

# PHOTO RESTORATION

Improving Scanned  
and Digital Images

1

# ORIGINAL TO RESTORED



# IMPROVED



Cropped, added space above  
Color corrected greenish cast  
Lit candles, removed object above  
Could have fixed shoulder tan



# CLASS COMMENTS

THE AGENDA IS FLEXIBLE! THIS ISN'T A CREDIT CLASS.

- Feel free to ask questions, if you are confused others probably are
  - It will also help me improve this class
- Some topics will be emphasized more depending on what the class members want or need
- We will be doing hands-on exercises
- You may bring some of your own images

# SCANNING IMAGES

- Images at 300/360 dpi to print same size
  - To print twice as big, double dpi
  - To reduce surface pattern try 4x dpi
- 35mm negatives/slides at least 2400 dpi
  - Some flatbeds include film holders
  - Dedicated film scanners can do a better job faster
- Most scanner software does a pretty good job of moiré and color fixing
- Scan in color, do NOT save as JPG or PDF, use TIFF or PSD

# PHOTOGRAPHING IMAGES

- Often photo in frame can't be removed
- If available use raw image format
- Never use digital zoom
- Closeup filters, macro/micro lenses or extension tubes
- Keep photo and camera parallel
- Tripod makes it easier
- Lights and diffusers
- Flashes are often difficult, but can be used

# COMPUTER USE

- Must have Dixie ID to logon and use Lightroom and Photoshop
  - You can of course bring your own computer
- Examples files can be downloaded from [www.nohrphoto.com](http://www.nohrphoto.com)
- Save your work in Cloud or on portable USB drive if you want to take it home and work on it
  - This is important because user files get erased by DSU!



# PROBLEMS TO SOLVE

Repairing the effects of age and mileage



# DAMAGE TYPES

- Dust, spots, and blotches
- Cracks, scratches, tears, emulsion damage
- Mold and fungus growth
- Missing pieces
- Faded color and contrast
- Pen and ink damage, don't write on the picture!
- Silvering

# TEXTURE, MOIRÉ, OTHER ARTIFACTS

- Best dealt with during scanning
  - Scan at high dpi, then reduce
  - Concentrate on important areas
    - Sometimes take several scans or photos
  - Try soft light and polarizers
  - Silvering, bronzing, shoot at an angle

# GOALS — UNDERSTAND THE TOOLS

- **Photoshop CC (Creative Cloud)**
  - This is not an exhaustive class on PS, it is a huge program, but we will only need a few tools to make big improvements
  - Much of what we use will also be in Photoshop Elements
- **Photoshop Lightroom Classic CC**
  - We'll look at some of the tools and use as image manager
- **Lightroom CC**
  - This is the new cloud based LR, not covered in this class
  - We will assume Lightroom to mean Lightroom Classic
- **Scanner software can also do some of the initial repairs**
  - Color, contrast, and dust
- **Photoshop and Lightroom are \$9.99/month**
  - 30 day free trial to see if you like it

# MONTHLY RENT IS A PAIN

## Against

- Pay every month
- You don't "own" the program (note that most EULA's say you don't own it either)
- Lose access to LR catalog when you cancel
- Almost the cost of a good pizza or a haircut

## Advantages

- New features and bug fixes are immediately available
- Support for new cameras
- Always compatible with latest OS versions
- Predictable cost, you don't have to upgrade at random times

# OTHER MONTHLY EXPENSES

- Internet access
- Phone service
- Rent or mortgage
- Utilities
- Insurance
- Car payments
- Medical and dental insurance
- \$25/month car washes!

# ALTERNATIVES TO PS AND LR RENT

- Acdsee (\$39 to \$99)
- Affinity Photo (\$49)
- Paintshop Pro
- Mac only: Aperture, but it has been discontinued
- Linux: Gimp (might be available for Windows and Mac) (free)
- Pixelmator Pro
- Adobe Lightroom 6 (no more updates) (\$149)
- Should have bought 30 shares of ADBE stock. (\$80 to \$200 in 3 years, would have paid for 10 years worth)

# ADOBE PHOTOSHOP ELEMENTS 2018

- It is a perfectly good image editor
  - Although we won't use it in this class
  - Many basic Photoshop features and even a few tricks of its own
- It includes an image browser/organizer
- \$99 list (can often find discounts)
  - Remember that upgrade versions cost \$69 and are released every 12 to 18 months
- Compare to Adobe Lightroom/Photoshop for \$9.99/month and you always have the latest version

# PHOTOSHOP ELEMENTS

- It is not Photoshop!
- It does have many of the same features
  - Cropping, healing, brushes, adjustment layers, layers, clone, etc
  - It is lacking the channels view
- The interface is simplified but very different from PS



# PHOTOSHOP/LIGHTROOM VS PS ELEMENTS

- Lightroom
  - Library
  - Develop and other modules including operations
  - Non-destructive editing
- Photoshop
  - Tabs
  - Toolbar
    - Settings above
  - Full set of complex tools
  - Assumes you are expert
- Elements
  - Organizer
  - No other modules, but some operations are available
  - No editing at all
- Image Editor
  - No tabs, uses filmstrip
  - Tools in pane
    - Settings below
  - Subset of simplified tools
  - Has guides to help and useful tools, like eye opener

# MORE GOALS

- This class is about restoration and improvement of old photos
- It is not a class about extensive compositing or fashion retouching

# CONCEPTS

- Files
  - Explain jpg, psd, bmp, tiff, pdf, etc.
- Destructive and non-destructive editing
- Color corrections and improvements
- Dust and scratches
- Tears and missing parts, physical damage
- Contrast and brightness
- Cropping and straightening

# BOOKS & WEB

- Photo Restoration & Retouching, Katrin Eismann
  - 3<sup>rd</sup> edition, very out of date with current tools, 4<sup>th</sup> edition estimated for March 2018
- Photograph Restoration & Enhancement, Vickie Ellen Wolper
- Many other books and videos can be found by searching the web, including Amazon and YouTube
- [www.KelbyOne.com](http://www.KelbyOne.com) (formerly NAPP)
- [www.Lynda.com](http://www.Lynda.com)

# CLASS INFORMATION

- [Martin.nohr@dixie.edu](mailto:Martin.nohr@dixie.edu)
- [www.nohrphoto.com](http://www.nohrphoto.com)
  - Download files for this class

# GENERAL WORKFLOW 1/2

- Make a backup copy just in case...
- Adjust image size as necessary
  - For screen only just count pixels
  - For print need (300 or 360) ppi
- Crop and straighten image as needed
- Remove color cast
  - Often a result of aging

# GENERAL WORKFLOW 2/2

- Adjust contrast and levels
- Repair physical damage
  - Spots, tears, scratches, dust, etc.
- Adjustments in targeted areas
  - Masking is used for this
- Sharpening depending on use

# TWO PROGRAMS

- Lightroom and Photoshop
- Both have their strengths
- LR can do many things easily and quickly
  - Color adjustments are quick and easy in LR
  - Printing and file output is easier
  - Collection management
- PS will be needed for some jobs
  - Masked adjustments and layers



# TWO APPROACHES

## Lightroom

- Files are never modified, changes are applied for viewing, exporting and printing
- Everything saved automatically
- All changes are saved and can be undone even after exiting and returning to LR

## Photoshop

- Opens and works on files that are saved
- Modifies the file
- Changes cannot be undone after exiting

# FEAR OF PHOTOSHOP



- Yes, it is a big powerful professional program that does almost everything
- You don't have to learn all of it to be useful
- We will take small manageable bites and chew them well
- So, don't be afraid, you have a guide!
  - And the internet has many tutorials

# PHOTOSHOP PARTS

- File management
- Color, contrast and other controls
- Layers
  - Blend modes
- Adjustment layers
- Layer masks
- Clone stamp
  - Content aware
- Healing brush
  - Spot and area
- Filters
  - Sharpening
  - Dust removal
- Exporting & printing

# ADOBE LIGHTROOM CLASSIC

- Great tool for managing photo collection
- Keyword/metadata searching
- Never modifies the original image file
  - This is a really big deal! The originals are treated like negatives and will never be damaged by editing, editing can instantly be undone, even after saving
- Virtual copies, try different ideas
- Excellent basic editing tools

# LIGHTROOM PARTS

- Archive and retrieve, keywords
- Basic photo editing
- Works well with Photoshop
- Publishing to web, books, pdf
- Printing
- Inherently non-destructive
- Contrast, color, exposure, noise, cropping, dust, etc.
- Not the best for physical damage



# LIGHTROOM

A Quick Introduction

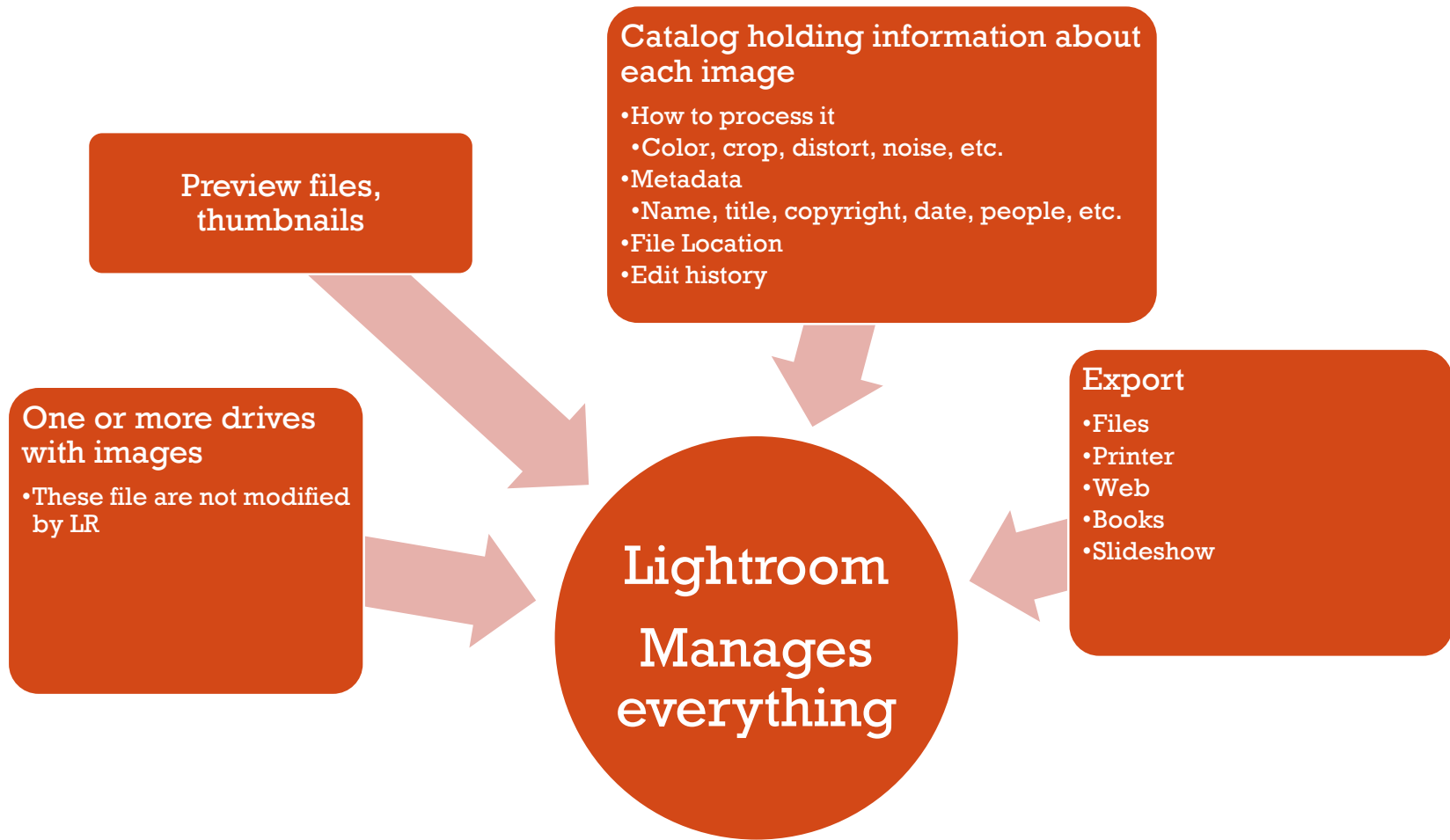
One or more drives with images

- These files can be modified by PS

Export

- Files
- Printer
- Web

Photoshop  
Edits  
Image  
Files





# LR AND PS

- LR shows a catalog, looks at all the photos
- You select one or more to edit
- No open or save command
- PS is traditional editor
- Use explorer or bridge to open a file
- Must save after editing

# NON-DESTRUCTIVE EDITING

**Instructions**  
**Stored in Lightroom**  
**Can be changed anytime**

**Original - it is never modified**



- Crop
- Correct Perspective
- Make Black and White



**Final Result**



# NON-DESTRUCTIVE EDITING IN PS

- Not as easy as Lightroom
  - Because it is automatic in LR
- Done with extra layers and smart objects
  - This results in larger files
  - Also a little bit of extra work
- Why do it?
  - Because it can be changed later

# LIGHTROOM MODULES

- Import (get the images into LR)
- Export (get images out of LR)
- Library (browsing, searching, comparing)
- Develop (editing)
- Map (shows location, requires geo-tags)
- Book (coffee table books)
- Slideshow
- Print
- Web (photo collections)

# LIGHTROOM WORKFLOW

1. Import images
2. Add keywords to aid searching later
3. Examine images  
Delete bad ones, improves your reputation!
4. Select keepers, edit as necessary
5. Output to web, PDF slides, print, or book
6. Later: search collection for further work

# LIGHTROOM CONCEPTS TO NOTE

- Images are never modified directly, so backup copies aren't needed, but you can use virtual copies if you want to try different treatments
  - Virtual copies use very little disc space
- There is no “save” command, everything is recorded and saved as you work

# PHOTOSHOP WORKFLOW

- Open file to edit, perhaps from Lightroom
- Edit file
- Save file
  - If opened from Lightroom, thumbnails and metadata will be automatically updated
- File can be opened anytime for more editing, or printing (easier from LR)

# ARCHIVING AND RESTORATION

- Some photos do not need to be restored, but should be archived
  - Good enough
  - Not too interesting
  - Too difficult to improve
- Pick the easy ones you would enjoy first
  - This will build your skills and confidence
- Archive the others for later work



# RESTORATION IS PART ART

- Good enough is often amazing to others
- Do not expect to be “perfect”
  - Even slight improvements are good
  - Don’t overdo editing, it is ok to look a little old
- You will get better with practice
  - Never give up, but take a break occasionally
    - Especially when you feel like throwing the mouse

# IMAGE EDITING

## Easy

- Color, contrast
- Dust, small scratches
- Cropping
- Sharpening (sort of)

## Harder

- Tears, missing pieces
- Face parts
- Stains, blotches
- Background replacement



# EQUIPMENT

Where did HAL go?

What computer and accessories are useful

Get the best you can afford, video and ram

# COMPUTER

- Mac or PC, both are fine, LR/PS similar
  - Swap command/control and option/alt
- Good video card will speed things up
- Sufficient ram and disk space
- External or network drives for backups
  - Don't lose your work or your images!
  - Time machine or Windows 10 backup
  - Acronis, NovaBackup, Carbonite, etc.

