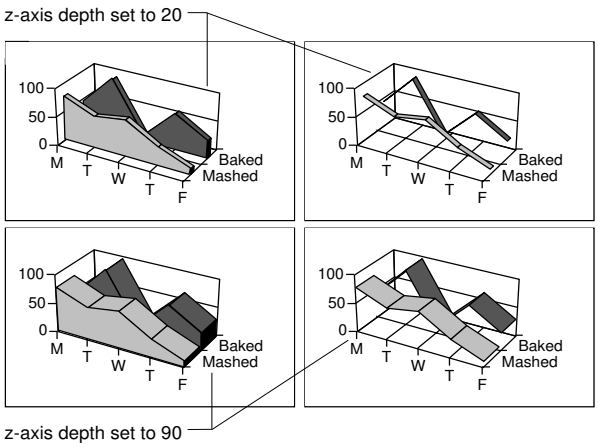
In 3D line or 3D area charts, you can control the depth of the lines or areas as shown below.



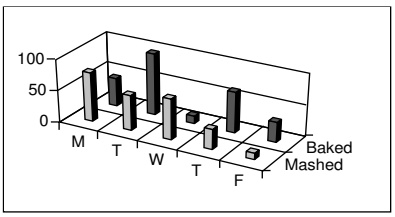
To change the setting, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Enter an integer between 1 and 100 in the Z-Axis text field. (For 3D bar charts you can also enter an integer in the X-Axis text field.) Click *Set* to see the chart change.

Drag the *Border Weight* slider knob to specify a new setting. To set a precise setting in points, type a number from 0 to 10 in the text field to the right of the slider.

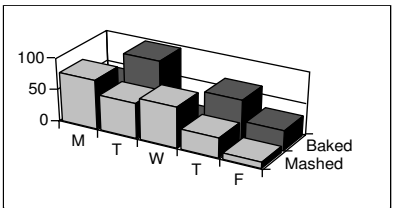
As you adjust the setting, the preview box shows how the line or border will look. Click *Set* to change the object on the spreadsheet.

Setting 3D Bar, Area, and Line Thickness

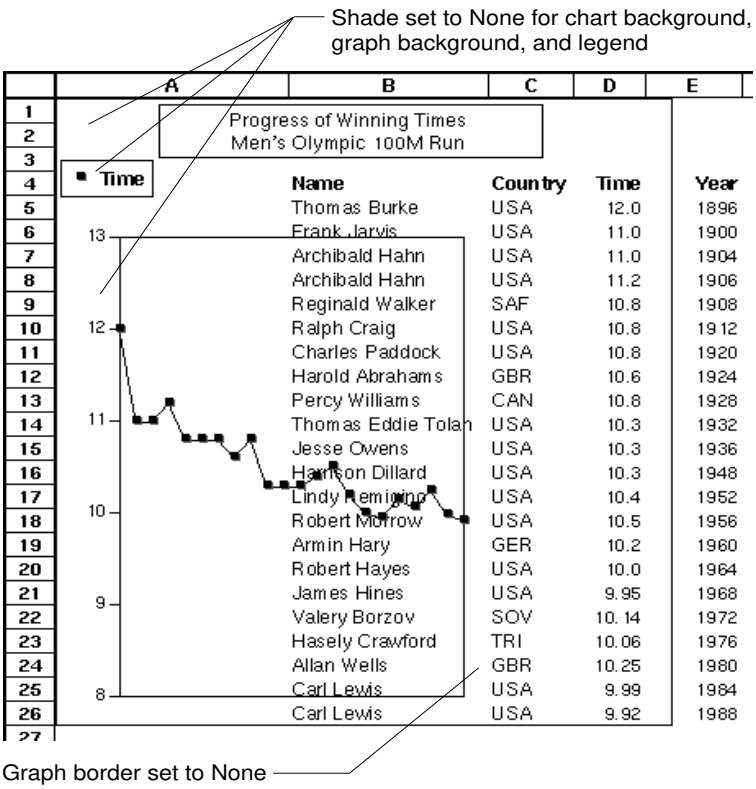
In 3D bar charts, you can control the width and depth of the bars as shown below.



x-axis and z-axis depths set to 20



x-axis and z-axis depths set to 90



	Name	Country	Time	Year
5	Thomas Burke	USA	12.0	1896
6	Frank Jarvis	USA	11.0	1900
7	Archibald Hahn	USA	11.0	1904
8	Archibald Hahn	USA	11.2	1906
9	Reginald Walker	SAF	10.8	1908
10	Ralph Craig	USA	10.8	1912
11	Charles Paddock	USA	10.8	1920
12	Harold Abrahams	GBR	10.6	1924
13	Percy Williams	CAN	10.8	1928
14	Thomas Eddie Tolan	USA	10.3	1932
15	Jesse Owens	USA	10.3	1936
16	Harrison Dillard	USA	10.3	1948
17	Lindy Remigino	USA	10.4	1952
18	Robert Morrow	USA	10.5	1956
19	Armin Hary	GER	10.2	1960
20	Robert Hayes	USA	10.0	1964
21	James Hines	USA	9.95	1968
22	Valery Borzov	SOV	10.14	1972
23	Hasely Crawford	TRI	10.06	1976
24	Allan Wells	GBR	10.25	1980
25	Carl Lewis	USA	9.99	1984
26	Carl Lewis	USA	9.92	1988

Changing Line or Border Width

To vary the width of an object's outline (its border), use the *Border Weight* slider in the Chart Inspector. As you increase the width, the border is drawn closer to the center of the object; the overall object stays the same size.

To change the width of a border or line, select it and choose *Color* from the Chart Inspector's pop-up list.

Raise the *Colors* panel by clicking the rims of the *Fill* or *Border* color wells or by clicking the *Color Panel* button. For information on working with the *Colors* panel, refer to your NEXTSTEP User's guide.

If a color well is activated (its rim will appear highlighted in white), then as you as scroll through the colors, the well will display how the shade will look. Click *Set* to change the selected chart object.

Remember that you can select many different parts of a chart. For information, refer to the "Selecting a Chart" section on page 144.

Making Parts of Objects Transparent

To make a chart object transparent so you can see through it, select it, and choose Color from the Chart Inspector's pop-up list. Deselect the *Fill* check box so that object's fill will disappear from view. Click *Set*.

