Best strategies for using cameras in archives and then processing the images taken

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Using cameras in archives

- **Will cameras meet our needs as scanners?**

Our goals/needs - Getting illustration images for publication purpose	Our goals/needs - Having images for our own research reference	Digital cameras nowadays
General requirements from publishers for an illustrative image: 1. 300 ppi 2. color 3. Tiff is preferred, JPEG is acceptable 4. excellent quality	General rule of thumb: 1. Crisp photos 2. Text legible 3. Clear image/diagram/chart	1. Most digital cameras have pixel resolution bigger than 8MB. *Note: In order to have 300 ppi for a 8.5"x11" photo, you will need 8.5x300x11x300=8415000 pixels (i.e. 8.415 megapixels).* 2. Most digital cameras take photos in JPEG or JPEG+Raw format *Note: no cameras take tiff format photos.*

Conclusion: The digital cameras should meet our needs if we use them effectively.

- **Which type of cameras to use?**

	iPhone 6 plus	Canon PowerShot G16	Canon DSLR T3i
Sensor size	1/3.0-inch (4.89 x 3.67 mm)	1/1.7 inch CMOS Sensor	22.3 x 14.9 mm
Sensor resolution	**8 megapixels**	**12.1 Megapixel**	**18 Megapixels**
Lens foal length	4.15mm (29mm, 35mm equivalent)	5x Optical Zoom 28-140mm Lens (35mm equivalent)	18-55mm(28.8-88mm, (35mm equivalent))
Lens maximum aperture	f/2.2	f/1.8 - 2.8	f/3.5-5.6
ISO	**32-2000**	**80-12800**	**100-6400**
Minimum focal range	**6cm**	**5cm**	**25cm**
File format	**JPEG**	**JPEG, RAW**	**JPEG, RAW**

a. Smart Phone Cameras work just fine.
b. Low End Point and Shoot Cameras are a bit better
   i. a bit bigger image sensor size
   ii. more pixels
   iii. zoom lens
   iv. bigger ISO range which means better performance in low light situations
   v. auto mode and several other creative shooting modes
c. DSLR Cameras **may** work the best
   i. much bigger image sensor size
   ii. much more pixels

  iii. bigger ISO range which means better performance in low light situations
  iv. auto mode and several other creative shooting modes allowing you to control the exposure flexibly

- **How to best use cameras in archives?**
    a. Focus
    Make sure you know the visual clues on the camera that indicate your camera is in focus if you use auto focus. Try to avoid to take blur photos or photos that are not in focus.
    b. Photo size/resolutions
        i. use the highest resolution on your camera if storage is not an issue (e.g. Large or the top option). *- Large photo size*
        ii. Use 300 ppi to save space (e.g. 8.5x300x11x300 = 2,550x3,300 = 8,415,000 pixels (i.e. 8.415 megapixels)). *- Medium photo size*
        iii. Use 300 ppi for book illustrations, 150 ppi (e.g. 8.5x150 x11x150 = 1,275 x 1,650 = 828,750 pixels (i.e. 0.8 megapixels)) for your own research reference to save more space and take more photos. *- Small photo size*
    c. Use a tripod if you have
        i. a regular tripod for a compact/DSLR camera
        ii. a special tripod for smart phone cameras
    d. Low light situations
        i. Bring your items closer to a light source
        ii. *Use flash if allowed*
        iii. With a tripod
            1. ISO - 100 - 800. A lower ISO value will produce less digital noise on the photo.
            2. Aperture f/8 - f/13. A relatively smaller opening of aperture will create a bigger depth of field on the photo so that the page edge will be sharp in focus.
        iv. Taking photos without a tripod in low light situations will be very hard to get good exposures.
            1. ISO
                a. Use high ISO to achieve faster shutter speed. If shutter speed is too slow and the camera is not on a tripod, hand shake will make the photo very blurry.
                b. Higher ISO may introduce digital grainy noise on the image. Use high ISO when you don't have other options.
            2. Aperture
                a. Use a big aperture such as f/1.8 - f/7 to have a faster shutter speed as long as all areas of a page are in focus.
                b. Use a smart phone camera instead of a DSLR since the bigger the image sensor size, the shallower of the depth of field of a photo.

