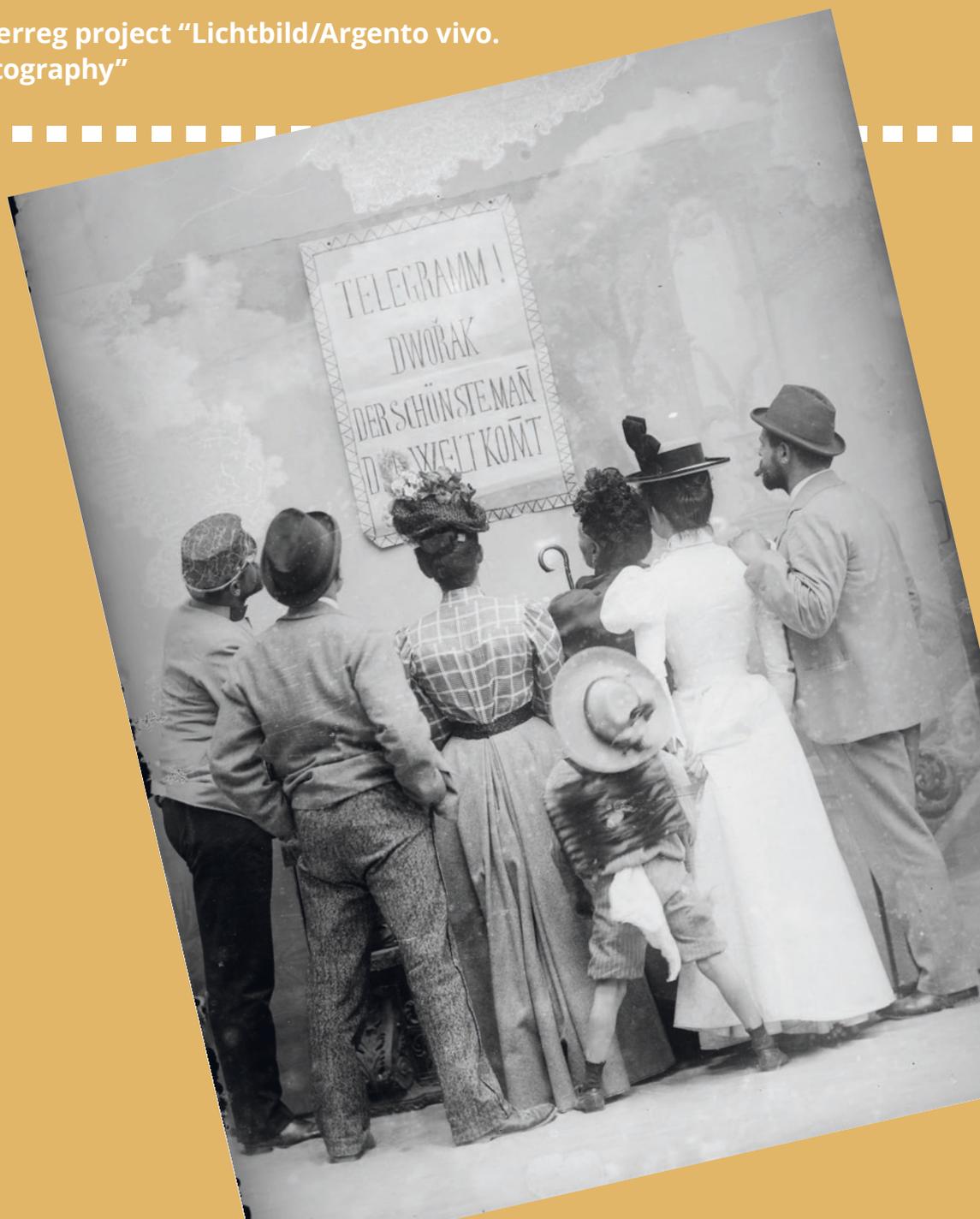# Digitizing and Editing Photos

Handout 4

Supplement of the Interreg project "Lichtbild/Argento vivo. Cultural Treasure Photography"

The Interreg project "Lichtbild/Argento Vivo. Cultural Treasure Photography" is a collaboration between the following partners: the Tyrolean Archive of Photographic Documentation and Art (TAP), the Municipality of Brunico as well as the Office for Film and Media and the Department of Museums of the Autonomous Province of Bolzano – South Tyrol.

The Lichtbild team consists of the following members: Martin Kofler, Rosemarie Bachmann, Helene Ladstätter and Evelyn Müller (TAP), Sonja Hartner and Julia Knapp (Municipality of Brunico), Arpad Langer, Oscar La Rosa and Notburga Siller (Office for Film and Media) as well as Gertrud Gasser and Verena Malfertheiner (Department of Museums).

The team is supported by several representatives of the associated partners: Alessandro Campaner of the South Tyrolean Provincial Archives, Roland Sila and Claudia Sporer-Heis of the Tyrolean State Museums and Bernhard Mertelseder of the Tiroler Bildungsforum in Innsbruck. Another associated partner is the European Region of Tyrol–South Tyrol–Trentino.

In line with the motto "Professional handling, open access. Photography goes future," the project defines guidelines for the competent handling of historical photographs in the project area of Tyrol and South Tyrol. These guidelines are developed within the framework of various workshops; the results will be presented on a webpage, in an app and as an e-learning program. Furthermore, for the first time ever, the project will make historical photos available in Tyrol and South Tyrol as open data.

Table of Contents
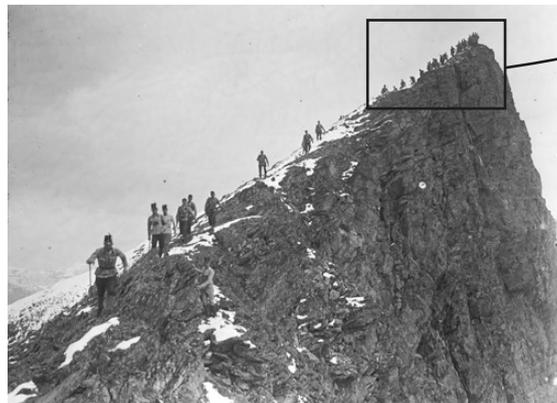
Richard Piock

Preface

In comparison to other image reproduction techniques such as printing, lithography and copperplate engraving, photography is a recent, modern technology; in comparison to scanning – transforming analog photographs into digital impulses – it is old, almost antiquated. The first scan of a photo was not made until 1957, around 120 years after the invention of photography, by Russel Kirsch, who scanned a photo of his three-month-old son in a resolution of 176 × 176 pixels, thus laying the foundations for this technology.

The contactless scanning of a tactile analog photograph using photosensitive sensors and converting it into a cold, mathematical-physical sequence of numbers, in other words digitizing it, does indeed have many advantages: just think of the mobility of images and their storage. However it does take away one dimension of art from photography. An analog photo – in other words an image projected through a negative onto light-sensitive paper and rendered visible and durable via a chemical process – has two dimensions of artistic composition. Firstly the photographic shot: the choice of subject, selection of aperture and time, waiting for the right light; and secondly its reproduction in the darkroom: the choice of paper, focus, aperture and time. The work in the darkroom determines whether a photo becomes a work of art or sinks into mediocrity. An analog photo possesses a certain three-dimensionality. The quality of a black-and-white glass negative on platinum paper from 1905 or a color negative on Cibachrome exposed through a Durst Lambda will never be achieved by an inkjet print from the year 2018.

Nevertheless, in our digital world, digitizing image documents has become a must. Only in digital form can photos be disseminated and shared globally as well as preserved, although it is not yet fully clear how safe storage is. Only in digital form can photos be altered, composed, improved, indeed even falsified, depriving us of their reliability as a document of the real world.