To make the border of a chart or chart object transparent, deselect the *Border* check box so that object's border will disappear from view. Click *Set*.

The shade is set separately for the chart background, graph background, and the bars (or areas, wedges, or wireframe). So, to show the spreadsheet underneath completely (as shown below), you must make each part of the chart transparent.

the shade or transparency of each object's *border* (the outline) and the *fill* (the interior, or background) separately.

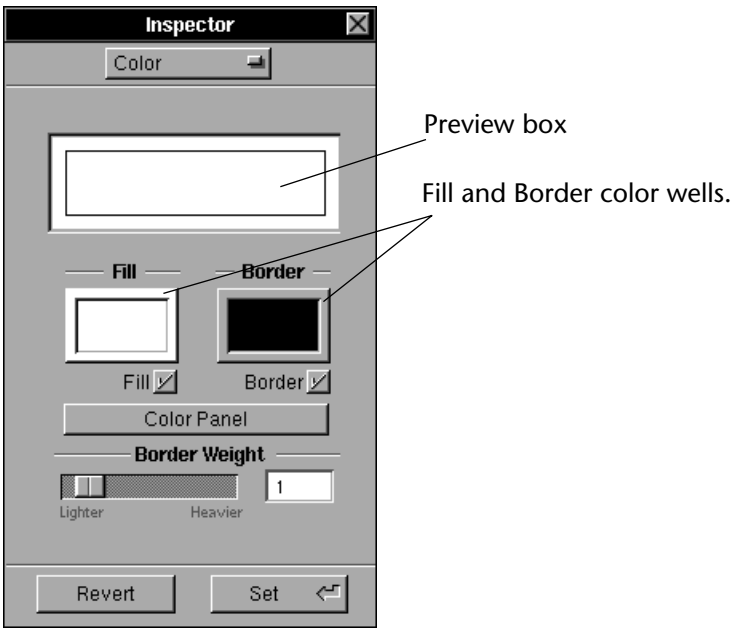
The following parts of charts and chart objects are adjustable:

- Lines and the symbols in high-low charts (these are treated as borders)
- Chart, graph, legend, and chart text frames or their backgrounds (frames are treated as borders)
- Borders and fills of bars, areas, pie wedges, 3D bars, 3D areas, 3D wireframes, and 3D lines
- Walls of 3D charts and the lines that border them

You can also change the *width* of lines, high-low chart symbols, and any of the borders noted above.

Applying Shades

To change the color of a chart or chart object, select it and choose *Color* from the Chart Inspector's pop-up list.

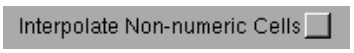


For more information, refer to the “Scatter Charts” section on page 229.

Interpolating Non-numeric Data

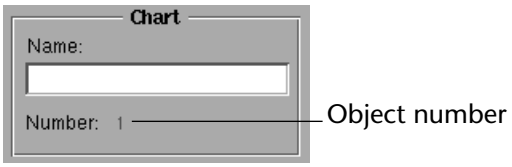
When you select data for your chart, you can include empty cells and cells that contain text. Normally, ParaSheet plots a value of zero in the chart for these non-numeric cells. However, in all types of charts except pie and high-low charts, ParaSheet can plot empty cells and text cells as nonzero values by interpolating between adjacent cells.

To use this option for a chart, select the chart and choose *View Options* from the Chart Inspector’s pop-up list. Select the *Interpolate Non-numeric Cells* check box if it's not already checked.



Naming a Chart

Every chart has an *object number*. Choose *Common* from the Chart Inspector’s pop-up list to see the object number of the selected chart. A chart’s object number is one convenient way to identify it. For example, you can use a chart’s object number to refer to it in a macro.



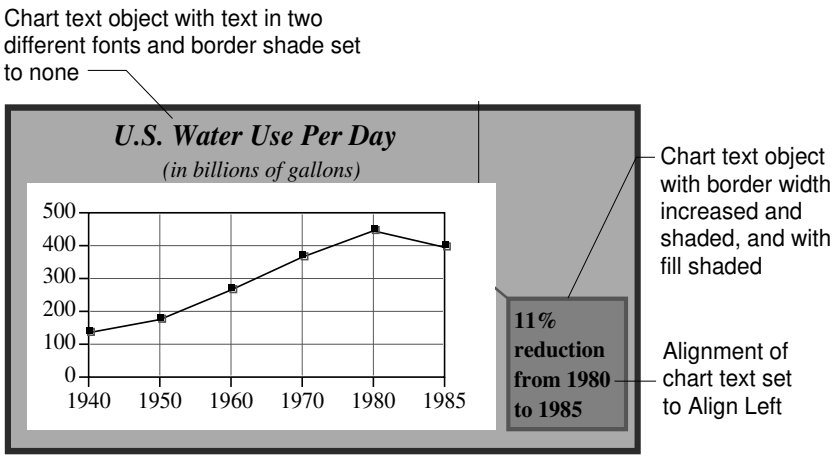
You can also give the chart a unique name. To name a chart, select it and choose *Common* from the Chart Inspector’s pop-up list. Type the name in the *Chart Name* text field (the name can have up to 255 characters) and click *Set*.

When you select a chart that has been named, its name will appear in the *Name* field. The name you give a chart does not appear on the chart itself and shouldn’t be confused with any chart text you might add.

Controlling Shading and Width

Color can be added to any chart or chart object. Colors can also be removed, thereby making objects transparent or invisible. You control

For example:



To remove the chart text object, select it, then choose *Remove Chart Text* from the Charts menu.

Plotting Data in Special Cases

The data you plot in a chart doesn't have to be a single range of cells. There are several unusual and useful ways to select, interpret, or plot data.

Plotting Multiple Selections

To make multiple selections for your chart data, select the first set of data. Then hold down the Shift key and make the second selection, and so forth. Make all your selections equal in number of cells, rows, or columns. Otherwise, your chart may not make sense.

