Digital Appendices

Remote Capture: Digitising documentary heritage in challenging locations

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Digital appendices

These appendices accompany the book Remote Capture: Digitising documentary heritage in challenging locations, which is available here: http://dx.doi.org/10.11647/OBP.0138

They provide detailed information about certain aspects of a digitisation project, as follows:

Digital Appendix 1. Practical Methods for Digitisation
Digital Appendix 2. Using Electronic Flash
Digital Appendix 3. Digitisation Process Notes
Digital Appendix 4. Costed Equipment List
Digital Appendix 1

Practical Methods for Digitisation
Odd- and even-page photography using a portable book stand

Introduction

In this method, the object book is photographed on a simple cardboard book stand. This method applies to bound volumes only and is particularly useful for fragile volumes, and/or those with tightly-bound pages. The book stand allows the book to be photographed while only partially open, while still having the object page flat beneath the camera. First all the odd pages are photographed, then the even pages. The use of this method is not necessary for unbound volumes, since loose pages do not require the book stand and may be photographed sequentially.

The advantages of this method lie at the photography stage, but the process of organising the files is more complicated and, potentially, prone to error. For reasons that are made clear below, this method may only be used for volumes that already have numbered pages, and where the numbered sequence is both complete and correct.\(^1\) It is also recommended that, if this task is delegated, you only do so to staff with good IT skills and a very high attention to detail. If you have doubts about the competence of your staff, avoid this method: if a single page is missed, severe problems will occur at the organisation stage.

Advantages:

- The book stand is easily made.
- The book stand is light, compact and easily portable.
- It allows sympathetic handling of the book, as it minimises handling and reduces the stress placed on the spine/binding.

Disadvantages:

- Because the book is photographed out of sequence (i.e. not from front to back), several sets of images are created which then have to be collated. A mistake in this collation process can have disastrous consequences, with the digital images wholly (and perhaps irretrievably) out of order.
- The collation process will become still more complicated if the volume contains fold-out maps or other inserted material.

Method

Photography

- Photograph the spine, front cover, the front inner leaves and any preliminary pages.
- Place the book on the book stand, such that the first object page is Page 1.
- Retain the front cover and any pages leant against the book stand with the securing tape, if necessary.
- Photograph Page 1.
- Release the securing tape and turn the page, such that the object page is Page 3. Refasten the securing tape.

\(^1\) EAP does not advocate its grant-holders adding page numbers (‘foliating’) to un-numbered volumes. It is also necessary to be aware that people in the past may have made errors and mis-numbered pages. If a volume is incomplete (i.e. not every page is present and in a continuous sequence), or not fully and correctly numbered, this process will fail.
Photograph Page 3.

Repeat this process until all odd-numbered pages have been photographed.

Take the book off the stand and return to the beginning of the volume. Place Page 2 under the camera. (N.B. to do this, you will have turned the book around, so that the text facing you is now upside-down).

Photograph all of the even-numbered pages.

Photograph the final part of the book, i.e. any final un-numbered pages, the back inside leaves and the back cover.

Photography is now complete.

Organising the digital files

The process above has created four separate sets of images. For simplicity it is advised that these are shot in four separate digital folders (e.g. labelled ‘front’, ‘back’, ‘odd’ and ‘even’). These images now need to be collated into a single sequence which reflects the original order of the book.

The first task is a preliminary check of the two main folders (i.e. containing the photographs of the odd and even pages). Each folder should have an identical number of images or, if the book finishes on an odd page, with one extra photograph in the ‘odd’ folder. If this is not the case, then you will know that an error has occurred. Assuming no obvious error, you must then scan each image to make sure that each page is present (1, 3, 5 etc., then 2, 4, 6 ...). Again, if any page has been missed, it will need to be photographed and stitched into its correct place within the odd- or even sequence.

Collation then takes place as follows. Figure 1 gives an example for a notional six-page book (three odd and three even-numbered pages, plus front and back cover).

Finally, to reiterate the reasons why this method should be used with caution, Figure 2 gives an example of what happens if one or more pages are missed during photography, and when this fact is not picked up at the checking stage. The figure shows how the collated sequence of files will fail to reflect the original page-order of the book. It also makes it clear why this method can only be used for foliated or page-numbered books. Imagine a scenario where an un-numbered book is photographed but pages are accidentally missed. How would any absent pages be detected and, after collation, how could the correct order of pages be re-established without being effortful and time-consuming?
Figure 1. Odd and even page photography: workflow

1. Photograph (separate folders for front, back, odd and even)
2. Rename and rotate (even pages only)
3. Move to single folder and sort by file name
4. Rename all files into single sequence

- Spine
- Front cover
- Inside cover
- Odd numbered pages
- Even numbered pages
- Inside cover
- Back cover

Yellow highlight denotes an action applied to a file

Page number (of book)

File name (photograph)
Making the book stand

The book support can be made out of a single piece of board or by cutting two strips/pieces that are stuck together in a cross shape (Figure 3).