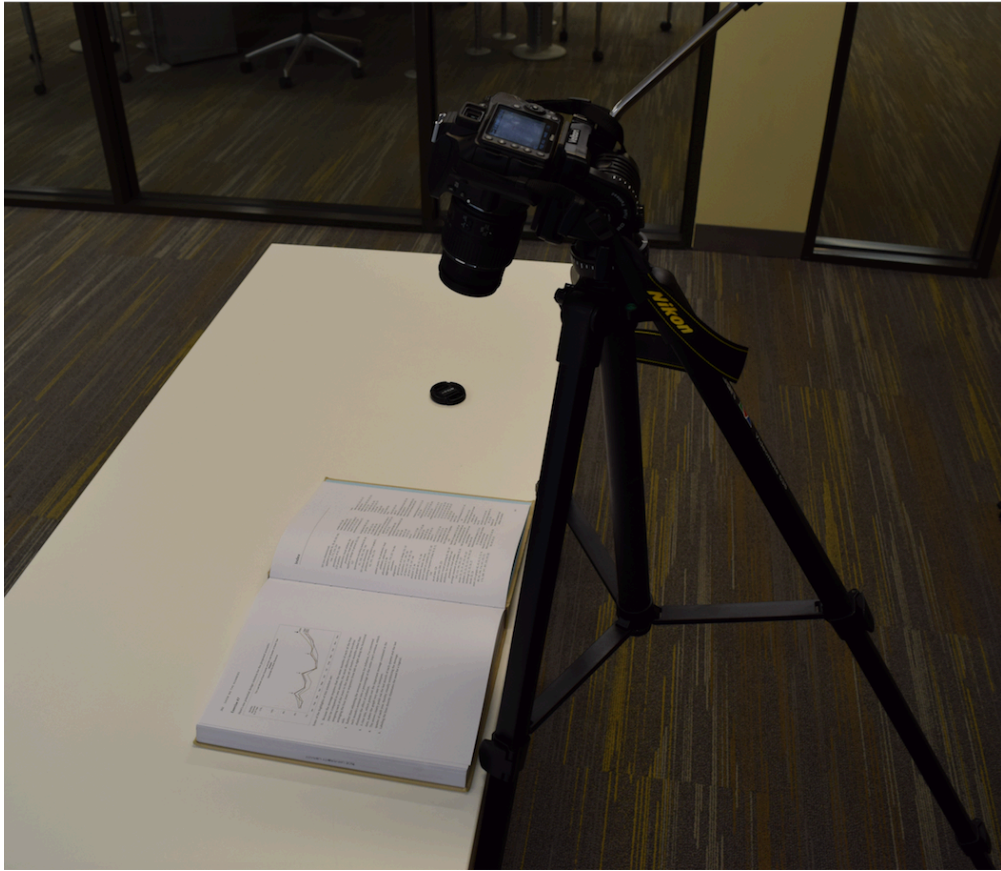# Challenges in practice updated on 10/09/2017

