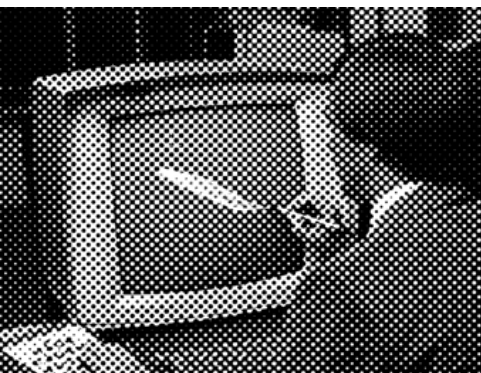


Creating Films For Printmaking

Films from Digital Sources



Example of a photo that has been bitmapped using halftone.

Resources:

Printmaking: A Complete Guide to Materials and Processes

By Beth Grabowski and Bill Fick,
Laurence King Publishing, 2009.

Printmaking Bible: The Complete Guide to Materials and Techniques

By Ann d'Arcy Hughes and Hebe Vernon-Morris, Chronicle Books, 2008.

Printmaking: History and Process

By Donald Saff and Deli Sacilotto,
1978.

[Understanding Resolution and the meaning of DPI,PPI,SPI & LPI](#)

David Creamer 2012

[Halftoning The Secret Print Ingredient](#)

Tom Arah 2001

Introduction

In Printmaking we traditional work with high contrast, binary images; Positives and negatives, or black and white. These high contrast images have no real tonal effects. To achieve the illusion of tone artists have used effects like crosshatching or aquatints to fool the eye into thinking there is tone.

Photography on the other hand is a medium rich in tonalities, a continuous tone medium. To be able to print photographic images the use of halftone photography was developed. The process breaks the tones of a picture into lines of small dots of varying densities (size) that trick the eye into seeing what appear to be various tones.

Options for Creating Films

Films are typically required for transferring photographic or digital imagery to the printing matrix. These are used in a variety of Printmaking processes However, they are generally associated with Screenprinting.

There are 3 options available at WSA for creating films:

01. Laser prints or photocopies onto acetate for small scale work up to A3 in size.
02. Inkjet prints onto Colour Separation Film for large scale prints (available through Creative Services).
03. Hand drawn images on Tru Grain or Drafting Film.
(See the separate guide '[Autographic Films For Printmaking](#)' for further details on creating hand drawn films)

Working with Digital Output

Images of a digital origin can be outputted through laser printers or inkjet printers. The conventional form of the bitmap is called a halftone. In this case, changing the size or amplitude of the dot creates tonal variances. In light areas, dots will be very small, increasing in size, as the tone gets darker.

However there are other methods that can be used to manipulate the image in interesting ways that do not rely on the halftone method including Threshold and Diffusion Dither.

Numbers and Acronyms

ppi = pixels per inch (the resolution of your file)

lpi = lines per inch (lines of halftone dots)

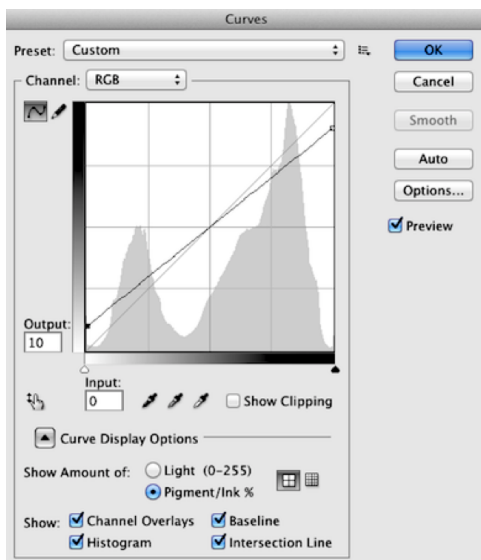
dpi = dots per inch (pertains to printers)



Original image converted to Grayscale.



Image after curve adjustment.



