Photo Restoration and Retouching: The Digital Basics

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This demonstration uses Photoshop Elements 14, Canon Lide500F scanner and a Spyder4Pro Colorimeter.

The laptop has an Intel 2-GHz i7 Quad-Core CPU, 16GB RAM, a 240GB SSD & Windows 10 Pro (64-bit)

Things worth knowing:

- Use the Histogram •Edit with Layers •Make Selections •Calibrate monitor with a Colorimeter;
- "64-bit" CPU/OS/Software allows the use lots of RAM for speed with HUGE files;
- Scan and save for editing using the file formats "tiff" or "PSD";
- **Resolution** (scanner samples per inch vs. printer dots per inch vs. monitor pixels per in);
- **Output Resolutions:** Prints 300dpi Canon/HP, 360dpi Epson, Display Online 72-96dpi;
- **Scanning Resolution** depends on the type and size of **input** & the type and size of **output**;
- **"Re-Photography"** – Using a digital camera to re-photograph prints/negatives/slides;
- Scanning Software: **Scanner Driver** vs. **Dedicated Scanning Software** (i.e. VueScan/Silverfast);
- **Bit Depth**: 8bit vs. 16bit (the amount of data the scanner collects);

Workflow:

1. Preparation;
2. Scanning; - using Levels in the scanner driver for each colour channel and scan at 16-bits.
3. Editing; - software intensive/expensive with lots of RAM for 64-bit software and many **"Layers"**
4. Production;
5. Archiving.

1) Preparation

- Calibrate Monitor for accurate colour reproduction using colorimeter;
- Clean scanner platen and cover plate. Do NOT remove mounted prints, scan whole mount;
- NO Liquid cleaning of prints, VERY GENTLE cleaning with a SOFT CLEAN brush;
- Sort most important photos into groups with similar issues that can then be gang scanned;
- Re-Photograph "unscannable" mounts. Use 2 lights at 45 degree angles to subject. Also use a tripod, self-timer and a Polarizing filter to reduce any possible glare, tilt tarnished photos away from camera.

2) Scanning

Scan mostly in Colour Mode; Scan at 16-bits per channel; Use the scanners levels controls; Scan resolution depends on the size of original & desired output size; Use Digital I.C.E., R.O.C. & G.E.M. on supported scanners; save scans as 16-bit Tiff, PSD or DNG; organize scans by using Tags & Keywords.
Remember to scan with the emulsion side facing down! (The emulsion side is the less glossy side)

3) Editing Working order is 1,2,3,4,5 but your time invested is 3,4,5, 2,1.

Clean-up	1 Exposure	2 Colour	3 Minor Damage	4 Major Damage	5 Uneven Damage
Scans	Underexposed	Casts *	Spots	Missing Emulsion	Tarnish
	Overexposed	Shifts	Stains	Torn Pieces	Bleached Spots
	Uneven	Fades	Tears		

*Remove a Colour Cast by Adding some of its Opposing Colour

Remove a Colour Cast		Use the following technique:
Red	⟷ Cyan	1) Filter>Blur>Average
Green	⟷ Magenta	2) Filter>Adjustment>Invert
Blue	⟷ Yellow	- Blend mode "Overlay or Color" 30-40%

Clean-up	1 Exposure	2 Colour	3 Minor Damage	4 Major Damage	5 Uneven Damage
Tools Use the Scan tools when scanning	Layer Blend Mode	Levels	Spot Healing Brush	Clone Stamp	Levels per channel
	Dodge Burn Tool	Smart Brush	Healing Brush	Selection Brush and Move tool	Selection brush & Layers
	Enhance lighting	Enhance color	Clone Stamp		Convert to B & W

4) Production

- Export files: for online viewing as jpegs, for printing as Tiff or PSD;
- Files for a digital photo frame can be copied onto an SD card;
- Printing Service vs. DIY printing;
- NOTE: Colour Printers do NOT make very good B&W prints. (3 Black inks are required)

5) Archiving

"3, 2, 1 style Backups":
3 copies on at least 2 different media with 1 copy stored off-site

Keeping files intact:
Access the files regularly to ensure that they are still intact. Have, and know how to use, **image recovery software** for lost image files.

Keeping files readable:
Safeguard against **digital obsolescence** by ensuring that files are readable by keeping them in a **current format**, such as Adobe Digital Negative (or TIFF), and check them regularly.