- **What works**

- The scenario: a fragile book checked out from WRC can't be scanned with scanners
- The solution: the setup in the DMC video studio
  - a heavy duty ManFroto tripod
  - a tripod arm
  - two lights
  - Nikno D610 camera
- Sample pages from the beginning, the middle, and the back of the book: DSC_4102.JPG, DSC_4103.JPG,DSC_4105.JPG.
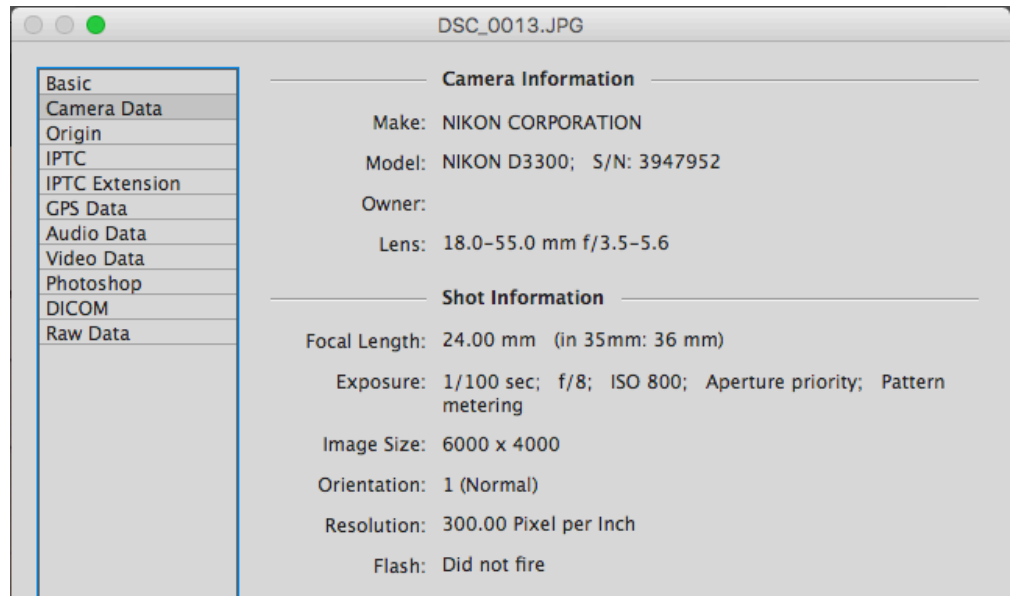- The camera settings:

- With this setting, all areas on the pages in different parts of the book appear in sharp focus.