Scanning, the digitizing of analog photos, is the subject of this handout. Scanning as an intermediate step between taking the shot and reproducing it, through the choice of resolution and the use of various processing and editing techniques, determines whether an observer perceives an analog

photo as a work of art or simply as a print in a world inundated with images. The digitizing of negatives or positive templates essentially determines the quality of the reproduction. It is often assumed that the highest resolution – say 4,000 DPI, maximum greyscale, 8 bit – is best. Creating a maxi file that overburdens storage is, however, needless to say, "too much of a good thing." A basic understanding of correct digitizing should enable documents to be recorded so that the best quality can be achieved while avoiding huge volumes of data.

Proper scanning also allows to find new details: Descent from Monte Sief, weapons training 1908 (summit section; original size 12×9 cm). This picture is part of the "Lichtbild/ Argento vivo" database of the Interreg project.

The author
Dr. Richard Piock was born in 1947 in Merano; he graduated in commercial sciences from the University of World Trade in Vienna; from 1972–1984 he was managing director of Euroclima Bruneck/Sillian; from 1984–2013 CEO of Durst Phototechnik AG; from 1994–2000 Provincial Commander of the Südtiroler Schützenbund; in 2011, he became a founding member of the Tyrolean Archive for Photographic Art and Documentation (TAP); Chairman of TAP and the associations Velatum and Osttiroler Kulturspur – Kulturnetzwerk.

Clemens Cichocki

Photo Archives – Digitization and the Challenges It Poses

This article provides practical guidance for digitizing photographs, whether privately at home or in an archive office. It is essential that we develop now, in the present, a sensitivity for certain subject areas, indeed the general rules of digitization, for the future.

How far the indications given here can be implemented depends of course on the resources available, not only in terms of workspace, but also, and especially, in terms of finance.

Workroom

This should, if possible, be decorated in a neutral color (gray, black). Moreover, no daylight should be allowed to enter the room as color temperatures may differ over the day, thereby preventing a correct color assessment. Ambient lighting should have a color temperature of around 5500° Kelvin.

Workplace

It is important that there are no primary colors (such as brightly colored pictures) in the immediate surroundings as the eye reacts to these, making color analysis difficult. A gray work surface is an advantage and substantially supports the eye.

The medium to be digitized

The first thing to do is to verify the condition of the archive material, together with a conservator if possible, in order to minimize any damage.

To make the digitization work more efficient, it is an advantage to process media made of the same material together. It is helpful to divide them up as shown below:
- Black-and-white glass plate negatives, sorted according to size
- Color glass plate positives (autochromes)
- Black-and-white acetate or polyester negatives, sorted according to size
- Black-and-white "top view" materials, sorted according to size
- Color "top view" materials, sorted according to size

Each medium to be digitized should be assigned to the corresponding scanning device.

Copyright

The right to reproduce material must always be clarified before it is digitized, or at the latest before being published. The easiest way is to record the copyright in the metadata.

Computer – operating system

Windows or Mac OS: both systems work fine. The simplest solution is to choose a system that suits the structure of the other, already existing devices.

Software

Further software is required in addition to the operating system. The most popular program for image editing is currently Adobe Photoshop; simple adjustments can

be made using Fast Stone Image Viewer for example, which is available as freeware.

It is advisable to choose scanning software that allows you to profile your work. SilverFast is one of the most popular solutions for this. Do not forget an image database such as M-Box, Augias, Adlib or Ajaris is required. This raises the question of whether you want to operate the database yourself or rent space in an existing archive and thereby save on maintenance costs.

Digital camera or scanner?

The choice of which digitizing devices to use depends primarily on the amount of material you want to archive as well as size and conditions. The fundamental difference in scanners is between transmitted light (light through an object e.g. slide or negative) or reflected light (light shining from the front onto an object such as a photo or printed matter). In the desktop field, scanning devices work up to A3 document size; there are also large-format systems (e.g. Cruse scanners), which can take originals of up to 2.50 m in size. Moreover,

Cruse Scanner
© Cruse

Epson A3 Scanner
© Epson

Nikon Coolscan or Plustek
(Symbolic photo)
© Nikon

MegaVision MSI
System incl. RTI
© MegaVision

from fading even after long periods of time. There are dye and pigment inks available for this purpose. We are more in favor of the pigment inks since they can last for up to 100 years when used with the corresponding archive-compatible printing papers (e.g. Hahnemühle).

Calibration and profiling

What do these mean? All devices featuring displays, whether monitors or smartphones, will display the same photo differently if they do not have what is known as color management. Not only can the brightness vary but also the color reproduction.

Small differences can certainly be tolerated. So, for example, the sky on a holiday photo on a smartphone looks just as stunning as on a much brighter television screen.

Perhaps we perceive the sky as being a brighter blue on one device and a deeper blue on the other. The basic information, "fantastic holiday, superb weather" may therefore be reproduced in a lighter or deeper shade of blue. When dealing with archive material however, we are aiming for a faithful reproduction of the original.

it may make sense to have specially designed scanners if you are going to digitize small- and medium-format film footage, or the service provider should have these if you outsource the work.

For smaller quantities of material to be digitally reproduced, a digital camera with a macro lens is also sufficient. In this case, it is important to ensure that the camera resolution is high enough.

Monitor

There are very large differences between monitors. In the field of graphic design and photography, the firm Eizo has earned itself a reputation for monitors that can be perfectly calibrated. If there is no calibration option on the monitor, basICColor display SQUID 3 can be used, for instance.

Calibration

Calibrating a monitor means simply adjusting the possible settings to a certain value. This, however, is not sufficient, which is where profiling comes in.

Printer

If your digital copies also need to be printed, it is important to ensure that the quality is high enough to prevent the colors

Profiling

Profiling means measuring and protocoling the properties of a monitor. To do this we establish the current state by creating a measuring device on the screen. The current value given is now compared with the target value using the software attached to the measuring device; a so-called profile is

calculated from this and a profile file created. This file can be recognized by the .icc extension. It is stored in the operating software and informs the graphics card how to create the reproduction.

All these processes may be performed on input devices such as cameras and scanners as well as output devices (printers). The aim should be for the image on the monitor as well as on the print to be identical to (the same as) the original.

Resolution and file format

Image resolution is the perception by the eye and arrangement of graphic elements, i.e. areas, lines and points. The finer these graphic structures are, the higher the image resolution.

Input Image Resolution

A digital photo is made up of pixels. The number of pixels determines the image resolution of a digital photo. Photographing or scanning creates an input image resolution. This is calculated by multiplying the number of pixels of the height × width of a photo. For example: 2,845 pixels × 4,284 pixels = 12.2 megapixels.

Output Image Resolution

Image data for printing and provisioning to databases produces output image resolutions. As a general rule, in offset printing, the size (height and width) of the printed photo in millimeters must be scaled so that it features 300 pixels per inch (PPI) for the planned image size. It is then printed in dots per inch (DPI). In practice, resolutions in PPI and DPI are almost identical. Photoshop uses the term PPI for output resolutions. As a general rule for image databases, the raw file can be calculated and scaled so that it is designed for maximum print size based on 300 PPI.

There should only be two file formats: when creating the file, the RAW format should be used. This is our "digital negative," upon which we can always fall back; the finished file, the one to be saved, is meanwhile an uncompressed TIFF format file.

Note: with JPG file formats a part of the image information is destroyed every time the file is opened and saved again – this format should therefore definitely not be used.

