

Scanning and Images Part II

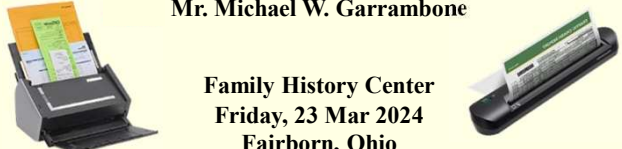
Instructor Mike Garrambone

Interesting Genealogy Topics

Scanning and Images **Part II:** The Poop, the Scoop, and the Skinny

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Family History Center
Friday, 23 Mar 2024
Fairborn, Ohio





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So, What Is this About

Everyone wants images in their genealogy documents



- Family Photos
- Documents
- Paper Narratives
- Maps and Charts
- Graphic Treasures






Great Uncle Bob

The next level about what you need to know to capture and keep those images

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Agenda



- Introduction
- Scanning a Photo
- B/W and Color
- Image Ideas
- Fixing Images
- Image Types
- Format Types

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Recall: Scanning is

Pixel Grabbing

Scanning: Using a device (a scanner) to detect and capture the information, arrangement, color, text characters or images contained in a document and storing this information in a computer graphic or file of some format








Image → Scanner → Computer File

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Let's Scan a Photo

3" wide x 4" tall



- Scan information
 - Scan at 300 dots per inch (dpi)
 - Create a **JPG** file
 - Scan in color
 - File name is TaraPooh 300.jpg

Cute Little Tara Pooh

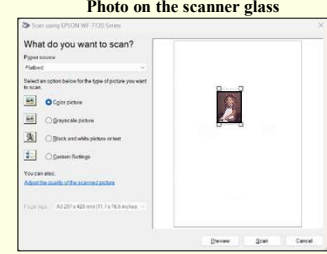
Pixel = Picture Element, one dot on a display screen

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Scanning a Photo

Photo on the scanner glass



Using Photoshop Elements scanning software here

Image is 3" wide x 4" tall

Scanning tells the computer how big the image really is

- Result
 - (3x300) x (4x300) = 900 x 1200 pixels
 - Width is 900 & Height is 1200 pixels
 - Total number of pixels is 1,080,000 (1.08 MP)
 - Each pixel needs **color information**

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Color Information

Color makes a more interesting image

- Black and white**
 - Like a printing press
 - Makes the smallest file size
- Shades of black and white (gray tones)**
 - Eight shades
 - 16, 32, or more shades
- Color**
 - Eight color
 - 16, 32, 64, 128, 256, or millions

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Talk about Black & White

Today's Scanners can capture Black & White and Color images

Simple Black and White takes only one computer bit to store each pixel's information 1 or 0 1 bit

• Eight shades of Black and White takes three computer bits to store each pixel's information 7 To 0
4 2 1 3 bits/8 shades

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Color on Monitors & Printers

Computer Monitors

Monitors require three sets of colors for each pixel Red, Green, Blue (RGB)

Color Printers

Printers require four sets of colors for each dot Cyan (C), Magenta (M), Yellow (Y), Black (K)

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B/W & Color File Examples

(8 bits = 1 byte) (1 million bytes = 1 MB)

Black and White

White or Black

• Let's look at pure B/W (No shades)

Uses 1 bit per pixel

White

Takes 1 bit x 1,080,000 pixels for photo

Takes 1,080,000 bytes, or 1,080 Kilobytes (KB), or **1.08 Megabytes (MB)** for the photo

Eight Colors

• Let's look at 8 colors

Uses 3 bits per pixel

White

000 = 0	100 = 4
001 = 1	101 = 5
010 = 2	110 = 6
011 = 3	111 = 7

Takes 3 bits x 1,080,000 pixels for photo

Takes 3,240,000 bytes, or 3,240 KB, or **3.24 MB** for the photo

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The Truth: Scanners Only Sample Information

Density: The number of dots in the space of an inch (both directions)