The board should be of good quality so that you can create sharp folds where needed.

The thickness of the board will depend on the size of the book support; for the size of the present example a sheet of Premier Boxboard - Neutral Grey/White of 1000 micron has been used and the book stand has been created by overlapping two strips on part B as shown in the following diagram.
Measurements are in centimetres. While keeping the proportions the same, it is obviously possibly to make larger versions, though for heavy books the card will collapse unless the inside of the support is filled with a solid material, for example polystyrene foam.
The book stand has been formed by folding the board along the dotted lines as shown on the diagram and by adhering parts F under part C.

The cohesion between parts F and C can be achieved by using glue or double-sided tape. You can also use self-adhesive Velcro here, which means the book support can be easily dismantled and transported flat.

Parts D and A should be secured with weights to make the book support more stable during imaging.

The book support is ready to be placed onto the copy stand and consequently the book will be secured to the Book stand with the cotton tape strips.

The number of the strips used to hold the opening of the book will depend on the size and difficulty of the opening of the book to be processed.

The page to be photographed will need to be fully visible, so the strip or strips holding that part of the volume will need to be placed a few pages beneath the one to be shot. The page being digitised should be held in place by a Perspex pointer, as shown in Figure 6 below.
Figure 6. Book stand in use
Sequential photography using a ‘slide table’

Introduction

This method has its application in studio-based scenarios, where the subject material is bound volumes. Here, the book is laid open on a flat platen. This platen sits on a baseboard and slides upon it. The left-hand page is photographed, the platen is then moved beneath the camera, bringing the right-hand page beneath the camera. The page is then turned and the process is repeated. Photography is ordered, from the front cover through the back cover, in a continuous sequence. Handling is significantly reduced, though not to the same extent as the book stand described above.

In pure terms of document handling, the book stand is probably preferable to the slide table. British Library imaging staff would be unlikely to use the latter. However, they operate in ideal circumstances, with books that are foliated prior to photography, with highly trained staff and with strict monitoring arrangements. In more remote circumstances, where pages are not numbered, or where staff ability to reorganise the digital files is questionable, the slide table comes into its own. With due attention to book supports for protection of the spine, this method has much to recommend it.

Advantages:

- Significantly reduces the amount of handling needed during photography.
- Digitisation is considerably faster than a process that requires the book to be moved for every photograph.
- Photography of the book is sequential, making subsequent organisation of the digital files simple.

Disadvantages:

- The slide table is not portable. Its use is therefore restricted to studio scenarios.
- Some handling of the book is still required, particularly to hold pages down during photography.
- The book has to lie flat, or nearly so, beneath the camera. The book may be supported a little, but not such that the outside edge of the page is higher than the inside edge.
- Because of the need to lay the book quite flat, there tends to be more pressure on the spine, by comparison to the book stand. Damage to the spine can result if there is poor judgement about how wide the book may be opened.

Method

- Photograph the spine.
- Place the book on the platen.
- Photograph the front cover.
- Open the book and slide the table such that the left-hand page is framed correctly beneath the camera (‘Position A’). Consider at this stage whether some support for the book is needed to level up the page beneath the camera and to protect the spine. (At the start of a thick volume, this support is likely to be needed more beneath the front cover; by the time you reach the later parts of the book, the support will be needed beneath the back cover).
- Photograph the left-hand page.
Making the table

The slide table is essentially an improvisation and to our knowledge nothing like it is manufactured. At its most basic, it could simply comprise a single wooden board without a base. This board would sit on a desk, and be slid or placed beneath the camera lens - this would be functional, if not necessarily very easy to use (especially when dealing with a heavy book). A more elegant design involves a top table or platen which slides on a baseboard with captive runners. One possible version is outlined below, though numerous other variants could be made.

The dimensions given are suitable for documents with cover dimensions of c. 600 mm high x 500 mm wide. Larger volumes would not fit on this table and would be difficult to fit into the camera’s field of view, even with the camera at the top of a 1m tall copy stand.

