z. These scroll bars represent the angle of rotation of your image about their respective axes. They have a minimum value of zero degrees and a maximum of 360 degrees. On the center left of the screen you can see a small cube (refer again to Figure 2.3 to see the cube). To use the cube to rotate your image:

1. While holding the mouse button down, you can rotate the cube by dragging the mouse. Try moving the mouse vertically to rotate the cube about the horizontal axis.
2. Next, try moving the mouse horizontally to rotate the cube about the vertical axis.
3. Move the mouse diagonally to rotate the image on both axes simultaneously.

Rotate the cube to your desired orientation. When you release the mouse button, the actual 30 plot will be drawn in that orientation. The square drawn in bold lines represents the top surface of the cube.

The scroll bars scroll through the data points in your raster file. This allows you to see a 3D surface plot of regions neighboring your selected rectangle.

You can copy 3D images into the Clipboard just as you do in 2D (except you cannot select a 3D rectangle to copy into the Clipboard). However, you will not be able to print the 3D image from within Contours. To print your 3D image, paste it into a MacPaint file and then print it.

When you produce a 3D surface plot, you may notice that the command `Toggle axis` under the Plot menu is enabled. You can use it to toggle between the two perpendicular planes of the 30 plot. Experiment with this command until you get the best view.

CHAPTER SUMMARY

Start Contours by double-clicking its icon in the Finder. Open a raster file and specify the information about your image. There are three types of plots you can select from Contours: linear, shaded, or 3D. Linear is the default. To expand a portion of an image, use `Zoom In`. Choose `Zoom Out` to recenter the plot.

You can copy all or part of a Contour image with the `Copy` command; use `Print` to produce a hard copy of all or part of it. Save the image with `Save As`; you can then read a linear or shaded contour into another object-oriented program on the Macintosh.

Use the `Redraw` command to recreate an image if it contains errors.

You can create a three-dimensional plot of the contour with the `3D` command under the Plot menu.

The key points of this chapter are:

- Double-click the Contours icon in the Finder to start the program.
- Select a previously stored raster file with the `Open` command.
- After you specify the values for an image and click on `OK`, a linear contour is displayed. You can change this type of contour, zoom it, copy it, print it, or save it.
- Use the `Redraw` command to correct errors, or to zoom an image or change its perspective quickly.
- Rotating the cube manages the perspective of a 3D image.