Note *Unlike single selections, multiple selections require you to select the tick mark labels for the x-axis. Before making your other selections, first select the cells containing the labels you want to appear as the x-axis tick mark labels.*

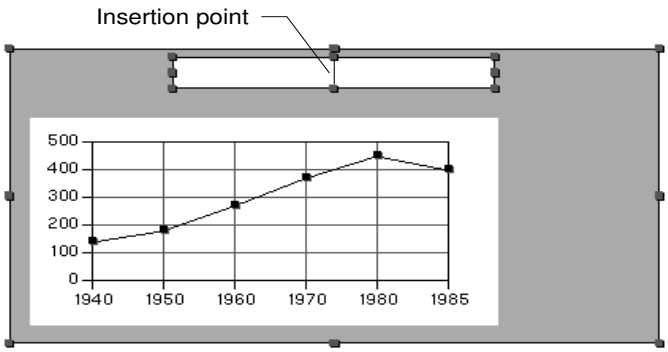
If you use multiple selections for a pie chart, the first selection contains the legend labels (which are also the Categories labels).

In a scatter chart, use the first selection for the first set of data with which the other data is paired. This is the data that would be adjacent to the selection if you used single selection.

Adding Chart Text

You can place chart text anywhere within the chart. Each chart text object you create is initially placed in the top center of the chart, but you can move and resize it.

To create a chart text object, select the chart, then choose *Add Chart Text* from the Charts menu. A rectangle appears in the top center of the chart with the insertion point in the center. Text is centered in the chart text area as you type into it. The chart text frame grows to accommodate more text if you exceed its initial size.

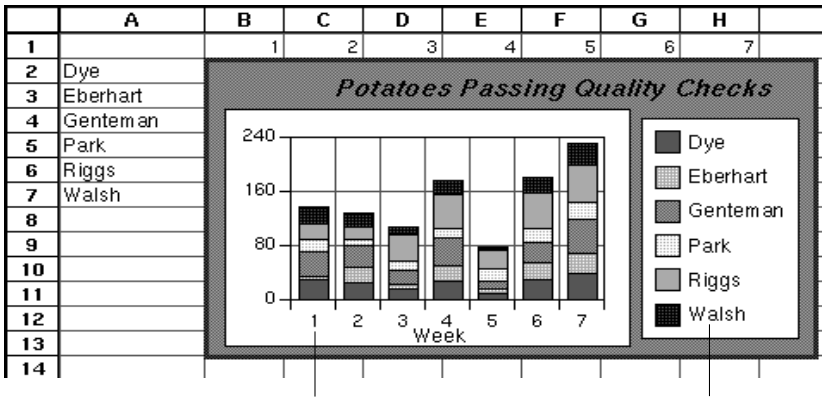


If you make a mistake when typing, use any of the standard editing techniques that work with text. A chart text object:

- Must stay within the boundaries of the chart.
- Is always elastic; that is, you cannot freeze its size.
- Is initially set to center its text.
- Is initially set to have no background (so that it is transparent).

Once you've entered the chart text, you can change the font or alignment with commands in the Font or Alignment submenus of the Format menu. You can also change its background shade, border shade, or border width through the Chart Inspector (see the "Controlling Shading and Width" section on page 161 for more information).

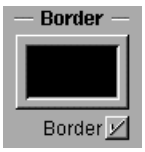
section on page 150 for more information.) No legend appears if there are no values in the appropriate cells.



To turn off the legend, select the chart and choose *Common* from the Chart Inspector's pop-up list. Then deselect the *Show Chart Legend* check box.

To move the legend, select it and drag it to a new location. To resize it, drag it by one of its handles . The legend contents are realigned as you resize. For more information, see the "Moving and Resizing" section on page 148.

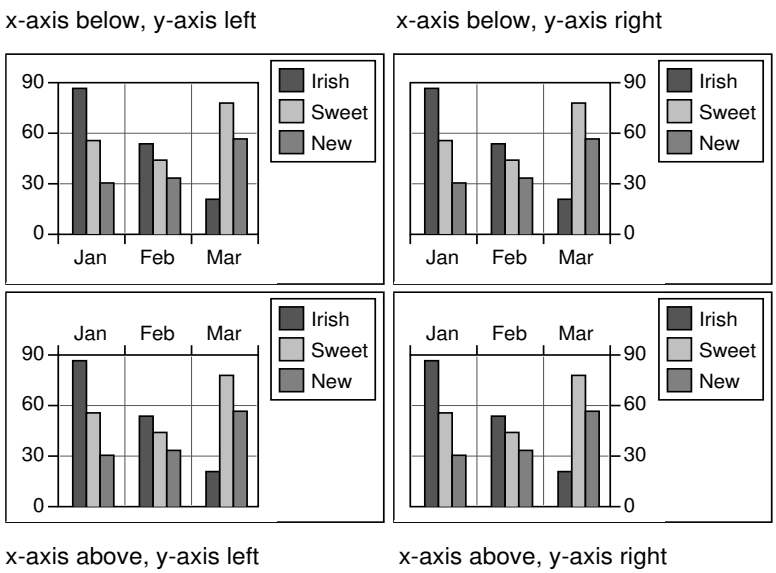
If you don't want to display the frame around the legend, select it and choose *Color* from the Chart Inspector's pop-up list.



Deselect the *Border* check box and click *Set*. The border around the legend will disappear from view.

For more on working with borders, see the "Controlling Shading and Width" section on page 161.

The figure below shows one chart with each the four possible setting combinations.



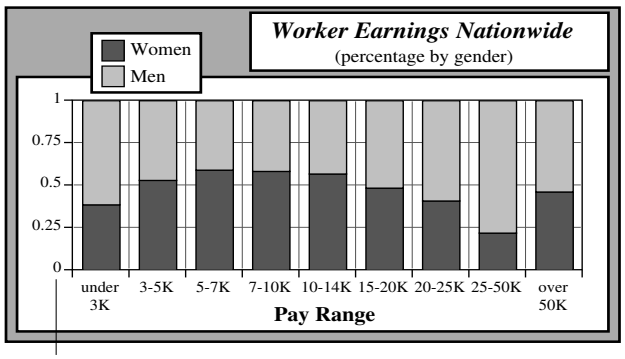
In horizontal bar or horizontal stacked bar charts, the x-axis and y-axis are reversed, so you can move the y-axis above or below, and the x-axis left or right. In all 3D charts, only the position of the y-axis (left or right) is movable.