Items required:

- Baseboard: 18mm thickness MDF board, 130cm long (X dimension) x 75cm wide (Y dimension)
- Top table/platen: 18mm thickness Medium Density Fibreboard (MDF) board, 80cm long (X dimension) x 74cm (Y dimension)
- 4 x roller bearings
- Roller support rail: two lengths of aluminium angle, 20cm x 20cm, and 70cm long
- Guide rails: two lengths of wood, 20cm x 20cm, and 100cm long
- Rubber feet for baseboard
- Wooden location blocks to hold in the copy stand base in place, in relation to the table base
- MDF sealer
- Matt black spray paint
- Screws and fixings
Figure 7. Slide table used for EAP 794 Nevis
This version had a cut-out baseboard, to reduce its weight and shipping costs. It also broke down into two parts for ease of transport, being joined in the centre by hinged clips. A solid base has been used for other models.
Figure 9. Underside of top table/platen, showing roller support rails and roller bearings
Figure 10. Roller bearing, mounted on the support rail

Figure 11. Hinge clips joining the two-part baseboard
Figure 12. Slide table in operation
Figure 13. Plan view (top of table)

Minimum Baseboard Width
= \((1.5 \times \text{“W”}) + 10\%\)

Figure 14. Plan view (underside of table)

NOT TO SCALE
Figure 15. Section

Figure 16. Ball bearing mount kit
Digital Appendix 2

Using Electronic Flash
Electronic flash adds another level of complexity to the copying process and also adds significantly to the process of learning the camera controls. For that reason, the Endangered Archive Programme does not recommend using flash to researchers with little working knowledge of digital photography. However electronic flash has some clear advantages, offering a very bright and repeatable light source that can speed up the copying process and remove problems with slow exposures and camera shake.

Some digital SLR cameras have a small built-in flashgun, but **this should never be used when copying** as it will give very harsh and uneven results, especially at close working distances, and is likely to cause reflections from surfaces.

Despite the additional learning necessary, flash has several very particular advantages. Battery-powered flashguns are portable and not directly dependent on electricity. Bounced flash offers a very bright, diffused and even illumination that produces very sharp images because flash provides a very brief burst of light. In most indoor situations away from direct sunlight, flash overrides other sources of local illumination thus avoiding problems with mixed lighting sources, though it is still good policy to turn off indoor lights.


Copying can be fast and efficient when using electronic flash. We recommend using the most powerful Canon or Nikon branded portable flashguns. These are very robust, tried and tested pieces of equipment, suitable for use in the field. The flashguns recycle (recharge) very quickly and quietly. An electronic beep can be turned on to monitor the recycling times.

It is perfectly possible to work with flash in an automatic mode and adjust the exposure using the flash exposure compensation controls, just as with exposures made without flash. However, there are advantages in using manual flash exposure.

Cameras respond to the amount of light hitting their sensors and set the exposure accordingly. They cannot distinguish between a very reflective subject in low light and a darker subject in brighter light in situations where the total amount of light reflected from the subject is the same. Cameras will therefore tend to underexpose pale subjects and overexpose darker ones. Manual flash settings avoid the minor exposure variations between frames that comes with automatic exposure. The light output is always exactly the same and every exposure is repeatable (Be sure however that the flash has had time to recycle properly: if the flash recycle speed starts to increase then change batteries).

It is possible to turn down the power of flashguns when set to manual. Reducing the power allows for almost instantaneous recycling and also prevents the units from overheating on repeated long copy sessions. Nikon and Canon professional flash units have thermal safety cut-out circuits to prevent overheating but it is a good idea to stop and allow the flash to cool if copying a lot of objects in rapid succession. (N.B. Batteries can get very hot in such circumstances)

A flash set up can be extremely fast and flexible in operation. For example, two Canon Speedlite 600EX-RT flashguns set on half power at ISO 100 and with a flashgun to object distance of about 60cm, provide correct exposure between f8 and f11 and will recycle very quickly with fresh batteries. Such a set up allows the photographer to efficiently copy items ranging in size from A2 down to A6 without having to move the flash set up or adjust exposure. (N.B. If you need to work
with a smaller aperture set the flashguns on full power and perhaps also move the flash and umbrellas closer to the object being copied but this will change the exposure.

Electronic flashguns need to be triggered by the camera so that their brief burst of light is synchronised with the shutter even at high shutter speeds. The fastest shutter speed that flash will synchronise with the shutter is called the sync speed and varies from camera to camera, but is commonly about 1/200 sec. (On most DSLR cameras it is not possible to set too high a shutter speed when using flash but the flash will also synchronise with the shutter at any speed slower than this). The reciprocal relationship of shutter speed and aperture (see above) does not hold true with flash: in most conditions, varying the shutter speed has little to no effect on flash exposures. To change exposure with flash, change the aperture.