Sample taken

300 dots per inch

300 dots per inch

Subject being scanned

This Section Only

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Stretching an Image

• Pixels can be stretched
• But there is a limit

Pixelation

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Effects of too much Stretching

- Spaces between pixels
- Color guessing of fill ins
 - Pieces missing
 - Averaging of colors

Resampling is needed

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Images

Images enhance our genealogy

- **IMAGE:** a visual representation of something: as (1): a likeness of an object produced on a photographic material (2): a picture produced on an electronic display (as a television or computer screen)

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Aspect Ratio

Every image has shape called its **Aspect Ratio**

The Aspect Ratio Matches the length to the width Shows the numbers in reduced form

Width: 1024 pixels
Height: 768 pixels
226 : 142 or 113 : 71

Monitors also have Aspect Ratio They are normally 4 : 3 or 16 : 9 My monitor is 1920 x 1200, or 8 x 5

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Framing in PowerPoint

Just some examples

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Four PowerPoint Cropping Secrets

Density: The number of dots in the space of an inch (both directions)

1. You can crop an image right in PowerPoint
 - This removes the cropped parts from view (still there, but hidden)
2. You can put any part of image back to the original from this crop
 - This allows you to fix mistakes!
3. You can discard the edges of the cropped image
 - Reduces the file size and the briefing size as well
4. You can change (e.g., reduce) the image density in PowerPoint
 - PowerPoint can take a big file image and reduce its screen dpi

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Easy PowerPoint Image Duplication

Identify with (Ctrl C) then duplicate with (Ctrl D)

So This becomes this

Many wagon wheels

☆ → ★★★★★★

Place the first one and the others will fall in the path with more Ctrl Ds!

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Recall the Four Popular Image Types


Each image type has different characteristics



- **Raster:** Made of various dots 
- **Vector:** Made of various lines 
- **Character:** Made of a standard type-set (font) and size (points)
Letters, Symbols, Numbers 
- **Compound:** One or more of the above that looks like this 



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Raster (Bitmap Images)

Raster Images are made from dots 

Original photo  High Power close up 

- BMP (Bitmap)
- TIFF (Tagged Image File Format)
- JPEG (Joint Photographic Expert Group)
- GIF (Graphics Interchange Forma)
- PSD (Photoshop Document)
- TGA (Truevision Graphics Adapter)
- PNG (Portable Network Graphic)
- MNG (Multiple-image Network Graphics)

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File Compression

Compression: Reducing the size of image to take less storage

1. You can change from one file format to another

A BMP becomes a smaller TIFF becomes a smaller JPG



BMP file 4,571 KB TIFF file 860 KB JPG file 240 KB

2. You can use the PPT compression button

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File Compression Example

The data for an image is kept in the image file

- Compression
 - Can reduce the size of the file
 - Can either keep all the image information, or can lose some information
 - LossLess compression (all info is kept - BMP, PNG, GIF)
 - Lossy compression (some info is lost - JPG, HAM, JBIG)

Example Black and White file (letters used in place of binary code)

```
WWWBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB  
WWWBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
```

This changes to this (with no loss of info)

```
12W1B12W3B24W1B14W
```

Same file info but compressed and no loss

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Some Vocabulary

Color Words:

- **Transparency:** Ability to see through part of the image and show background
- **Alpha Channel:** An area where parts of the image can be transparent
- **Color Depth:** The number of colors in the image (more depth-increase size)
- **Color Palette:** A list of the colors available in image
- **Gamma Correction:** A way to correct the image lightness or darkness on devices

File Words:

- **Compression:** A way to make an image file size smaller
- **Lossless Compression:** Makes a file smaller, but doesn't lose any information
- **Lossy Compression:** Makes a file smaller, but reduces image quality
- **Interlaced:** A way to send a file image on the internet where the image builds

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BMP Files

BMP Basic Thoughts:



- Two-dimensional, universal to windows
- Any size, any height, any width, any density
- Editable by pixel – easy to recolor sets of pixels

Advantages:

- No compression, keeps quality
- May be only choice on your scanner
- One bit to 24 bit color