# PEN TABLET OR MOUSE

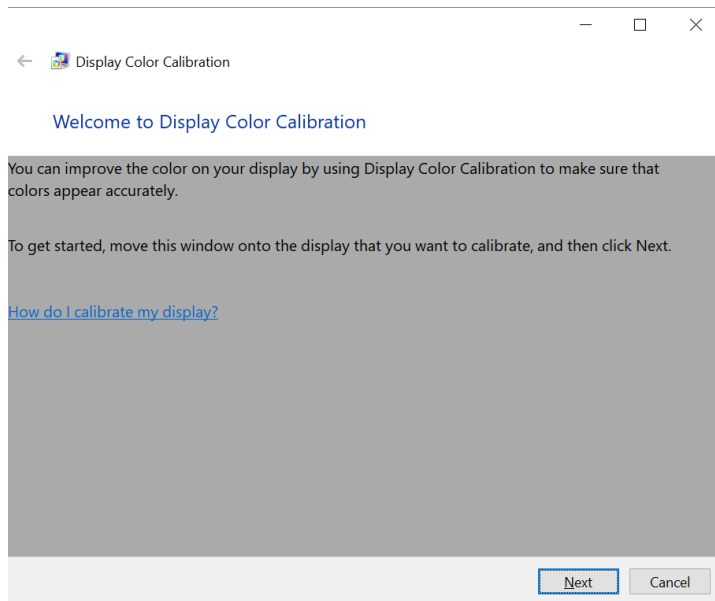
- A Wacom graphic pen tablet is handy
  - There are other brands available
- Mouse is better than touchpad, but pens and touchscreens that you can write on are even better

# MONITOR

- Wacom Cintiq graphic display is ideal
  - You can draw right on the screen \$\$\$
- For color work monitor should (must!) be calibrated or certified to at least sRGB
  - Adobe RGB is better but \$\$\$
  - Many lower cost LCD's have poor color
- Can manually calibrate but more accurate to use monitor calibration device

# MONITOR COLOR CALIBRATION

- X-Rite ColorMunki
- Datacolor Spyder5
- Windows 10 “display color calibration”



# COLOR TEST PHOTO





# SOFTWARE

- Lightroom for managing collection
  - Basic editing
  - Printing
  - Publishing to books and web
- Photoshop
  - More advanced image editing
- Both together cost \$9.99/month
  - Don't forget the 30 day free trial



# COLOR THEORY

Helps you understand color and how to manipulate it

I'm feeling blue today, I need some yellow

# COLORS

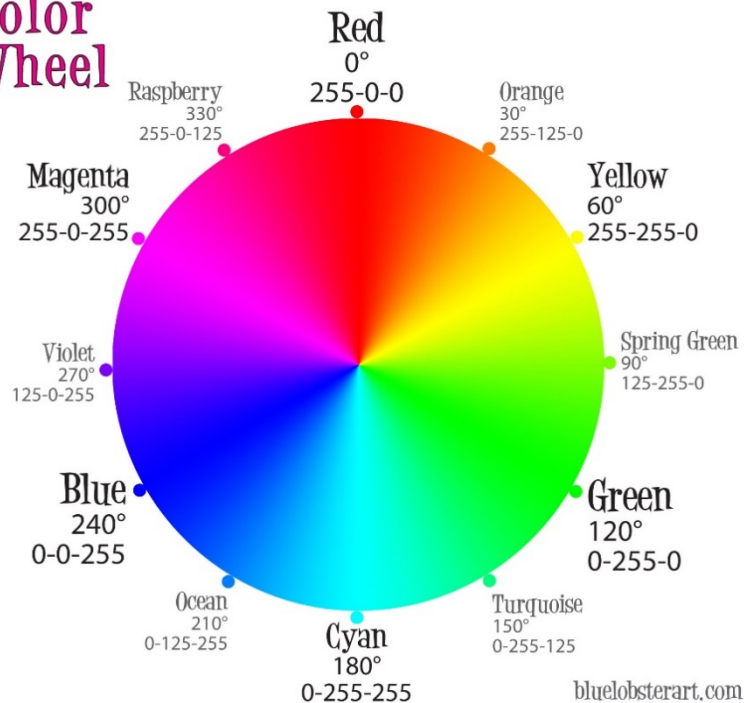
- Any color can be made up by mixing varying amounts of primaries
- Two sets of primary colors are used in digital photography
  - RGB (red, green, blue)
    - Additive, things that glow, like monitors
  - CMY{K} (cyan, magenta, yellow, {black})
    - Subtractive, things that absorb, like paper
- Not the same as you learned in school with crayons!

# OTHER COLOR MODELS

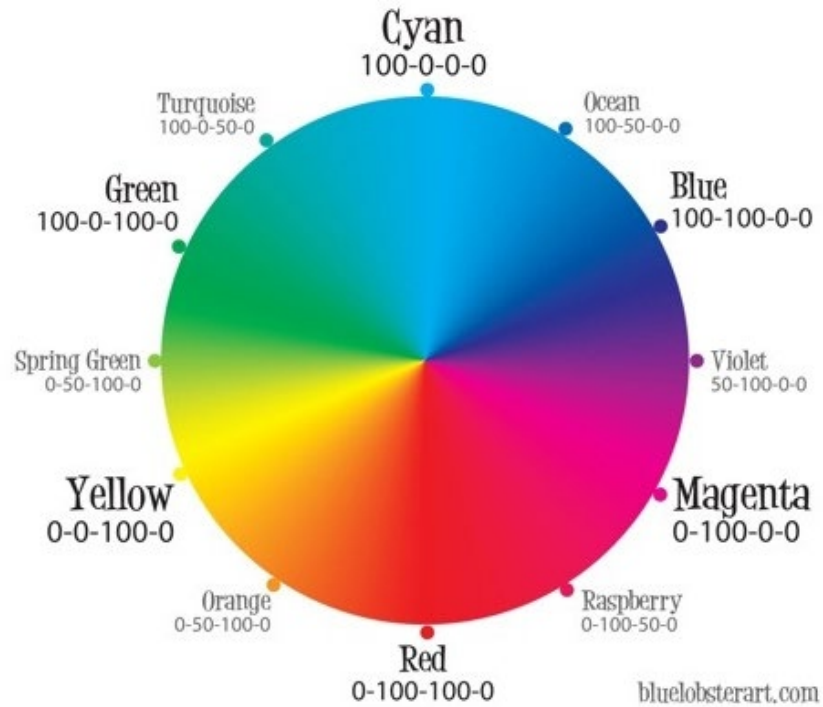
- Photoshop supports LAB and others
- Useful for some things, but beyond the scope of this class

# RGB COLOR WHEEL - DISPLAYS

## RGB Color Wheel



# CMY COLOR WHEEL - PRINTING



# RGB COLOR VALUES

- Often shown as byte values (0, 255, 255)
- Sometimes shown as (100%, 0%, 100%)
- 255 is 100% of a single byte value
- What is (255, 255, 255)?
- What is (50, 50, 50)? Or (0, 0, 0)?
- How about (255, 0, 0)?
- (100, 100, 0)?

# COLOR RELATIONSHIPS

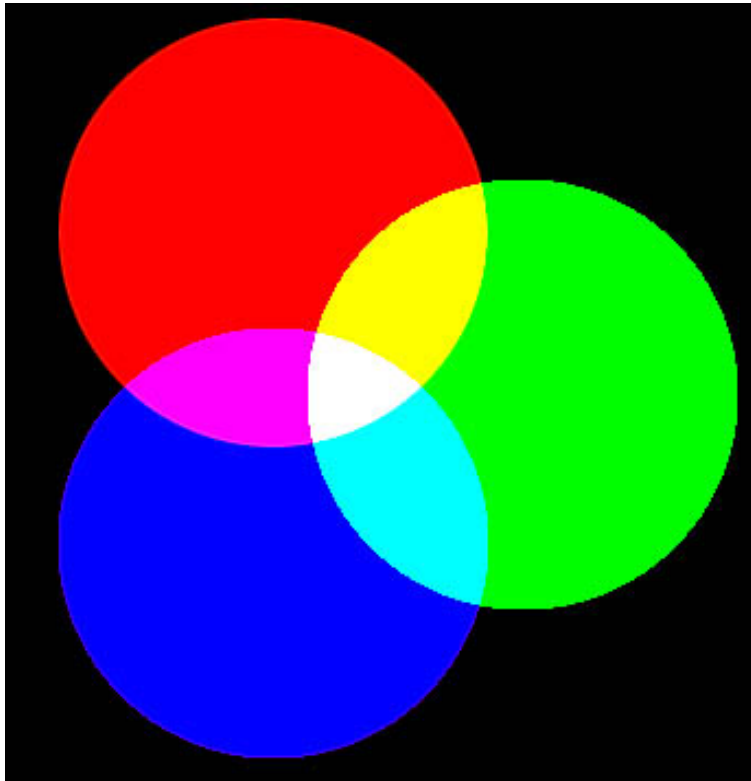
- Understanding the color wheels will help you fix image color problems or to use colors creatively
- Learn the relationships
  - $R+B=M$
  - $R+G=Y$
  - $B+G=C$
  - Etc.

## Opposites

- $R \sim C$
- $G \sim M$
- $B \sim Y$



# COMBINING GLOWING COLORS (RGB)



Notice how each two form a color that is the opposite of the third color



# PIXELS

Did somebody mention pixies?

I need to get them out of my garden



Notice each block has a color and brightness.



All you have to do is make them small enough so you can't see them.

# RESOLUTION

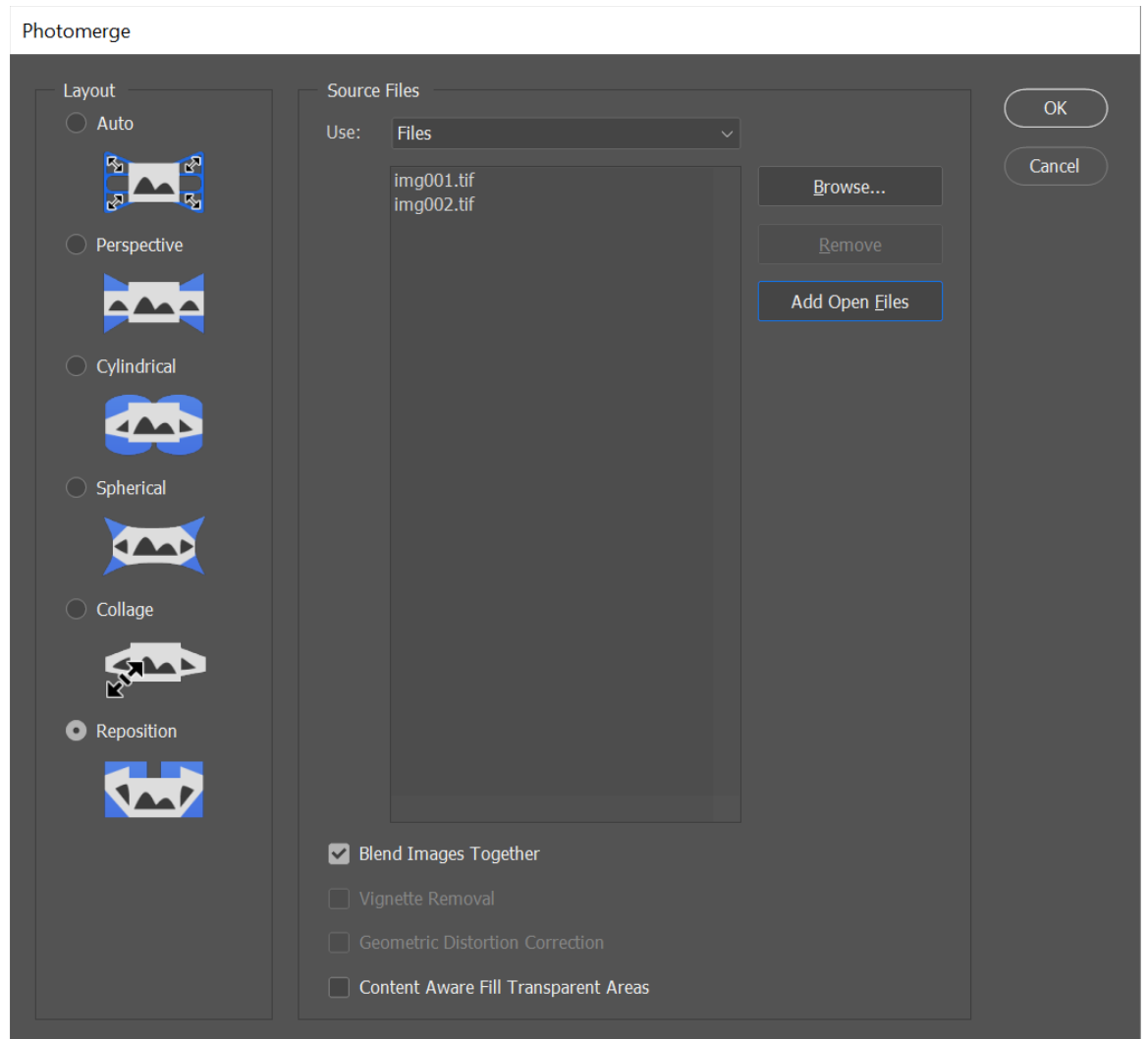
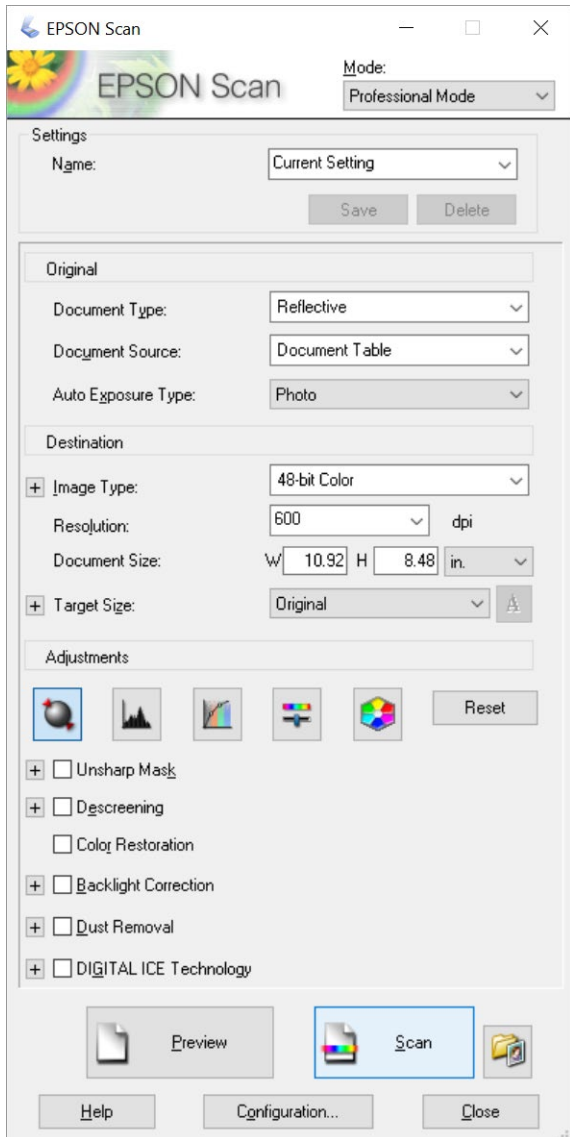
- Confusing terminology
  - Sometimes it means to **pixel counts**
    - Sensor size in MegaPixels
  - Sometimes it refers to **pixel density**
    - Printing pixels per inch, often dots per inch is incorrectly used
  - Sometimes it refers to scanning
    - Pixels per inch

# RESOLUTION FOR SCANNING

- PPI pixels per inch
  - 300 minimum PPI for scanning photos
    - It depends on the end use, printing or display
  - 2400 or better for 35mm slides or negatives

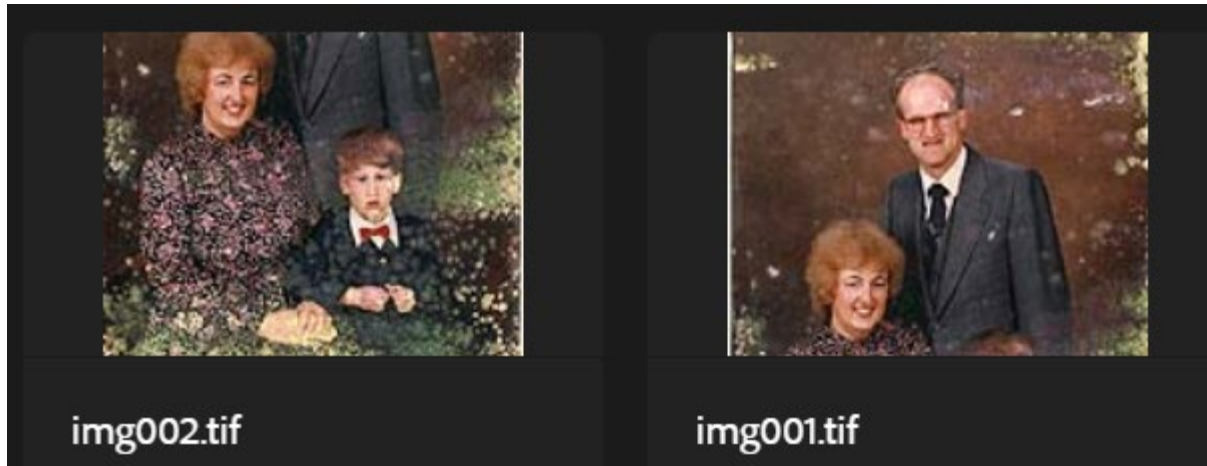
# SCANNING LARGE PHOTOS

- Using a camera is often best choice
- If picture is curled, then flatbed is better
  - Have to scan multiple parts and combine
  - Turn off auto color corrections
    - It will likely give different colors on each part
  - Combine parts in Photoshop using File | Automate | Photomerge
    - Choose the Reposition type

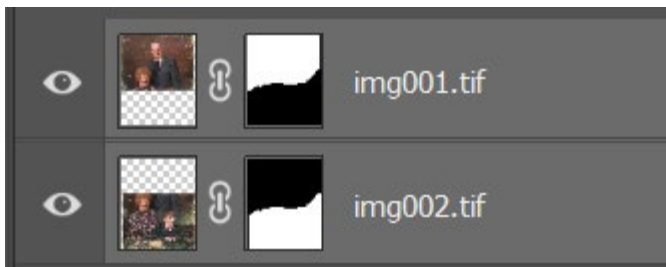




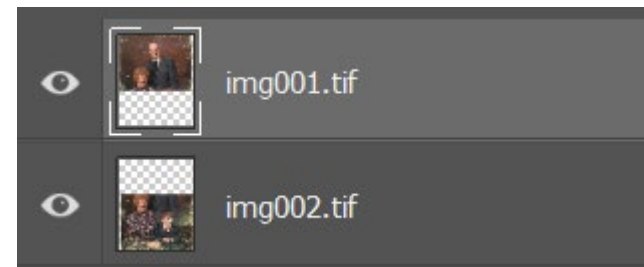
# BLEND OPTION LAYER RESULT



Blend on



Blend off



This picture (16"x 20") was stored rolled up in a drawer in Hawaii. It was badly curled and has major mold damage. It also has cracks and missing pieces of the emulsion. The color has faded somewhat.