A RAW file is always a vendor-specific file, which is not uniform and therefore not suitable as the only file storage format.
Here is a selection of file name extensions:
• Adobe Inc. Digital Negative: .dng
• Canon: .tif, .crw, .cr2, .cr3
• Contax: .raw
• Epson: .erf
• Fujifilm: .raf
• Hasselblad: .3fr, .fff
• Kodak: .dcr, .dcs, .kdc (for EasyShare P850, Z990), .raw
• Leica Camera: .raw, .dng, .rwl
• Mamiya: .mef, .mfw, .iiq
• Minolta Raw: .mrw, .mdc
• Nikon: .nef, .nrw
• Olympus: .orf, .ori
• Panasonic: .raw, .rw2
• Pentax: .pef, .dng
• Phase One: .iiq
• Ricoh: .dng
• Samsung: .srw, .dng
• Sigma: .x3f
• Sinar CaptureShop for Macintosh: .cs1, .cs4, .cs16
• Sony: .arw (as above: .srf, .sr2)

The following link provides a broad description of different resolutions.
https://www.blitzrechner.de/pixel-zentimeter-umrechnen/
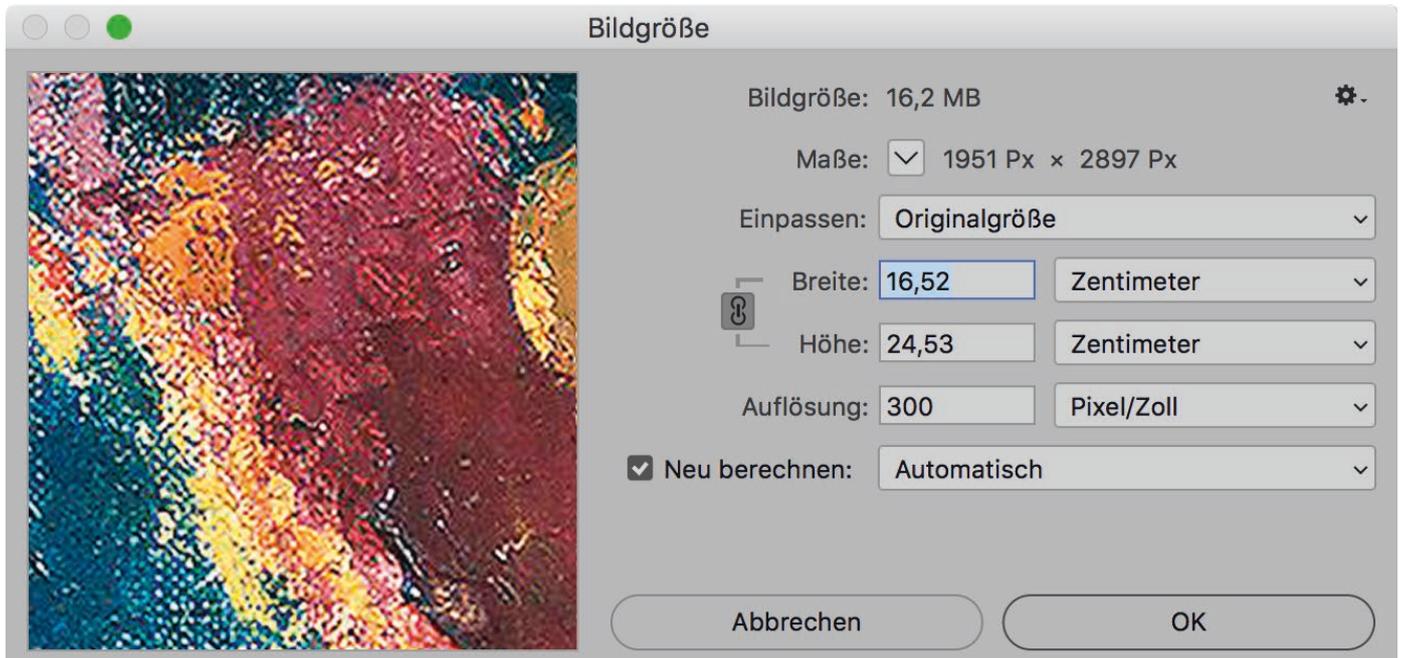
Image captioning and keywording

Based on format and content, a complete captioning of the photos should be made according to IPTC standard; this can also be done in several languages. IPTC stands for International Press Telecommunications Council and is the name of an organization; IPTC IIM is a standard for directly storing text information in image files. The international IPTC standard ensures that certain technical, legal and content data are stored together with the respective photo and are therefore easy to find and retrieve. Almost every archive nowadays is based on this standard.

Metadata and copyright

The maintenance of IPTC metadata with regard to authorship in the Copyright Notice field is recommended for rightsholders such as photographers, graphic artists or image and news agencies to prove their authorship.

Copyright protects these data by means of a special provision ("Protection of information required for rights management"). This provision prohibits the removal or alteration of information provided by rightsholders for the purposes of rights management. If rights-management information is removed or altered without authorization, it must not knowingly be distributed, disseminated, broadcast, publicly reproduced or be made publicly available.

Photographers, graphic designers and agencies therefore frequently include notices for this purpose in their image metadata. By using a specific contractual clause, they can ensure that digital retransmission is only allowed together with the metadata. When in-house thesauri or systemizations/categories are used, these must of course be taken into consideration in the captioning.

EXIF – exchangeable image file format

This is a standard format used by the Japan Electronic and Information Technology Industries Association (JEITA) for storing metadata in digital images. The latest version of the standard (2.31, April 2010, last revision July 2016) was formulated by JEITA
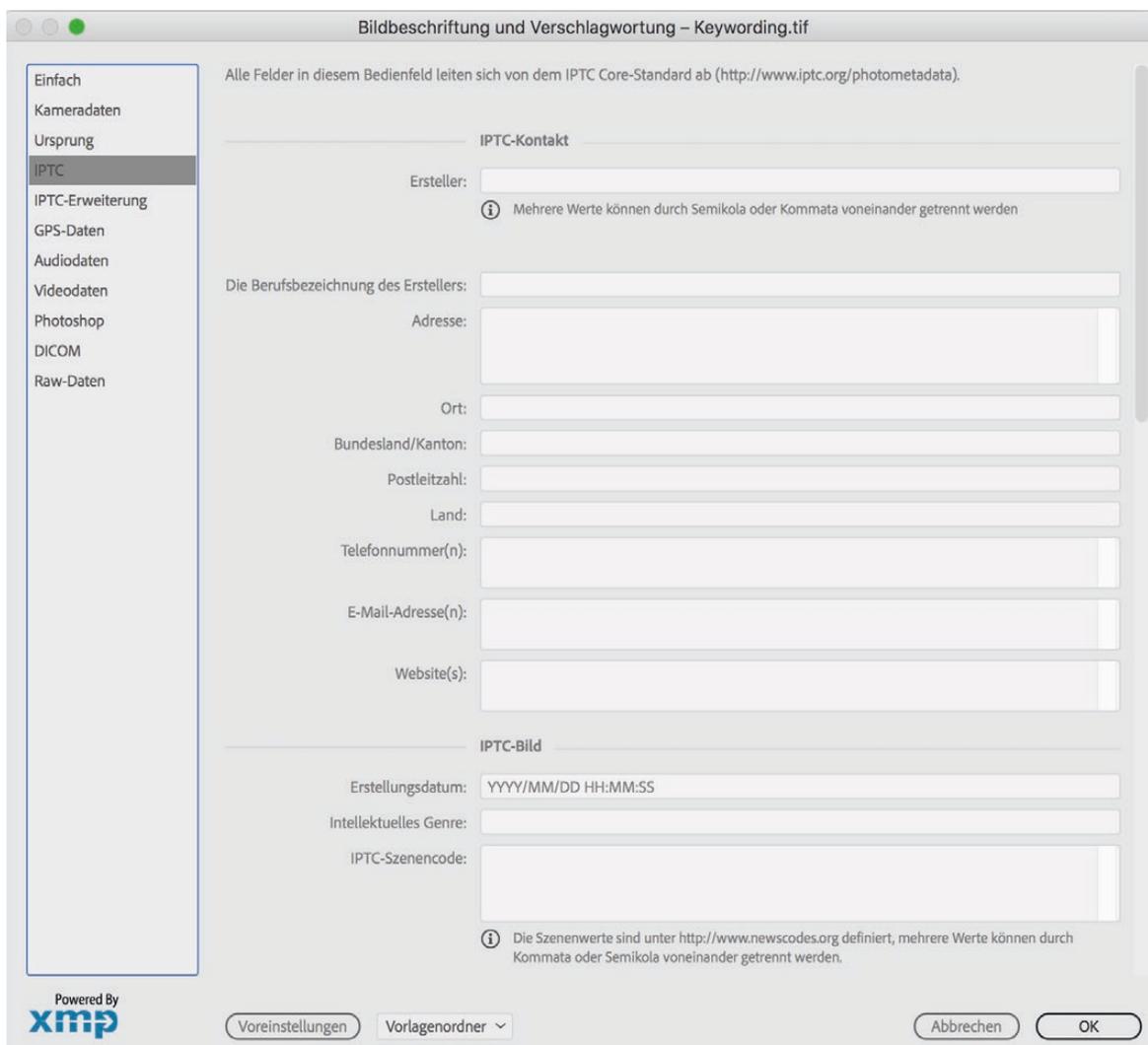
in conjunction with another Japanese organization, CIPA (Camera & Imaging Products Association, a successor organization of the JCIA or Japan Camera Industry Association).

