Europeana Photography Workshop - Girona

Digitization systems and procedures in photographic image archives
RECOMMENDATIONS FROM THE WORKSHOP
by Carles Mitjà and Bea Martínez

The Centre for Image Research and Diffusion organized in 22-23 May 2012 a 14 hours workshop about digitisation in the framework of the Europeana Photography project. The workshop aimed to provide an overview of the available systems for original photographic materials digitization as well as the procedures in order to obtain the best results in terms of image quality and fidelity to the original. The teachers for this workshop were Carles Mitjà and Bea Martinez, both teachers at Polytechnics University in Catalonia (UPC), and very renowned professionals in Spain.

The goal of this short paper is to establish the **main recommendations** for partners of the project involved in the **process of digitizing**. These recommendations come from the explanations that the teachers made during the workshop. They can not be understood as a theoretical corpus, but a procedure in how to work.

RECOMMANDATIONS

1. Digitization should be done by camera better than by scanner. The use of camera avoids physical contact with the original and has virtually no limits about original properties and sizes.
2. Lighting for digitization with camera should be by electronic flash strobes. It allows for very short exposure times that avoid camera shaking at large magnifications work and provide better sensor response.
3. The camera lens must be near free of distortion (best options below 1%); this is not possible with zoom lenses. TCA must be also not present; in any case, the lens must be tested and both residual distortion and TCA should be fixed at the RAW file processing stage.
4. The camera lens resolution must be tested in order to find the aperture range actually useful avoiding aberrations when full open and diffraction effects when closing down the diaphragm.
5. Being into the resolution needed for a given application, the more photo sites on the sensor, the more prone to be limited by diffraction at smaller apertures. To increase the number of photo sites is advantageous by increasing too the sensor size.
6. Sensors without anti aliasing filter (so called optical low pass filter or OLPF) can produce image artefacts taking pictures from textures with small details periodically structured. The more the

camera resolution, the less the aliasing and moiré risk. For a given situation, changes in magnification can reduce or completely remove the aliasing effects.

7. In any case and for a given equipment set up, the system MTF measurement and interpretation provides objective information about:
   a. Best lens, aperture and sensor combination performance.
   b. Risk level about aliasing.
   c. Best camera settings and values to be used in each case.

8. Any lens-sensor system provides raw files that lack in contrast and sharpness; this can and should be fixed as a raw processing adjustment or as a post processing operation.

9. Any processing about image tone, colour, contrast and sharpness must be monitored by groups of originals and taking objective measures from the image.

10. Although cameras capture in 12 or 14bit and can provide 8 or 16bit output, capture must be done at highest bit setting available and output always at 16bit because this helps avoiding processing artifacts. After image processing, any output intended for a given application must be saved as B&W or Color of 8bit in depth.

11. When lighting textured objects, single fixture can be considered better than uniform two lights illumination. This helps keeping natural texture appearance; unevenness in brightness can be fixed by digital image processing.

12. The edges enhancement needs to be applied with care to avoid any over-sharpening and must be monitored by objective measurements. In general, while unsharp mask (high pass filter) tends to exaggerate edges enhancement over the high contrast regions, band pass filters as DOG (Mexican Hat) acts preferentially over the mid frequency regions, providing a more natural result.

13. Screens must be calibrated in order to visualize image colors accurately and to do a correct image processing. It is important to know the color space of the screen and avoid the visualization of images with wider color spaces; working with ProPhotoRGB is not recommendable to visualize images.

14. Archive images must have a known ICC profile (specific or standard). AdobeRGB is recommended for archive images, because it allows optimizing images for different outputs with minimum losses.

15. There are different ways to calibrate camera colors, depending on the RAW processor. Adobe Camera RAW (ACR) works with ACR profiles that can be created for each camera and situation, while Capture-One works with pre-defined ICC Profiles, created for each camera model. In all cases, is recommendable to take a photo of the ColorChecker Chart in the same conditions as digitized images; it will be useful to calibrate and evaluate camera color reproduction.

16. When applying a new ICC profile (or standard color space) is important to know the difference between Assigning and Converting; the result is different in both cases.

17. Working with RGB color spaces is the recommended option to process and archive images, because it has a higher bit depth than grey scale images and wider color ranges than CMYK color spaces.

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