Disadvantages:

- Files are typically very large
- Not support by web browsers
- Hard to scale image up (stretch to larger image)



Summary:
Can be beaten by Tiff, JPG, PNG

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TIFF (Tagged Image File Format)

TIFF Basic Thoughts:

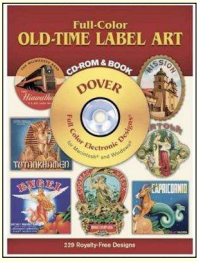
- Two-dimensional, universal to windows
- Most widely supported format (MAC/Windows)
- Editable by pixel – easy to recolor sets of pixels

Advantages:

- Optional compression, keeps quality
- May be only choice on your scanner
- Can use any color depth

Disadvantages

- Not support by web browsers
- Files are typically very large
- Many different type of TIFF files



Summary: Industry standard, beats BMP

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JPG (Joint Photographic Experts Group)

JPG Basic Thoughts:

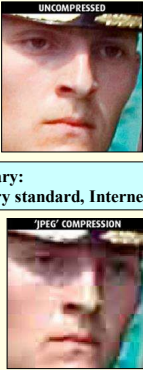
- Two-dimensional, universal to windows
- Most widely supported format
- Platform independent, Internet standard

Advantages:

- Superior and variable compression
- Interlacing for progressive development
- 24 bit color depth

Disadvantages

- Lossy Compression
- Edit and resave causes degradation
- Not suitable for simple pictures



Summary: Industry standard, Internet standard

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GIF (Graphic Interchange Group)

GIF Basic Thoughts:


- Two-dimensional, universal to windows
- Most widely supported, Internet standard
- Can create animated images

Advantages:

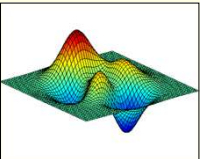
- Lossless compression and transparency
- Interlacing for progressive development
- Supports single or multiple image data

Disadvantages

- Only 256 Colors
- Lossless compression inferior to JPG
- Limited transparency (in Alpha Channel)



Summary: Low color, small files, animation



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PNG (Portable Network Graphic)

PNG Basic Thoughts:


- Two-dimensional, universal to windows
- Most widely supported Internet standard
- Can have any color depth

Advantages:

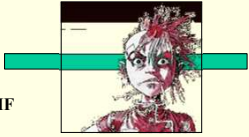
- High level lossless compression
- Alpha Channel transparency
- Gamma correction and interlacing

Disadvantages

- Lack of support in older browsers
- Provides less compression than JPG
- No support for multi-image, animation like GIF



Summary: Full color, small files, transparency




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Vector Images


Images are made by putting together lots of lines

Lines




Easy to stretch lines without loosing image

Great for precision
Great for graphic plotters





7x Magnification



Vector
Bmp
Gif

– CGM (Computer Graphics Metafile)
– SVG (Scalable Vector Graphics)
– AI (Adobe Illustrator)
– CDR (CorelDraw)
– GEM (Graphics Environment Manager)

AMAZING VECTOR ARTWORK GRAPHICS

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TXT or ASCII Character files

Each character has a symbol-code

- Character Files
 - .TXT (Text) --- DOS text
 - Works with windows
 - .DOCX (Word Files)
 - Great for word processing

Example ASCII Code

Binary	Oct	Dec	Hex	Glyph
010 0000	040	32	20	
010 0001	041	33	21	!
010 0010	042	34	22	"
010 0011	043	35	23	#
010 0100	044	36	24	\$
010 0101	045	37	25	%
01100000	060	48	30	0
011 0001	061	49	31	1
011 0010	062	50	32	2
100 0001	101	65	41	A
100 0010	102	66	42	B
100 0011	103	67	43	C
110 0001	141	97	61	a
110 0010	142	98	62	b
110 0011	143	99	63	c