The two scans have now been merged and the image is awaiting the magic touch of the image restoration artist!



# PIXEL RESOLUTION FOR DISPLAY

- It is simply the number of pixels that matter, your display might have 640x480, 1600x1200, 1920x1440 or even larger
- The pixel density can vary between monitors (although it is often 72 to 96 PPI)

# PIXEL RESOLUTION FOR PRINTING

- Often incorrectly called DPI dots per inch
  - DPI is how many little ink dots in a pixel
- Need 300 PPI for HP and 360 for Epson
- Can use 600 and 720, but doesn't look much different, just prints slower
- In Photoshop use resize to see effects
  - Try with and without resample checkbox
- Much easier to print from Lightroom





100dpi

50dpi





300dpi



600dpi



1200dpi

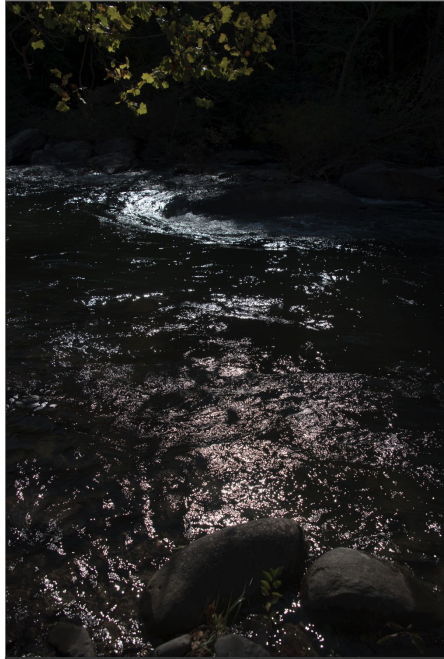
# 8 OR 16 BIT SCANS OR IMAGES

- Many scanners and cameras can set the bit depth
- 8 is enough most of the time
- 16 is better if you need to make major image adjustments, but the files will be twice as big

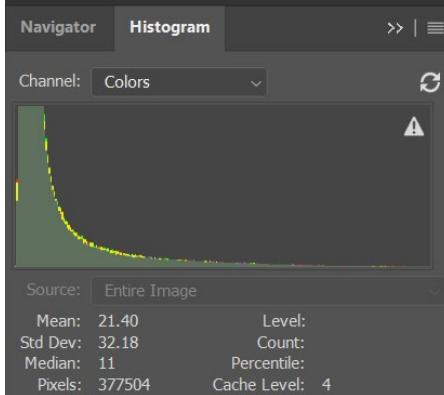




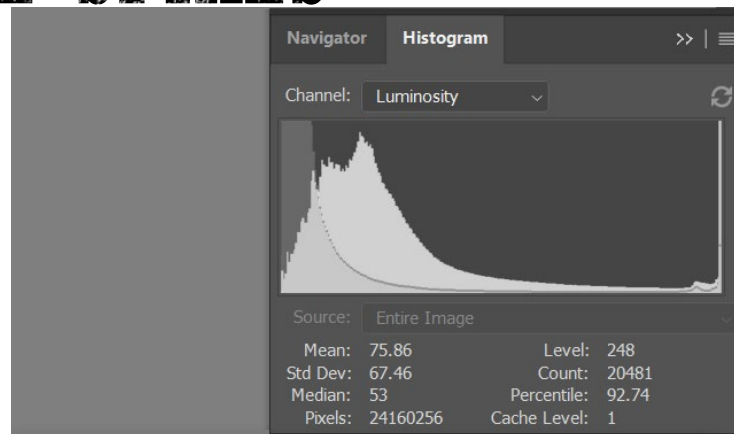
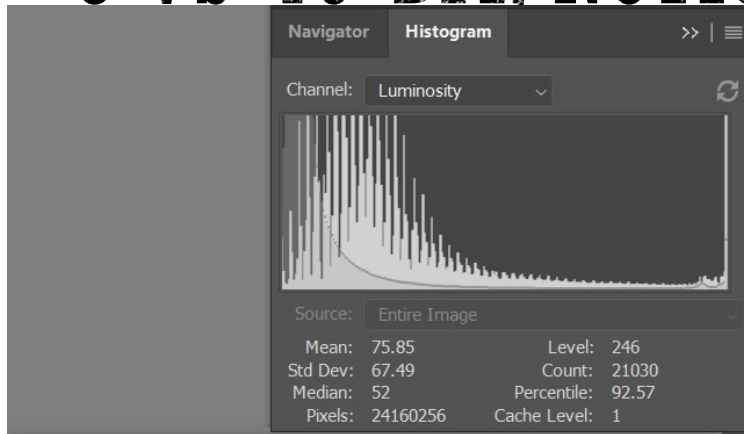
# ORIGINAL, 16 BIT RESOLUTION



Use levels to  
brighten



# 8 VS 16 BIT. NOTICE SPIKES



Levels ×

Preset: Custom [gear icon] OK Cancel

Channel: RGB

Input Levels:

0 1.00 50

Output Levels:

0 255

Preview

Levels ×

Preset: Custom [gear icon] OK Cancel

Channel: RGB

Input Levels:

0 1.00 50

Output Levels:

0 255

Preview





# FILE TYPES

What they are and when to use which for what

# METHODS OF IMAGE STORAGE

## Compressed

- Reduces file size by removing redundancies
- Two kinds
  - Lossy, some detail is lost (JPG)
  - Non-lossy, nothing is lost (PSD, TIFF)

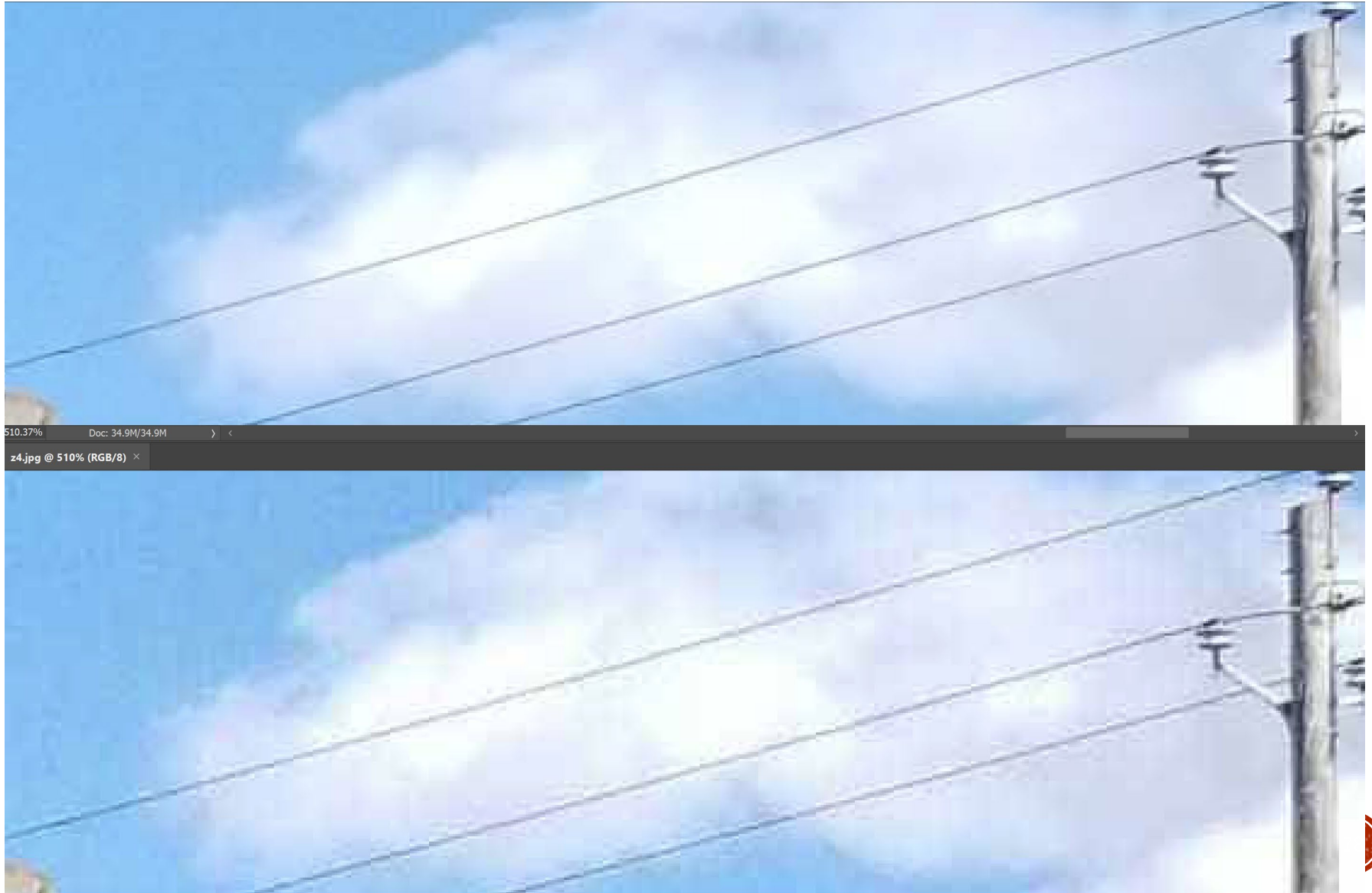
## Uncompressed

- Big files, but no data is ever lost
- BMP, TIFF(sometimes), others

# JPEG COMPARED TO NON-LOSSY

- JPEG
- Resolution loss
- Should NEVER be edited and re-saved, image rot (generation loss)
  - Exception: Lightroom, it does not modify the original image
- Use for eMail or Web
- Non-lossy
- No loss of quality
- Save in PSD, TIFF(LZW) or other non-lossy format, editing does not damage image
- Easily convert to JPG for sharing

- re-compression causes problem, happens on cropping or quality settings etc.
- IF you don't change size or jpg settings the quality loss can be minimal
- Top is original, bottom is 6 pixel crop and save 4 times



# BEST FILE TYPES

- **JPG** for email and sharing, not editing
  - Although Lightroom treats it special
- **TIFF** or **PSD** for editing in Photoshop
  - Lightroom understands “all” formats
  - However, it is possible to use Adobe Raw as a non-destructive filter on a smart object in PS
- **PDF** for mixed text and photos used as output format, not good for editing

# CAMERA FILES

- Raw file format
  - Better adjustments are possible
  - Maximum image detail stored
  - Lightroom and other programs convert automatically to something that can be edited
- JPG
  - Should never be edited and saved in Photoshop unless non-destructive method



# SCANNER FILES

- Use non-lossy file format like TIFF if available instead of JPG
- If driver supports it, > 8 bits per channel
- Scan B&W in color mode, it will give more information for corrections and improvements later
- Some scanners save in PDF, do not use
  - It is more trouble to extract the image to edit

# METADATA IN FILES

- Data that is attached to the image file
  - Automatically has date, camera settings, and GPS if available
- Add keywords, copyright, etc.
- Can save names, places, events, etc.
- Software can search contents
- Either stored in image file or as “sidecar”
  - Jpeg and tiff/psd store in file
  - Some formats use a sidecar file (xmp)



# THE HISTOGRAM

It's not the hysteria-gram!

They said there would be no math!

It's just a bar graph, but so very important and useful.

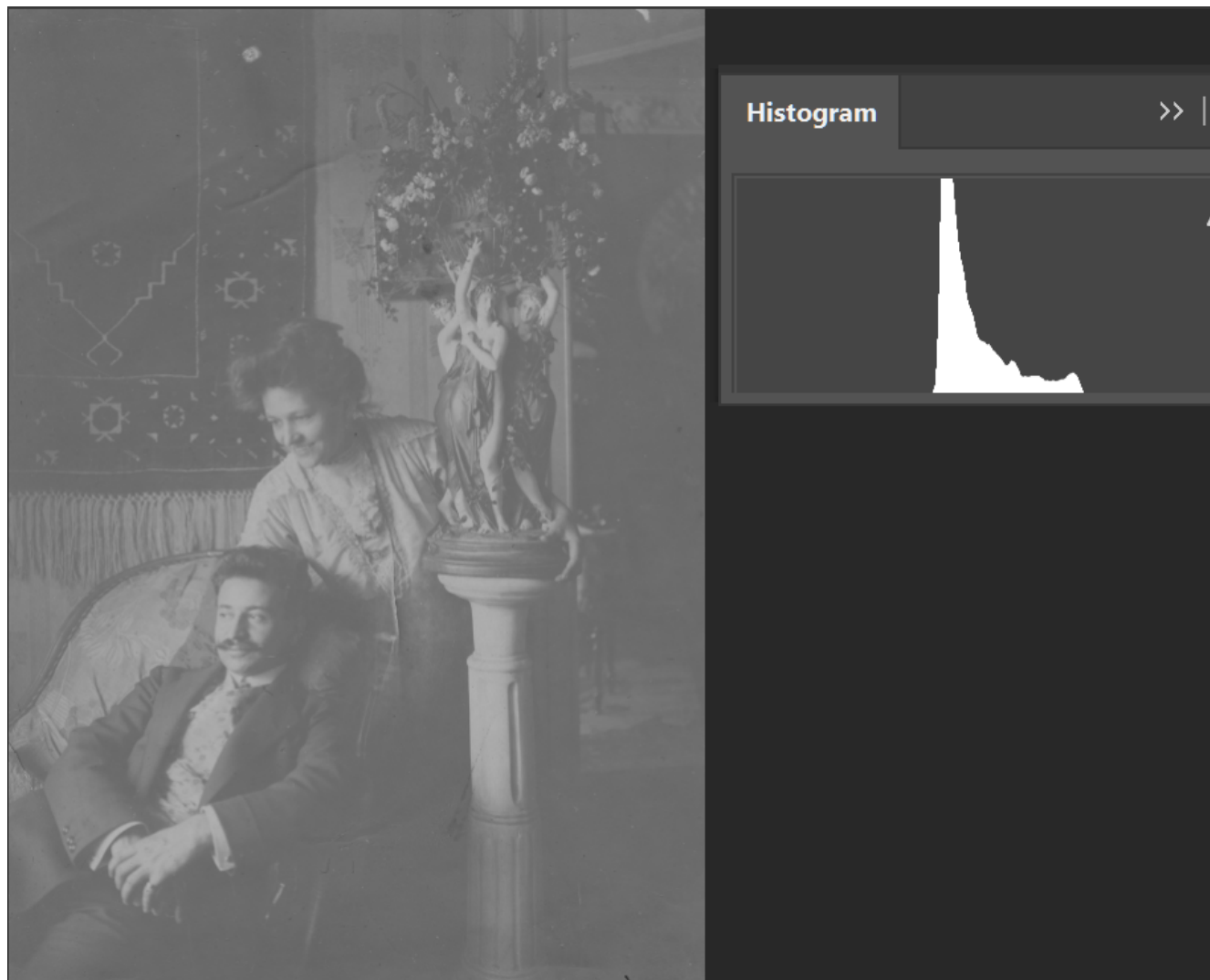
# HISTOGRAM

- One of the most important tools you need to understand the image light quality
- It's a bar graph showing the count of pixels at each brightness level
  - Black on left
  - White on right
  - Optionally sometimes a graph for each color
- A glance will tell you much
- Keep your eye on it while editing

