

Art tasks

Many kinds of books do not require artwork. However for those that do, one of the drawbacks of older reproduction processes is that it is difficult and costly to add graphics to books. Two things have dramatically changed that picture in recent years: digital clip art and desktop scanners. Both make it much easier to add visual content to your book.

Clip art

Clip art is an old-fashioned term that gets its name from a class of books that were published for graphic designers. Designers would page through the books and cut (or “clip”) out any images that they wanted to use. They would then take the clip art and glue it into their page layout. Today’s computer clip art is just an electronic version of book clip art. Clip art ranges from the amateur and unimaginative to funky collections of avant-garde drawings. Clip art books were typically used in newspaper advertising to give layout artists easy access to seasonal images, borders, and space fillers. Electronic clip art is now used extensively in business for livening up corporate presentations.

If you want to insert a clip art image in a document, go to the “Insert” menu, choose “Picture” and then “Clip Art”. Word will then show you a selection of clip art images that you can select and place in your document. You may have access to additional clip art on your Word or Office program CD-ROMs.

I'm not a big fan of clip art. It seems to me that it's a one-size-fits-all solution to a very individual problem. If you do choose to use clip art, I suggest you consider your choices carefully. Keep in mind that everyone who gets a Windows computer gets access to some of the same clip art as you, and some of that clip art is grossly overused. For example, the "screen beans" that you see everywhere (once you first notice them) are part of the standard clip art that comes with Word.

Figure 17 – A screen bean



There are also more original ways of using clip art than simply placing it in the document. You may take an image and use only part of it or combine it with other images to form a new image. You may also find non-traditional fonts that contain symbols or drawings that you choose to use at regular sequences within your book. For example, you might insert a dingbat (see below) to mark the close of each chapter.

Figure 18 – A dingbat from an Adobe font called Giddyap Thangs



Desktop scanning

A scanner is basically a conversion device. It takes a drawing or a photograph on paper and converts it into a computer file that you can manipulate and place into a document for printing. Desktop scanners connect to a computer and allow you to bring scanned images into your document with relative ease. Very capable scanners are now available for under \$300.

Figure 19 – A desktop scanner



Resolution

The resolution of a scanner describes its ability to “see” detail and also shades of gray or color. A good desktop scanner can capture files with up to 600 dots per inch (dpi) of detail and up to 36 bits of tonal information.

“Dots per inch” is the term used to describe how much information a scanner can capture in a linear inch. A 600-dpi scanner can capture up to 600 data samples (i.e., dots or pixels³⁹) in every inch. This is a lot of information, and it can translate into

³⁹ A pixel is a contraction of the words “picture” and “element” and refers to the smallest amount of information that a scanner can capture. A 600-dpi scanner captures 600 such pixels in a linear inch. Each pixel may represent black or white or a variety of colors or shades of gray.

very large files depending on the size of the original as well as the amount of tonal information required.

“Bits” or more accurately “bits per pixel” refers to the amount of tonal information that is captured for each data sample. A 36-bit scanner captures 36-bits of information for each data sample.

Therefore, resolution really has two dimensions. One dimension is known as “spatial resolution” and it describes how a scanner captures detail. The number of dots (a.k.a. pixels) that a scanner can capture in a given inch is a measure of its spatial resolution. The other dimension is called “tonal resolution”. Tonal resolution describes how a scanner captures tonal and color information. It is measured in bits per pixel.

The maximum spatial and tonal resolution settings of a scanner are a very important factor in judging a scanner’s quality. However, you do not have to use the maximum values when scanning an image. Virtually all scanners allow you to select appropriate spatial and tonal resolution settings. The resolution selections that you make when you scan an image will have a direct impact on the quality and file size of the resulting scan.

Color scanning

A color scanner captures information using three channels: red, green, and blue (RGB).⁴⁰ Each of these channels can capture 12 bits of data (and three 12-bit channels equals 36 bits). The primary colors used by a scanner are red, green, and blue. These are the light or additive primaries (as opposed to the pigment or subtractive primaries). Color images captured by a scanner are therefore called RGB images. Images that are viewed on screen are also called RGB. Images that are printed on paper are not reproduced using RGB. Instead, printed images use the pigment or

⁴⁰ Red, green, and blue are commonly referred to by the acronym RGB.

subtractive primary colors: cyan, magenta, yellow, and black (also known as CMYK).

If you are interested, there are many texts that describe the color theory behind the additive and subtractive primaries. Some of what you learn about additive primaries will surprise you, for example, mixing red and green light produces yellow light. This is diametrically opposed to the pigment color mixing theory you learned in grade school. However, it's not necessary for you to understand color theory to use a desktop scanner. You should, however, understand that there are two key types of color files:

- RGB – RGB is the file format used for displaying images on screen. Television and computer monitors use red, green, and blue phosphors to project the light that creates images on screen.
- CMYK – CMYK is the file format used for printing images. Cyan, magenta, yellow, and black inks or toners are used by color printing presses and digital printers.