1212 Cat Street ← You see this

1 2 1 2 b C a t b S t r e e t

49,50,49,50,32,67,141,116,32,83,116,114,101,101,116

Computer sees this ↑

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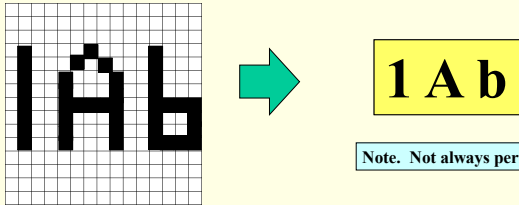
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Optical Character Reader (OCR)

Your scanner is told to look for characters

- OCR (Optical Character Reader)
 - Scans a document and captures characters
 - Dots are gone and only characters remain

Text at 300 dpi is best
Times New Roman Font is Best
Be ready to edit and format



Note. Not always perfect

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I Scanned this document as a JPG Image

```
*****
ITALY, AGRIGENTO, NARO - CIVIL REGISTRATION
-----
Naro (Agrigento). Ufficio dello stato civile.      |EUROPE | I
Stato civile, 1821-1865. -- Salt Lake City : Filmati dalla |FILM AREA |
Genealogical Society of Utah, 1988. -- In 20 bobine di
microfilm : 16 mm.

Microfilm dei registri originali nell'Archivio di Stato, Agrigento.
Microfilm di alta riduzione (42x). Adoperare una macchina di alto
ingrandimento.
Births, marriages, banns, deaths.
Include indici parziali.

Nati, morti, notificazioni, ----- 1468162   I
matrimoni 1821-1823 ----- 1518046
Nati, morti, notificazioni, ----- 1518046
matrimoni 1823-1825 -----
Nati, morti, notificazioni, ----- 1518046   I
matrimoni 1828-1830, 1829 ----- 1546587   I
Matrimoni 1829 -----
Nati, morti 1830 -----
Nati, morti, notificazioni, -----
matrimoni 1831 -----
Nati, morti, notificazioni, ----- 1468217
matrimoni 1832-1833 -----
Nati 1834 -----
Nati, morti 1834-1835 ----- 1468218
Notificazioni, matrimoni 1834-1835 -----
Nati 1836 -----
```

See next Slide

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Then "OCR it" into a White Text File

```
ITALY, AGRIGENTO, NARO - CIVIL REGISTRATION

NARO (Agrigento). Ufficio dello stato civile.
Stato civile, 1821-1865. -- Salt Lake City : Filmati dalla
Genealogical Society of Utah, 1988. In 20 bobine di
microfilm: 16 mm

Microfilm dei registri originali nell' Archivio de Stato, Agrigento.
Microfilm di alta riduzione (42x) Adoperare una macchina de alto
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Births, Marriages, Banns, Deaths.
Include indici parziali

Nati, morti, notificazioni: ----- 1468162
matrimoni 1821 -1823 -----
Nati, morti, notificazioni: ----- 1468163
matrimoni 1823-1825 -----
```

20 Rolls

Partial Indices (nice)

Film Order Numbers

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Portable Document Format (PDF)

Your scanner can create single page and multiple page PDFs

- PDF represents documents independent of application software, hardware, and operating systems
- PDF files capture a complete description of a fixed-layout flat document, including text, fonts, graphics, and other information needed to display it

The PDF combines three technologies:

1. A subset of the PostScript page description programming language, for generating the layout and graphics.
2. A font-embedding/replacement system to allow fonts to travel with the documents.
3. A structured storage system to bundle these elements and any associated content into a single file, with data compression where appropriate

http://en.wikipedia.org/wiki/Portable_Document_Format

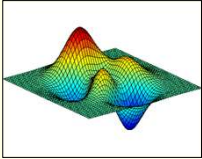
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Summary

Today we talked about:

- Photo Scanning and File Size
- B/W and Color Examples
- Stretching and Aspect Ratio
- Some Nifty PowerPoint Tools
- Reviewed Image Types
- Reviewed File formats



GIF File Image


You are doing well and perhaps will want to attend Scanning & Images III

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Point of Contact Information


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