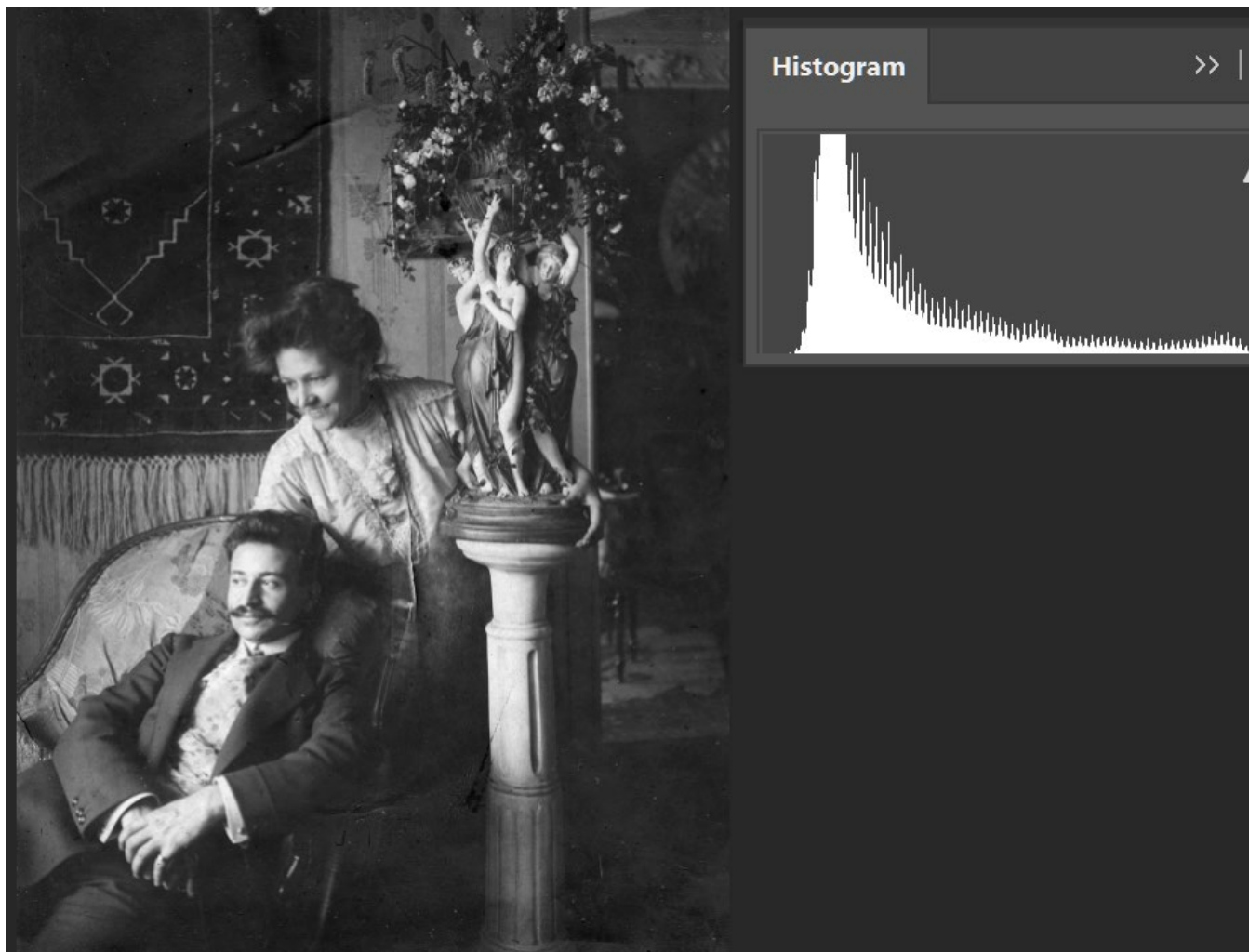
# HISTOGRAM ANALYSIS

- Spikes show loss of data, E.G. when adjacent pixels combined
- Holes = loss of data when pixels spread
- Crowding black side = poor shadow detail
- Crowding white side = poor highlight detail
- Crowding in middle = low contrast

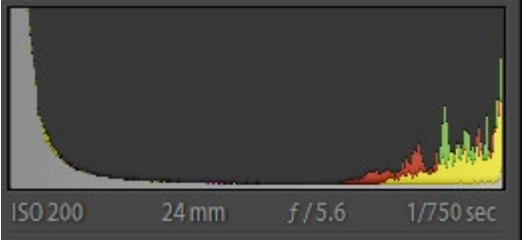
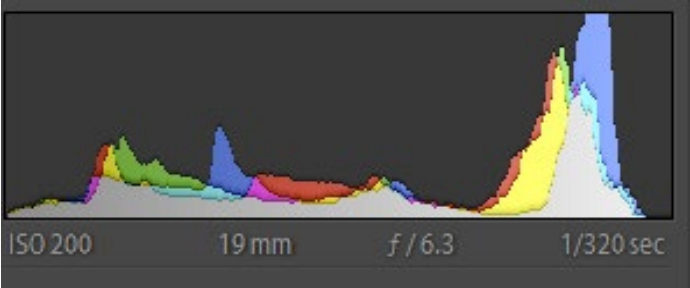
# HISTOGRAM EXAMPLE - ORIGINAL



# HISTOGRAM EXAMPLE – CONTRAST+



# HISTOGRAM EXAMPLE - COLOR





# HISTOGRAM EXAMPLE





# LIGHTROOM

Managing the image collection



# LIGHTROOM EXERCISES

How do I get my pictures into LR, and where are they?

Let's import the example images.

# IMPORTING IMAGES

File Edit Library Photo Metadata View Window Help

FROM N:\(NIKON D750) : All photos

Copy as DNG Copy Move Add

TO Local Disk (C:) : Users \marti\ Pictures

Source

Devices  Eject after import

N:\(NIKON D750)

Files

- Local Disk (C:)
- WORKING (D:)
- FastDriveSSD (E:)
- Seagate Backup Plus Drive (F:)
- NIKON D750 (N:)
- homeshare (\\links00566) (Z:)

All Photos New Photos Destination Folders

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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

File Handling

File Renaming

Apply During Import

Develop Settings None

Metadata None

Keywords

Destination

Into Subfolder

Organize By date

Date Format 2017/11/18

Local Disk (C:) 280 / 476 GB

Users

- ▼ marti
  - ▶ .android
  - ▶ .AndroidStudio2.3
  - ▶ .gradle
  - ▶ 3D Objects
  - ▶ AndroidStudioProjects
  - ▶ Contacts
  - ▶ Creative Cloud Files
  - ▶ Desktop
  - ▶ Documents
  - ▶ Downloads
  - ▶ Favorites
  - ▶ Intel

61 photos / 2 GB

Import Preset: None

Check Videos Uncheck Videos

Sort: Capture Time

Thumbnails

Import Cancel



# LIGHTROOM EXERCISES

The library module is where we look at things, and where we can search to find them

Adobe Photoshop  
Lightroom Classic CC

Navigator FIT FILL 1:1 3:1

Library Filter: Text Attribute Metadata None

Filters Off

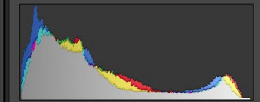
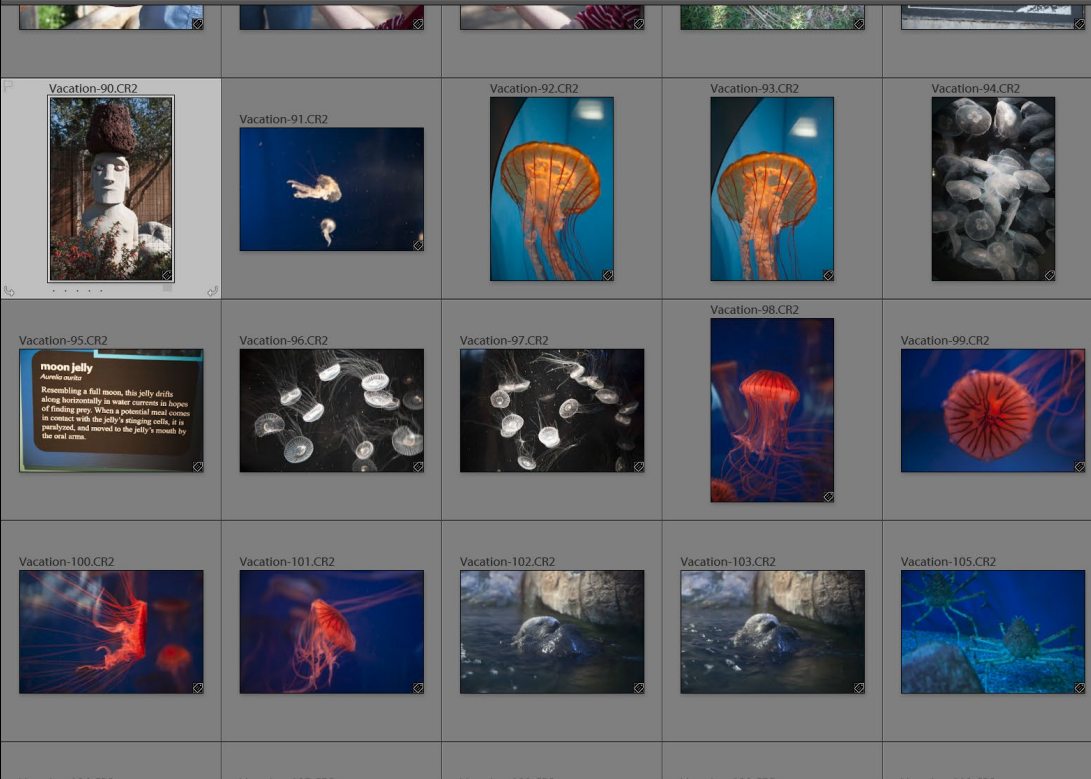
Histogram



- Catalog
- All Photographs 42779
  - All Synced Photographs 0
  - Quick Collection + 467
  - Previous Import 35
  - Previous Export as Catalog 155
  - Photos That Failed to Export 17

- Folders
- WORKING (D:) 0.1 / 1.8 TB
  - MN Photos 42705
  - FastDriveSSD (E:) 203 / 224 GB
  - M:
  - P:

- Collections
- Filter Collections
  - Big Prints
  - Events
  - Family
  - From Lr mobile
  - Point Curve Recovery...
  - Smart Collections
  - SNM 2012-2013
  - SNM 2013-2014
  - SNM 2015-2016
  - SNM 2016-2017



Custom Quick Develop

Keywording

Keyword Tags Enter Keywords

Aquarium, California, Long Beach, statues

Keyword Suggestions

- Monterey illinois nauvoo
- Mazelle Temple Calgary
- Alberta Alex Ortega disneyland

Keyword Set Custom

- 7 counselors 8 Special n... 9 yw
- 4 YM 5 Goblin Va... 6 Trees
- 1 Richfield ... 2 satpaq 3 phone

Keyword List

Default Metadata

Preset None

File Name Vacation-90.CR2

Sidecar Files xmp

Copy Name

Folder 2008-05-19

Metadata Status Up to date

Sync Metadata Sync Settings

Import Catalog Export Catalog

Sort: Capture Time

Thumbnails

All Photographs 41666 of 42779 photos / 1 selected / Vacation-90.CR2





# LIGHTROOM EXERCISES

The develop module is where we do colors, crops, and many other image corrections



# CROPPING

I only want to keep what is important

But LR doesn't lose cropped pixels, they can be recovered anytime

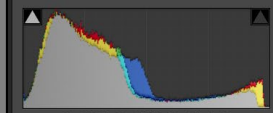


# LIGHTROOM

- 'r' command in develop for crop tool
- Use three goblins.jpg
- While we're here, lets try some other develop operations



Histogram



R 32.2 G 32.5 B 34.9 %

Original + Smart Preview



Basic

Treatment: Color | Black & White

WB: As Shot

Temp 4800  
Tint 0

Tone Auto

Exposure 0.00

Contrast 0

Highlights 0

Shadows 0

Whites 0

Blacks 0

Presence

Clarity 0

Vibrance 0

Saturation 0

Tone Curve

HSL / Color / B & W

Hue Saturation Luminance All

Saturation

Red 0

Orange 0

Yellow 0

Green 0

Aqua 0

Blue 0

Purple 0

Magenta 0

Split Toning

Detail

Previous Reset



# LIGHTROOM EXERCISE

Use white tool in develop

# COLOR FADED EXAMPLE



Lightroom or  
Photoshop



# COLOR CORRECTION IMAGES

- Really blue.jpg
- Faded bill.jpg
- Faded color.jpg
- Faded color-2.jpg
- Faded color-3.jpg



# LIGHTROOM EXERCISES

This is dusty, let's clean it up.

And what about those ugly stains?

# LIGHTROOM DUST REMOVAL

- Spot tool, clone and heal
  - Clone replaces, heal copies texture only
- Must use for each spot
- Can also be used on areas
- Automatically picks source, but can be changed later
- Checkbox, “Visualize Spots”
  - Helps to see the dust sometimes

# IMAGES TO WORK ON

- Color spots.jpg





# PHOTOSHOP

When did this become a verb?

# PHOTOSHOP ELEMENTS

First a quick look at PS Elements tools

Use the manager to look at your files, a bit like Adobe Bridge, but much simplified

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Open

eLive

Quick

Guided

Expert



Create

Share

VIEW

faded.jpg @ 100% (RGB/8) x



SELECT



ENHANCE



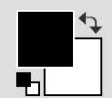
DRAW



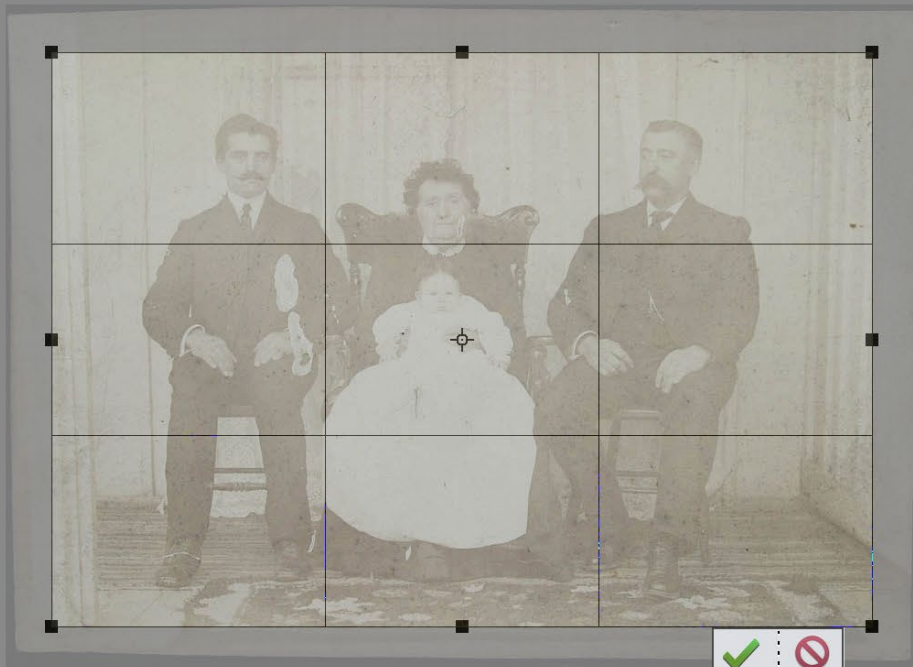
MODIFY



COLOR



Normal Opacity: 100%



100% Doc: 2.08M/2.08M

Crop



No Restriction

W: [ ] H: [ ]