Using Legends

The legend provided by ParaSheet automatically appears in the upper right corner of all charts except high-low or 3D wireframe charts. The legend identifies each set of data in the graph.

The legend consists of the values in the cells above the selected data or to the left of the data. If the x-axis is labeled with column titles, the row titles are used in the legend, and vice versa. (See the “Labeling the X-Axis”

For example:



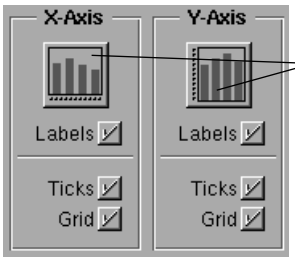
To display your tick mark labels as percentages, use multiple selection to select their cell entries. Then choose *Format Inspector* from the Format menu and click the *Percent* format you want.

Note *For effective use of percentage scaling, Automatic Calculation in the Marking subpanel of the Chart Inspector must be checked. Otherwise, the y-axis labels will not range from 0 to 1.*

Moving the Axes

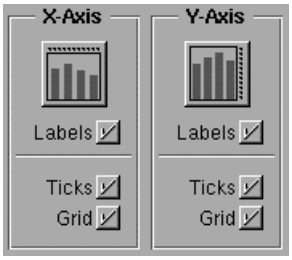
The y-axis of a chart is usually to the left of the plotted data, and the x-axis is usually below the data. To change the axes' positions, select the chart and choose *Marking* from the Chart Inspector's pop-up list.

In the *X Axis* section, click *above* or *below* the diagram to change the placement of the labels. In the *Y Axis* section, click to the *left* or the *right* of the diagram to change the placement of the labels.



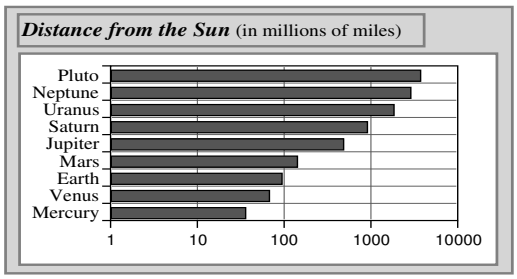
Click these diagrams to change label placement.

This setting places x-axis labels *below* and y-axis labels to the *left*.

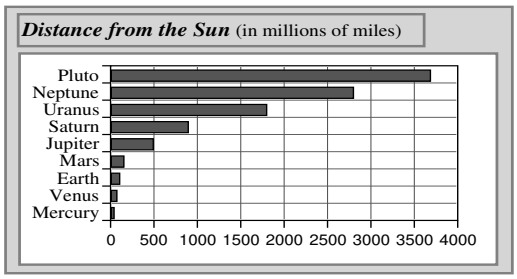


This setting places x-axis labels *above* and y-axis labels to the *right*.

figure below shows the same data plotted against linear and logarithmic scales.



Logarithmic scaling

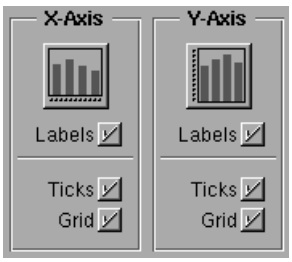


Linear scaling

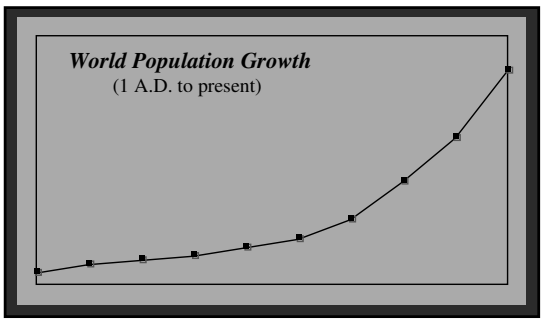
Note *In a chart with logarithmic scaling, the Start and End values of the axes must be positive numbers.*

Percentage scaling helps you see each value as a proportion of a whole, as in a pie chart. The sum of the values in each group of bars, points, or areas is assigned to 1. You can see each value's percentage at a glance.

To remove one of these features, select the chart and choose *Marking* from the Chart Inspector's pop-up list. Deselect *Ticks*, *Labels*, *Grid*, or all three.



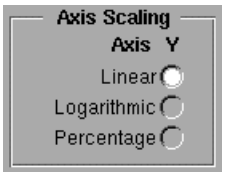
The figure below shows a chart with no tick mark labels, no tick marks, and no grid lines.



Using Logarithmic or Percentage Scaling

ParaSheet uses linear scaling when it initially draws a chart. However, you can draw charts using *logarithmic* or *percentage scaling*.

To change the type of scaling, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Click either *Logarithmic* or *Percentage*. Click *Set*, to redraw the chart in the new scale.



Logarithmic scaling increases the intervals between tick marks by powers of ten so that a wide range of values can appear in the same chart. The

To change a label's font type or size, select it in the chart or select the text of the cell in the input window. Use the commands in the Font submenu of the Format menu. For information on using the Font Panel, consult your NEXTSTEP User's Guide.

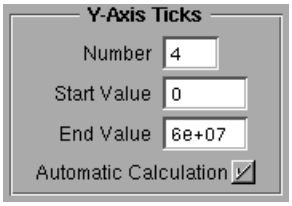
Note *Once you've changed a font in the chart making changes to the font in the cell no longer has an effect on the chart.*

Labeling the Y-Axis

In all chart types except pie charts, the *y-axis* tick marks are labeled with values at regular intervals. In scatter charts, both the x-axis and the y-axis are labeled with values. These values are initially automatically calculated from the data you're plotting.

To change the minimum (or start) value, maximum (or end) value, or number of tick marks on an axis, select the chart and choose *Marking* from the Chart Inspector's pop-up list.

First, deselect *Automatic Calculation* and enter the desired values for the *Number*, *Start Value*, and *End Value* of the ticks. Alternatively, check *Automatic Calculation* to set the values and number of tick marks automatically.

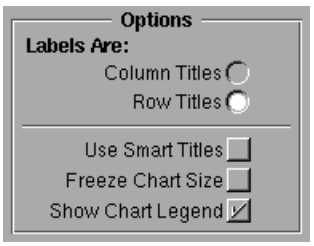


As with other types of tick mark labels, to change the font, select it and use the Font commands in the Format menu.