Computer files are in RGB format when they are captured by a scanner, but must be converted to CMYK prior to printing.

You could work on your computer at home and print to your desktop printer at home without ever caring about the difference between RGB and CMYK. Why? Because your computer handles the conversion from RGB to CMYK. It sends files to your desktop printer that it can easily print. When you take an RGB file to a print shop, however, it's a different matter. At that point, the print shop must convert the RGB file to CMYK. Most print shops can do this, but they need to do it well for the image to print well. It is important to understand that graphic arts professionals spend a significant amount of time working to assure that the conversion of an image from RGB to CMYK produces the best printed results. It's not easy, particularly when the scan that you printed (and

liked) on your desktop printer, is printed on a color device that may not handle RGB files well at all.

It is fairly common for a high-end color printer in a print shop to mistakenly print a gray image when it is confronted with an RGB file. In addition, it is not a simple matter for a print shop to match the colors that you see displayed on your computer monitor or printed on your desktop printer. I mention this only to underline the difficulty of producing good-looking scans that will result in good-looking printed color images. The difficulty of printing acceptable color quality is one of the reasons why you will probably want to work with a professional if you choose to reproduce a color image for your cover (or for anywhere inside the book).

Printing economics to consider when scanning

I am assuming that you will limit the use of color in your book to the cover. You can certainly include color on the inside of your book, but color pages are much more expensive. A print shop will probably charge you about a nickel to print a typical black & white page. They will charge you 50 cents to a dollar or more for a typical color page. Is the color important enough in your document to warrant ten to twenty times the price of a black & white page? You also need to consider that these color pages must be inserted at the appropriate place in the document prior to binding. This complicates the collation and binding of the book.

In the not too distant future, the price of a color page is likely to drop significantly. There will also be digital printing machines capable of printing mixed black & white and color documents at a reasonable price.⁴¹ These devices will be able to produce a complete book block with the pages in the correct collated order.

⁴¹ Your home inkjet printer does a pretty nice job producing mixed color and black & white documents in collated order, but desktop inkjets are slow and expensive when it comes to producing a hundred or so books.

However, for now you are better off economically to stick to a black & white document with a color cover, which is not too bad, considering that books have looked like that for years.

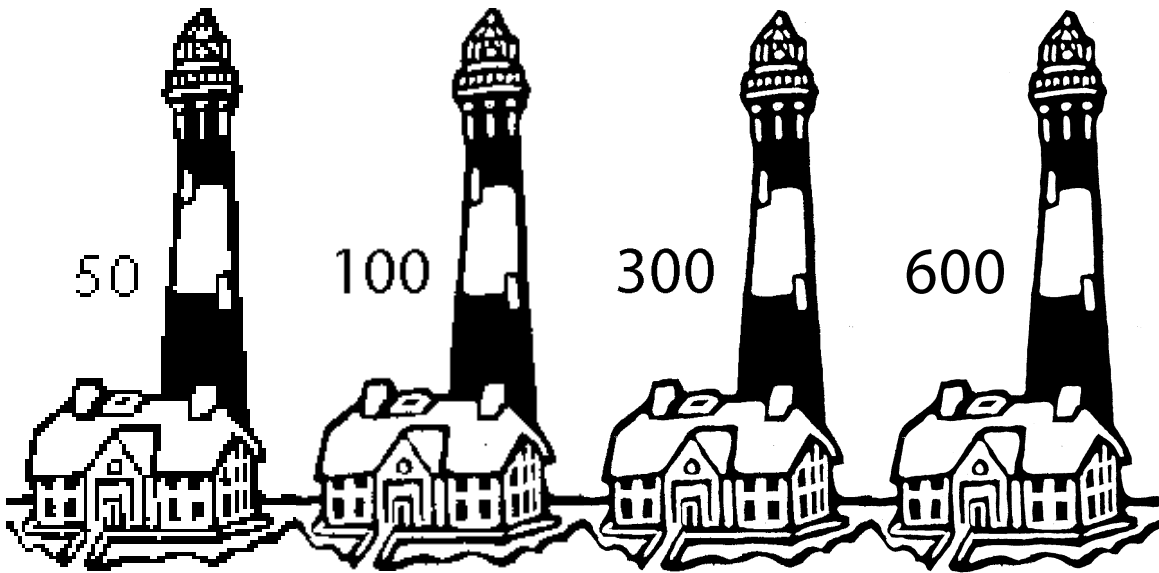
With a typical book, the publisher often groups the images together as an insert that is printed on a nice glossy paper. And while images do look better when printed on glossy paper, one of the nice things about digital printing is that you can easily mix photographs, illustrations, and text on the same page. A digital printer will put down toner or ink wherever you tell it to. You don't have to quarantine your images away from the text of the book.

The types of scanned images

One of the key tasks that faces you as you use a scanner is the selection of the proper spatial and tonal resolution for images of different types. There are three kinds of scanned images that are important for books: line art, grayscale, and color. Each of these types has special scanning requirements. (See table below.)