Crop Suggestions



Photo Bin



Tool Options



Undo



Redo



Rotate



Layout



Organizer



Layers



Effects



Filters



Styles



Graphics

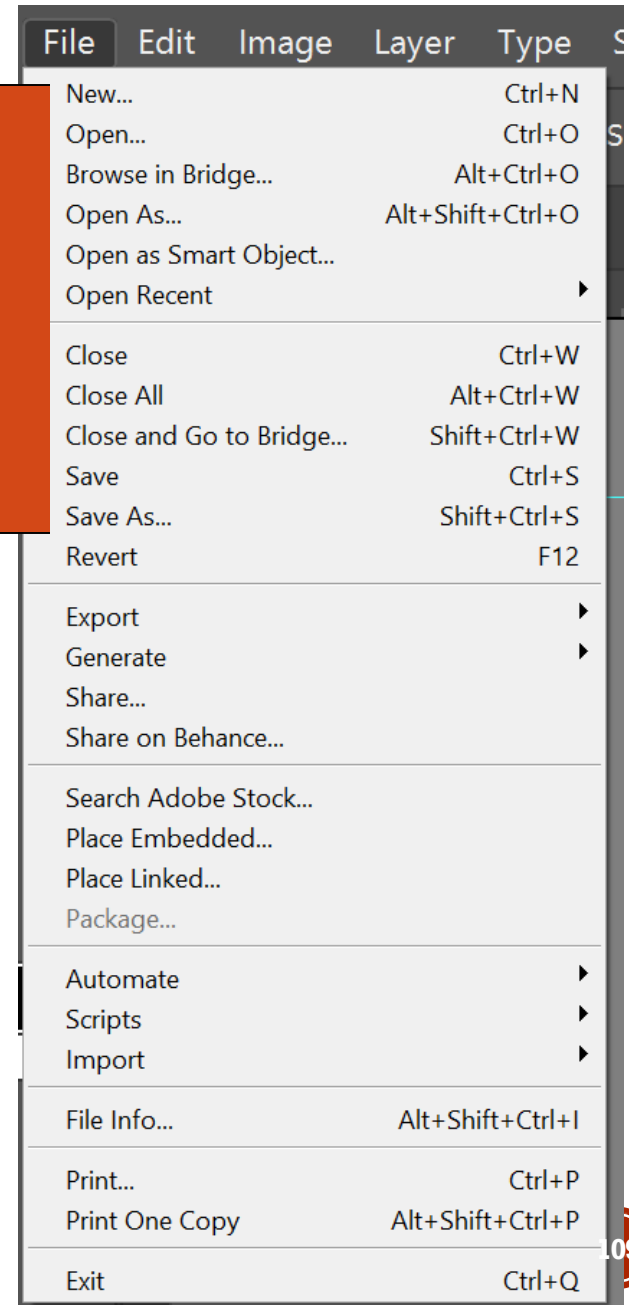
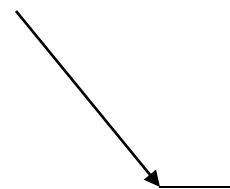


More

# OPENING AND SAVING FILES

- Adobe Bridge
- PS open, save, save as
- However: Lightroom is excellent for file management and can directly call Photoshop for things not easy to do in Lightroom

# FILE MENU IN PS





# NAVIGATING & CHOOSING TOOLS

I want to look closer at something before I use a hammer on it

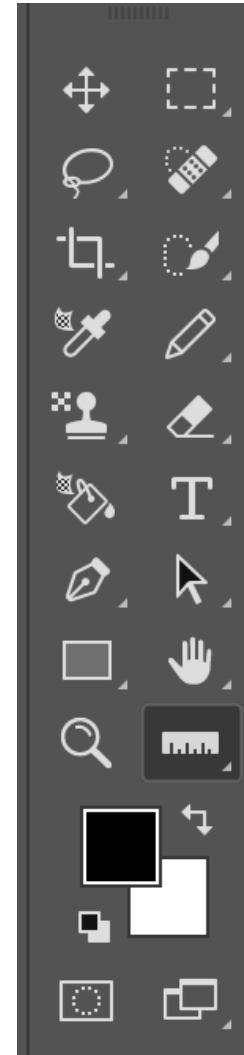
# USEFUL KEYS

- Space – to move view (same as hand tool)
- Ctrl+ to zoom in
- Ctrl- to zoom out
- Ctrl0 to fill window
- Ctrl+space to zoom with mouse
- Alt, shift, and control often modify tools in useful ways
- Letters choose various tools, lower/upper

# THE TOOL PALETTE



It can be set to a single column.  
Icons can be rearranged.  
They can be removed and added  
so your most commonly used tools  
are visible. All tools are always  
available under the ... icon.  
If the ... icon is not visible just  
select another tool. It shows the  
last tool you used that isn't on the  
default tool palette. As seen on the  
right here.







# VIEW TOOLS

Controlling the View

# IMAGE AND CANVAS

- The image contains your pixels
- The canvas is the workspace
- Initially they are the same
- Expand the canvas to provide some working room when necessary
- Crop later to get rid of extra space

# ZOOM (Z) AND HAND (H) TOOLS

- Ctrl+/-/0
- Scrubby zoom
- Drag marquee
- Click and alt click for zoom in and out
- The 'F' key, screen mode (also tab)
- Space bar as hand
- Ctrl space (alt) zoom no matter what tool
- Navigator window

# TABS AND WINDOW | ARRANGE

- Useful when multiple files opened
- You can even drag a tab away into its own window, and put it back again



# IMAGE TOOLS

How to improve images

# TOOLS

- Photoshop
  - Cropping
  - Color adjustments
  - Levels, curves, etc.
  - Dust & scratch filters
- Scanner software
  - Descreening, eliminate Moiré patterns
  - Restore fading
  - Levels, curves, etc.

# MORE PHOTOSHOP TOOLS

- Clone stamp
- Healing brush
- Spot healing
- Content aware cloning
  - Repair damaged or missing backgrounds
- Layer masks
- RGB channels

# TWO WAYS TO EDIT

## **Destructive**

- Changes are permanent and can't be changed later
- Almost anything you do to the image and save

## **Non-Destructive**

- Changes can be reversed or modified later
- Use special Photoshop tools
  - Layers and smart objects



# NON-DESTRUCTIVE EDITING

- Copy layers and work on the new layer
  - Makes file bigger
- Use layer masks to limit visibility
- Use adjustment layers instead of changing the pixels in a layer
- Convert image to a “smart object”
- NOTE: Lightroom always does non-destructive editing

# THE LAYERS PALLETTE

- Think of the layers as a stack of aligned images that you look at from the top
- Any transparent areas let you see the next layer down
- The transparency and blending rules can be adjusted for each layer (advanced)

# TWO KINDS OF LAYERS

## Bitmap or image

- Contains pixels, some of which may be transparent
- Can have a mask that hides some of the image, I.E. makes part of it transparent
- Overall transparency can be adjusted
- Blend modes control how it interacts with lower layers

## Adjustment

- Affects the underlying image information in various ways
- Can be set to affect all lower layers or only the first one
- Often used to affect color, levels, brightness, saturation etc. of image(s) below it

# SMART LAYER

- Acts like an image layer
- Allows to use of filters and other controls that do not permanently modify the pixels and can be modified later
- Very useful for sharpening, blurring, and many other effects
- Since the source pixels are not changed this is extremely useful
  - If you decide reduce the amount of blur added it can be done
    - With a normal layer this would have been impossible since the pixels were changed

# BACKGROUND LAYER

- The background layer is special, it is always on the bottom of the stack and some commands do not work on it until it is converted to a normal layer
- Double-clicking will convert it to a normal layer which can then also be named to help stay organized



# PHOTOSHOP EXERCISE

The crop tool, down to the bare essentials

NOTE: The crop tool has an option to straighten as well

# PHOTOSHOP



# CROP TOOL

- Try image tilted.jpg
- Try manual, notice cursor when outside
- Ruler (ctrl or button) drag line
- Classic checkbox
- Overlay options





# PERSPECTIVE CROP TOOL

- Crop, straighten, tilt, and rotate all at once
- Click once on each of 4 corners or just drag a box around important part
- Can adjust corners and rotate and shift crop mask until the ✓ is clicked

# PERSPECTIVE CROP

- Try tilted church jpg



# SHINY SURFACES

- Sometimes there is a shiny reflective surface on the print due to silver ion migration
- Sometimes the picture sticks to the glass
- Try soft light and if necessary tilt the photo, it can be straightened later
- Sometimes a polarizer can help

# PERSPECTIVE CROP

- Try reflection tilt.jpg



# PERSPECTIVE CROP

- Try surface reflection tilted.jpg



# CONTENT AWARE CROP

- Magic
- Make sure “classic mode” is not checked
- “content aware” checkbox in crop tools can be used to fill in blank areas
- Let’s experiment with dry lake.jpg
  - Extend crop to side
  - Try bottom, fails badly!



# CONTENT AWARE CROP

- Try trees and road tif
- Extend road a bit to the right





# PHOTOSHOP EXERCISE

Guide lines and straightening images

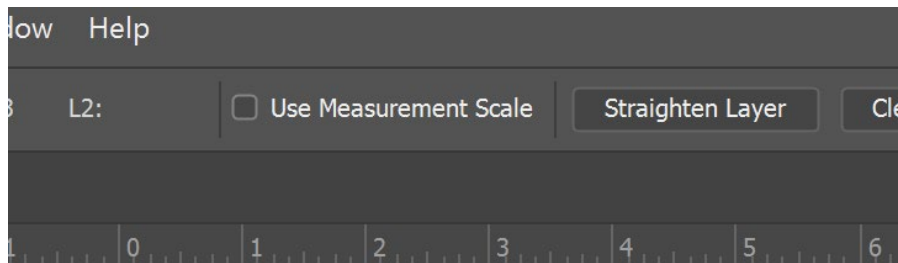


# LET LINES BE YOUR GUIDES AND FREE TRANSFORM YOUR HELPER

Drag guides  
From rulers



# IT IS EASY TO STRAIGHTEN WITH RULER



# RED EYE

- The dreaded evil relative at the reunion
- Modern cameras use pre-flash to prevent
- Open red eye.jpg
- Exorcism tool is under the healing brush
- Also try Lightroom to see a different way



# PHOTOSHOP EXERCISE

Multiple Photos in one scan

File | Automate | Crop and Straighten Photos

Try with [multiscan.tif](#)



# COLOR & CONTRAST

We all fade with time, but not always in the same way

# TOOLS

- Scanner software can often do a remarkable job during scanning
- PS Curves/Levels, black, white, grey and auto
- Auto button is similar to Lightroom grey tool, but much more adjustable

# BRIGHTNESS AND CONTRAST

- I don't recommend using it
- It's a very blunt instrument
- But it is sometimes useful



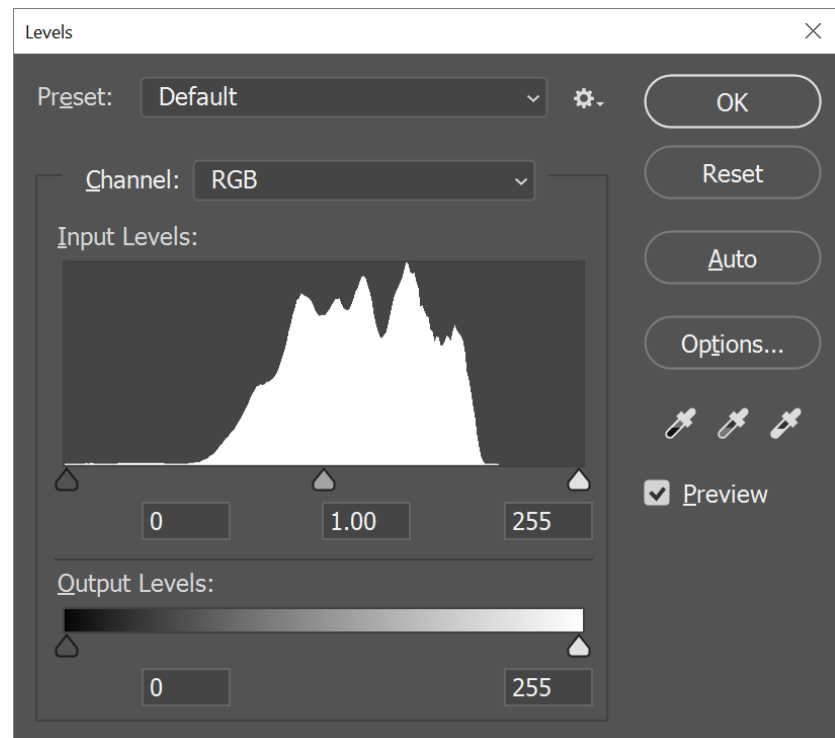
# LEVELS & CURVES

No, this is not a description of a race track!



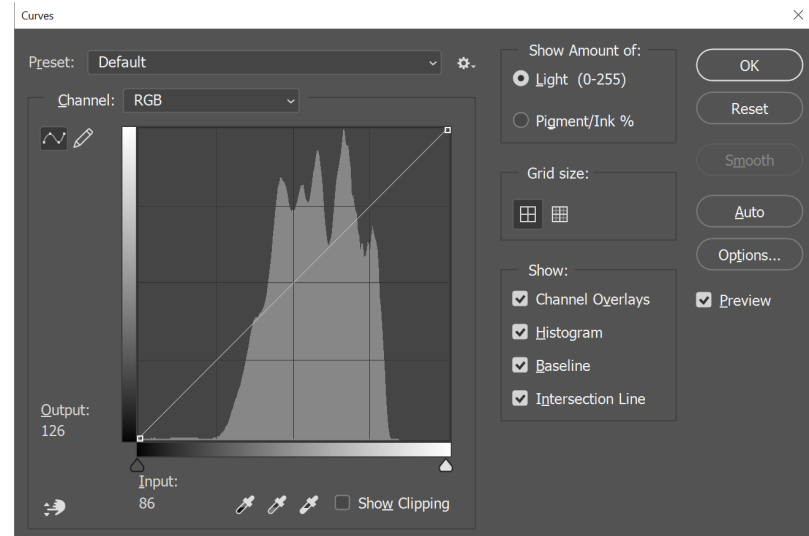
# LEVELS (^L)

- Used to set black, white, and gray points
- The auto button can often get things close



# CURVES (^M)

- Used to set black, white, and gray points anywhere in between
- “S” curves for + or – contrast
- The auto button can often get things close



# LEVELS & CURVES AUTO OPTIONS

Auto Color Correction Options ×


Algorithms

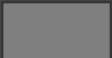
- Enhance Monochromatic Contrast
- Enhance Per Channel Contrast
- Find Dark & Light Colors
- Enhance Brightness and Contrast


---

Snap Neutral Midtones

Target Colors & Clipping

Shadows:  Clip:  %

Midtones: 

Highlights:  Clip:  %

Save as defaults

OK

Reset

Feel free to experiment

# ADJUST CONTRAST

- Nurse low contrast.jpg
- Faded.jpg
- Use level adjustment
- Alternatively use curves
- Try others



# PHOTOSHOP EXERCISE

Color, let's restore the faded glory

# TRY AUTO AND MANUAL LEVELS AND CURVES

- Trees and road.tif
- Faded bill.jpg
- Faded color.jpg
- Faded colors\*.jpg





# PHOTOSHOP EXERCISE

Examine how clone and healing tools work

# COVER SPOTS AND BLEMISHES

- Spots easy.jpg
- Use healing brush
  - Note that it works best with short strokes, not long ones





# DUST REMOVAL

Dust is everywhere!

It's a noun and a verb, and the verb has two meanings, to add or to remove, very confusing. 😊

# REMOVING DUST AND SPOTS

- Start by cleaning the image before scanning to start with as little as possible
- Removing dust automatically is a trade-off between spots and sharpness
  - Masking preserves sharpness where needed
- Do them one at a time if there aren't too many, use dust filter if too many spots

# DUST



# AFTER PHOTOSHOP DUST FILTER



# DUST FILTER WITH MASKING





# SCRATCHES

Photos aren't always lovingly protected

# TOOLS FOR SCRATCHES

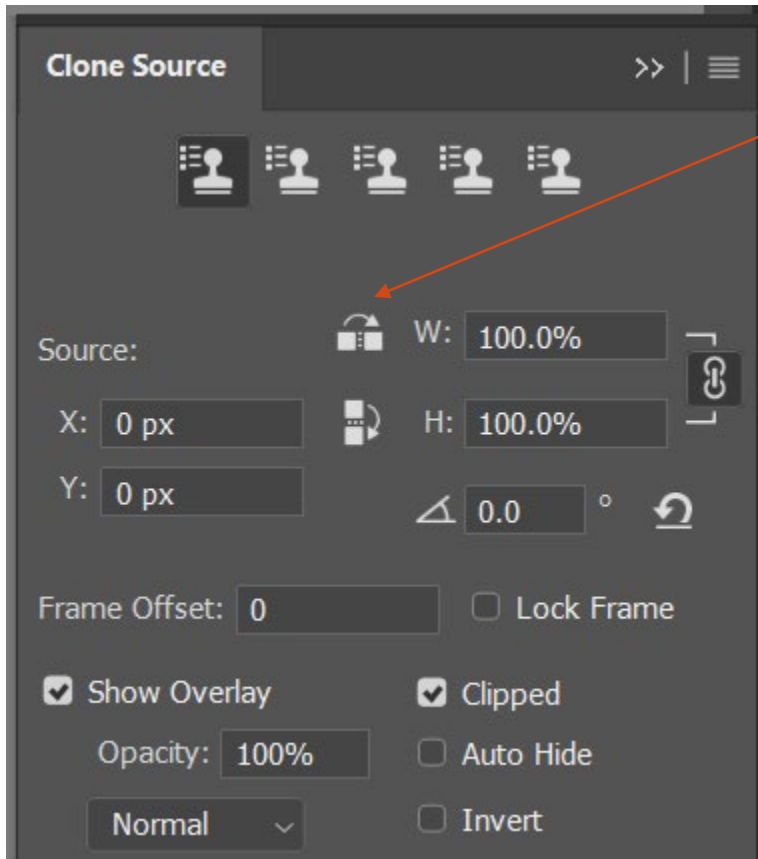
- Clone stamp
- Healing brushes
  - Spot
  - Patch
- Sometimes use clone followed by healing

# CLONE STAMP

- Used to copy pixels from one area to another
- To set the source location:
  - Hold the ALT key down, the cursor changes to a target
  - Move the target to the desired location with the mouse
  - Left click
  - Release the ALT key
  - Move the cursor to the area you want to copy to
  - Hold the left button down and drag the mouse around to paint
  - Release the mouse button when you're done
  - Move the mouse and use the left button to drag another area
    - If “aligned” is not checked the source stays the same
    - If “aligned” is checked the source will follow the mouse motion



# CLONE HAS OPTIONS TO FLIP



Flip horizontal to repair ears, faces, hands, clothing, etc.