Removing Tick Marks, Labels, or Grid Lines

Tick marks, their labels (whether they are values or text), and the grid lines can be displayed or hidden. Each of these items can be controlled separately for each axis. They are all initially set to display.

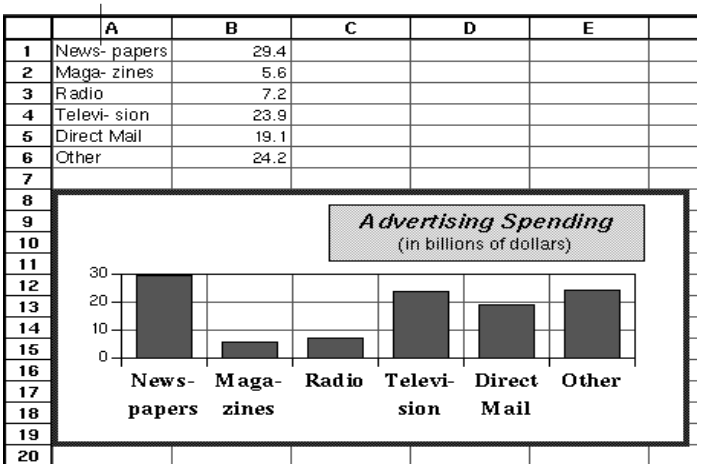
To change the source of x-axis labels, choose *Common* from the Chart inspector's pop-up list and check *Column Titles* or *Row Titles*.



Note *The dimensions of your data selection (or your selection of Column Titles or Row Titles) also determines how a pie chart is plotted. For example, if the selection has more rows than columns (or if Row Titles is selected), only the first column in your selection is included in the pie chart.*

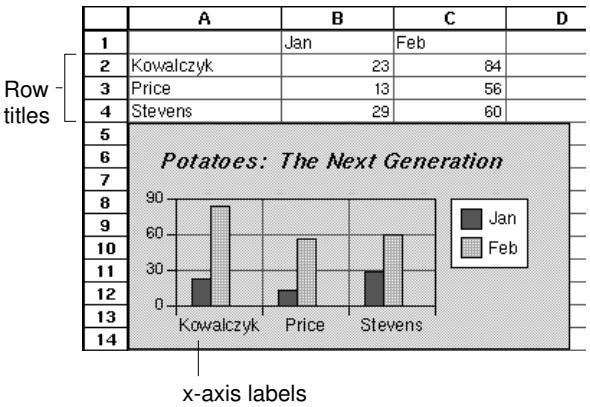
To change the text of the tick mark labels, edit the labels in the cells adjacent to your data. (Use the editing techniques described in Chapter 8, "Editing a Spreadsheet.") For example, if you want a label hyphenated, add a hyphen followed by a space as shown in the figure below:

Add a hyphen before a space to hyphenate a label



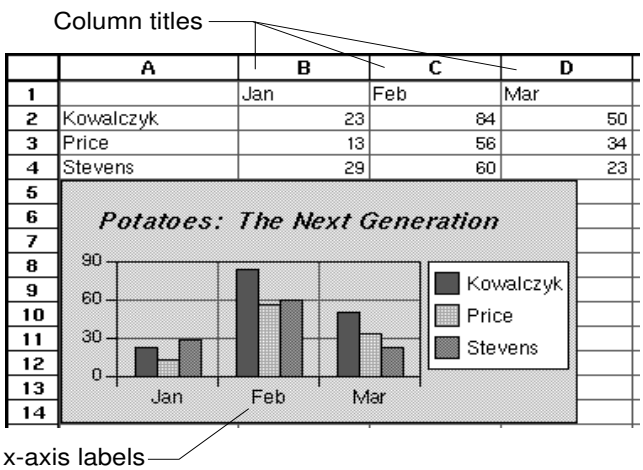
Shortcut *If you are trying to prevent your labels from wrapping, you can also resize the graph, as describing in the "Moving and Resizing" section on page 147. Or, you can select the label and make its font smaller.*

If the selection contains more rows than columns, the x-axis labels are the row titles from the *left* of the selection.



	A	B	C	D
1		Jan	Feb	
2	Kowalczyk	23	84	
3	Price	13	56	
4	Stevens	29	60	

If your selection contains more columns than rows or if the number of rows and columns is equal, the x-axis labels are the column titles from *above* the selection.

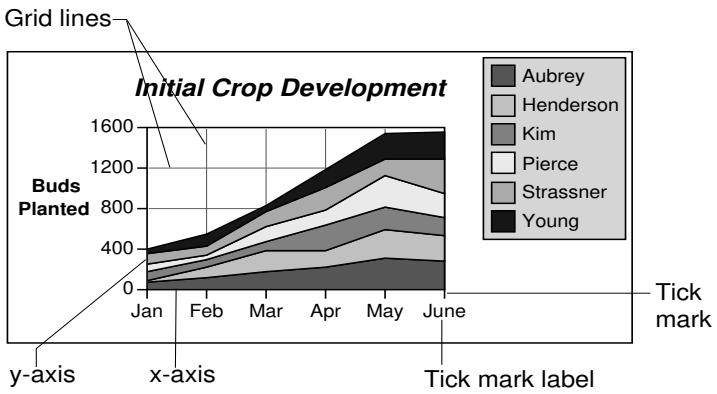


	A	B	C	D
1		Jan	Feb	Mar
2	Kowalczyk	23	84	50
3	Price	13	56	34
4	Stevens	29	60	23

Modifying a Chart's Axes

Most charts, with the exception of pie charts, use horizontal and vertical axes to plot the data. Reading the chart is made easier by the appearance of *tick marks* at regular intervals along each axis.

The *tick mark labels* are usually numeric values along the y-axis and text labels along the x-axis (and along the z-axis in 3D charts). *Grid lines* extend from the tick marks across the chart. This section explains how to control tick marks, their labels, the grid lines, and the placement of the axes themselves.



Labeling the X-Axis

The x-axis can be labeled for all types of charts with axes except scatter charts. For information on labeling scatter charts, see the "Labeling the Y-Axis" section on page 153.