- Line art – Line art refers to line drawings or other images that are only made up of lines or solid marks. When line art is reproduced using a scanner, it is sometimes called “bitmapped” artwork. This refers to the amount of information that the scanner captures for each pixel. With bitmapped artwork, each pixel contains one bit of information, enough to represent two states, in this case either black or white. Bitmapped artwork requires enough spatial resolution to reproduce smooth curves and fine details. Since digital printers generally have 600-dpi print resolution, a 600-dpi scan resolution is suitable for output. If less than 600 dpi is captured in the scan, jagged edges may become visible. If more than 600 dpi is captured, the file will be unnecessarily large. The file will look fine, but it will take longer to process and it will increase the overall file size of your book.

Figure 20 – From left to right, bitmapped art at 50, 100, 300 and 600 dot-per-inch resolution. Notice the jagged appearance of the two lighthouses on the left. At 300 dpi, the image is much smoother, but not quite as smooth as the image on the far right. However, the 600-dpi image requires four times as much storage space as the 300-dpi image.



- Grayscale – Grayscale images are black & white reproductions of artwork or photographs. Unlike line art, grayscale images contain a range of grays between white and black. To capture this amount of tonal detail, scanners capture eight to twelve bits of information per pixel. An “8-bit” grayscale image may contain up to 256 different shades, including white, grays, and black. For reproduction on digital printing devices, a grayscale image should have approximately 150-dpi spatial resolution and at least 8-bit tonal resolution. Somewhat more spatial resolution may be required for very detailed images (for example, automobile images with fine grilles), but in general 150 dpi will suffice.
- Color – Color scans capture not only detail and tonal information, but also color information. As described above, this is captured in three channels by the scanner, each of which may represent 8- to 12-bits of information. Therefore, the file size of color scans is generally three times as large as the file size

of comparable grayscale scans. As with grayscale scans, a spatial resolution of 150 dpi is usually sufficient.

Table 2 – Summary of scan types

Name	Computer name	Tonal resolution	Recommended spatial resolution	File size of an uncompressed 4" x 5" image
Line art	Bitmap	1 bit	600 dpi	880 KB
Black & white photographs or artwork	Grayscale	8-bit to 12-bit	150 dpi	440 KB (8-bit)
Color photographs or artwork	Color (RGB)	24-bit to 36-bit	150 dpi	1.3 MB (24-bit)

Issues of file size

For any class of images (i.e., bitmapped, grayscale, and color), the biggest factor determining the file size of those images is the spatial resolution. If you have a number of images in your book, you need to consider the spatial resolution to use when scanning. Capturing too much information results in large files that are not any higher in quality than their smaller counterparts. In addition, the larger file size will make it more difficult to send the file by e-mail to a colleague or to fit it on a diskette. It will also increase the processing time when you print the file on your printer (or when the print shop tries to print it for you).

As an example, a 150-dpi grayscale scan has an uncompressed file size of about 440 kilobytes (KB). If you double the spatial resolution to 300-dpi, the uncompressed file size increases to 1.7 megabytes (MB) or four times the size at 150 dpi. As a rule, if you double the spatial resolution, you quadruple the file size. This also holds true for any image type, grayscale as well as bitmapped and color. Therefore your decisions about file size are very critical to the overall file size of your book.

The file sizes mentioned above do not take any compression into account. Typically, computer file formats for images allow you to apply some level of compression, which shrinks the file size of the image. For example, TIFF (Tag Image File Format) and JPEG (Joint Photographic Experts Group) are two common image file formats⁴² that offer compression. Some compression methods are extremely good at reducing the size of files. Unfortunately, useful data is sometimes thrown away during the process of compression. If so, the quality of the compressed image may suffer. The JPEG format allows you to set the quality level associated with compression. If you set it to “high”, it will maintain a high level of quality. If you set it to “low”, it will make the file as small as possible, however with the chance that some image quality will be lost.

Before you begin scanning images, you should consider the implications of file size. Estimate the number of images that you will put in your book. Will they be bitmapped, grayscale, or even color? Suppose that you expected to have twenty 4” x 5” grayscale images in your document. Uncompressed, a single 4” x 5” grayscale image would be about 440 kilobytes. Using JPEG compression with a “high” quality level, the resulting file size would range between 100 and 150 kilobytes, depending on the content of the image.⁴³ As an experiment, you should scan a typical image at the desired size and at the recommended resolution. Then save it in a file format that you can place in Word (JPEG works well for grayscale and color images while TIFF is what I use for bitmapped images). Identify the size of this image.⁴⁴ Multiply it by the total

⁴² Under the Windows operating system, TIFF is identified by the “.tif” file extension and JPEG is identified by the “.jpg” extension.

⁴³ The more detail an image has, the harder it is to compress to a small file size without sacrificing some of the detail.