Keep the files accessible:
Back up your files regularly. Verify the backups. USB 3.0 disc drive docks work well.

Long Term Storage:
DVD's not properly stored can be subject to mold, fungus and heat. As well, Felt Tip Ink markers contain alcohol, which can leech through the plastic layer and damage the dye layer. **Use CD/DVD safe markers to label your disks!**

Prints, Write Once Optical media, LTO-6 Tape Drives and Hard Drives are all good for long term storage. The equipment used, as well as the process used, is mostly referred to as "Archival preservation".

Resources:
- The Epson Perfection V600 is a very good flatbed scanner for the work you have seen here.
- www.Photo-repair.com – Restoration services offered by Ctien.
- http://spyder.datacolor.com/display-calibration/ to see Colorimeters;
- VueScan (www.hamrick.com) and Silverfast (www.silverfast.com/) are two prominent scanning specific packages for those dedicated to the task.
- www.dpreview.com and www.filmscanner.info/en/ , as well, you can go to the film scanner page of www.PhotographyReview.com (www.tinyurl.com/34m424) for finding information regarding cameras, scanners, etc… Just don't be overcome by "sticker shock" when you see prices!
- www.scancafe.com does your scans for you (though you have to UPS to them). Although I have never used them I have heard and read nothing but good reviews. Still, if you choose the service route it would be prudent to send them a small sample of the work you want done, as a test.
- Do a Google search for **"Polaroid Dust and Scratch Removal"** and download the tool. It is quite amazing in what it can do!

Books:
- Digital Restoration from Start to Finish – Ctein, Focal Press, ISBN: 9780240812083, $42.95.
- Adobe Photoshop Restoration & Retouching - Katrin Eismann ISBN – 9780321701015, $56.57
- The VUESCAN Bible - Sascha Steinhoff - ISBN – 9781933952697, $45.50
- Scanning Negatives and Slides - Sascha Steinhoff - ISBN – 9781933952307, $35.39

Scanning Tips and Tricks: Computer, Software, Scanner & Methods of work

Computer Tips:
- Use a 64-bit CPU of 3 GHz or faster
- Use a 64-bit Operating System so that you can use a lot of RAM (computer memory)
- Put as much RAM into your computer as possible (this aids speed)
- Purchase and install in the computer a large capacity hard drive for your images (1 TB or more)
- Regularly calibrate your monitor with a colorimeter like the SpyderX (https://spyderx.datacolor.com/)
- If using a laptop calibrate often, and work at the same distance with the monitor at a consistent angle

Software Tips:
- Use the software that came with your scanner (update it to the most current version)
- If the scanner software does not meet your needs try software like VueScan (from www.hamrick.com)
- Editing software, like Photoshop Elements, makes quick work of cleaning up and restoring your scans
- Learn about Layers, and tools like the "spot-healing" brush and the "clone-stamp" tool;
- Learn how to make selections and how to use the "Move" tool;
- Software that works with Photoshop, called "plug-ins", offer many alternative and effective capabilities

Scanner Tips:
- Flatbed scanners can make excellent scans (Epson Perfection V600 is about $250.00 with software)
- You need to be fastidious about cleaning the glass platen of the scanner to get a good scan
- Let the scanner warm up if it is older than a few years
- DO NOT sharpen during the scanning stage
- If your scanner can do Infra-Red Dust and Scratch removal (Digital I.C.E.) use that feature

- Re-Photography is an option worth considering for slides/negatives using an adapter

Methods of Working:
- Sorting is your first step:
  - Sort your photos into groups that are the most important to scan;
  - Sort into Types (i.e. Prints, Negatives, Transparencies, Re-Photography);
  - Sort into like groups (i.e. faded group, colour cast group, tarnished group);
- Clean negatives/slide/print very gently with a soft brush, never with wet cleaning;
- Scan with the emulsion side of negative/slide facing down;
- Batch scan several photos from the same group at one time to save working time;
- Scan in 16/48-bit mode if possible;
- Scan in full RGB colour mode, even if you are scanning B&W;
- Use the Histogram of the scanner driver to fine-tune the scan for maximum quality;
- Use the "divide scanned images" command to separate the group into individual image files;
- Save scans as either Tiff or PSD. Only when your are done with restoring should you consider JPEG.