When the flash is used off-camera (i.e. not connected to the hotshoe on the camera body), you need to employ an electronic radio trigger or an off-camera cord. The former is more complex to set up but once mastered is much more functional. With an electronic radio trigger there is no cable running between camera and flashguns and less chance of accidents.

The Canon ST-E3-RT Speedlite Transmitter attached to a Canon digital camera such as the Canon 5D Mark III camera can wirelessly synchronise with, control and trigger two Canon Speedlite 600EX-RT flashguns. This is a very sophisticated electronic lighting system but once set up is remarkably easy to use, reliable and simple. In order for this technology to function, the Canon ST-E3-RT transmitter has to be set up to operate as the master and the Canon Speedlite 600EX-RT flashguns have to be set up to operate as slaves. Once established, settings on the transmitter will be remotely and wirelessly transferred to both of the slave flashguns.

The Canon Speedlite 430EX III-RT Flashgun can be set up with a similar system and different transmitter but we recommend the more powerful and more expensive Canon Speedlite 600EX-RT. Nikon offer a similar system with a Nikon SU-800 Wireless Speedlight Commander placed in the camera hotshoe controlling and triggering two remote Nikon SB-5000 Speedlight Flashguns. (N.B. Nikon flashguns will not work with Canon cameras and Canon flashguns will not work with Nikon cameras)

The alternative is using a dedicated synch cord running from the camera to one flashgun which is set up as the master and which wirelessly synchronises with, controls and triggers the other flashgun, which is set up as a slave. We do not recommend this set up as the length of available synch cords is short and restricts the copying set up, specifically the distance between camera and the first flashgun. This physical link between the camera and the master flashgun is a trip hazard, potentially causing the lighting stands and expensive flashgun to be pulled over, so makes such a flash set up less stable.

**Initial wireless radio flash setup**

You need to set up the transmitter as the master and the flashguns as slaves, then you need to set up the three units to operate on one single transmission channel. Finally, you need to give each of the three units an identical wireless radio ID number. Once you have done this, any settings you change on the master will automatically be transmitted to the slaves. Once set up the units link easily and immediately to each other when turned on. The flashguns and controller store these settings but also allow you two or three minutes to change the batteries without having to input any of the settings again. This should be enough time but if you leave the units without batteries for too long some of the settings will be lost and you will have to start the process of setting up again (this is
quite simple to do once you have done it before). Detailed step by step instructions are available online and from the manufacturers.

An important fact to understand is that the master (the transmitter), controls the settings on both the slaves (the flashguns). Settings on the master are communicated wirelessly but only as the flashgun is triggered and not beforehand. The transmitted settings are only displayed on the slave flashguns LED screens after the flash has been triggered.

**Wireless manual flash**

Working in manual (M) allows you the possibility of using the flashguns in full power or reduced power. When copying with two umbrellas, set each slave unit to a fixed and identical output on the master (e.g. both on full power, or half power). You have to set the camera exposure manually. Make a trial exposure and adjust the aperture until correct exposure is achieved. This exposure will be correct for all subsequent exposures if none of the settings are changed. This mode is ideal for lighting setups where the flash-to-subject distance is fixed and you want your exposure setting to be utterly consistent from one shot to the next. This is useful if photographing subjects whose reflectivity and colour varies.
Digital Appendix 3

Digitisation process notes
Background to the notes

The original version of these notes was written for EAP 596 Anguilla. The digitisation equipment was left on the island after the project’s completion and there were a number of Anguillans who were trained to use it. However, in order to leave a full aide memoir for future training, and to forestall the possibility that the trained staff might leave for other jobs (and perhaps the island altogether), these notes were compiled.

The notes are a detailed step-by-step guide, from the physical set-up of the equipment, through to the final data export. In theory a person with minimal experience of digitisation should be able to build and use the equipment – though of course the notes cannot replace the need for training in document handling and photography.

The original notes for EAP 596 Anguilla were the work of the project co-director Ben Jeffs. These were adopted and updated for subsequent Caribbean EAP projects. The version included here is for EAP794 Nevis (undertaken in 2016-17). In each case, the digitisation process focussed on post-medieval (colonial era) documents in a studio situation, with the materials photographed using a ‘slide table’.