⁴⁴ You can check the size of a file by closing the file and opening the file folder in which it resides. Press the “List” button to view the folder’s contents by name, date, etc. You should be able to see the file size. If that column is not visible, increase the size of the window or reduce the size of some of the other columns.

number of images that you expect to have in your book. These files will be included in the Word file, so their size should be added to the several hundred kilobyte size of the typical Word file.

For example, if you have twenty 150-kilobyte grayscale images, this amounts to about 3,000 kilobytes of image data. If the text portion of your book alone amounts for 300 kilobytes, this would result in a 3,300 kilobyte file, or approximately three megabytes. Once the file size passes one and a half megabytes, you no longer can fit the file on a standard diskette. Once this happens (and if you include images, it will), you need to consider other ways to get the print-ready file to your print shop. (This issue will be discussed in the chapter entitled “Production Tasks.”)

Resolution and size

Whether you are scanning line art, grayscale, or colored images, there are a few things you need to consider.

For all types of images, you must pay special attention to the following factors: spatial resolution, tonal resolution, and size.

Spatial resolution

When you scan an image, you must choose a spatial resolution setting. If you choose too high a setting, the file size of the image will be excessively large. If you choose too low a setting, the image will be pixelized. For books that are to be digitally printed, you should set the spatial resolution to about 600 dpi for bitmapped images and 150 dpi for grayscale and color images. Be very careful whenever you re-size an image. When you do so, you will be changing the spatial resolution of that image. This is particularly important to consider when you enlarge an image, because by enlarging the size, you effectively decrease the spatial resolution. (See discussion of size below.)

Tonal resolution

Choosing the appropriate tonal resolution is relatively easy. Most scanner software gives you fairly clear choices for bitmapped, grayscale, and color images. Bitmapped images may be described as line art, 1-bit images, or even as a black & white document. Grayscale images are generally called photographs, but may be described as 8- or 12-bit images. Color images are often called color, true color, 24- or 36-bit, or RGB. It will be clear once you view the image if you have made the right choice.⁴⁵ However, the software that came with my scanner presented one odd choice: black & white halftone. This setting simulates grayscale images with regular patterns of black dots. It is really a 1-bit setting and does not reproduce photographs particularly well. You should avoid any “halftone” settings when you scan. Halftoning is more effective when it is applied as the image is being processed for printing.

Size

As discussed above, your choice of an enlargement size has important ramifications for spatial resolution. Let’s say that you scan a 1” x 1” line art image at 600 dpi. That means that the scanner captures 600 pixels for each linear inch. If you think of one row of these pixels, it’s like a long line of tiny marbles (600 of them for every linear inch). Let’s say that you take that 1” x 1”, 600-dpi bitmapped image and enlarge it to 2” x 2”. You didn’t add any more “marbles”, so now those 600 marbles will have to cover two inches instead of one. Each linear inch now only contains 300 marbles. Therefore, by doubling the size of the image, you halved the spatial resolution.

⁴⁵ The display properties of your computer monitor will have an important impact on the way scanned images appear on your screen. The display properties of your monitor should be set to “High Color (16 bit)” or “True Color (32 bit)”. Otherwise grayscale or color images may display poorly.

Figure 21 – The image on the left is a 150-dpi, 8-bit grayscale scan. The spatial resolution is appropriate for its size. The next image was created by enlarging the first. Its resolution is now 75 dpi. The third image is enlarged even further and is now 37.5 dpi. The last image is 18.75 dpi.



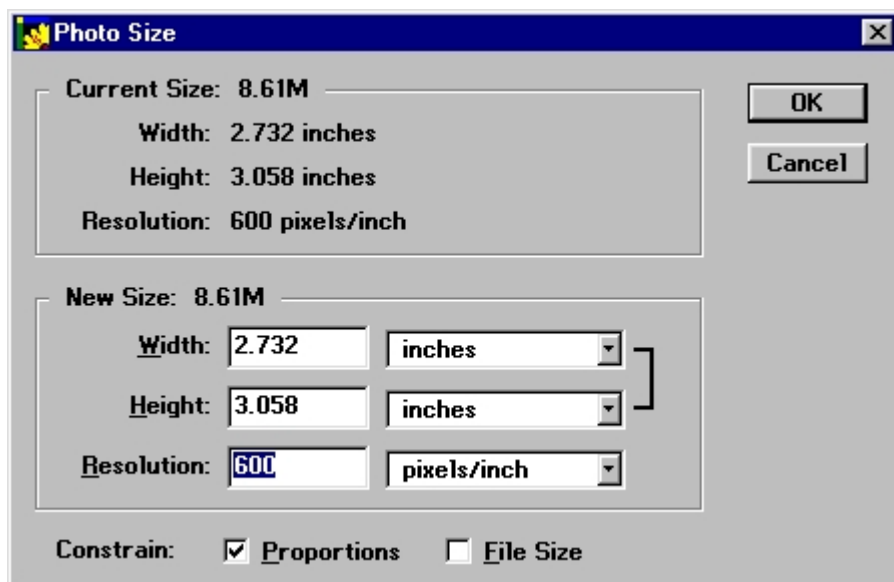
This means that you must also consider the enlargement (or reduction) of an image when you scan. Scanning software usually provides you with an enlargement factor. If you set the resolution at 600 dpi and the enlargement factor at 200%, the scanner will double the dimensions of the original image, but maintain the resolution at 600 dots per inch. You could achieve the same result by setting the resolution to 1,200 dpi⁴⁶ and resizing the image later in a graphics program or in Word.

