BILL'S QUICK GUIDE TO SCANNING AND GRAPHICS
The goal: proficiency for humanities scholars

Resolution
Strictly speaking, you should distinguish *resolution,* which is measured in dpi (dots per inch) and *image size,* which is measured either in inches or pixels. Often there's confusion between these terms, and a "high-resolution image" can just mean one with a lot of pixels. Most publishers will print images at 300 dpi; this means that an image that will print at 6" × 5" should be at least 1800 × 1500 pixels. (Very fancy art books might go as high as 400 dpi, while a large poster can go as low as 150 dpi without major problems.)

Scanner Settings
In general, the quality of your scans should be greater than what you'll ever need, but manipulating or emailing very large files can be incredibly cumbersome. So scanning a 24" × 36" map at 300 dpi is usually unnecessary, but if you want to show a detail at twice-actual size, you'll probably need to scan the whole thing at 600 dpi and then crop down to the area you want to use.

My recommendation is to scan at 600 dpi ("photo" quality on the Yale scanners), always in color (especially when using the Yale scanners, which are terrible in grayscale), in PNG or TIF format if possible. This should be enough to avoid the annoying artifacts known as moiré patterns when scanning halftone images in books, magazines, or newspapers. (If not, try 1200 dpi – but this exceeds the Yale scanners' abilities.) And unlike JPG format, both PNG and TIF are "lossless," which means that the files are larger but no information is discarded during compression. Publishers always want lossless formats, usually TIF. (Note: TIF and TIFF are identical.)

After scanning, I recommend making *two* copies of the resulting file. Name one something like "historical image RAW.tif" and don't do anything with it – ever. The other file, named "historical image.tif," you can then resize, crop, manipulate, or convert to gray without worrying about making irrevocable mistakes. This is especially important if you happen to end up with a JPG file (say, downloaded from the web or taken with your digital camera), since JPGs are re-compressed – and more information is lost – every time you save.

Color or Gray?
If you're writing a paper for a class or other informal distribution, use color! You'll also want your images in color when you make slides for a talk. But publishers will usually agree to print in color only for primary-source images that would lose their meaning in grayscale, and some journals can't print in color at all. So you should do most of your work with color images, but be ready to convert to grayscale for publication. And if you're making your own tables, graphs, or other custom illustrations, you should have versions that work both in color and in grayscale.

Software
I commonly use Excel, Photoshop, Illustrator, and ArcGIS. There are open-source equivalents for the first three: LibreOffice, GIMP, and Inkscape. (Based on my experience, I can't recommend any open-source GIS programs, but please let me know if you know any

that deserve wider notice. And I generally prefer LibreOffice to Microsoft Office, but your mileage may vary.) Excel is good for making graphs, Photoshop is for image manipulation, Illustrator is for custom graphics, and ArcGIS is for maps. Often I'll use more than one program. For example, a dataset could start in LibreOffice before being plotted in ArcGIS, then I'd export it to Photoshop for color adjustment and finally add text and linework in Illustrator. For most purposes, knowing the basics of Excel and Photoshop is enough.

Basic Image Manipulation
Regardless of whether you use Photoshop, GIMP, or some other image software, there are a few basic tasks that you'll need to learn. This isn't a hard-and-fast list, it's just my own sense of what everyone should know.

Very basic: *crop, resize, rotate.* (Most scans will not be perfectly aligned. Sometimes you'll need to rotate as little as a few tenths of a degree. A one-degree misalignment is very noticeable.)

Slightly more complex: *converting to grayscale,*[1] adjusting *brightness and contrast,*[2] cleaning up graphics with *levels*, applying simple filters like *despeckle* or *sharpen* (sparingly!).

Good proficiency, no major skill required: adding shading for emphasis, adding dots or circles (usually best as a color overlay on a grayscale image), adding simple text or linework. These require understanding layers.

Good proficiency, lots of practice required: image retouching using the *clone* tool, correcting for (or regularizing) paper yellowing, fixing gutter distortion, removing watermarks.

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1   Bonus tip for Photoshop users: there are several ways to convert from color to grayscale. You can convert the "Mode" to grayscale, you can "Desaturate" (or, equivalently, set the saturation to zero), or you can use the "Black & White" tool. The third option gives you a lot of helpful control over how different colors are translated into grays, and I recommend it highly. In GIMP you can do something similar with the "Channel Mixer" if you select monochrome output.

2   In Photoshop there are two modes for Brightness/Contrast. "Legacy" mode can sometimes be useful for adjusting graphics, but keeping the box unchecked is better for most purposes. Photoshop "legacy" mode is the same as what's available in GIMP.