Creating a Halftone Bitmap with Photoshop

The halftone process involves setting two variables - the size of the pixel (ppi), which makes up the dot, and the size of the dot itself. This second measurement determines the frequency or linescreen of the image and is expressed as lines per inch (lpi). The pixel size is important in that a smaller pixel makes the halftone dot smoother, allowing more detail and subtlety in the image.

For the best possible results the digital image you wish to reproduce should be of the highest quality possible. If you are using appropriated imagery from the web you may run into problems as they are of a low resolution.

01. Open a new, blank canvas in Photoshop and set the canvas size to the intended output size (A4, A3, etc.) and the resolution to 150ppi.
02. Open the image you intend to bitmap and copy and paste into your new blank file. Enlarge the image to fit the page.
03. Convert the image to a Grayscale Mode (Image > Mode > Grayscale). Flatten the image and discard colour information by clicking the button when prompted.

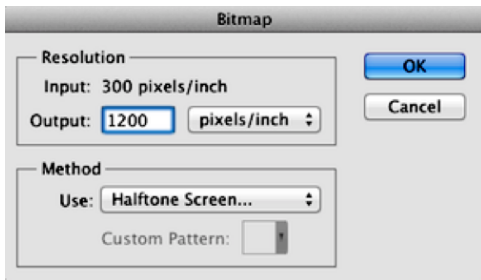
To produce a well-balanced image it is necessary to adjust the contrast of the image. While on screen the image may appear well balanced after bitmapping the solid black/white areas in the tonal range will stand out like a sore thumb.

This is exaggerated when printing due to the smaller halftone dots being lost and the largest spots likely to suffer ink spread resulting in 'dot gain'.

To counteract the 'dot gain' we need to use the levels or curves command in Photoshop to edit the levels. Essentially this will darken the highlights and lighten the shadows and while the image may look dull on screen it will benefit when actually printed.

04. Open the Curves dialog box in Photoshop IMAGE > ADJUSTMENTS > CURVES.. and ensure the Curve Display options is set to 'pigment/ink%'.
05. Using the cursor drag up the end point of the diagonal line from the bottom left corner setting the White Output to 20. Drag down the top end point of the diagonal line from the top right corner setting the Black Output to 80. Click OK.

The Curves function can also be used to adjust the midtones by clicking anywhere on the line and dragging it up or down.



06. Convert the image to a Bitmap Mode. IMAGE > MODE> BITMAP
07. Set the Output Resolution to match the printer you will be using to print the acetate. In this case 1200ppi, the resolution of the MFD and Creative Services printers at WSA.
08. Choose 'Halftone Screen..' from the Method drop down menu. And click OK. In the following dialog box, set the relevant frequency according to the print technique you will use (see below table).

Print Technique	Suggested Resolution	Typical Range
Screenprint	40	10-60
Polyester Plate	75	60-100
Photo Litho	60	60-100



Print with no curve adjustment

09. Set the Angle, the standard Angle is 45-degrees for a single colour halftone in offset print, however for Screenprinting 22.5 is best to avoid conflict with the screen mesh.
10. Set the shape of the Halftone dot. There are different dot types available, each having their own characteristics.



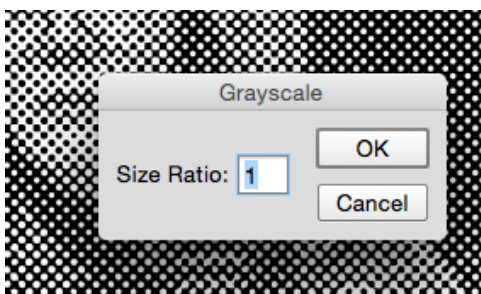
Print with 20% curve adjustment

- Round:** most common, suitable for light images, especially skin tones.
- Ellipse:** appropriate for images with many objects. Elliptical dots are the standard shape used in screen printing.

11. Click 'OK'

During the UV exposure, the photo emulsion underneath the black areas of the acetate will remain soft and water-soluble. These black areas are what will wash out of the screen and allow ink to flood through to create your imagery.