Show this panel – Window | Clone Source  
Can also rotate the angle if needed.

Try fixing the eye in  
surface scratch and  
blue stain-01.jpg



# HEALING BRUSH

- Instead of copying pixels it copies the texture and blends the colors while painting, this is good for covering scratches and spots
- Follow the previous clone stamp instructions
- Remember to use short strokes

# SPOT HEALING BRUSH

- Instead of copying from a source it looks around the current area
- There is no need to set the source with the ALT key, in fact, if you try you will get an error message



# PHOTOSHOP EXERCISE

Let's look at layers, channels, masks and smart objects

# LAYERS



3D Layers Channels

Kind [v] [img] [circle] [T] [img] [img] [img]

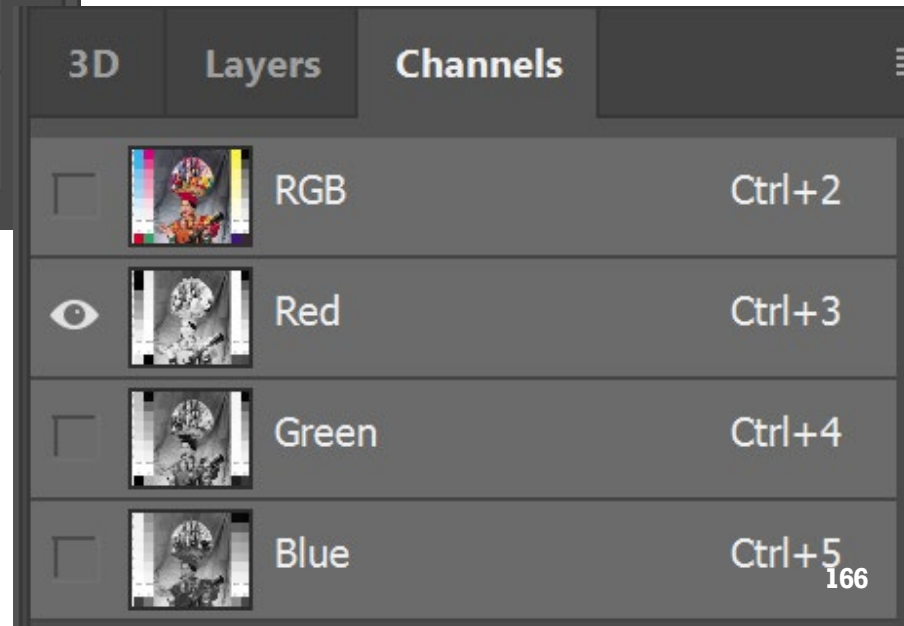
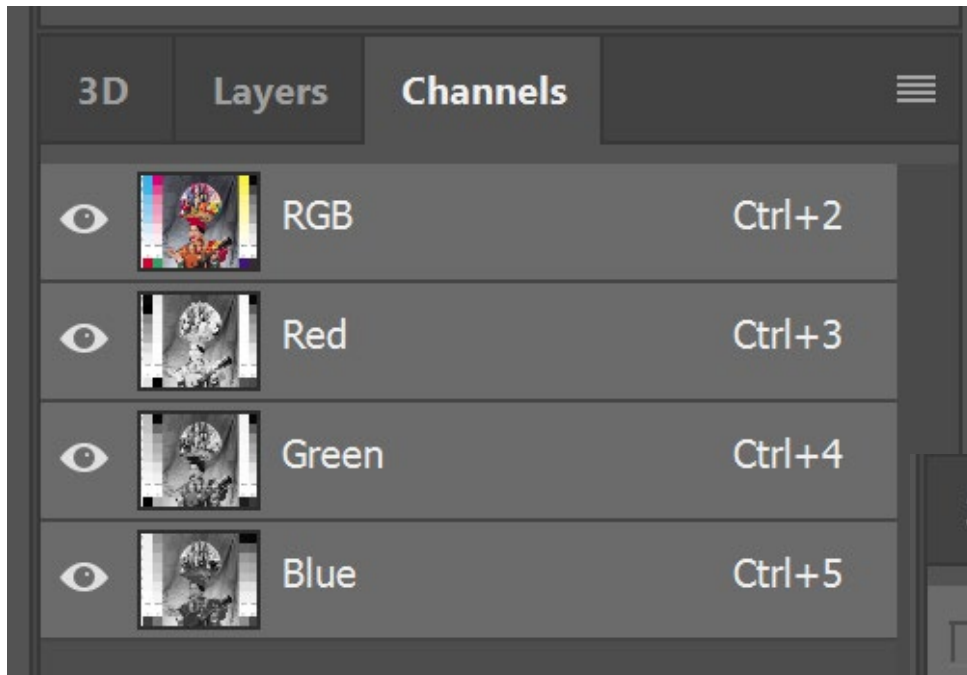
Normal [v] Opacity: 33% [v]

Lock: [img] [img] [img] [img] [img] Fill: 100% [v]

- [img] DVD Mask
- [img] Mask on top
- [img] [img] Pictures
  - [img] Layer 4 fx [v]
  - [img] Layer 3 fx [v]
  - [img] T Photos by Martin Nohr fx [v]
  - [img] T A Bountiful Harvest ... fx [v]
  - [img] [img] Layer 5
  - [img] Layer 6 fx [v]
  - [img] [img] Layer 2 fx [v]
- Effects
  - [img] Bevel & Emboss
- [img] White Background

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# CHANNELS IN RGB MODE



# SMART OBJECTS

- Applies filters without changing the pixels so the filter settings can be changed later
- We will mostly use adjustment layers in this class, but you will want to experiment with smart objects in the future as your skills and confidence improve



# PHOTOSHOP EXERCISE

Examine color tools, hue/saturation, curves, levels, color filters





# STAINS AND SPILLS

What? Somebody spilled coffee on my precious photos?  
My grandchild used a red marker pen where?



# PHOTOSHOP EXERCISE

Examine channels

# PHOTOSHOP ELEMENTS

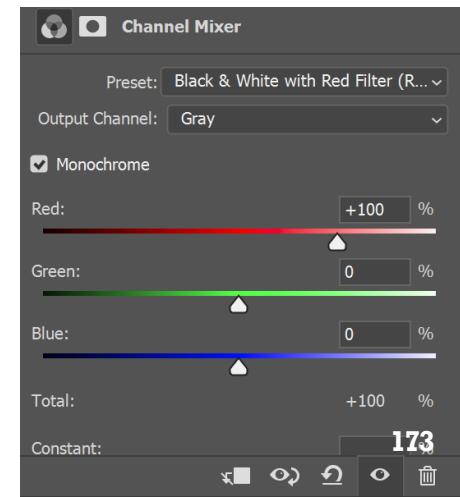
- Does NOT have the ability to examine the color channels
- Does NOT have a channel mixer
- However: can use the convert to B&W and adjust sliders
  - Not as easy, but can result in improvements to the image

# CHANNEL GENERALITIES

- R – mostly contrast
- G – lots of detail
- B – most noise

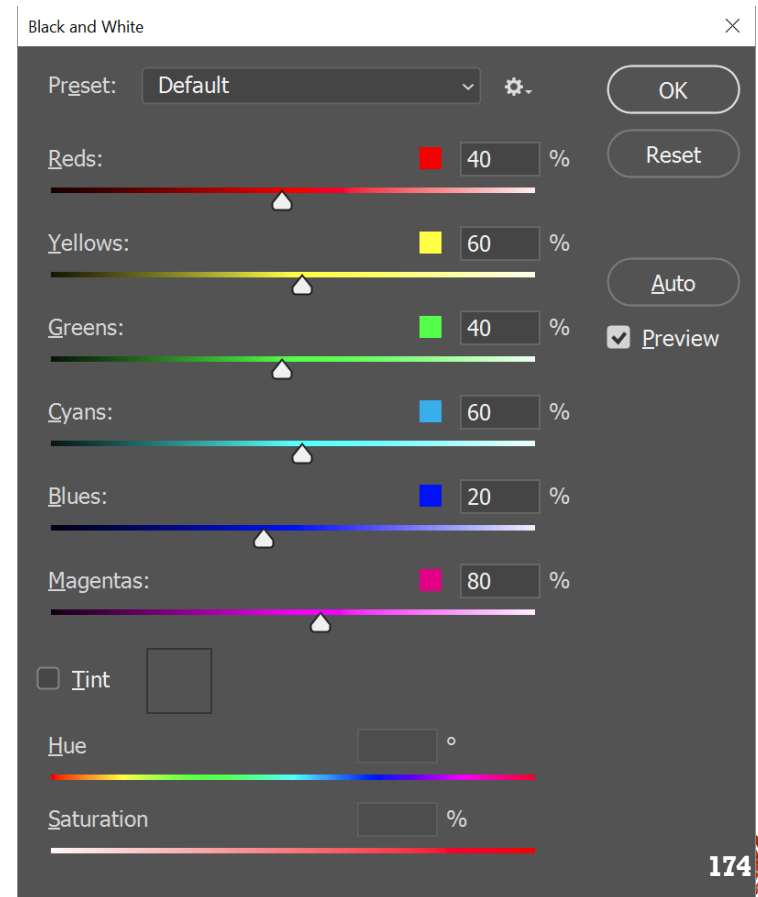
# YELLOWING

- Lots of old pictures get a yellow color
- They weren't that way originally
- Yellowed.jpg
  - Examine channels, then use channel mixer with red filter
  - Next levels to restore contrast
  - Healing for some spots
- Try B&W adjustment layer



# B&W LAYER ADJUSTMENT

- Image Adjustments or Layer New Adjustment Layer
- Try on yellowed.jpg
- Follow with levels, auto
- Then smart sharpen
- Don't forget to crop!
- Heal will take care of the line
- Use Tint to bring back



# COLOR CHANNEL BLACK & WHITE

- If lucky, the color staining is mostly on one color channel
- Inkscribbles.jpg
- Scan in color
  - This is why!

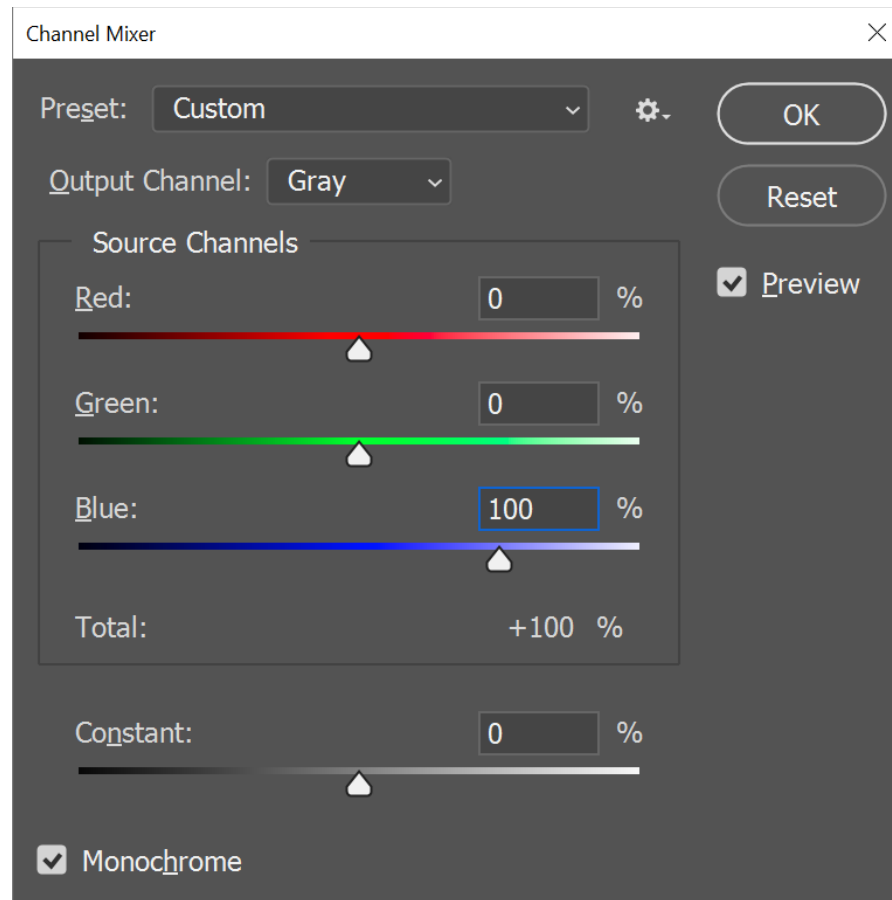








# USE CHANNEL MIXER TO SELECT B



# FINAL RESULT



# TRY NOISE AND SPOT STAINS.JPG

- Select color range
- Add hue/saturation adjustment layer
- Lower saturation to 0%
- Ctrl-j to copy layer a few times
- Mark and make group
- Use heal on spots
- Use noise filter
- Levels to bring back contrast
- Finally add smart sharpen filter



# OPEN REALLY BAD STAIN.JPG



- Examine channels, use channel mixer
- Then clone and heal
- Levels to restore contrast
- This one is tough!



# SHARPENING

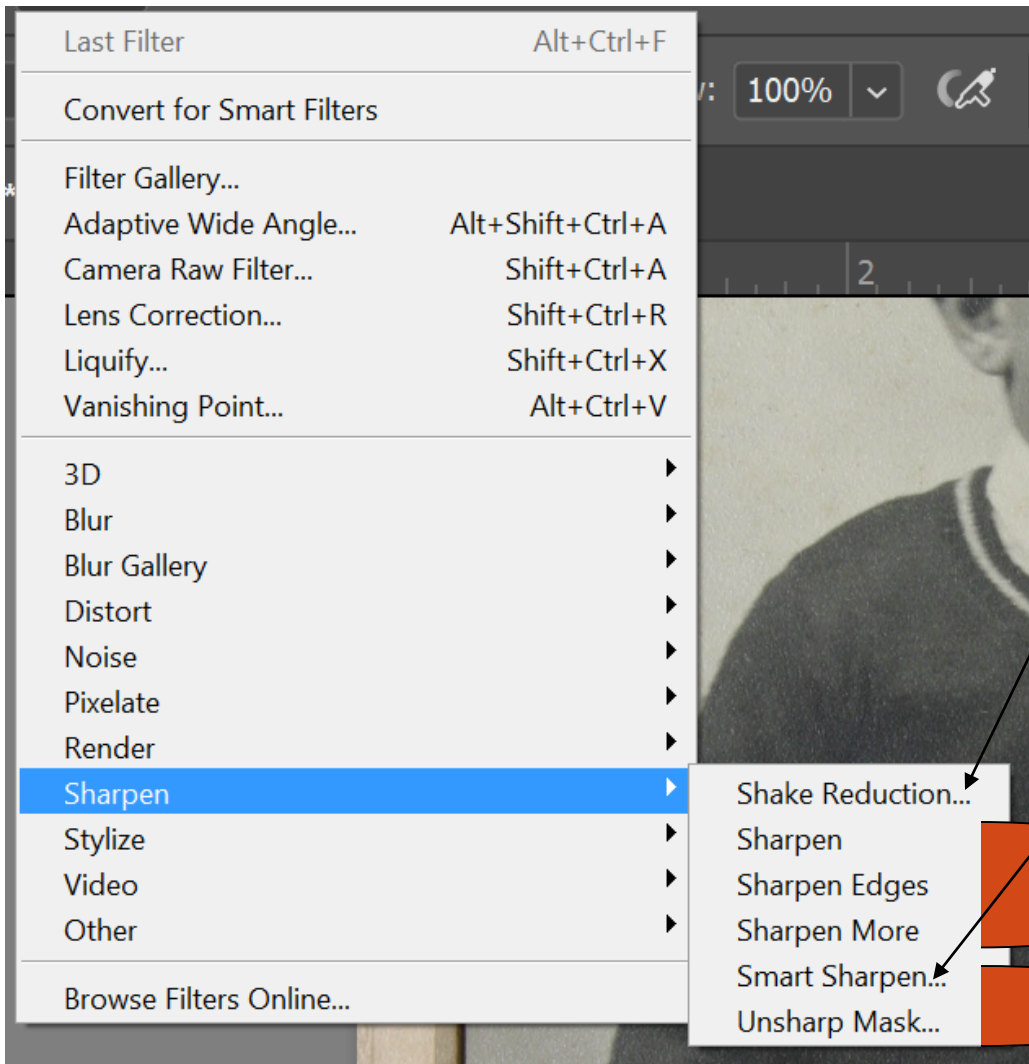
The view may be fuzzy, but we can make it better

But sometimes it is better to leave it alone or even to blur

Sharpening can create artifacts, use carefully!