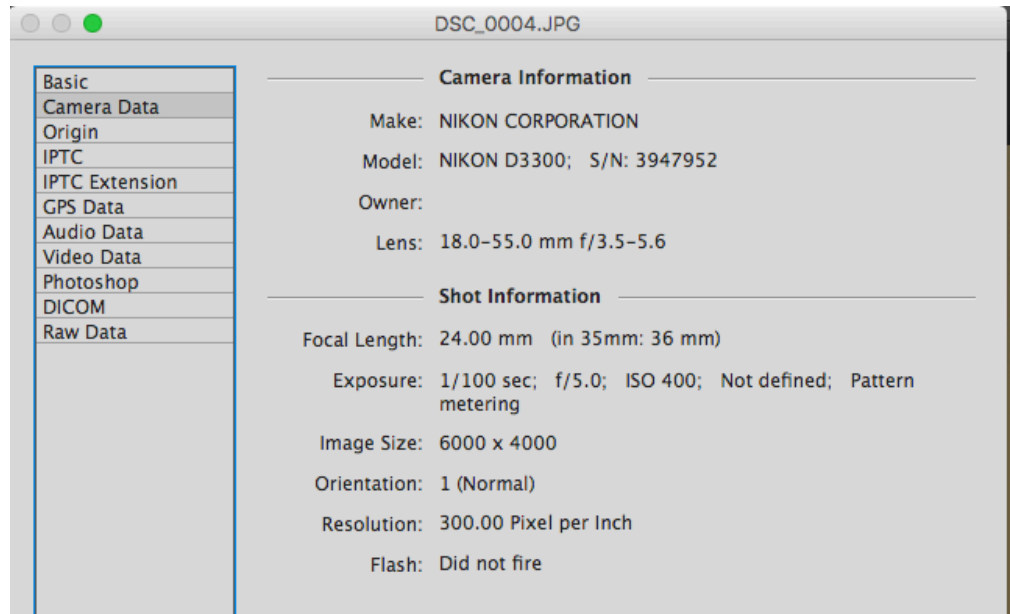- **What could work when you are on-the-go**
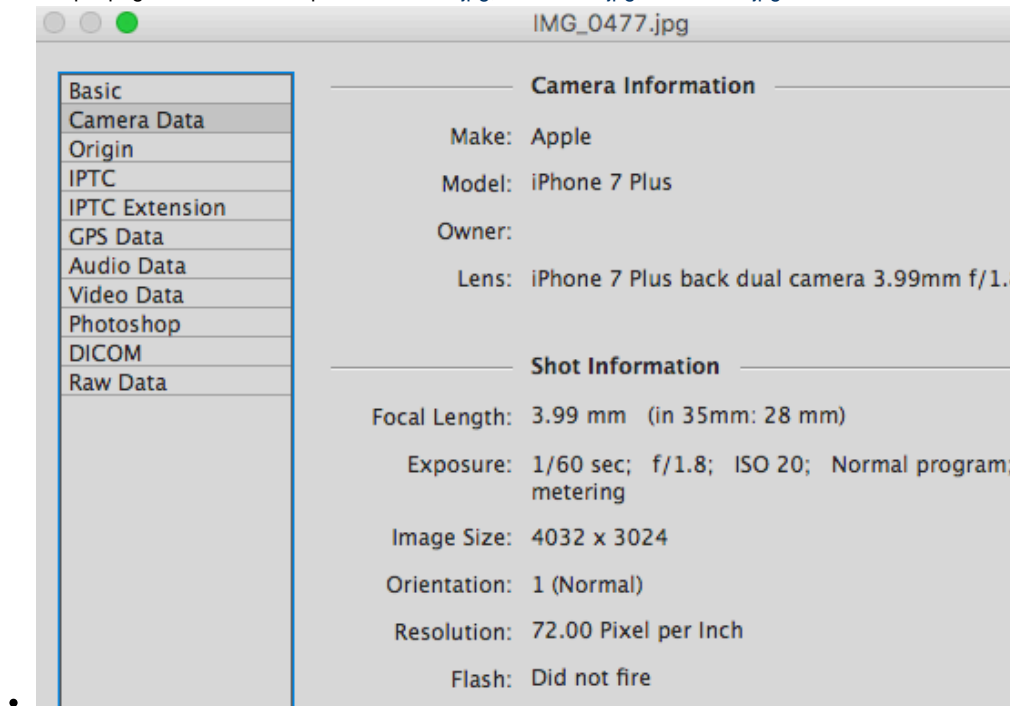
-
- The setup
  - a lightweight Velbon tripod
  - a Nikon D3300 camera
- Sample pages: DSC_0014-compressed.jpg, DSC_0013-compressed.jpg, DSC_0012-compressed.jpg.
- Camera settings:
  - Apterture priority mode
  - Fluorescent light WB
  - Live view shooting mode.
  -

  - In auto mode, the page looks like below DSC_0004.JPG, which is OK.

DSC_0004.JPG

Basic
Camera Data
Origin
IPTC
IPTC Extension
GPS Data
Audio Data
Video Data
Photoshop
DICOM
Raw Data

Camera Information

Make: NIKON CORPORATION

Model: NIKON D3300; S/N: 3947952

Owner:

Lens: 18.0–55.0 mm f/3.5–5.6

Shot Information

Focal Length: 24.00 mm (in 35mm: 36 mm)

Exposure: 1/100 sec; f/5.0; ISO 400; Not defined; Pattern metering

Image Size: 6000 x 4000

Orientation: 1 (Normal)

Resolution: 300.00 Pixel per Inch

Flash: Did not fire

- In summary, when you are on-the-go,
  - you can check out a Velbon tripod and a Nikon DSLR camera from the DMC.
    - camera Aperture priority mode will work better. It enables you to adjust aperture value, ISO, and WB. f/8-13 is suggested.
    - camera Auto mode will work OK.
  - Alternatively, you can buy a Cell Phone Holder For Desk, then take photos with your cell phone.
    - sample pages from iPhone 7 plus IMG_0475.jpg, IMG_0476.jpg, IMG_0477.jpg.

IMG_0477.jpg

Basic
Camera Data
Origin
IPTC
IPTC Extension
GPS Data
Audio Data
Video Data
Photoshop
DICOM
Raw Data

Camera Information

Make: Apple

Model: iPhone 7 Plus

Owner:

Lens: iPhone 7 Plus back dual camera 3.99mm f/1.