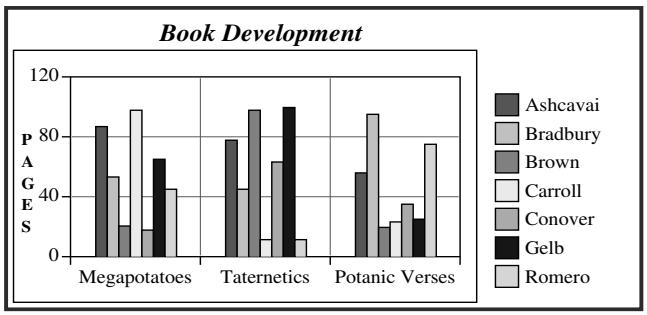
X-axis labels come from cells adjacent to your chart data selection. The number of rows versus the number of columns in the selection initially determines the cells ParaSheet searches for the labels.

Move the legend anywhere within the chart. A legend can overlap the graph, or be placed in the margin outside the graph.

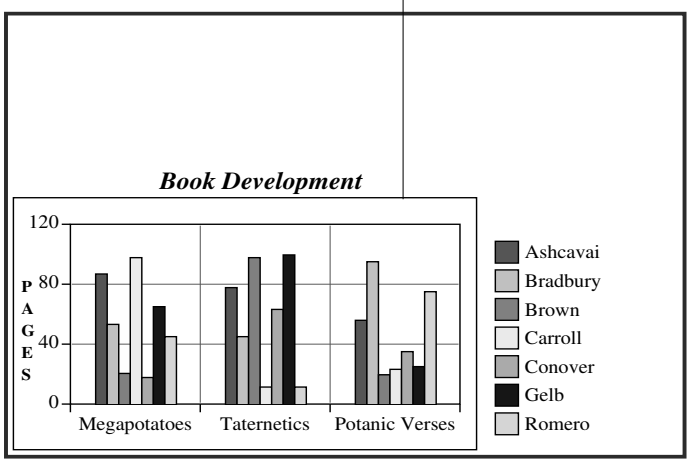
Freezing the Graph Size

You can freeze the size of the graph so it is not affected by changes in the size of the chart. This option is especially useful if you want to make the chart bigger to create more space for chart text within the chart.

To freeze the size of the graph, select the chart and choose *Common* from the Chart Inspector's pop-up list. Select the *Freeze Graph Size* check box. If you increase the size of the chart, the graph stays the same size, as shown below.

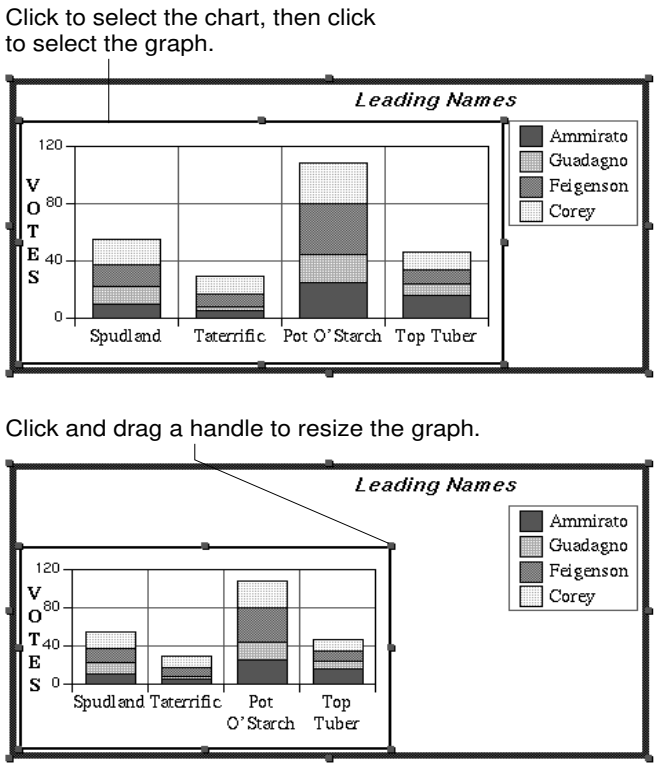


With Freeze Graph Size checked, increasing the size of the chart doesn't increase the size of the graph



Clicking and dragging data moves the entire chart instead of the graph. For instance, when you click within a shaded bar, area, or pie wedge, bubbles appear. If you click the wall of a 3D chart frame, the rotator handles prepare you for rotating the chart. Finally, if you click a tick mark label, it is selected as though you intend to change the format of the label. If any of these things happen, click and drag the graph frame or an unoccupied part of the graph to move the graph.

To resize the graph, select it, then drag it by one of its handles, as shown below.



Moving and Resizing the Legend

To change the position of the legend within the chart, first select the chart. Then click and drag any part of the legend except the labels. Or if you prefer, click the legend and then drag from any part of the border except the handles.

Use the Chart Inspector's pop-up list to choose between the *Common* (shown), *Marking*, *View Options* and *Color* panels. The contents of each panel vary according to the type of chart selected.

To modify the chart, use the control (button, slider, or text field) corresponding to the change you want to make, then click *Set*. If you want to undo changes to the inspector controls before you click *Set*, click *Revert*. The changes you specify in the Chart inspector won't show in the chart until you click *Set*.

Moving and Resizing

Charts and the elements within them can be moved or resized separately or as a group.

Moving and Resizing a Chart

To move a chart without selecting it first, click and drag it from anywhere on the border. When you release the mouse button, the chart is selected.

To move a selected chart, click and drag it from anywhere on the chart border (*except* one of the handles). The spreadsheet begins scrolling when you move a chart beyond the window's edge.

To move a chart in only one direction, hold down the Shift key as you drag. The movement is limited to the direction in which you move first (either vertically or horizontally).

To resize a selected chart, use the handles that surround it. When you drag the chart by a corner handle, the chart can change in *both* height and width as you drag. When you drag by a handle in the middle of the border, *either* the height or the width of the chart changes, depending upon the handle you use.

When you resize a chart, the graph expands or contracts with the size of the chart. If you don't want this to happen, see the "Freezing the Graph Size" section on page 149.