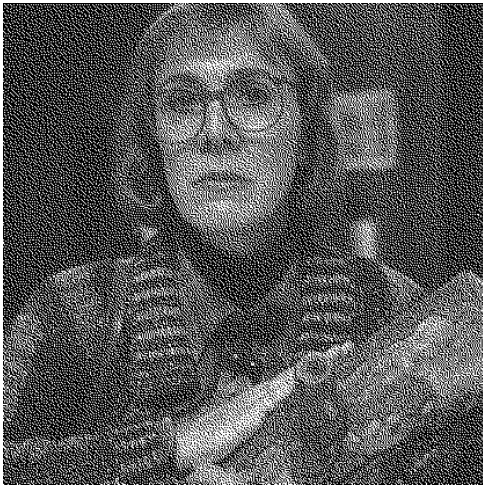
Because of this, it is important that the black image areas on the acetate are as opaque as possible in order for it to expose properly to the screen.



12. To help achieve this dense black, go > Image > Mode > Grayscale
13. In the dialog box set the Grayscale Size Ratio to 1 and click 'OK'.
14. Go > Image > Mode > RGB Colour

You are now ready to export your image as a PDF to send it to print.

Diffusion Dither



Diffusion Dither at 166 resolution

Diffusion Dither, or Stochastic screening as it is sometimes called, is an alternative method of simulating continuous tone in Printmaking. The difference between diffusion dither and halftones is that halftones create shading using different size dots; amplitude modulation, while dithering uses the same size dot but spaced out, frequency modulation).

With Diffusion Dither the dots do not overlap like in CMYK to create other colours. Instead they are printed beside each other. the advantage of this being that a less regulated pattern is created by the dots which reduces the effects of Moire and allows for a greater margin of error in registration without adverse effects.

01. You will need a Grayscale file that is at least 150ppi at the size you will print it. This information can be checked by going to Image > Image Size... in Photoshop.
02. Make any necessary changes to Levels and Brightness & Contrast until you are happy with the image.
03. Go to Image > Mode > Bitmap and select Diffusion Dither from the Use Method drop down menu.
04. Set the output between the 75-166 and click 'OK'

Experiment with the value to achieve the effect you want. The higher the value the more fine and detailed the image will be.

05. Go > Image > Mode > Grayscale
06. In the dialog box set the Grayscale Size Ratio to 1 and click 'OK'.
07. Go > Image > Mode > RGB Colour

You are now ready to export your image as a PDF to send it to print.

The Output resolution for Diffusion Dither should be the mesh count (inches) divided by approximately 1.5-2.25, and then round up or down to a whole number.

At WSA our screens are 100T/250. Therefore the highest output resolution capable of printing is 250 divided by 1.5 - 2.25 = 166.



Original Grayscale image.



Image with basic threshold settings.