Shot Information

Focal Length: 3.99 mm (in 35mm: 28 mm)

Exposure: 1/60 sec; f/1.8; ISO 20; Normal program; metering

Image Size: 4032 x 3024

Orientation: 1 (Normal)

Resolution: 72.00 Pixel per Inch

Flash: Did not fire

Processing the Images Taken

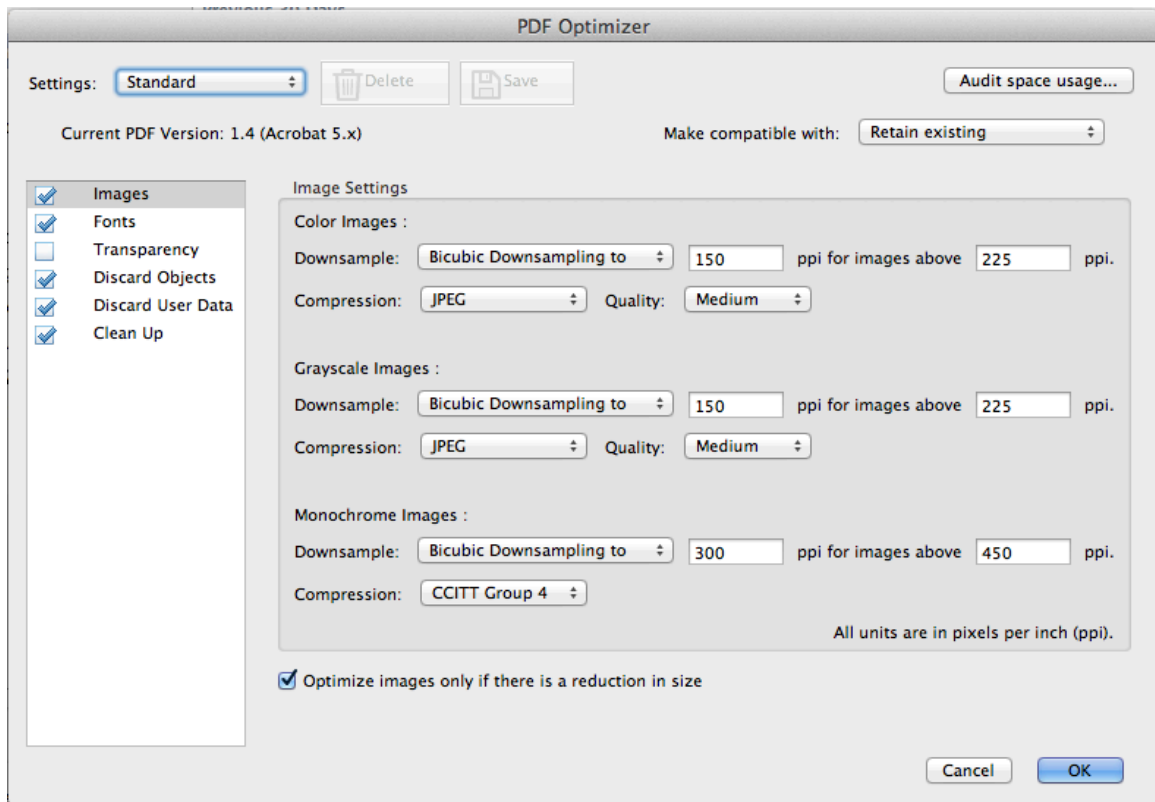1. **Illustration images for publication purpose**
   a. Keep the original image file
   b. Create a smaller version for quick reference. A suggested pixel dimension is 1024x768 or 1920x1080. Maintain aspect ratio

when reducing the file size.

      i. on PC, use Paint (Note: you can use freeware Irfanview to batch convert and rename files.)

      ii. on Mac, use Preview or iPhoto

  c. Open Zotero, new item -> Manuscript, refer to this guide for filling in metadata *Zotero for Archival Research* http://guides.library.harvard.edu/c.php?g=531255&p=3634253

      i. attach link to file

      ii. **attach stored copy of file - recommended. Zotero will make a copy of the image file to store in Zotero library folder.**

      iii. attach both the original copy and the smaller version.