Make sure you view at 100% to see effect accurately

# SHARPEN TOOLS – FILTER MENU



Need a fast computer  
Stay with lo-res  
images

Smart Sharpen can  
handle lens blur,  
gaussian and motion blur

Simple presets

Most useful

# SHAKE REDUCTION FILTER





# ANOTHER WAY TO SHARPEN

1. Duplicate layer
2. Filter | other | high pass
  1. Adjust to see edges
3. Change layer mode to overlay
4. Voila!
5. Can adjust transparency if too strong



# PHOTOSHOP EXERCISES

Let's try to make things sharper

# TRY DIFFERENT TECHNIQUES

- Old photos-07.jpg
- Sharpen(more) can repeated with ctrl-alt-f
  - Try several times
  - Restore image with F12



# TRY SMART SHARPEN ON PREVIOUS

Smart Sharpen



Preview

Preset: Custom

Amount: 324 %

Radius: 5.4 px

Reduce Noise: 51 %

Remove: Lens Blur 0 °

**Shadows**

Fade Amount: 0 %

Tonal Width: 50 %

Radius: 1 px

**Highlights**

Fade Amount: 0 %

Tonal Width: 50 %

Radius: 1 px

100%

# SMART SHARPEN

- Needs to be leveled.jpg
- Steps
  - Crop with content aware
  - Clone and heal to fix shoes
  - Levels, try auto button
  - Spots
  - Smart sharpen, gaussian setting



# PHOTOSHOP EXERCISES

When might blurring be needed?

Patterned or embossed paper

Use the surface blur filter

# TEXTURED PAPER DISTRACTING POLE.JPG

Surface blur filter



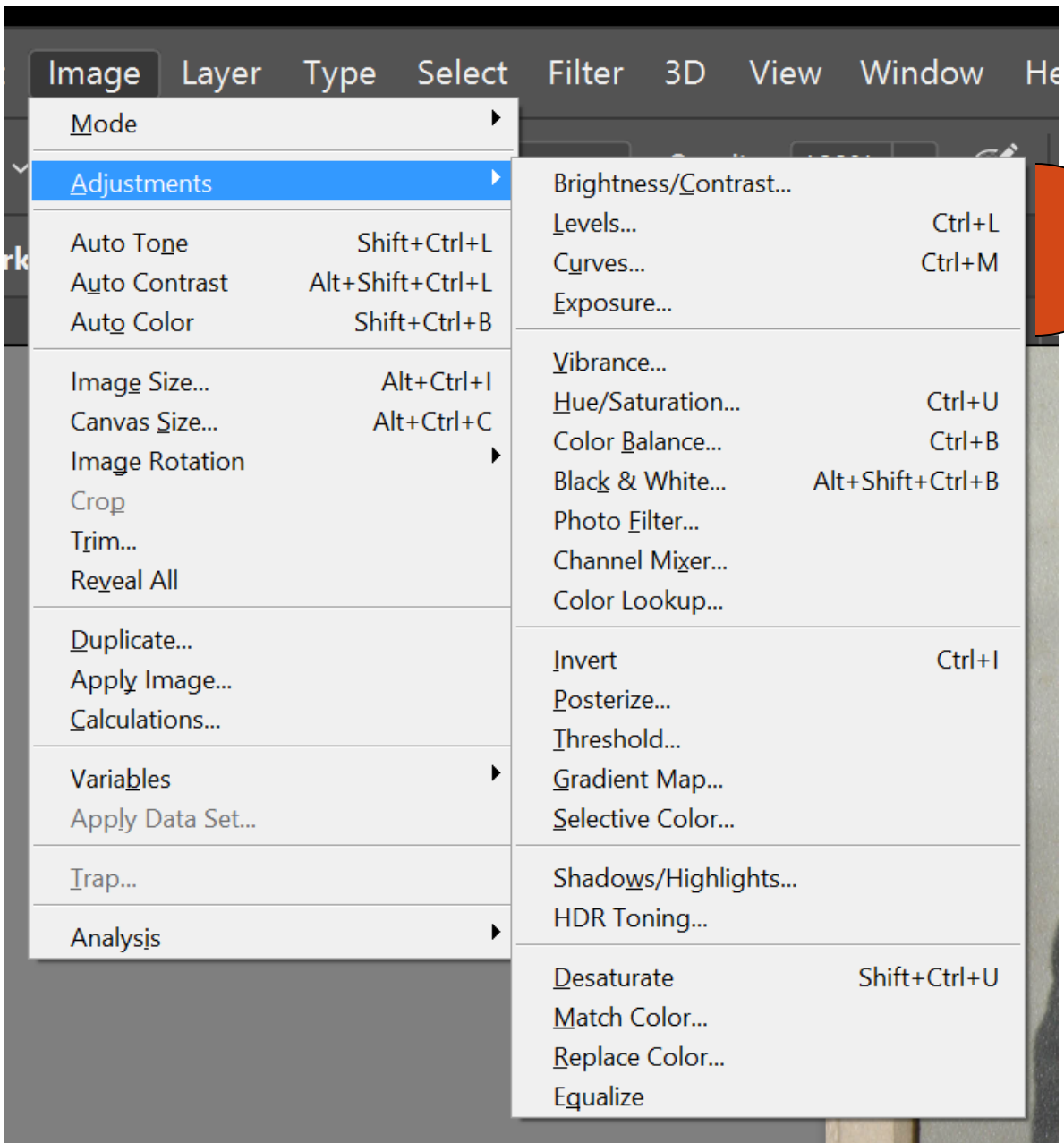


# EXPOSURE

This is not only for swimwear

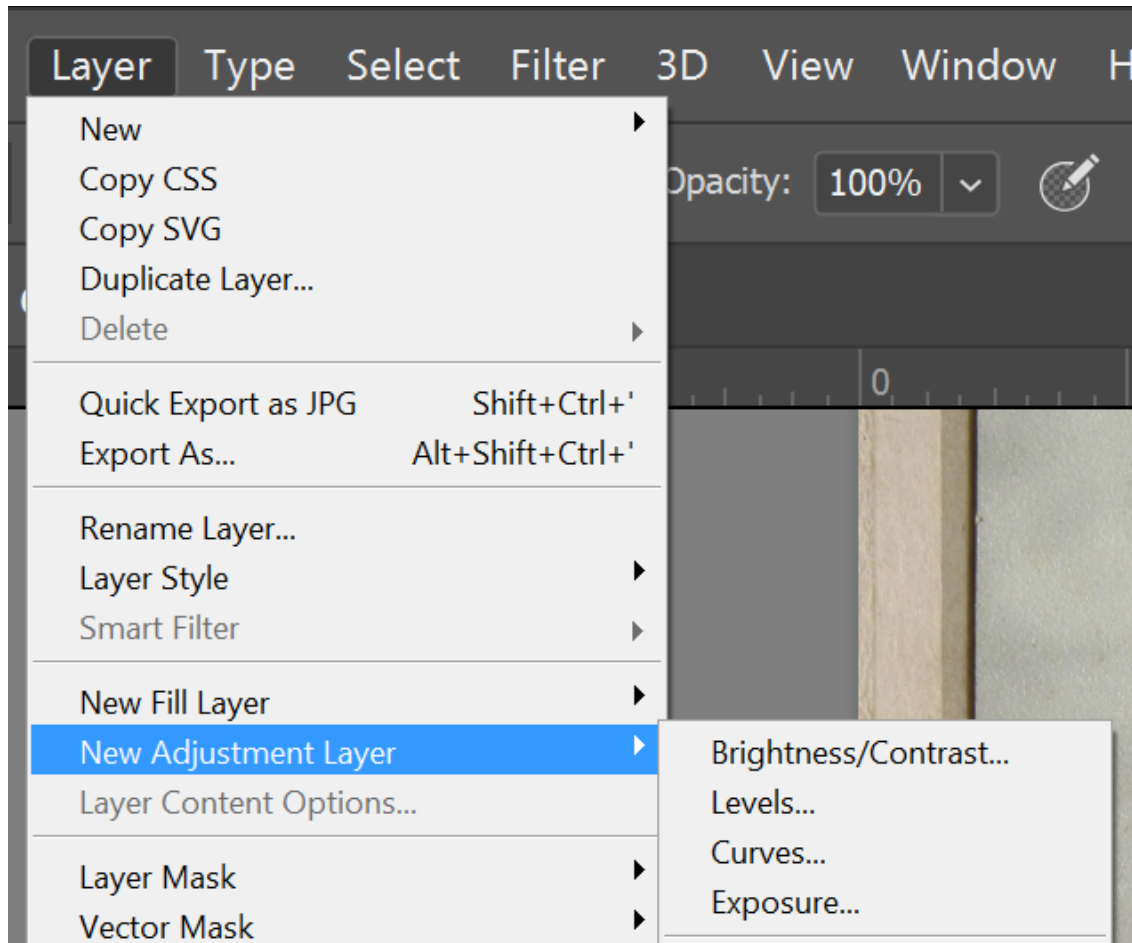
Contrast, brightness, shadows and highlights





These are the ones used to control brightness and contrast

# AS AN ADJUSTMENT LAYER





# CAMERA RAW

Maybe it needs cooking?

# RAW FILES

- Raw files from a camera need to be processed before editing
- Camera raw can also act as a filter on a layer or a smart layer
- On a smart layer it is non-destructive, the settings can be changed anytime
  - This is a great feature



# PHOTOSHOP EXERCISES

Experiment with Camera Raw filter

# CAMERA RAW FILTER

- Can be applied to a layer
- To use non-destructively:
  - Convert to smart object
  - Add camera raw filter
  - OR: simply duplicate the layer to keep the original one around, bigger file!
- Among many controls is a good noise filter



# REDUCE NOISE FILTER

Mostly useful for digital camera images



# PHOTOSHOP EXERCISES

Removing things we don't want

Visual clutter, but use with discretion!



# CLONE STAMP

- Copies stuff from one area to another
- The original PS tool to remove or add things
- Healing brush and content aware tools are more sophisticated, but the clone stamp is still useful in many cases

# HEALING BRUSH

- Used to fix up areas
- Simple example, remove window.jpg
- Visual clutter\*.jpg

# REMOVE WINDOW

- Remove window.jpg
- Use healing brush or clone stamp
  - Try both

# CONTENT AWARE FILL

- Remove leash.jpg
- Draw loose selection
- Use Edit | Fill with content aware option
- Usually some refining is also needed

# MORE PRACTICE

- Pole in distracting pole.jpg
- Try clone, patch and healing on haybale in tractor field.jpg
- Remove distracting branches in coast tree.jpg

# COLOR REPLACEMENT BRUSH

- Try on surface scratch and blue stain.jpg
- Select good color on jacket
- Paint over stained areas
  - Make sure continuous sampling is on
  - Could make a selection first of the jacket to ensure nothing is accidentally painted



# LIMITING THE SCOPE USING SELECTIONS

I don't want to change the whole world, just part of it

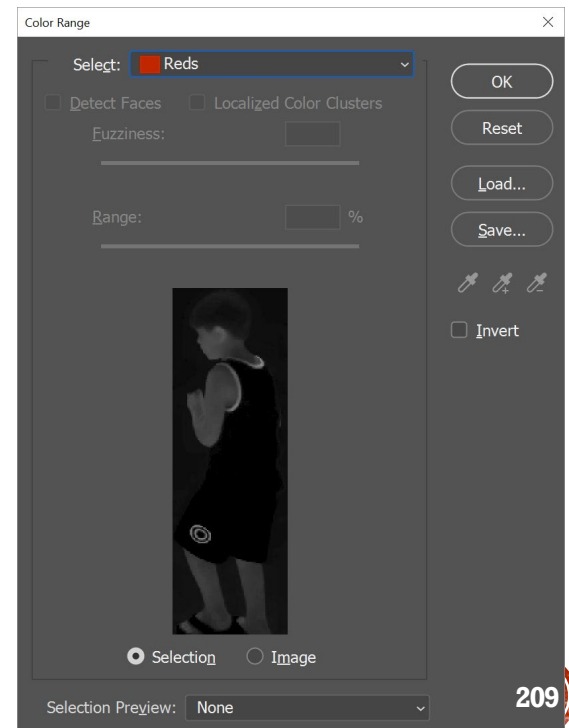
# CATEGORIES OF SELECTION TOOLS

- Geometric
  - Marquee tools (m)
- Freehand
  - Lasso tools (l)
- Edge-based
  - Quick selection (w, not q!)
- Color-based
  - Magic wand (w)



# SELECT COLOR RANGE

- Another tool under the select menu
- Use eye-dropper to choose color
- Often better than magic wand



# REFINING TOOL

- Refine Selection (under select and mask button), use after first selection
  - Extremely useful tool, takes some practice

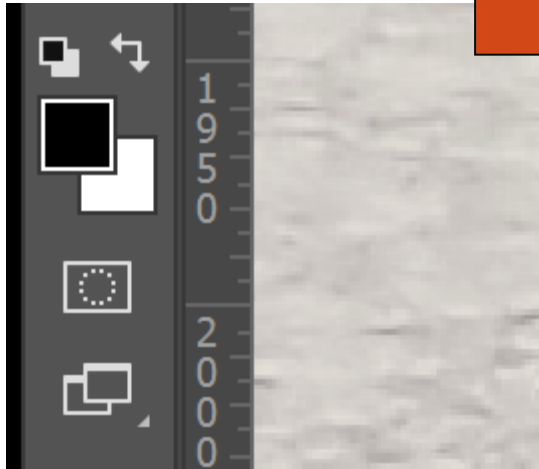
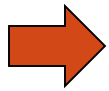
# PEN TOOL

- The drawing pen can also be used
  - Only touch on briefly in this class
  - Freeform draw, then r-click convert to mask

# VIEWING SELECTIONS

- Marching ants
- Ctrl+h to hide/unhide
- Ctrl+d to unselect
- Q for quickmask on and off
  - Shows masked area, good to check for flaws
  - Can paint on mask

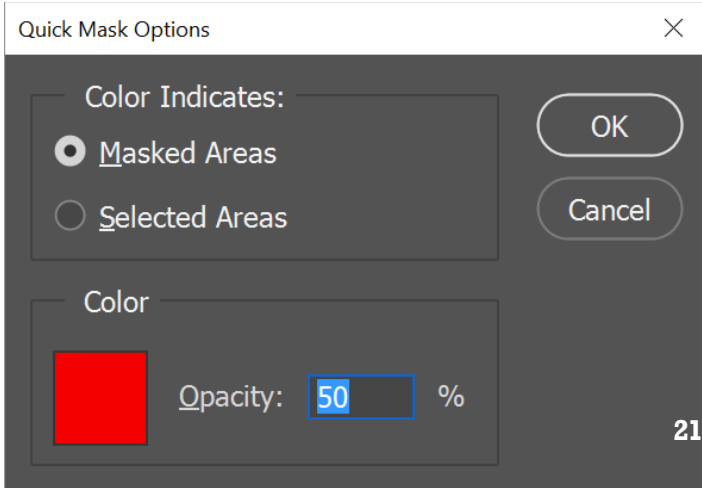
# QUICKMASK



We might have missed this



D-click on above icon to get this





# PHOTOSHOP EXERCISES

The Marquee tools

Rectangle and ellipse



# PHOTOSHOP EXERCISES

Free-hand drawing

Lasso, magnetic and polygonal lasso



# PHOTOSHOP EXERCISES

Color-based

Selection done by looking for similar colors





# PHOTOSHOP EXERCISES

Edges

Quick selection paints selection looking for edges

# SELECT FLOWER & CHANGE COLOR

- Red flower.jpg
- Try both color range and Quick selection
- Hue and saturation adjust, or any control, see how only masked area is affected

# BEST SELECTION TOOL

- It depends... 😊
- Learn how to use all of them, they each have their strengths and weaknesses

# CONTENT AWARE FILL

- Remove leash.jpg
  - Use lasso tool to draw a loose selection
  - Edit | Fill, choose Content Aware
  - Can also easily remove the badge



# LAYER MASKS

Controlling changes that can be edited later

Mostly start with a selection, can be modified later

# LAYER MASKS

MNEMONIC AID:

WHITE REVEALS, BLACK CONCEALS





# PHOTOSHOP EXERCISES

Save selection as channel

Load using menu or ctrl click on channel



# PHOTOSHOP EXERCISES

Turn selection into layer mask

Display layer mask

Edit layer mask





# TORN PHOTO EXERCISE


In a fit of anger we tore this photo to pieces, but now we're friends again!



