Presentation Graphics on the IBM® PC AND COMPATIBLES

How to use Microsoft® Chart to create dazzling graphics for professional and corporate applications.

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Introduction

The business world floats on and is nurtured by a sea of information. Those who accurately interpret this information thrive and grow stronger; those who don't, drown.

Information, without understanding, is not only meaningless, it is counterproductive. You can use a chart to distill a large quantity of information and grasp the essence of a complex relationship. You can then pass this essence on to others, in such a manner that they, too, can understand it. You can also, by graphically editorializing the information, influence the beliefs and decisions of others.

In the past, producing meaningful charts was not only time-consuming and tedious, it also required an understanding of mathematics and graphic design. The combination of the Microsoft CHART program and the IBM PC computer relieves you of all such concerns; now anybody can create sophisticated charts and graphs.

A Bit of History

Representing numbers with pictures, though hardly a new concept, is not as old as one might think. The logic behind this method of communication can be traced to René Descartes, the seventeenth-century mathematician and philosopher who lent his name to the Cartesian coordinate system we currently use to plot charts. The idea wasn't exactly a box-office hit, as the civilized world was still dogmatically caught up in Aristotelian reasoning and proponents of "new" thoughts were often called upon to support them with their lives.

It was over a hundred years later, in the late 1700s, that several books were published referring to the use of charts in the study of "history, genealogy, chronology, and matters of finance." Things picked up after that and in 1915 a Joint Committee on Standards for Graphic Presentation was formed in the United States, with hopes of discovering standards that would lead to the more universal acceptance of graphic methods.

The books written on this subject since 1915 have been produced by and for statisticians, mathematicians, and the occasional graphic artist. This is a fine group of people and they have done some dandy things with lines

and numbers; but with the computer's invasion of the business world and with the development of software that puts the production of professional-looking graphs within easy reach, the average businessperson needs a book that presents graphics standards and techniques in a manner that is relevant and easy to understand, and that takes advantage of the computer and its available software.

What Can You Learn from This Book?

This book illustrates the standards upon which classical charting is based, and shows you how to use the powerful formatting capabilities of Microsoft CHART to present your information dramatically and convincingly.

Using the proper tool makes any job easier; but it does not ensure that the job will be done properly or that the finished product will effectively represent the craftsman's original intentions. The combination of the Microsoft CHART program and the IBM PC is an amazing tool for creating graphs and charts from statistical information; but the fact that it is available doesn't mean we are about to be flooded with skillfully created graphic art that will effectively prove its point. After all, the pen existed for some time before Leonardo da Vinci sketched the Mona Lisa. In the world of business graphics, creative ability and care can still make the difference between crystal clarity and confusion.

I can't teach creative ability, but I can show you examples of it and explain how to emulate them. I can also explain the standards of graphic presentation that have evolved over the years, and demonstrate methods of meeting these standards with the assistance of a computer.

For the most part, I assume in my discussions that you have an IBM PC and the CHART program in front of you as you read. Even if you don't, the screen displays and detailed descriptions will give you a good grasp of how to create business graphs. As you work your way through the chapters, bear in mind that all illustrations were created on the IBM PC. Here, briefly, is what I'll be covering:

Chapter 1 explains the basic standards that apply to the creation of graphs in any format. The information contained in this chapter is particularly important when you start modifying and enhancing charts.

Chapter 2 gives you a quick tour of Microsoft's CHART program. You will create a simple column chart and then convert it to a pie chart. The basic terms and techniques used throughout the remainder of the book are introduced in this chapter.

Chapters 3 through 8 illustrate and explain the standards that apply to column, bar, line, pie, area, and scatter charts, and lead you through the creation of several examples of each format using the IBM PC.

Chapter 9 introduces you to some of the output devices that can be used to produce the charts you create, and presents a colorful collection of charts that illustrate the power of the CHART program.

The appendix provides a detailed description of the menu commands available in Microsoft's CHART program.

And now, let's start with the basics, by taking a look at what separates the good charts from the bad.