2. ## Images for your own research reference

  a. Acrobat -> File -> Create -> Combine files into a single PDF, this creates a binder file that is almost equal to the sum of the original file sizes. For instance, a 42 pages long binder file is 148.7MB with each image 4MB before binding.

  b. Document -> Enhance Scans -> Recognize Text, choose page range and language. Save file, this reduced the file size dramatically, from 148.7MB to 12.9MB.

  c. File -> Save as -> Reduce File Size -> Adobe PDF File, Optimized, with the default setting, there is no change for the file size. It is still 12.9 MB.

  d. However, if you change the ppi from 150 to 96, the file size will reduce dramatically. For instance from 12.9 MB to 3.9 MB. But we don't recommend you to do that since a file with 96ppi has very poor legibility.

  e. Open Zotero, new item -> Manuscript, refer to this guide for filling in metadata *Zotero for Archival Research* http://guides.library.harvard.edu/c.php?g=531255&p=3634253

      i. attach link to file

      ii. **attach stored copy of file - recommended. Zotero will make a copy of the PDF file to store in Zotero library folder.**

If you choose *attach stored copy of file* within Zotero, then the original files can be deleted afterwards.

Resources

1. Scanner or camera: which is better? https://ltlatnd.wordpress.com/2012/12/05/scanner-or-camera-which-is-better/
2. Zotero - Collect, Organize, Cite and Share your Research Sources: Archival Research http://libguides.nus.edu.sg/c.php?g=145733&p=956617
3. Scanning documents and photos using your phone http://bloodandfrogs.com/2013/09/scanning-documents-and-photos-using.html
4. Creating a Digital Repository (One historian's story) http://www.rebeccaerbelding.com/index.php?cID=219.

5. Archival Research http://guides.library.harvard.edu/zotero/advanced/archival_research
6. DIY Image Management with Zotero https://www.historians.org/publications-and-directories/perspectives-on-history/october-2012/history-and-the-digital-image/diy-image-management-with-zotero
7. Digital Workflows for the Archives http://chronicle.com/blogs/profhacker/digital-workflows-for-the-archives/53505?cid=wc&utm_source=wc&utm_medium=en.
8. Adobe Acrobat DC Plans and Pricing https://acrobat.adobe.com/us/en/pricing/pricing.html?cmpgn=sembrandbuy&sdid=KARFP&s_kwcid=AL!3085!3!80083638262!b!!g!!adobe%20%2Bacrobat%20proffessional&ef_id=TG67IgqoEEMAABwR6XQAAUHH:20151103215047:s
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   PDF OCR Community Edition is free and can do OCR for single page pdf and single image.
   PDF OCR Enterprise Edition can do OCR for multiple page pdf and images.
10. OCR PDF free 30 days trial http://www.wondershare.net/ad/pdf-editor/ocr-scanned-pdf-for-editing.html?gclid=CKqguLil9cgCFQczaQodX6oDoQ
11. 5 Ways to OCR Documents on Your Mac http://computers.tutsplus.com/tutorials/5-ways-to-ocr-documents-on-your-mac--mac-49683
12. Freeware Irfanview for batch renaming and conversion of files, PC only http://www.irfanview.com/
13. EverywhereFocus(TM) Cell Phone Holder For Desk, Flexible 360 Cool Universal Smartphone Stand,! Strong Clamp & 2 Stick, Devices Up To 4 Wide. Perfect For Vblogging & Video Chatting! https://www.amazon.com/EverywhereFocus-Flexible-Universal-Smartphone-Vblogging/dp/B00YJKFJAS/ref=pd_sim_107_12?_encoding=UTF8&psc=1&refRID=38T5X2F1STENZB1FQMNW
14. DOF calculator http://www.photopills.com/calculators/dof
   DOF Master http://www.dofmaster.com/dofjs.html