Archive structure

When carrying out digitization work, it is important to respect the archive structure and transfer this to the image data.

The image data produced are stored with file names, which correspond to the inventory number. It is also helpful to document the various work processes photographically, so that the whole process can be understood later.

When digitizing, it is efficient to write all keywording directly into the file before saving the produced data.

Digitizing the work yourself or outsourcing?

The team needs to determine the resources available internally in terms of staff and whether the digitization can be done in-house. Are all the devices already available or must new purchases be made? How large is the stock to be digitized? It is also advisable to get quotes from service companies and then decide whether the digitizing work is to be done internally or outsourced.

Original document format	Output format	Scanning resolution at least
24×36 mm	13×18 cm/300 dpi	1,500 dpi
6×7 cm	13×18 cm/300 dpi	770 dpi
9×12 cm	13×18 cm/300 dpi	450 dpi
13×18 cm	13×18 cm/300 dpi	300 dpi
18×24 cm	13×18 cm/300 dpi	225 dpi
20×25 cm	13×18 cm/300 dpi	195 dpi

Outside firms must be able to fulfil the specific requirements. Particular attention should be paid to ensuring that the files are delivered at the very least in Adobe RGB or in one of the larger color spaces. The scanning resolution should also be defined depending on the desired print size. It should also be clear how long the project will take.

All original documents in color should also be scanned in color; all black and white originals in greyscale.

Still/inactive archive (master copy) and work archive (working copy)

Digitization, which should only be carried out in the RAW format, produces the so-called master copy. This is generally stored in the TIFF format separately (not where everything else is stored).

The work archive is now the database, which contains our passworded and usable data.

The author
Clemens Cichocki was born in 1956 in Graz; in 1985 he qualified as a master photographer; since 1986 he has been a self-employed professional photographer initially in the field of advertising and catalog and industrial photography, then producing facsimile replicas of medieval manuscripts for international publishers;
he was originator and organizer of the *Faces of a City* photo exhibition, part of the 2003 Cultural Month in St. Petersburg; co-organizer of the kick-off event "1st Social, Cultural and Economic Forum" (exchange with experts from St. Petersburg) in Graz in 2004 as well as of the Social Meeting event held in 2006 in St. Petersburg.

Christian Meingast

Color Management, Scanner Software and Image Editing – An Overview

Colors

In order to avoid color issues, consider the following:

- For visual display, use applications that assist with color management, e.g. Adobe Photoshop or Adobe Lightroom.
- For correct color reproduction, use a monitor (for example Eizo ColorEdge) that is specially designed for color management; set the color temperature at 5,000 Kelvin.
- Use the correct printing inks, with for example Epson or Canon equipment.
- Check the image under suitable light (light box, such as JUST standard light).

What does Color Management mean?

Color Management provides a uniform color-handling environment and uses a common color reference (color profile) for each stage of the production process (monitor, multi-function device, inkjet printer, digital camera, offset and DDCP – Direct Digital Color Proofing). The aim is to work with a unified image throughout the production process, using the device profile to adapt the colors to suit the various devices. Monitors and printers have specific color characteristics. It is impossible for these characteristics to match perfectly. It is, however, possible to convert the color data of individual devices over a common color space (a color space independent of all the devices CIE XYZ, CIE L*a*b) so that the various colors resemble each other more closely. This is the basic principle of color management.

In this context, the Lab color space acts as a color-connecting space, converting colors from one color space to another, for example from RGB to CMYK.

The color spaces of digital camera standard Adobe RGB and standard ISO Coated v2 printing inks have reproducible differences. While these cannot be matched, color management can however be used to bring them closer together. If the colors to be printed on the end product are taken into consideration during the photographing, design and production of printing forms and are defined as a common standard, the data can be processed smoothly through all stages of production.

Color space: Adobe RGB encompasses a larger color gamut than sRGB and should therefore be used whenever possible.

Color models

- Additive Color System RGB (Red, Green, Blue).
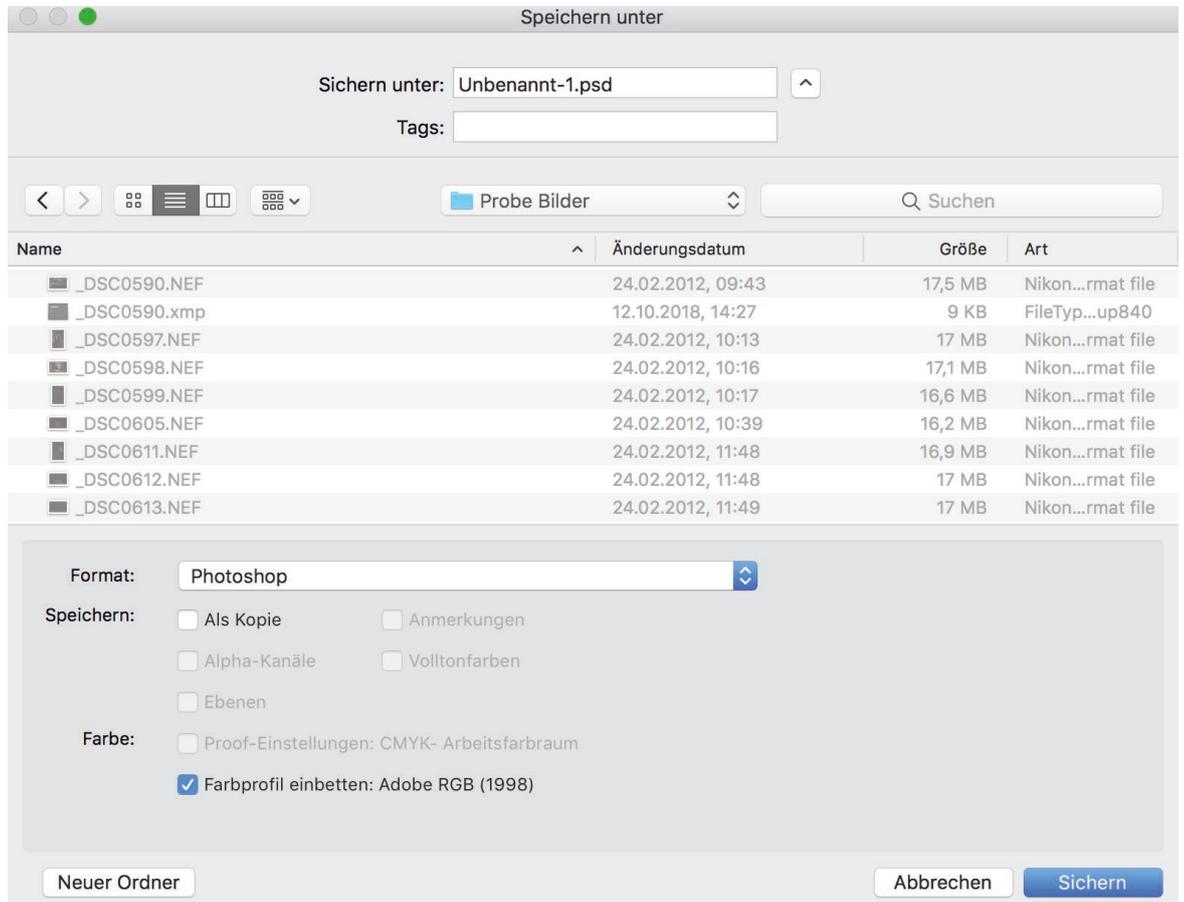- Subtractive Color System CMYK (Cyan, Magenta, Yellow, Black).