Table of Contents

Graphing Techniques

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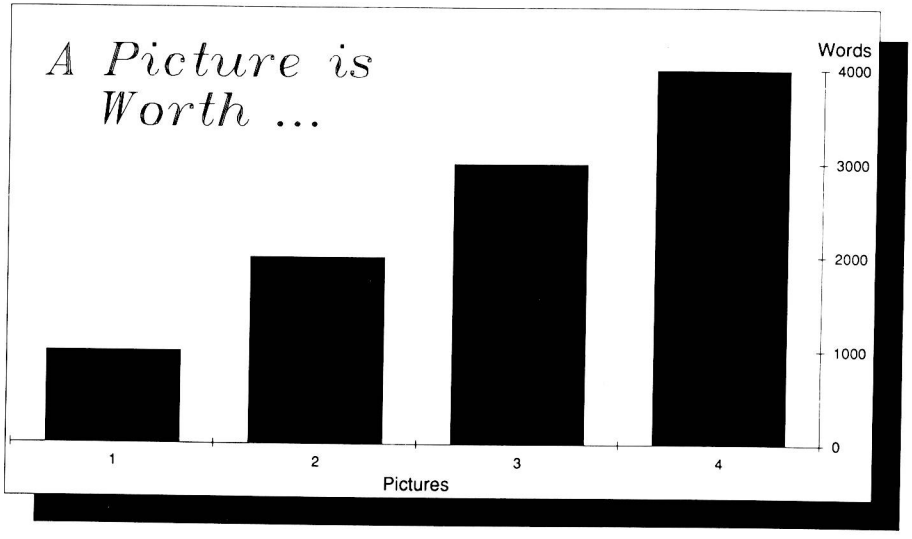
Although the human mind can comprehend a visual representation far faster, and retain it far longer, than the words and numbers required to adequately explain the same relationship, the shopworn statement illustrated by this graph is no longer totally accurate.



In this age of instant gratification the average person doesn't really want to read a thousand words: It is probably more realistic to say that a picture is worth ten minutes of discussion.

This book will show you how to use the IBM PC and the Microsoft CHART program to create picture-perfect presentation graphics that succinctly express your point of view. You will learn to use the power of the PC to compare innumerable variations on the same graphic theme. Once you select a specific style, you can play around with it on the screen—adding or editing the title, subtitle, labels, lines, arrows, and so on—and then either store it on a disk for future use or send it to a reproduction device, such as a printer, plotter, videotape recorder, or slide camera.

But, whether you are creating charts by hand or with the assistance of a computer, there are standards that should be kept in mind, so before studying the CHART program, let's first have a look at just what a chart is, and how it can most effectively convey information.

CREATING EFFECTIVE GRAPHS

To be effective, a graph must capture and hold the attention of your intended audience while clearly communicating your message. The probability of this happening is increased if you plan and prepare your graph in a logical manner consistent with established standards. This chapter describes preparation techniques you can apply to all graphs; subsequent chapters deal with techniques specific to each type of graph that you can create with the Microsoft CHART program.

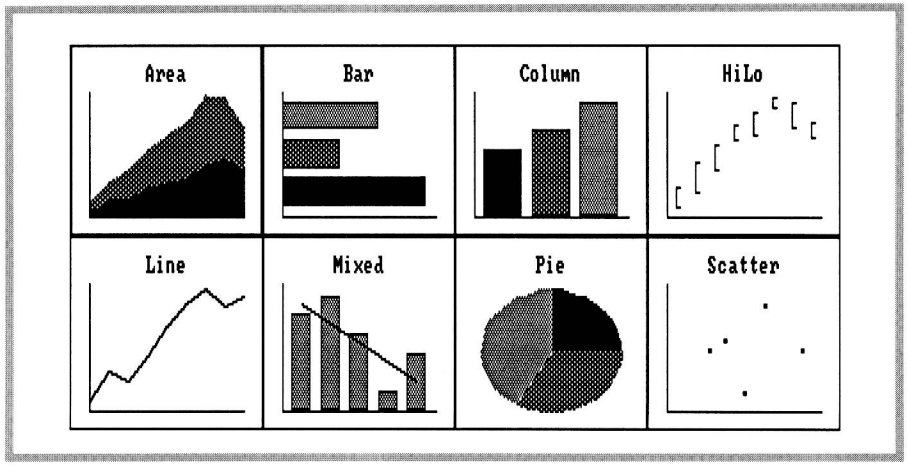
Step One: Identify the Point

A graph is an editorialized comment, weighted heavily by your opinion or point of view. The first step toward creating an effective graph is deciding precisely what point you would like to prove or which elusive fact you would like to force out into the open. The same information can be used to create a variety of graphs with implications varying from positive to negative to nonsense. Just as your tone of voice and body language can influence those who hear and see you, so can your choice of scale, shading, and color affect those who see your graphs.