Moving and Resizing the Graph

To move the graph within the chart, first select the chart. Then click and drag any part of the graph that does not represent data. Or if you prefer, you can click the graph and then drag from any part of the border except the handles.

Note *Unlike cell selection on the spreadsheet, where whether you click with the Shift key or the Alternate key makes a difference, you can select multiple objects with either the Shift or Alternate keys.*

Deleting and Copying

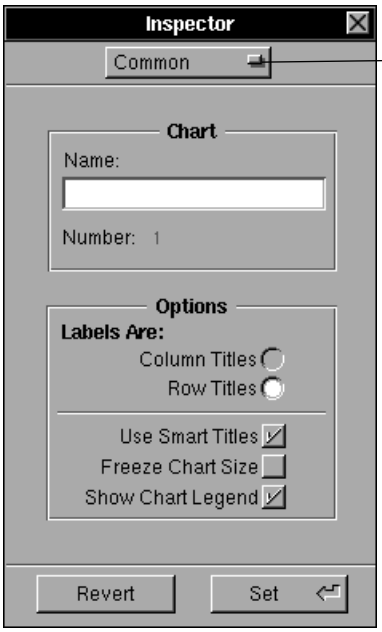
To delete a chart, select it so that it is completely highlighted and choose *Clear* from the Edit menu, or press the Backspace key.

To copy and paste a chart into another spreadsheet, select it so that it is completely highlighted and choose *Copy* from the Edit menu. Open the document where you wish to place it and choose *Paste*.

Using the Chart Inspector

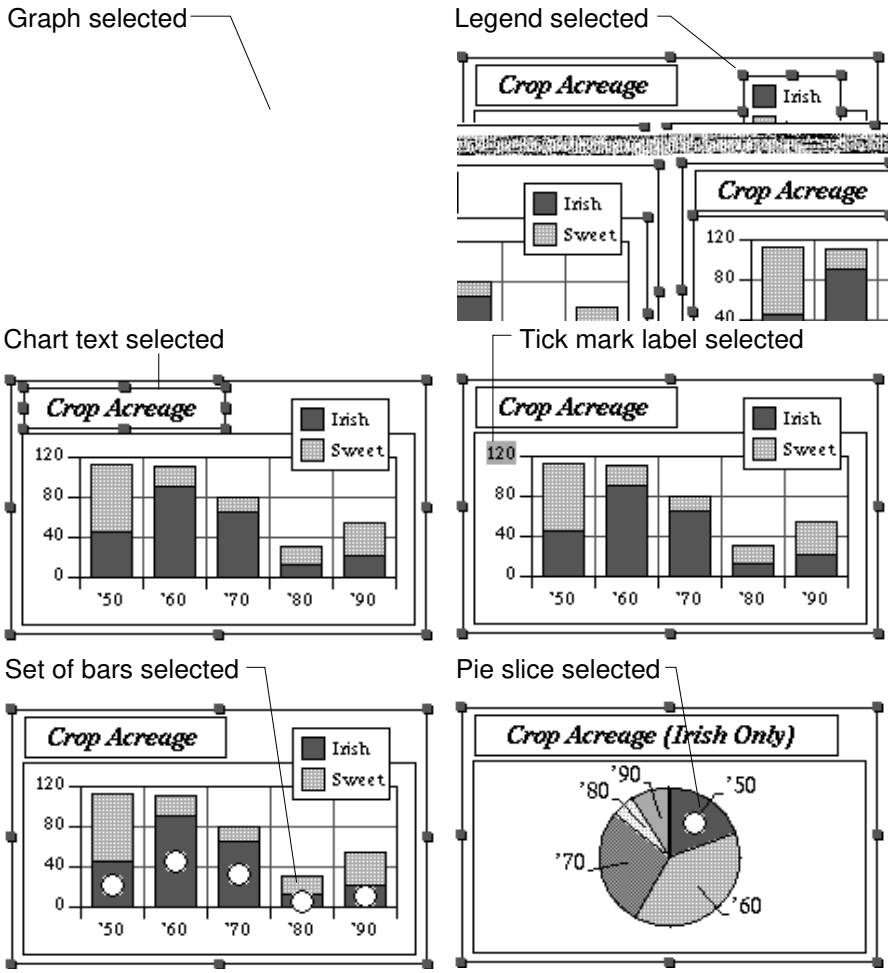
To modify a chart, select the chart, or an object within it (e.g., the legend, the graph, etc.) and choose *Inspector* from the Tools menu to raise the Chart Inspector.

For information on selection, refer the to “Selecting a Chart” section on page 144.



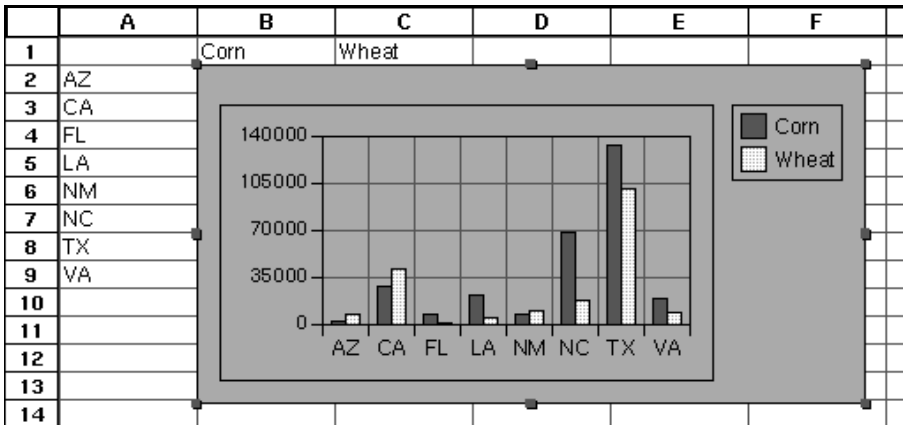
Use this pop-up list to switch between four different panels of modification options.

The figure below shows different parts of a chart selected.



Through *multiple selection*, you can select several items at the same time. For example, you may want to change the font of several tick mark labels at once. To use multiple selection, select the first item, then hold down the Shift or Alternate key while you select additional items. If you want to deselect an item (with the Shift or Alternate key still held down), click it again.