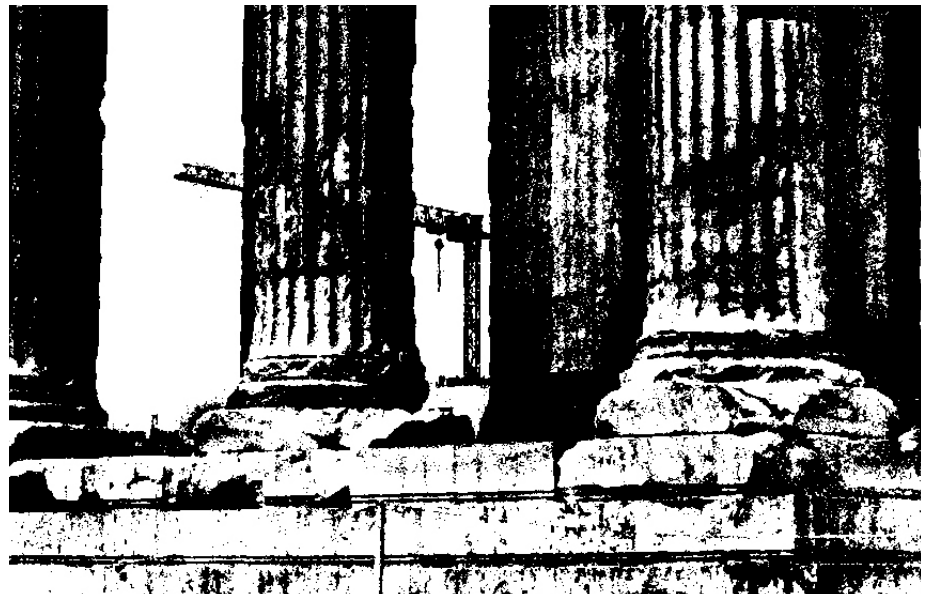


Threshold image after using dodge and burn tools.

Using Threshold

The Threshold setting in Photoshop is an easy way to create a high contrast black and white image to use for Screenprinting, it is particularly suitable for converting scanned line drawings in pencil, biro or any medium that creates a heavy textured mark. However you will often lose more information than you would like with this option at its default setting. Once your Grayscale image is ready, to pull more out of images with Threshold use the following steps.

01. Open your Grayscale image in Photoshop and make the default background layer (this should be your image) editable by double clicking on it in the layers panel and then pressing return.
02. Create a Threshold adjustment layer, you can move the slider to adjust where the Threshold cut off is.
03. Select your image layer again in the panel and then use the dodge and burn tools to bring back more information.
04. The dodge tool will help bring back details in the black areas, and the burn tool will help add details in the blasted out white areas.
05. Save the image as a PDF (see overleaf for best PDF settings)

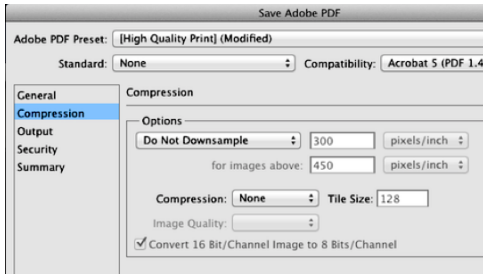


The above crop shows the threshold image at 100%. The dodge and burn tools allow for a great deal of control in the amount of achievable detail. However you must remember that some of this detail will be lost in the exposure of the image onto the screen or plate.



Exporting Your Film Positive For Output

01. In Photoshop choose save as FILE > SAVE AS in the dialog box change the format to PDF and tick As A Copy.
02. In the following dialog box. Ensure the settings are as illustrated on the left. And then click Save PDF.

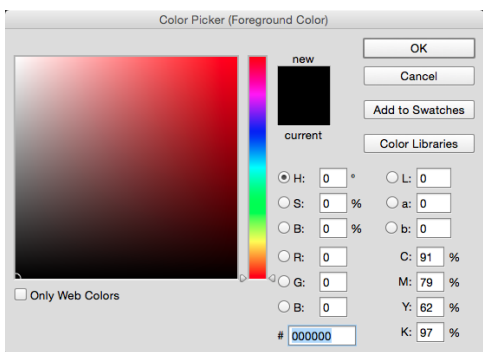


Your file is now ready and can be printed via the WSA laser printers onto Acetate. If you have an image that is larger than A3 you will need to send this to Creative Services to be printed onto Colour Separation Film.

Follow the instructions in [Printing Acetate On WSA Laser Printers](#) guide to achieve the best results.

PDF settings for creating films.

A Note About Digital Painting



It is possible to create Films by using the drawing and painting tools in software such as Adobe Photoshop or Illustrator. If doing so it is important to ensure you have setup your document correctly.

Create a new file at the size you wish to print, with a resolution of 300ppi, Colour Mode set to RGB and Colour Profile set to sRGB.

Any drawing/painting you do will need to be in black before you export the file to print. To ensure the densest possible black it is essential you create a RGB Black swatch.

To do this double click on the foreground colour to bring up the Colour Picker window and ensure the values in the R,G & B fields are all set to 0.