The information you choose to leave out of a report can sometimes be just as influential as that which you include. I remember an article released by the Soviet news agency Tass reporting on the outcome of an international sporting event. The valiant home team, it stated, had finished second, while the American Imperialists had ended up in the next to last position. The significant fact that was missing, from the point of view of the American Imperialists, was that there were only two teams in the competition.

Step Two: Select a Format

Once you determine the purpose of your graph, the next step is to select an appropriate format. This selection is based on an evaluation of the type of data available, the presentation medium to be used (such as book, magazine, slide, or overhead projection), and the size and experience level of the intended audience. Microsoft CHART will automatically produce charts in each of the styles shown here. You can then enhance the chart to appeal to the intended audience.



For example, a presentation designed for people who have a basic understanding of your subject and who are comfortable interpreting graphs can feature complex multiline graphs pointing out subtle variations that might otherwise escape detection. Scatter graphs, logarithmic scales, and exotic mutations of the standard formats, appropriate for this audience, would not

be as meaningful to a less sophisticated group. On the other hand, a presentation designed for visitors who may have only a casual interest in your subject would be better expressed with pie, bar, and column charts.

The graphs prepared for an informal presentation to six or eight people could be effectively displayed on the computer screen in slide-show format. The same display for 40 or 50 people, or for a presentation in a remote location, might require a show with real slides—actual photographs of the computer's display that could be projected onto a large screen for easy viewing.

Step Three: Check for Accuracy

The last stage in this creative effort is simply sitting down and calmly looking your graphs over—even if you are late for the meeting at which you plan to display them. Check the spelling, punctuation, capitalization, and overall appearance; but most important, check for numeric accuracy! This is probably the only exclamation point I will use in this book, but the statement warrants it. It amazes me that some people spend days gathering numbers and then don't bother to make sure the right numbers actually make their way into a report.

Several years ago I witnessed an excellent example of what can happen when numbers aren't properly reviewed. I dropped in for an early morning cup of coffee with a friend who was an executive with a major West Coast chain of retail stores. The stock market had been open for several hours on the East Coast and there was alarm and puzzlement evident among the early arriving employees of my friend's company regarding the action of the company's stock. Its steady upward creep had been interrupted that morning by a seemingly inexplicable plunge of several points. The cause was discovered when a reporter called to confirm the figures released the previous day in a preliminary annual report. It turned out that during preparation of the report, a copy of the previous year's report had been given to a staff member with instructions to "make it just like this." The accompanying list of updated numbers disappeared and the instruction was followed too literally. The report, which was identical to the previous year's, was approved by three people, each of whom should have spotted the radical reversal in the company's growth trend but didn't. Fortunately, the company's recovery was as rapid as their fall and no lasting harm was done—other than to a few egos.

AVAILABLE FORMATS

There is a variety of formats available for presenting quantitative data (numbers) to either prove your point or discover just what your point is. In the next several chapters I'll discuss standards that apply to column and bar charts; line, high-low, area, and scatter graphs; and pie charts. You can follow along as I use Microsoft CHART on the IBM PC to create an example of each basic format and modify these examples into a few not-so-basic formats.

Before we get into the standards and techniques specific to each format, here are a few general guidelines that apply to all formats.