1. Select each piece (quick selection or other)
2. Selection to layer (r-click)
3. Ruler to straighten
4. Move pieces to line up
5. Flatten
6. Healing brush
7. Artistic repairs to missing parts

For 2, could use layer mask to avoid losing any pixels. To do this first copy the whole layer. Then select and add mask.

# ANOTHER WAY USING LAYER MASKS

1. Make 4 duplicate layers, rename to “top left”, “top right”, etc.
2. On each layer use quick selection to select the image
  1. Add layer mask from the selection,  (found in layer panel)
  2. Use the ruler tool to straighten either vertical or horizontal edge
  3. Use move tool to get piece close, then arrow keys to nudge
3. Note that the layer masks can be edited if some parts were missing
4. Flatten the image after everything looks good (menu: Layer | Flatten Image)
5. Use clone and healing brush tools to fix cracks and missing parts



# RESTORE CHALLENGE

Try this one, cracks and splotches.jpg

Also notice the pant leg he is pulling up



# WHERE & HOW TO ARCHIVE

Cloud

Internal/External drives

Where do we keep things?

LOCKSS (lots of copies keep stuff safe)

# WHERE TO KEEP IMAGE FILES

- Camera
- Hard disc on computer
  - It will fail someday
- External network drives
- USB hard drives
- USB flash drives
  - 10 year life, but as long as you refresh OK
- Cloud
  - Trust others to not lose images
- Optical – CD, DVD, BD

# STORING LOCATION

## Local

- Buy more drives as you need space
- You have control
- Should also store offsite

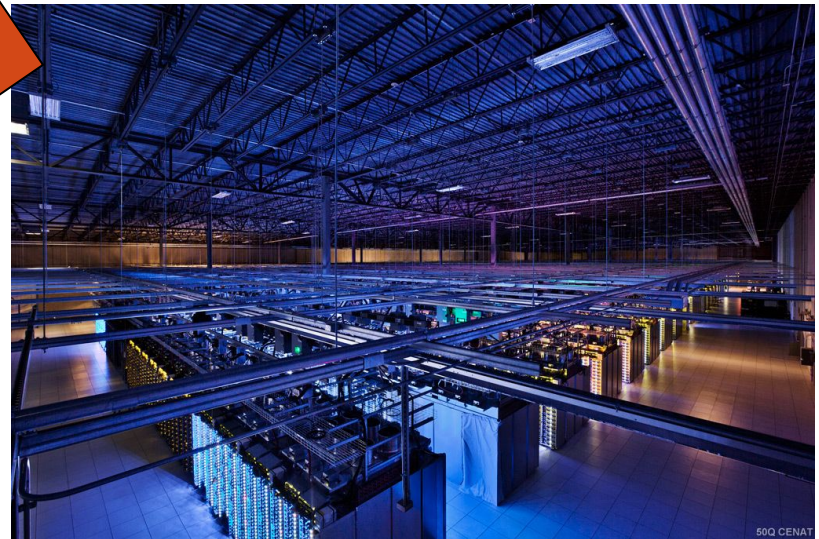
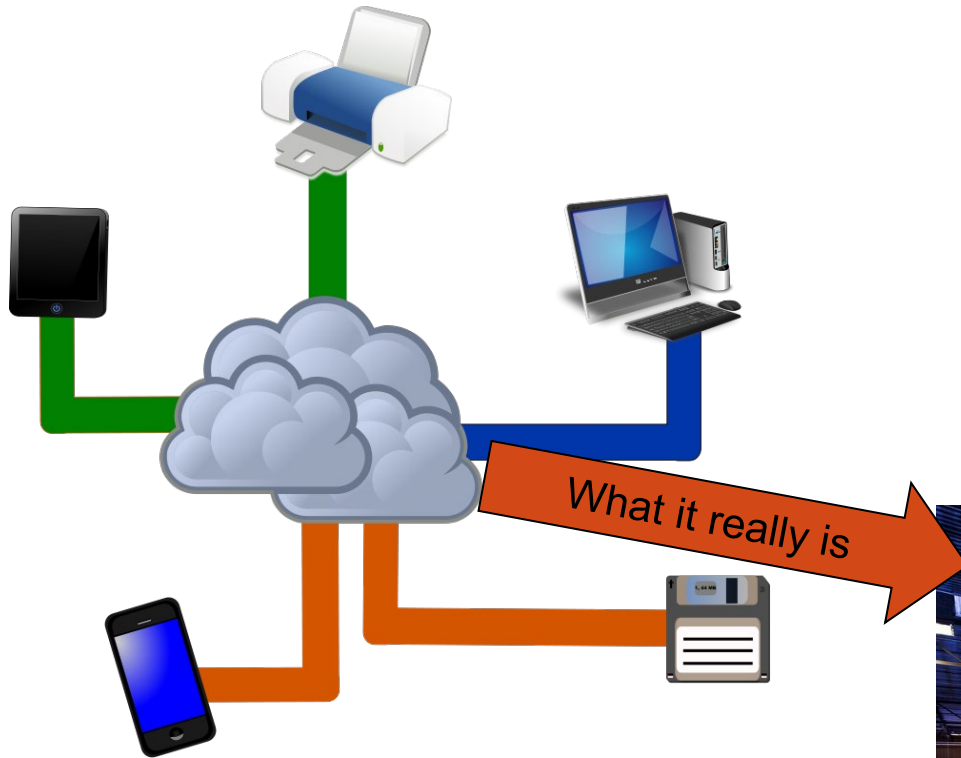
## Cloud

- Free until you hit limit, then monthly
- You trust them
- You should also keep a copy locally

# HOW THE CLOUD WORKS (SIMPLIFIED)

- Files are stored in huge service centers
- Copies in multiple places
- Local copy on your drive is synched
  - If you edit with no internet, the changed file will be copied when you connect again





# CLOUD CONCERNS

- You are trusting a company
- They might get bought
- They might go out of business
- They might change pricing
- Cost increases as you store more

# LOCAL DRIVE CONCERNS

- They do fail eventually
  - Often without warning
- Theft
- Accidental erasure
- Run out of space, buy more

# RECOMMENDATIONS

- Cloud is good
  - Stick with large reputable companies
- Local is good
  - Buy new drives and refresh your copies
- Do both at least, keep your valuables safe
  - If you don't trust cloud then your own offsite

# CLOUD FEES — MONTHLY UNLESS NOTED YEARLY

## Google Drive

<b>FREE</b>	<b>\$1.99</b>	<b>\$9.99</b>	<small>starting at</small> <b>\$99.99</b>
15GB	100GB	1TB	10TB+

## Microsoft OneDrive

Office 365 Home with Premium OneDrive Features	Office 365 Personal with Premium OneDrive Features	Storage only OneDrive 50 GB	Storage only OneDrive Basic 5 GB
\$99.99/year	\$69.99/year		Free

## Apple iCloud

**50GB: \$0.99**

**200GB: \$2.99**

**2TB: \$9.99**



# ARCHIVE TOOLS

How to backup your files so they don't get lost

Preservation for posterity, or anyone who cares

# MY FAVORITE TOOLS

- **Mac – Time Machine**
  - Keeps different versions in time
- **Windows – Backup**
  - Keeps different versions in time
- **Beyond Compare**
  - A tool to compare and reconcile folders
  - Great for figuring out what was changed
  - Does not keep time versions, it replaces



# PRINTING

There's nothing like an 8x10 glossy print



# PRINTER TECHNOLOGY

- Inkjet
  - Pigment
  - Dye
- Laser
- Photo
- Sublimation

# COLOR MATCHING

- Printer profiles are necessary for super accurate results
  - Manufacturers often supply
    - Costco has .icc files for their big prints
      - Use photoshop to preview
    - Can make your own, requires special hardware
- Let the printer try to do a good job
- Print a test image to see how it looks

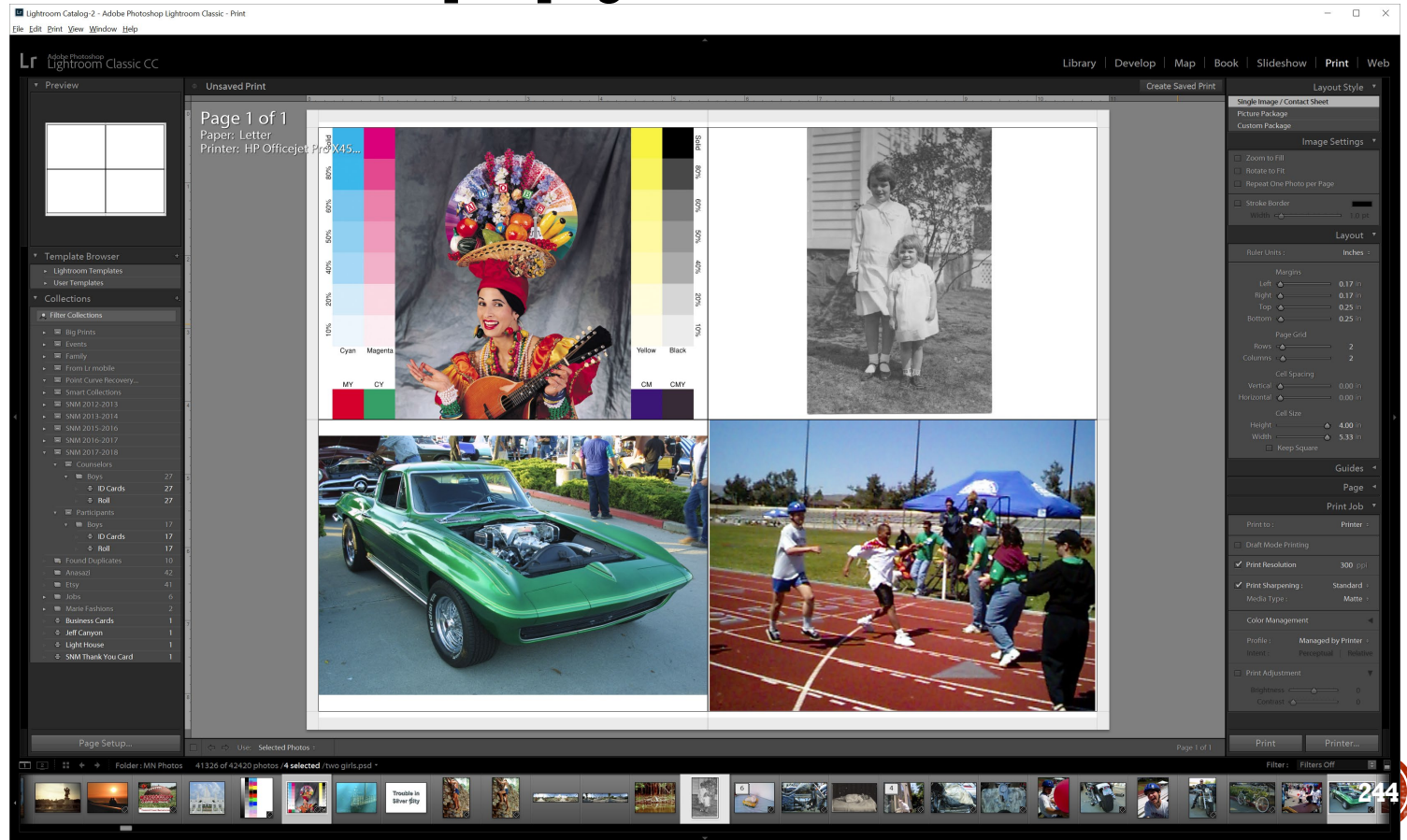
# LIGHTROOM

## ■ The print module



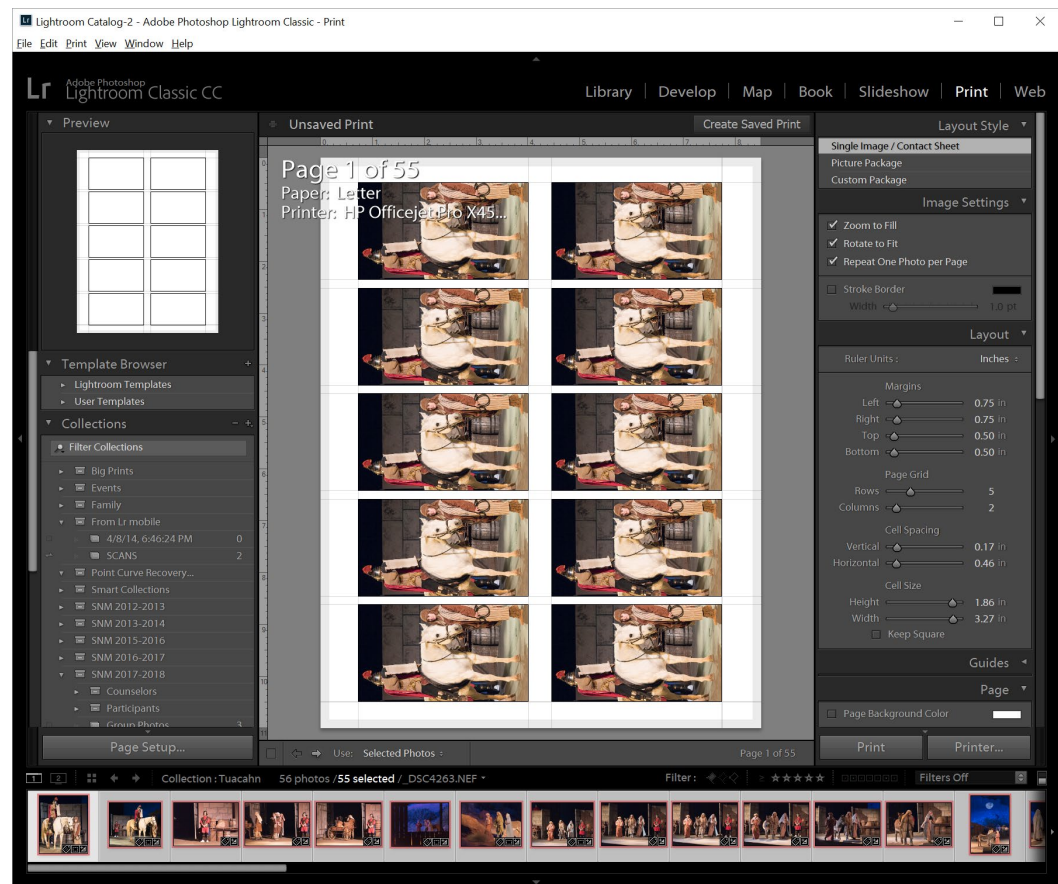
# LIGHTROOM

- Easy to do more than one per page



# LIGHTROOM

- Easy to do multiples per page



# LIGHTROOM PRINT COLLECTIONS

- Save named printer settings and images

# LIGHTROOM MOBILE SYNCING

- Can create folders that are automatically synced with all your mobile devices
- Editing anywhere will update all of them

# PHOTOSHOP

## ■ Print dialog

Photoshop Print Settings

11 in x 8.5 in

100% 80% 60% 40% 20% 10% 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan Magenta Yellow Black

MY CY CM CMY

**Printer Setup**

Printer: HP Officejet Pro X451dn Printer PCL 6

Copies: 1 Print Settings...

Layout:

**Color Management**

Remember to enable the printer's color management in the print settings dialog box.

Document Profile: sRGB IEC61966-2.1

Color Handling: Printer Manages Colors

Printer Profile: ACES Academy Color Encoding Specification...

Normal Printing

Rendering Intent: Relative Colorimetric

Black Point Compensation

**Description**

Match Print Colors  Gamut Warning  Show Paper White

Reset Done Print