Color settings in Adobe Photoshop CC

Unfortunately, many users do not bother with making the correct settings, due to lack of knowledge.

- Profiles should be set.
- Color management guidelines should be set.

- It is in principle **not** possible to work in Photoshop without color management.
- Profiles must in principle be embedded.
- Embedding profiles is like applying a Post-it note to a data file: it is basically a guide to correct color processing.

Assigning a color profile in Adobe Photoshop CC
- The original image remains unchanged.
- The attached source color space translation (source profile) in conjunction with a target profile will produce the best possible output result.
- If the profile information is discarded during transfer, a correct "translation" is no longer possible!

Converting a color profile to Adobe Photoshop CC
- Conversion is from a source color space (such as RGB) to a target color space (such as CMYK).

- The pixels of the original image are optimized in terms of color to match the target color space.
- The result is a new (changed) source color space.
- This process cannot be reversed without some loss.
- Conversion leads to the production of data sets, which correspond exactly to the desired target color space.

IT8 targets
IT8 is a summary of several ANSI color-control standards. Today scanners, digital cameras, monitors and printers are calibrated according to these standards to ensure color accuracy.

LaserSoft Imaging produces its own IT8 targets, ensuring maximum precision in Target production. Major companies around the world use LaserSoft Imaging Targets and are convinced of their quality. Use Reflective Targets to create color profiles
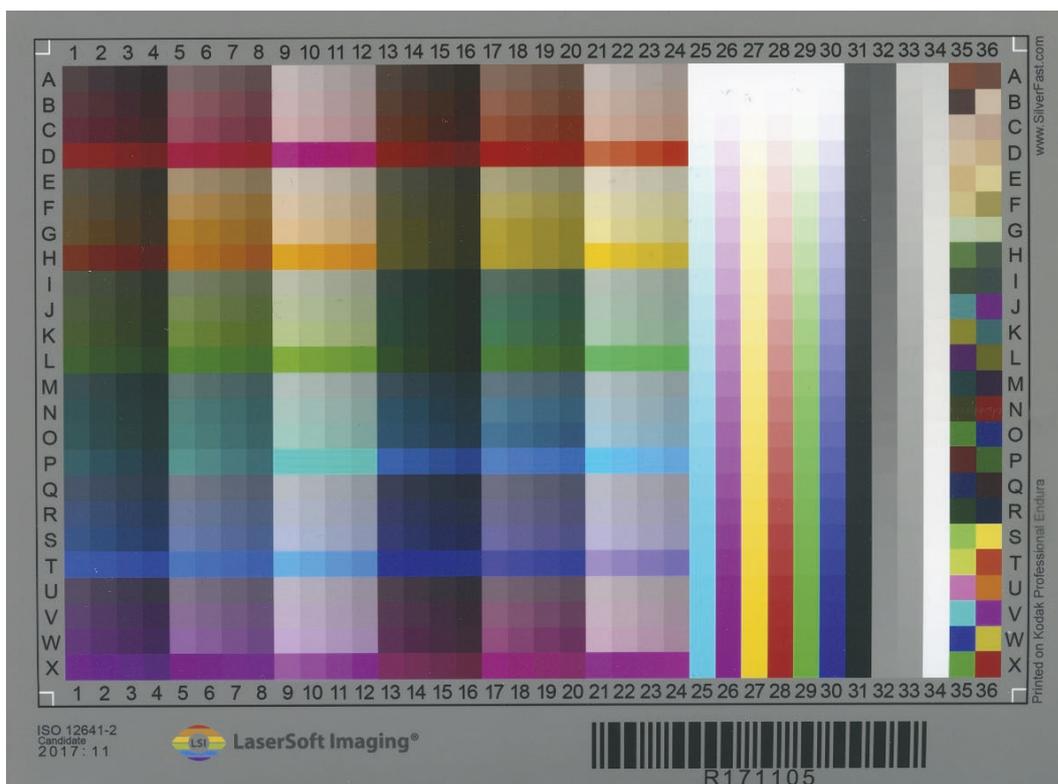
An IT8 target, color samples for calibrating scanners, cameras etc. and creating color profiles
(www.silverfast.com)

for the scanning of reflective ("top view") templates (10×15 cm and 13×18 cm) such as photo prints. Use Transparent Targets (35 mm, 6×7 cm and 4×5 inch), to create color profiles for scanning film templates such as slides.

Software in practice for scanning and image editing

SilverFast – A standard in the field of scanner and archiving software, also due to its fully automatic IT8 calibration and multi-exposure function; it currently supports over 340 different scanner models. As part of the Archive Suite and the lossless raw data concept, SilverFast saves slides, filmstrips, Kodachrome images and photos with all recordable image data as raw data images. These may even comprise the infrared channel for subsequent dust and scratch removal.

Adobe Photoshop Elements – Offers numerous ways to organize, edit, design and share your photographic material. When you start the program, slide shows and photo and video collages are created automatically. Automated editing options help you to get the most out of your photographic material. It also offers a wide range of intuitive ways for you to design, organize and share your work enabling you to create unique solutions.

Adobe Photoshop – Photo editing with pixel manipulation, the leading program for creative image editing. Photoshop is continuously evolving with new functions being added on a regular basis.

Adobe Lightroom – A cloud-based complete photo service. Here, no changes are made to the original data, so there is no need to make additional copies of the original photo files. Lightroom incorporates many features required to organize, edit, store and transfer images. It works across desktop, mobile devices and the web.

Affinity Photo – Professional photo-editing software. Thanks to the extensive array of tools, which has been specially tailored to the needs of creative professionals and professional photographers, images can be quickly and flexibly edited, retouched or assembled into a multi-layered montage.

Fast Stone Image Viewer – Useful freeware for simple photo-editing using the most important image file formats.