⁴⁶ Scanners have a maximum resolution setting. In some cases, for example with a small image that you want to enlarge a lot, you may find that your scanner cannot supply the combination of enlargement and spatial resolution that you requested.

The jagged edges of a low-resolution scan may not be very noticeable in a Word document. This is because images are automatically smoothed when placed in Word. Low-resolution images that are smoothed like this have a fuzzy look to them.

Your scanner software and any other graphics software should provide full information on the image, including number of pixels, the image's dimensions (in inches or some other measurement), and the image's resolution based on those dimensions.

Figure 22 – Resolution information from Adobe PhotoDeluxe



Adjusting scanned images

Once you have scanned an image, you could place it into Word using the “Picture” command under the “Insert” menu. However, there are several things that you can do to improve the quality of an image. Many users will be familiar with three products from Adobe Systems: PhotoDeluxe, Photoshop LE, and Photoshop.⁴⁷ PhotoDeluxe is included with many desktop scanners, so I’ll use it as an example for the descriptions that follow.

⁴⁷ Adobe’s Photoshop is a product used by professional graphic artists, but it costs more than \$600 and has many tools that you do not require. Photoshop LE is a “lite” version of Photoshop that sells for \$95.

For bitmapped artwork, the clean-up process is relatively simple. You should crop the image to remove any areas that will not appear in the image. (There is no sense in saving this extra space because it only increases the file size and you can always use styles in Word to add additional white space around your illustrations.) Once you have trimmed the image, you should use the “eraser” tool to clean up any wayward marks that appear in the image, including dust specks and dirt that may have been picked up during the scan. You should then check the size and spatial resolution to be sure that they are at the desired settings.

For grayscale and color images, the adjustment process is a little more complex. As with bitmapped images, you should crop the image to include only the areas you intend to reproduce. You will also need to confirm that the size and resolution of the image are as you expected. However, there are two additional steps that you should take to improve quality:

- Step 1: Use the software’s automated image improvement feature – Virtually every graphics software program has a function that analyses an image and applies some basic contrast and tonal corrections. In PhotoDeluxe, this feature is called “Instant Fix” and can be found among the “Advanced” tools under “Quality”. Just open the image, select “Instant Fix” and it analyses and corrects the image for you. Watch the screen while this happens (or apply an “Undo” so that you can evaluate the difference). You may want to experiment some with the manual use of contrast/brightness and tonal curve corrections, but for all practical purposes, features like “Instant Fix” do quite a good job of improving image quality.
- Step 2: Sharpen the image – Desktop scanners are marvelous tools, but they typically produce images that look a little fuzzy when printed. This can be corrected easily if you have the right software tools. All graphics programs offer sharpening tools, some of which are more sophisticated than others. The

sharpening tools in PhotoDeluxe are quite nice. PhotoDeluxe allows you to set a variety of different sharpening parameters and then preview the results of those choices. The software tools that are provided with desktop scanners do not always give you this kind of flexibility, nor do they make it easy to find and apply sharpness corrections. This is surprising, given that improving an image's sharpness is something that you will want to do with every grayscale and color image that you scan.

Sharpening an image

Here is how the sharpness tool works in Adobe's Photo Deluxe. After selecting "Advanced", go to the "Quality" menu and select "Sharpen". There are four options: Sharpen, Sharpen Edges, Sharpen More, and Unsharp Mask. The first three options provide push-button ability to sharpen a scan. "Sharpen" applies a basic sharpening filter to the image. "Sharpen Edges" applies the filter only to the edges of the image. "Sharpen More" is a stronger version of the "Sharpen" filter. These may be suitable for many of your images, but I like the flexibility of the "Unsharp Mask" feature.⁴⁸ Unsharp Mask allows you to adjust the strength of the sharpening through three parameters: amount, radius, and the threshold. A preview window displays the results. Adobe recommends the following ranges for high-resolution images: 150% to 200% (amount), 1 to 2 (radius), and 2 to 20 (threshold). Keep in mind that sharpening is a resolution-dependent process. The settings that work for a 150-dpi image may not be appropriate for a 300-dpi image. In addition, it is fairly easy to oversharpen an image. When this happens, the image looks grainy and there are thick white or black lines around edges. You should experiment with the sharpness tools by applying varying levels of sharpness and printing the results on your home printer. In general, an

⁴⁸ PhotoDeluxe's sharpening capability is very similar to the sharpening feature in Adobe's professional graphics tool, Photoshop.

image that looks very slightly oversharpened on screen will look just about right when printed.