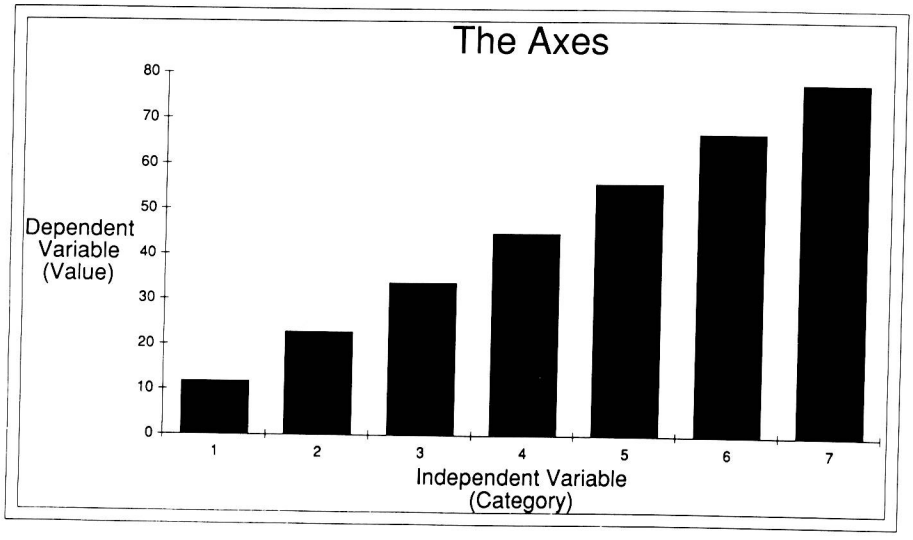
STANDARDS

In 1915, the Joint Committee on Standards for Graphic Presentation was convened with the objective of establishing standards for the creation of graphs. The passage of time has eroded the standards they established, and changes in taste and methods of production have further modified these standards into a softer set of guidelines.

Microsoft's CHART program adheres pretty closely to these guidelines when creating a basic graph in any format. Since you may want to embellish or refine these basic graphs, I will review and explain the standards. The computer will not force you to stay within these guidelines, but doing so will make your graphs more credible and comprehendible to the people who read and interpret them.

Axes

There are two types of variables connected with a graph: an independent variable and a dependent variable, referred to in the CHART program as the category and the value. The program automatically assigns each variable you enter to the appropriate axis and plots the points. Which variable goes on which axis is determined by the type of graph you instruct CHART to create.



Column, line, high-low, and area graphs mark the categories (independent variables) along the horizontal axis. This axis is known as the X-axis or abscissa. The values (dependent variables) are marked along the vertical or Y-axis, known as the ordinate.

The bar chart reverses this relationship, measuring the categories along the vertical axis and the values along the horizontal axis. The pie chart and scatter graph have their own methods of expressing this relationship, which I will discuss when describing these formats.

When you enter a series of numbers and specify a chart type, CHART automatically establishes the relationship between the value and category axes, and plots the points within seconds. Doing the same thing by hand would be tedious and time-consuming, as I will demonstrate with a simple example. After you have created a few graphs using CHART, you will begin to appreciate the power that is at your fingertips.

Suppose you want to show how the median income for families in the United States changed between 1955 and 1980 and you have looked the following information up in the *Statistical Abstract of the United States:*

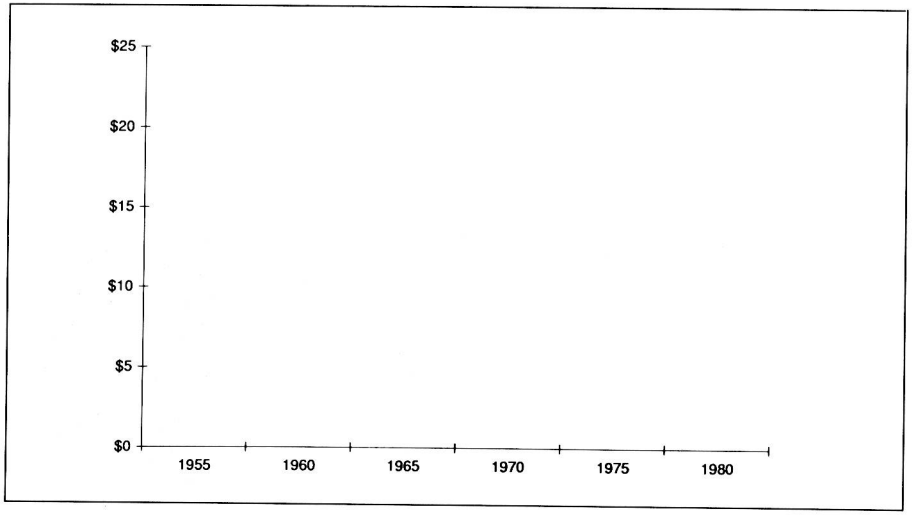
Year	1955	1960	1965	1970	1975	1980
Income	4599	5873	7330	10516	14867	23141

The information in this table is an example of the independent and dependent variables just discussed. The variables are arranged in pairs: a year (the independent variable) and a median income for that year (the dependent variable). Pairs of related numbers such as these are known as *data points;* each pair is one data point in that, as you will see shortly, the plotting of that pair produces one point on the chart. The group of data points required to plot one line, or one set of bars or columns, on a chart is called a *series.* This particular series expresses a change in the median income for families over a period of time.