Some Photoshop scripts ... and tricks

Magic Scripts – Here you can download free scripts for Photoshop, which elegantly solve a number of common problems that designers may encounter. The page presents some videos (in English) which show exactly what each of the scripts does. http://bereza.cz/ps/#two
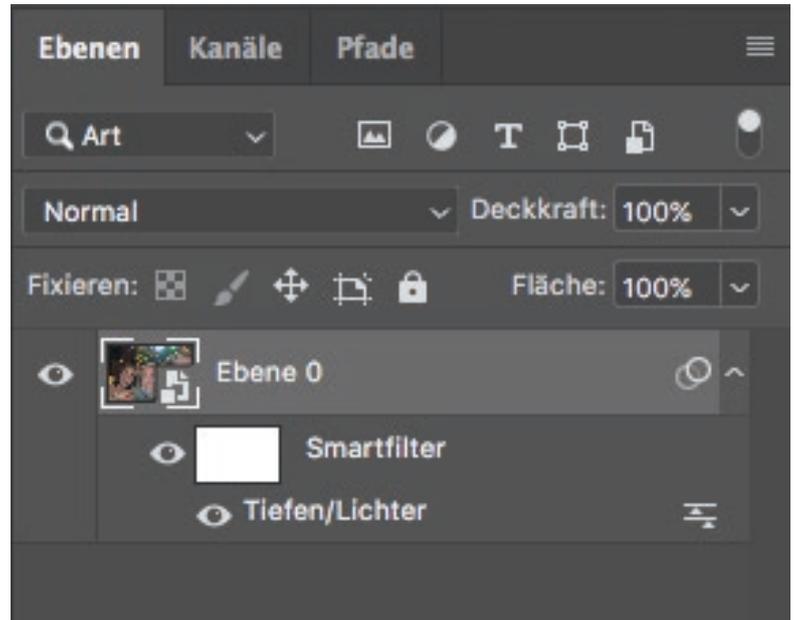
FFT Filter (FFT stands for Fast Fourier Transform) – Adobe Photoshop has no such in-house filter on board (while Affinity Photo does). Without this filter, it is relatively difficult to remove a "silk raster" surface on portrait and family photos from scanned pictures; with it, it becomes child's play. http://ft.rognemedia.no/

Photoshop Scripting (in English) – For use by beginners and professionals alike. For those who want to learn to write their own actions, scripts, HTML panels and Photoshop plug-ins. https://www.ps-scripting.com/

The **Shadows/Highlights dialog** box in Adobe Photoshop, which may be accessed

through Image > Adjustments, makes it easier to reconcile the light and dark areas of images. Using the gradation curve alone, you cannot adjust this effect as it is based on a soft focus. If you use Shadows/Highlights as a smart filter, and apply it to a smart object, you can convert each layer by right-clicking and selecting "Convert into smart object." Double click on the filter to open Shadows/Highlights as needed to adjust the values.

The **New Adjustment Layer dialog** in Adobe Photoshop – is accessed via Layers > New Adjustment Layer – An adjustment layer allows you to apply color and tonal adjustments to an image without altering the pixel values permanently. You can for example create a tone level or gradation curve adjustment layer, instead of making adjustments directly to the picture. The color and tone adjustments are stored in the adjustment layer and applied to all underlying layers. So by making a single correction, multiple layers can be simultaneously adjusted. The changes may be discarded at any time and the original image restored.

Shadows/Highlights in Adobe Photoshop
(Screenshot: Christian Meingast)

The author
Christian Meingast, a trained photo dealer, has traveled around for 30 years for Apple Computers and maintains close contacts with photographers, graphic designers and printing companies throughout Tyrol and South Tyrol; for many years he has organized training courses in South Tyrol and Tyrol on the topics of digitization, image editing and color management.

Konrad Faltner/Arpad Langer

Digitizing Slides

Some Options Proposed for Private Use

Slides are invaluable testimonies of our experience and therefore carry a high sentimental value. However appealing a slide show made in the company of friends or family using a slide projector may be, in the digital age it is increasingly becoming a passion for nostalgics. Digitizing our slides allows us to keep up to date with technical progress and provides many advantages for our images with respect to analog photographs. The files obtained are available at all times on hard disks, can potentially be modified using image-editing programs and, most importantly, if the data is maintained properly they can be preserved over the long term.

Preparations and general indications

Before beginning the digitizing process, it is advisable to organize slides and wherever possible make a selection: Are there several slides depicting the same subject? Are all slides equally relevant? Making a careful selection can save you a great deal of time later on, and also minimize expense if you have to outsource the work.

When archiving and digitizing slides, one should always record their content at the same time. Assigning an inventory number is essential to linking the original with the scan and content. Important data may be held for each individual slide and the inventory number allows this to be assigned at any time to this specific image. If the scan file name corresponds with the inventory number, which is highly recommended,

then the connection is retained. Additional information on the cataloguing or indexing of photographs can be found in Handout 3: "How to Preserve and Organize Photographs."

In order to scan or photograph slides, it is necessary to remove any existing glass frame. Always use cotton gloves to avoid direct contact with the skin, which is acidic. Cleaning with a fine, soft, clean paintbrush is essential for optimum digitization results and has the advantage of the originals being exposed to fewer acidic or abrasive substances or particles.

To ensure your slides last as long as possible, it is advisable to store them appropriately. A relative humidity of between 30% and 50% and temperatures from around 13°C to maximum 20°C, preferably in dark surroundings where there is no risk of flooding or fire, are suitable for this purpose. Proper storage ensures you have access to high-quality slides even after several years, which if necessary can be scanned again in a higher resolution. In Handout 3, entitled "How to Preserve and Organize Photographs," you will find further detailed information on cataloguing and indexing photographs.

Several different digitization options are set out here below. The following indications apply to all of the options:

- Disable automatic filters on your DSLR (Digital Single-Lens Reflex) camera and automatic image-correction programs on
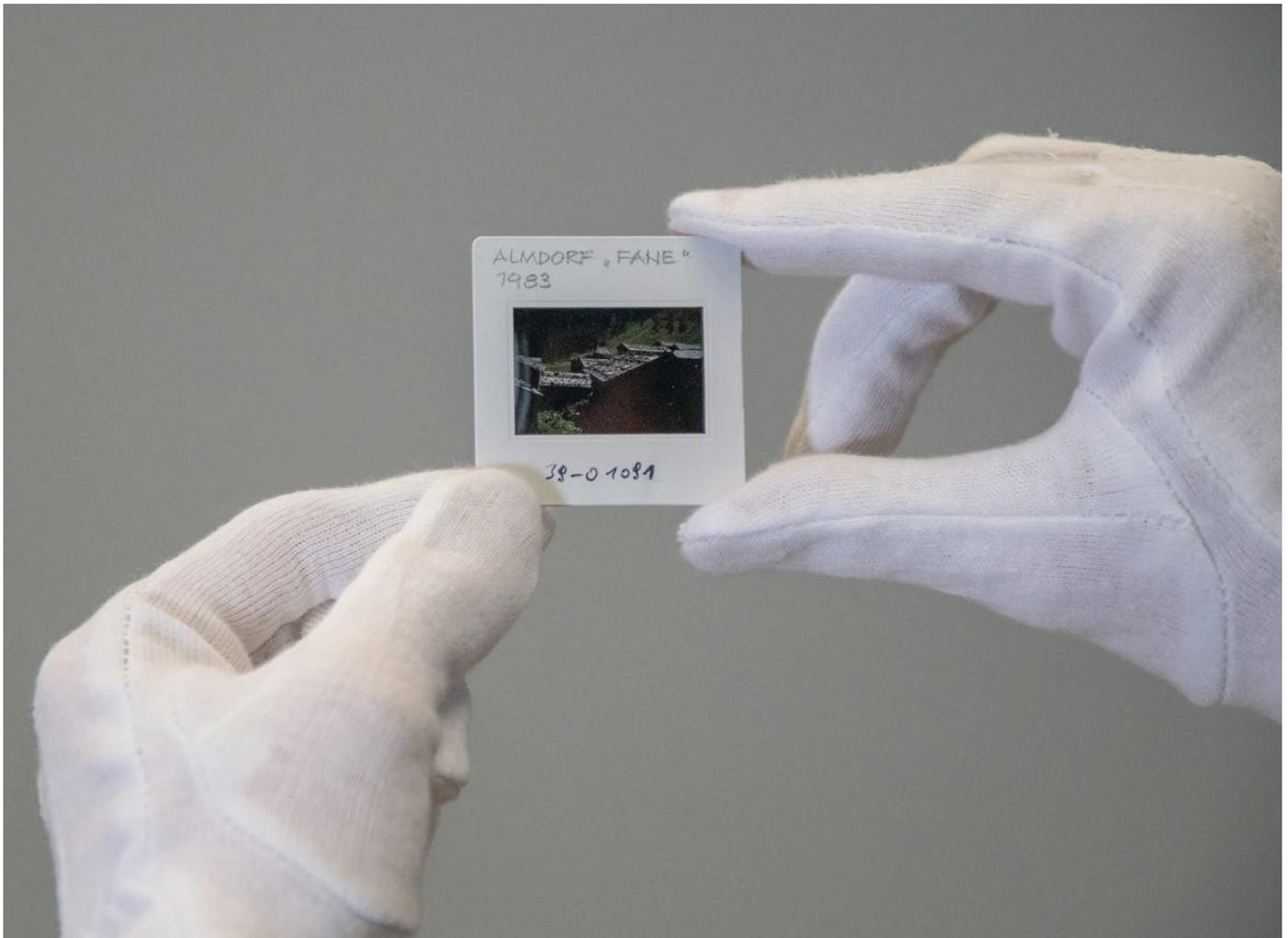
the scanner; the closer the properties are to the original, the better.