Figure 23 – Original image (left), image corrected using Instant Fix (right). Notice how the background is much lighter in the corrected image. Note: The images in this and the following figure have a 150-dpi spatial resolution and an 8-bit tonal resolution.



Figure 24 – Unsharpened image (left), properly sharpened image (center), oversharpened image (right). Notice how the image on the left seems soft and slightly undefined. The image on the right is unnaturally sharp.



You can test the results of sharpening and automated image improvement by printing out both the original scan as well as the adjusted one. This is a good test for your home printer, but you may also wish to do a sample print at your print shop to confirm that the corrections are appropriate for the printing method used in your print shop. When you evaluate your test images, ask the following questions:

- Are there rough edges, lost detail, or pixelization? This tells you that the spatial resolution is too low.
- Is there posterization,⁴⁹ particularly in highlights and shadows? If so, your scanner may not be adequately capturing this information or your image adjustments may also have been overambitious.
- Is the image too dark or too light? Is there enough contrast between the dark and the light areas? Brightness and contrast adjustments may help you improve such scans.
- Is the image sharp enough? Are there any signs of oversharpening?

Overall, the images should just look good to you. At times you will be stuck with a poor original, and no amount of adjusting will improve it. However, if the problems lie instead in your scanning and the adjustments you applied to the image, then you need to consider whether you could have done a better job. If you can't get your images to look good, then you should find a professional graphic artist to help you.

Don't forget the two most important steps!

I'd like to stress something before we move on to other topics. The graphics software programs that come with scanners typically

⁴⁹ The term "posterization" comes from the art world and describes an image that is reproduced using only a few shades or colors. When you posterize a grayscale image (i.e., reproduce it with a handful of shades of gray), it contains large flat areas that are devoid of detail.

present all sorts of artistic features that allow you to colorize, posterize, polarize, or apply a zillion goofy filters to an image. You should ignore all of them. They are like putting icing on a cake that you haven't baked yet. What's worse, these artsy tools distract novice users from the two basic features (i.e., sharpening and automatic image correction) that have the ability to dramatically improve the quality of every single one of their images.

If you use PhotoDeluxe, you should spend the vast majority of your time in the Advanced area with a few selected tools:

- For cropping – The cropping function is called “Trim” and appears under the “Size” menu.
- For sizing – The sizing function is called “Photo Size” and appears under the “Size” menu. Under “Constrain”, be sure that the “Proportions” box is checked, but leave the “File Size” box unchecked. Configured this way, you can adjust the width or height of your image and PhotoDeluxe will assure that the resolution stays the same. If you choose to adjust the width or height, be sure that you only reduce it. When you reduce it, the program simply throws away excess data. This means that it uses the appropriate amount of resolution for the size you've chosen. When you increase the width or height, the program has to make up information to maintain the desired spatial resolution. Remember what happened to the 600 marbles when we doubled the dimensions? If you still want 600 “marbles” per inch, you'll have to find them somewhere. A program like PhotoDeluxe will just fill in the gaps with extra marbles. The resulting spatial resolution will appear to be 600 dpi, but the detail will look like a much lower resolution scan. If you know in advance that you will want to enlarge an image, you should either scan the image using the appropriate enlargement factor, or, if you're not exactly sure what it will be, you should scan at a higher spatial resolution and adjust the size and resolution accordingly later. You should also keep in mind that the file size

shown in this menu does not reflect the compression applied when the file is saved as JPEG or TIFF. Your files will probably be much smaller once they are saved.⁵⁰

- For erasing in bitmapped images – The erasing function is called “Eraser” and appears under the “Tools” menu.
- For sharpening in grayscale and color images – The sharpening function is called “Sharpen” and appears under the “Quality” menu.
- For automatic image adjustment in grayscale and color images – The automatic image adjustment function is called “Instant Fix” and appears under the “Quality” menu.

Figure 25 – The menu selections in Adobe PhotoDeluxe



To get to these PhotoDeluxe features in the easiest way, you will want to be sure that the program is displaying the “Long Menu”. When you are using the “Advanced” features, the long menus will be displayed. However, you can set the preferences to always display the long menus. To do so, go to the “File” menu, select “Preferences”, and choose “Long Menu”.