The chart appears over your data.

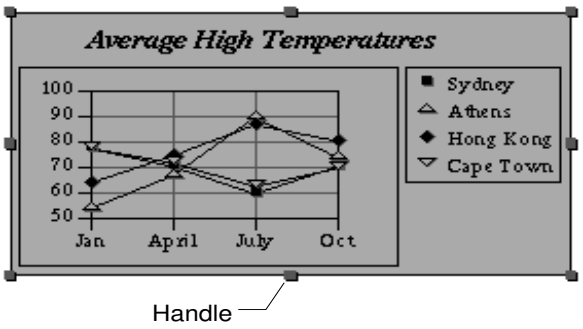


Charts can be selected, moved, resized, copied, deleted or modified in a variety of ways.

After creating a chart, you can change the chart type by simply clicking the buttons on the icon bar, with the chart still selected. The chart will automatically redraw. This is a good way to cycle through the different options and see which chart type most effectively communicates your data.

Selecting a Chart

A chart is selected when handles appear around its border and when it is highlighted.



To select a chart, click anywhere inside the chart. After the entire chart is selected, you can select individual parts by clicking.

Creating a Chart

To create a chart, select the data you want to include in the chart.

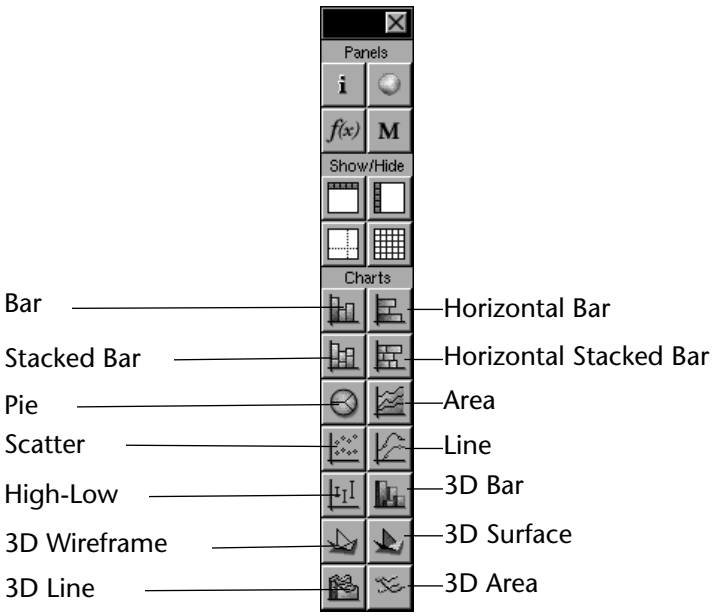
Note *Don't include any identifying text, such as column or row labels, in your selection. ParaSheet automatically uses your labels in the chart if they are immediately above or to the left of your data selection.*

Don't select surrounding text labels

	A	B	C	D
1		Corn	Wheat	
2	AZ	2000	8005	
3	CA	28500	41610	
4	FL	7560	1800	
5	LA	22365	5270	
6	NM	7595	10880	
7	NC	69000	18040	
8	TX	133750	100800	
9	VA	18900	9675	
10				

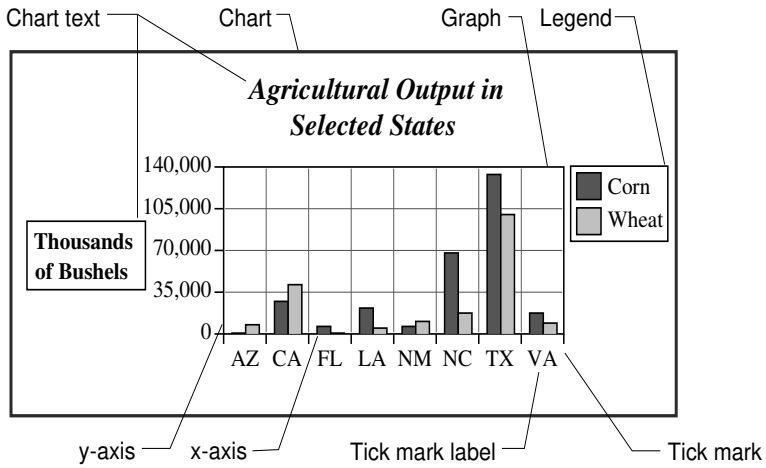
Select only the numeric data

Choose the type of chart you want by choosing the appropriate command from the Charts menu, or by clicking its icon on the icon bar.



Parts of a Chart

The figure below shows a typical ParaSheet bar chart.



When referring to parts of charts:

- The plotted data is called the *graph*.
- The entire *chart* includes the graph, the legend, and any chart text.
- A *legend* identifying the data automatically appears in the upper right corner, except in high-low charts and 3D wireframe charts.
- The *y-axis* is the vertical axis, and the x-axis is the horizontal axis. (These axes are reversed in horizontal bar charts.)
- The *z-axis* is the axis that gives the illusion of depth in 3D charts.
- *Tick marks* and *tick mark labels* along the axes are taken from the data itself (except in pie charts, which don't have axes).
- *Chart text* is a paragraph of text within the chart. Chart text appears only within a chart.
- A *data set* is one column or one row of data being plotted. For instance, a bar chart that shows a single set of bars in one shade is plotted from one row or column of data, or one data set, in the spreadsheet. A stacked bar chart represents at least two data sets, each in a different shade, that are plotted from at least two rows or columns of data.

Chapter 11

Charting Your Data

Although numbers are useful, they don't always tell the whole story. Sometimes you need to add charts to your spreadsheet to help clarify or emphasize the data. This chapter explains how to easily add charts to your spreadsheet and how to customize them for maximum effect.

What is a Chart?

A chart is a graph plotted with the selected data. ParaSheet draws 14 types of charts: bar, horizontal bar, stacked bar, horizontal stacked bar, pie, area, scatter, line, high-low, 3D bar, 3D wireframe, 3D surface, 3D line, and 3D area. Each chart type is described and illustrated in Chapter 19, "Charts."

Through charts, you can illustrate your data to maximum clarity and impact. Every ParaSheet chart is customizable, from resizing and positioning to adding color and labels.