- The TIFF file format is preferable to less stable and compressed formats such as JPEG. Non-proprietary file formats are suitable for long-term archiving.
- When photographing, ensure you use as uniform and color-neutral a light source as possible; avoid so-called mixed light (light coming simultaneously from light sources composed of different colors).
- A high-quality digital reproduction can be achieved by scanning small size transparencies (24 x 36 mm) with an image resolution of at least 2,700 PPI and where possible 16-bit color depth. Use the RGB color space for your digital reproductions.
- Always save your data on several hard drives (backup copies), and if possible do not store all of these in the same place.
- If you want to edit your digital reproductions, it is wise to save an original file and modify a copy you have made, so that you always have the original data file to fall back on if necessary. You can use RAW files to edit your images, however the TIFF format should be used for long-term image archiving.
- Classify your slides and digital image files using the same method. If you assign an inventory number, you can create a link between the slide and the digital reproduction.

Cotton gloves should be used for the correct handling of slides.
(Photographer: Konrad Faltner, Office for Film and Media, Bolzano, CC BY 4.0)

slide duplicator
with diffuser

adapter ring

slide carrier

duplicator tube

camera lens
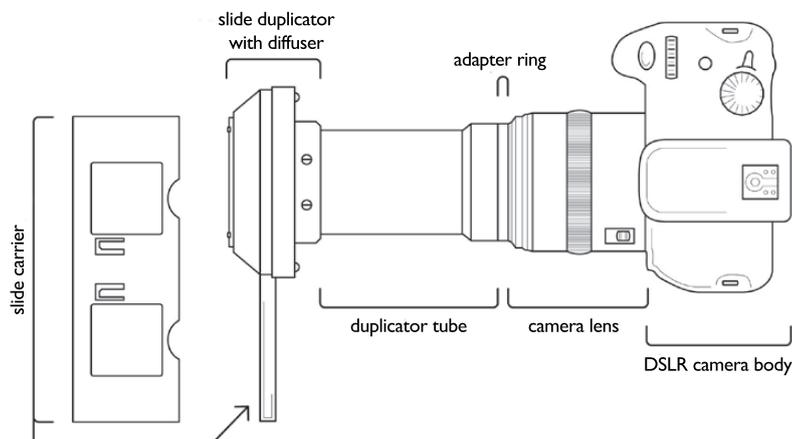
DSLR camera body

Left: The assembly and use of a slide duplicator
(Photographer: Konrad Faltner, Office for Film and Media, Bolzano, CC BY 4.0)

Right: Slide duplicator assembly on lens and DSLR camera
(Drawing: Arpad Langer, Office for Film and Media, Bolzano, CC BY 4.0)

Photographing using a slide duplicator (lens extension)

The following materials are required for digitizing standard-size slide transparencies (24 mm × 36 mm) using a slide duplicator:

- DSLR camera
- Suitable lens (macro lens 50 mm focal length)
- Memory card of sufficient capacity
- Adapter ring to connect the lens to the slide duplicator housing
- Slide duplicator (housing with slide holder)
- Light source (evenly diffused light)

Using an SLR camera and slide duplicator to photograph your slides means you can begin digitizing your slides without any major preparation work.

Slide photographed using slide duplicator. When photographing, a part of the slide mount may still be visible; post-processing of digital material (cutting) is required. Pictured: Fane Alpine village above Mühlbach, as photographed in 1983.
(Photographer: Franz Mayr, LAV039-01090. Franz Mayr Portfolio, Office for Film and Media, Bolzano, CC BY 4.0)

In order to set up the slide duplicator, first connect the housing of the SLR camera to the lens; now using an adapter ring, connect the lens to the lens barrel on the slide duplicator (when buying, take note of the lens size or diameter and model). Next the slide can be positioned in the slide holder on the housing and pushed until it engages. Use as evenly diffused lighting as you can, in order to avoid undesirable overexposed or underexposed parts on your images.

Please note that the settings on your SLR camera must be adjusted to suit the lighting conditions, type of lens and characteristics of the slide; however in general, always aim to maintain as far as possible the same lighting conditions and camera settings and avoid mixed light wherever possible in order to achieve consistent results in terms of quality.

This digitization option offers the advantage of producing good, usable digital reproductions quickly and straightforwardly.

Photographing using a repro stand and light box

It is also possible to digitize your slide stock using a repro stand and a light box. To do this, you need the following:
• DSLR camera
• Lens (50 mm f2 or 60 mm macro lens)
• Repro stand
• Memory card of sufficient capacity
• Light box to be used as backlighting for the slides

The use of a repro stand in combination with a light box supports easy and quick digitization of slides. Position the light box so that it acts as a baseboard for the repro stand. Attach the SLR camera to the camera arm to enable it to be more precisely positioned on the column of the repro stand. Now the photograph template (slide) can be positioned on the light box. The SLR camera can now be placed in position on the column of the repro stand: The distance to the template must be determined first, depending on the type of lens or

model. It is important to always maintain the same lighting conditions and camera settings as far as possible, in order to achieve consistent results in terms of quality.

Photographing against backlighting using a slide holder

The following materials are required for this digitizing option:
- DSLR camera
- Suitable lens
- Tripod or a means of fixing the camera in place
- Memory card of sufficient capacity
- Matte glass panel
- Suitable slide holder made of card, wood or other material
- Light source (uniformly diffused light)

Using a matte glass panel (e.g. frosted glass) with a slide holder positioned in front of it, it is relatively easy to photograph slides using a DSLR camera. This requires the glass panel to be attached vertically and a ready-made or self-constructed slide holder (cardboard or wood) to be attached directly onto it. It is recommended for the holder to have an opening so that slides can quickly be changed without having to remove the holder from the glass panel every time you want to change a slide. Also make sure that the lighting behind the matte glass panel is evenly distributed. Now you can bring the camera with a tripod into position in front of the attached slide and begin photographing.

Converting a slide projector

To use a modified slide projector for digitizing, you will need the following:
- DSLR camera
- Suitable lens (preferably a macro lens)
- Tripod or camera mount option
- Memory card of sufficient capacity

- Modified slide projector (possibly smaller dim lights to create diffused light)
- Suitably sized matte glass panel (frosted glass) or similar plastic panel
- Light source (uniformly diffused light)

You can also digitize your slides by converting a slide projector, however this does require some preparation. Detailed instructions on adapting or converting a slide projector are relatively easy to find online. To do this, the casing must be dismantled, and the projector lens removed. The existing lamp must be replaced with a weaker one (e.g. 75 W), because if lighting during photographing were to be too strong, the solution would be to use a less powerful lamp. Please ensure that the lamp emits as uniformly diffused light as possible by placing a small matte glass (frosted glass) or plastic panel in front of it. The slide projector casing can now be replaced. Now determine the distance, depending on the model, between the slide (in the projector) and the camera sensor: Also in this case useful instructions can be found online. Switch the projector on, photograph the slide and change over to the next using the projector control lever.