Placing images in Word

Once you have completed your adjustments, save the file in a format that you can place in Word. I used JPEG for grayscale and color images and TIFF for line art. Placing images in Word is simple, but there are some things you can do to make your job simpler. First, I created an “Illustration” style that assured that any images would be centered on the column with the correct spacing above and below. I also used Word’s caption feature so that the

⁵⁰ When you save a file using JPEG, you are given a choice of quality settings. Choose a “high” quality setting. Lower quality settings greatly reduce the file size, but the quality suffers significantly.

figures would be numbered automatically.⁵¹ For some reason, perhaps related to Word's handling of TIFF files, my line art images always appeared larger in Word than they were supposed to. I had to manually reduce them to the appropriate size by selecting the edge of the image with the mouse and dragging it until the image reached the desired size.⁵²

Before closing on this subject, here are two more points:

- Don't overlook the width of your column – When you scan images for inclusion in Word, don't create any images that are wider than your text column.
- Microsoft Word's Anchor – Sometimes when you place an image in Word, a small anchor will be visible (if you are viewing "Invisibles"). The anchor determines where the image is "anchored" to the text. I hate these anchors and have been unable to figure out exactly how they work or why they appear with certain types of images (like clip art) but not with others (like JPEG or TIFF). (This is another reason why I avoid using clip art in Word.) I believe that the anchor feature might come in handy if you wanted to place images in a very exact fashion, particularly for layouts that have two or more columns on a page. However, if you really want to do this, I suggest that you use a true page layout program, not Microsoft Word.

The value of skill and training

One of the reasons why adding graphics to books has been so costly is that it has traditionally required the efforts of skillful, trained professionals. These people have spent years helping authors get books and other printed works into print. Clearly, desktop scanners and software do not provide a full substitute for

⁵¹ Had I wanted to, I could also have created a Table of Figures automatically.

⁵² If you hold the Shift key when you re-size an image, the image will be re-sized proportionately. If you do not hold the shift key, your adjustments may change the aspect ratio of the image (i.e., a square may come out looking like a rectangle).

this kind of training and experience. You should not expect to reach the absolute highest quality levels without professional help. However, you will be able to get surprisingly good results with desktop tools if you pay attention to a few basic rules:

- Get the spatial resolution right for the size of your image.
- Apply your software's tools to improve the image's contrast, tonal quality, and sharpness.
- Print out and evaluate your results on your own desktop printer as well as the printer at your print shop.

There are many books that cover the use of scanners and the software used to manipulate scanned images. Read them and learn. You will benefit from this knowledge in situations where you need to manually adjust grayscale or color images, and also when working with originals like slides or transparencies (which are not easy to scan with a typical desktop scanner). However, I have found that if you apply the basic principles described above, you will be able to produce appealing scanned images.

Copyright issues

You may not take an artist's or a photographer's work and reproduce it without their permission. Doing so would violate copyright law. Therefore, whenever you add clip art or a scanned image to your book, you need to have the artist's or photographer's permission to do so.

Using clip art is generally not a problem because clip art collections are sold or included with software with the understanding that the user may re-use the images at no charge. However, if you use clip art of a wild-haired scientist in an advertisement that states that Albert Einstein would have loved your book, then you may end up hearing from the lawyers of the Einstein estate.

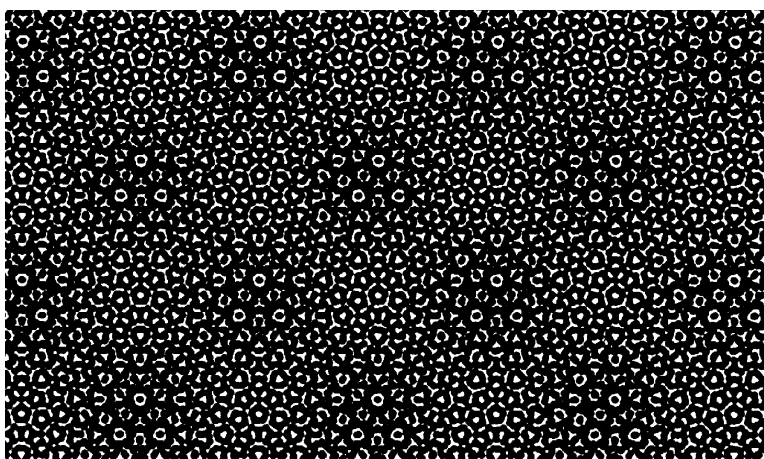
You will have less to worry about if you scan photographs that you took yourself because you will own the rights to that photograph. However, when you take photographs of people, you should be sure that the subjects know that the image is headed for print (and that they have no objections to its use in that manner). Professional photographers have their models sign a release form to assure that there is no confusion. This also protects them in case of a lawsuit.

The situation becomes a little more complex when you scan someone else's photographs. When you do, you need to be sure that you have their permission, preferably in writing. With other photographers' work, you will need to contact the source that owns the photograph, which may be the photographer or perhaps an agency that represents the photographer. For a price, they will send you an original to scan and return. You will frequently see these stock photography houses listed in the credit line of a photograph. Stock photography houses are developing a much bigger Internet presence in recent years and you can find many types of images through Internet searches.

Whenever possible, you should scan from an original photograph (rather than a reproduction from a book or magazine), and to the best of your ability, confirm that you have the photographer's permission. Avoid scanning a printed image from a book or a magazine. If the image you scan has already been printed in a book or a magazine, chances are that you will violate a copyright by reproducing it. However, the way in which you use an image will also relate to the seriousness of a copyright violation. Suppose that you wanted to include the image of a popular movie star in a family history to give to your relatives. You would be unlikely to be pursued for this violation because you did not intend to gain financially from it. It would be a much more serious violation if you used the image of that movie star as part of a book that you intended to sell.