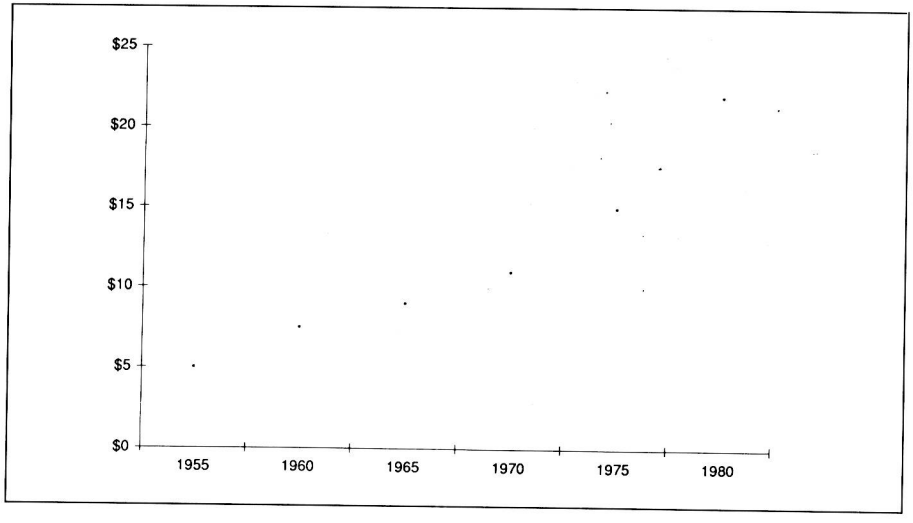
The type of information best expressed by each graphic format is discussed in the chapter about that format. For now, simply accept the fact that a change in value over a series of equal time periods can be properly expressed with either a column chart or a line graph. Since there are only six data points to plot in our example, a column chart will adequately illustrate the change; if there were several dozen points, a line graph should be used since a column chart would be too crowded.

To present your data as a column chart, you follow these steps:

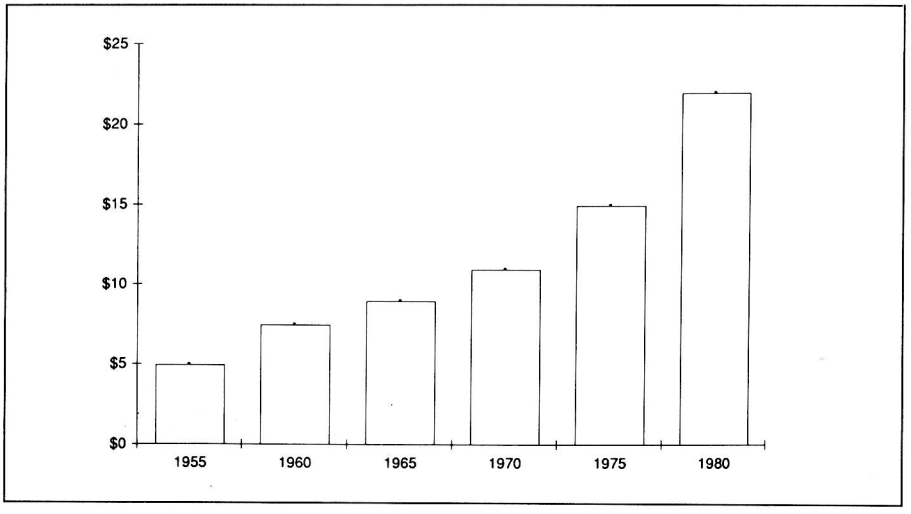
- Lay out the horizontal and vertical axes.
- Create a category scale along the horizontal axis by making one mark (called a tick) for each of the years to be plotted.



- Mark the increments for the dollar values along the vertical axis, starting with zero at the bottom and measuring off equal increments up to a value just higher than the largest dependent variable. Since the range of values for this variable is $4,599 to $23,141, increments of $5,000 extending up the scale to $25,000 would be appropriate.
- Plot the value of the dependent variable (income) that corresponds to each increment of the independent variable (year); that is, put a mark within the plot area at the point of intersection of imaginary lines drawn horizontally from the income value on the vertical axis and vertically from the year on the horizontal axis.



- Draw a column for each year, extending it upward from the horizontal axis to the point you have just plotted. (To create a line graph rather than a column chart, simply connect the plotted points with a series of straight lines, rather than drawing columns.)



Scaling the axes

Take care when selecting units of measurement and the distances between them for both axes. As you can see in these different plottings of the same values, it is possible to completely change the apparent value of a graph by selecting different scales and distances.