This method of photographing slides requires somewhat more manual dexterity yet produces very good results and enables multiple slides to be digitized reasonably quickly.

Purchasing a slide scanner

You can also consider purchasing or hiring a commercially available slide scanner. Prices vary greatly depending on model, supplier and possibly hire period. When choosing a piece of equipment, your needs should determine your decision: do you need to scan a large number of slides or is your slide repertoire manageable? Most slide scanners can only digitize one slide per scan, while some models can automatically scan

Slide digitized using professional scanner. Pictured: the Fane Alpine village above Mühlbach, as photographed in 1983. The picture bears inventory number LAV039-01090 and was digitized as part of the Lichtbild/Argento Vivo project in the Office for Film and Media, Bolzano.
(Photographer: Franz Mayr, Franz Mayr Portfolio, Office for Film and Media, Bolzano, CC BY 4.0)

entire magazines. Also bear in mind the time that you want or are able to invest; as a rule, three minutes should be taken into account for each slide scan. An important factor here is the maximum possible resolution, which the manufacturer or supplier specifies in PPI (pixels per inch) or DPI (dots per inch). In order to achieve high-quality digital material, as a guideline, scans from standard size slides (24 x 36 mm) should have a resolution of at least 2,700 PPI.

Getting your slides scanned professionally

Should the options listed above not be practicable, it is always possible to consider contracting out to professional providers. This has the advantage that slides in large numbers (whole magazines) can be digitized quickly and to a very high quality. The disadvantage is of course the cost. Depending on the number of slides, scanning resolution, desired file format and any post-treatment processing, the price per slide may fluctuate considerably. It is therefore recommended to narrow down the selection of slides beforehand and clean them. When contracting out this work, consider important factors such as scanning resolution, faithful reproduction (no automatic image processing) and most importantly, non-proprietary file formats such as TIFF suitable for long-term archiving.

The authors

Konrad Faltner was born in 1962 in Bressanone; he attended a vocational school for radio and TV technicians, has directed a large number of photography and video courses and since 1998 has been Head of Department for Media Technology at the Office for Film and Media, Bolzano.
Mag. Arpad Langer was born in 1990 in Bolzano; he graduated in archaeology of the Roman provinces in Innsbruck; he works on archaeological and numismatic research projects and since 2018 has participated in the "Lichtbild/ Argento Vivo. Cultural Treasure Photography" project sponsored by the Office for Film and Media in Bolzano.

Alessandro Campaner/Notburga Siller

Digitizing and Editing Historical Photographs

Summary

The contributions in this handout give some indications on how different types of photographs can be digitized, in other words scanned or reproduced using a camera. When dealing with both historical and contemporary photographs, it is always important to take into account other key areas; legal issues were touched upon as well as long-term archiving and indexing, or cataloguing. These aspects will be dealt with in later handouts for the "Lichtbild/Argento Vivo. Cultural Treasure Photography" project. This graphic summarises the key content of the handbook "Digitizing and Editing Historical Photographs."
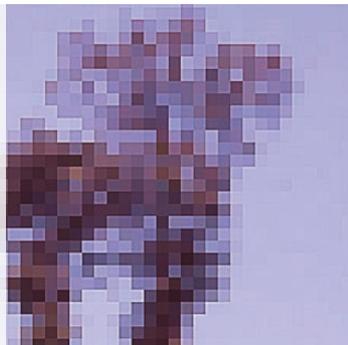
The authors
Alessandro Campaner was born in 1961 in Bolzano. He has done advanced training in the field of conservation and archiving, and is the head of the photo archive in the South Tyrolean Provincial Archives. He works in the IT Division of the Department for Historical Preservation of the Autonomous Province of Bolzano – South Tyrol. He has also produced several publications and exhibitions on the subject of archiving and museums.
Mag. Notburga Siller was born in 1984 in Merano. She studied history as well as journalism and communication sciences in Vienna. She has worked on various research projects and has experience in the field of museums and communication. Since 2017 she has taken part in the "Lichtbild/Argento Vivo" project sponsored by the Office for Film and Media in Bolzano, where she has served as project manager and archivist for the media archive since 2018.

Aims:

- Faithful digital reproduction of photos
- Back-up of image information

Save as a TIFF file

Two possibilities
- Scanning
- Repro photography

Work environment:
- neutral colors
- neutral, constant light
- suitable for historical photographic material

Note:
no automatic image correction

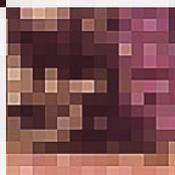Perform image editing on a working copy of the file.

Digitization method used depends on original.

Color mode on the screen: RGB, additive color process

Color mode for printing: CMYK, subtractive color process

Note:
no automatic color matching

Note:
Do not save only in compressed format such as JPEG.

Use calibrated scanners, cameras and monitors.

Color space: Adobe RGB (1998) or CIE L*a*b

Save metadata as IPTC.

Graphic used: Schnittlerhof hay barn (Rotwand), 1983

Photographer: Franz Mayr, Franz Mayr Stock, Office for Film and Media/Autonomous Province of Bolzano – South Tyrol, LAV039-01086, CC BY 4.0

Recommended Literature and Links

Literature

Ihrig, Sybil & Ihrig, Emil, Scanner e acquisizione delle immagini, McGraw-Hill, Milan 1996.

Ihrig, Sybil & Ihrig, Emil, Immagini digitali. Trattamento e stampa, McGraw-Hill, Milan 1996.

Gonzalez C., Rafael & Woods E., Richard, Elaborazioni delle immagini digitali, Milan 2003.

Schmidt, Marjen, Fotografien. Erkennen – Bewahren – Ausstellen (Museumsbausteine, Vol. 17), Berlin–München 2018.

Vacchiano, Michele, La riproduzione fotografica di documenti, Zanichelli, Bologna 1987.

Links (July 12, 2019)

Adobe image processing programs: URL: www.adobe.com

Eizo monitors: URL: www.eizo.at

FastStone image processing programs: URL: https://www.faststone.org/

Image resolution: URL: www.c-muc.de/fotografie/fototechnik-blitz-blende-brennweite-zoom-co-ppi-dpi/bildaufloesung-ppi-dpi/

International Color Consortium: URL: www.color.org/index.xalter

Klaffki, Lisa, Schmunk, Stefan & Stäcker, Thomas: Mehr als nur Scannen: Die Digitalisierung von Kulturgut in Deutschland, 2018: URL: irights.info/artikel/digitalisierung-kulturgut/29157

Konferenz der Leiterinnen und Leiter der Archivverwaltungen des Bundes und der Länder (Conference of the Heads of Archives Administration of the Federal and State Governments): Empfehlungspapier: Bilder und Töne bewahren, 2016: URL: www.bundesarchiv.de/DE/Content/Downloads/KLA/bewahrung-bild-ton.pdf?__blob=publicationFile

MEMORIAV, Empfehlungen Foto, 2019: URL: memoriav.ch/foto/empfehlungen-foto/

Pixel to centimeter conversion: URL: www.blitzrechner.de/pixel-zentimeter-umrechnen/

Pöschel, Alexander & Pöschel, Karin: Wie viel Auflösung brauche ich wann? URL: www.poeschel.net/fotos/technik/aufloesung.php?bildaufloesung=10

Scan software: URL: www.silverfast.de

Standardized lighting: URL: www.just-normlicht.com

Tips for purchasing a scanner for film footage: URL: www.filmscanner.info/FilmscannerKauf.html

Wendel, Klaus: „Checkliste" zur Bewertung von Angeboten zur Digitalisierung von Kulturgut, Berlin 2013: URL: dx.doi.org/10.12752/2.0.001.1

**Professional Handling
Open Access
Photography Goes Future**