The software used with today's scanners often includes a “de-screening” feature. This feature is used to eliminate (or soften) the moiré patterns that frequently appear when you attempt to scan and reproduce an already printed image.⁵³ When you see such a moiré pattern, it should remind you that you are probably violating someone's copyright.

Figure 26 – A moiré pattern



Sometimes you will be given a photograph and not know who took it or who owns the rights to it. Always proceed cautiously when this happens. Until you have permission from the photographer, you should refrain from using it. This may be difficult or impossible in the case of vintage photographs. In cases where I could not identify the photographer, I have acknowledged the person who supplied the photograph that I scanned.

Copyright law no longer covers some historical photographs, including many military photographs from World War II. I also found magazine advertisements from the 1930s and 1940s to be a

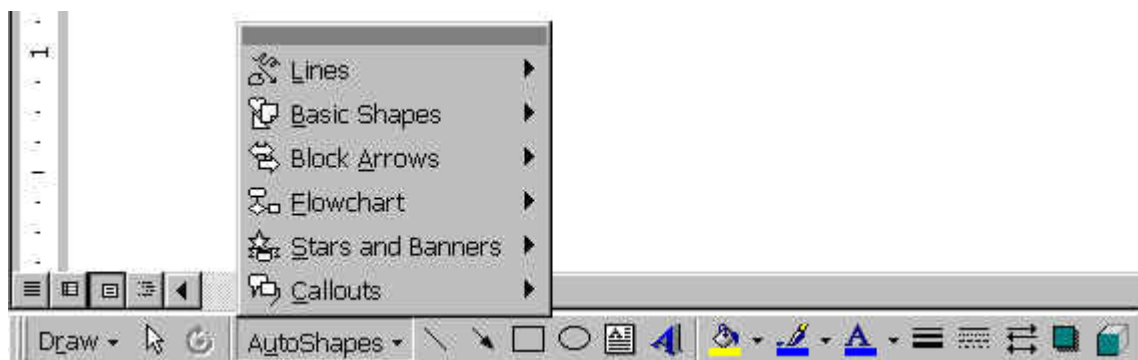
⁵³ The problem relates to the reproduction process. Printed images are usually reproduced using a fine pattern of dots that vary in size and are organized in neat rows and columns. When you attempt to reproduce an already printed image, the patterns of the dots from the already printed image conflict with the patterns of the dots used to reproduce the image. These two sets of conflicting dots produce the moiré pattern. Moiré patterns appear not only in print but also in real-life situations. For example, a picket fence viewed through another picket fence produces a moiré; so do two chain link fences viewed side by side (as they often are on highway overpasses or city front yards).

marvelous source of very high quality drawings that I used to illustrate the differences between military airplanes. I felt comfortable using these images, even though I did not ask the permission of the advertisers. In some cases, the companies no longer existed, but in general, I felt that the use of these images in a historical context would not be deemed objectionable by the advertisers. Had “The Writing 69th” been published through a traditional publisher, such a decision might well have garnered added scrutiny. Perhaps the images would have been replaced, or perhaps letters would have been written to any surviving arms of the defunct companies. Given the limited quantity of books being printed and the innocuous use of the images, I did not think this was necessary.

Drawing tools in Microsoft Word

You may be surprised to hear that Microsoft Word has some very capable drawing tools. The “Drawing” menu bar appears at the bottom of the screen. (If it isn’t there, then go to “View” and “Toolbars”, and then choose “Drawing” from the resulting menu.) You can use these tools to create line drawings with arrows, shapes, tints, and textured fills. These tools come in very handy when you need to draw a basic diagram.

Figure 27 – The “Drawing” menu bar in Microsoft Word.



I have used Word to create line art drawings that people assumed were done with more sophisticated graphics software program. If

you can distill a drawing to a few basic lines and shapes, then chances are you can create it in Word.

However, I should warn you that it can be difficult to place these images so that they flow appropriately along with the text of your book. Feel free to use Word as a creation tool for line art, but once you have finalized the drawing, I recommend that you print it out and scan the result. The scanned image will be much easier to place in your document.⁵⁴

Screen shots

For this book, I wanted to include images of menus from Microsoft Word. I used Hyperionics' Hypersnap-DX⁵⁵ to capture these images from the screen (so-called screen shots). It is also possible to capture screen shots by holding the "Alt" key while pressing the print screen key. The image can then be pasted into a Word document by typing "Control+v". However, Hypersnap-DX has additional features that allow you to crop and size screen shots easily. In addition, I wanted to be able to capture screen shots of pull-down menus, which is only possible with a tool like Hypersnap-DX.

⁵⁴ Make sure that these images include only lines and solids. If you attempt to scan a tint or halftone, the result will be of poor quality.

⁵⁵ For additional information, refer to <http://www.hyperionics.com>.