These notes necessarily refer to a specific set of camera equipment and IT suite. However, with adjustment of the detail, the process will work equally well with other camera brands and software.
Introduction

The process

The generation and protection of digital copies is a four-stage process:

1) The gathering of the digital images
2) Renaming and organising the files
3) Exporting the images to the correct locations and file sizes
4) Backing up the files

A summary of this workflow is included at the end of this document.

Software

The workflow uses six pieces of software:

- **Canon EOS Utility** – software distributed free with Canon SLR cameras. Used to provide a live view from the camera to the laptop, control camera settings remotely and trigger and receive the final photograph in RAW format.

- **Adobe Lightroom** – an industry standard photograph management tool used for handling large numbers of photographs and exporting batches from RAW format generated by the camera to TIFF format while managing the file sizes and colour space.

- **Rename Expert** – batch file renaming software.

- **Irfanview** – a small and lightweight image viewer.

- **Syncback SE** – a file synchronisation and backup utility.

- **AVG Free** – anti-virus software.
Setting Up

Equipment setup

All directions at the table are given from the users’ position, with the camera stand guide column to the rear of the table. All directions for the camera are given looking at the rear of the camera is if about to take a photograph.

Kaiser RS1 Camera stand, Gorillapod ballhead

- Slide the camera stand guide column onto the locating pins at the rear of the column mount. The white painted ruler should be facing the front of the table.
- Screw the attaching bolt into the large central hole at the back of the upright, tightening until the column no longer moves on the locating pins.
- Screw the ballhead onto the camera stand copy arm. This is via the loose bolt on the front of the copy arm. Ensure it is tight. The orientation of this mount can be adjusted once in place.
- Remove the quick release plate from the mount. This can be done by pushing the button on the mount and sliding the plate in the direction indicated.
- Fix the quick release plate to the base of the camera. This is best done using a coin. Care should be taken to fix the plate with the small spirit level facing the rear of the camera and parallel to its rear screen. Tighten the bolt just enough that the plate will not move when twisted by hand, but do not over tighten.
- Slide the quick release plate into the ballhead mount until it clicks into place.
- Adjust the camera mount by releasing the rubber coated grey knob until the mount loosens (while holding the camera steady) and rotating the camera into position. The camera should be positioned to the left of the column with the back screen facing up and the long edge of the screen running back to front. The small spirit level can be used to make sure the camera is parallel to the sliding table (once in place) – providing the table itself is level.

Slide table

- Place the slide table base over the top of the camera stand base board. The legs underneath the table will fit snugly around the board, locating it correctly.
- Place the slide table top onto the runners.

Lights

- Extend the legs of the lights by releasing the plastic screw and extending the legs until they reach their maximum spread, sliding the central collar down the column as they extend. Re-tighten the screw.
- Extend the central column by releasing its plastic screw and sliding the lamp head upwards. Re-secure the clamp by closing it against the column. Re-tighten the screw.
- Lights should usually be placed to the rear of the camera stand column, one on each side, approximately 30cm from the column.
- Adjust the lamp heads by releasing the clamping screws and rotating into position. The lower of the screws on the head both adjusts horizontal rotation and allows the heads to be removed. The upper screw adjusts vertical rotation on click stops.
• Ensure the lamps are switched off at the rocker switches on the lead close to the lamp head.
• Plug each lamp into the power supply.

**Laptop**
• Place the laptop on a secure surface close to the sliding table.
• Plug the power lead into the laptop.
• Plug into the power supply.
• Plug the USB hub into a USB port on the laptop.

**External hard drives**
• Plug the two external hard drives into the power supply.
• Connect their USB cables to the USB hub.

**Camera connecting cables**
• Loosen the rubber cover to the left-hand side of the camera; this should be facing you if you have the camera set to the right of the copy arm.
• Connect the small end of the mini USB lead to the socket beneath the cover. There are multiple sockets but only one will fit the USB lead.
• Run the lead along the copy arm and down the rear of the guide column.
• Connect the USB extension lead to the end of the micro USB cable and run the extension along the back of the sliding table (out of the way of the mechanism) and to the laptop location.
• Connect the USB extension to the USB hub. Any port will work.
Stage 1a – Gathering the Data

Turning on

- Turn on the laptop and log in using the password.
- Turn on the external hard drives (via the switches on the USB hub).
- Turn on the camera by rotating the switch around the mode dial (this is on the top of the camera on the left, and is marked on/off).
- Turn on the lights using the rocker switches on the cables close to the lamp heads.
- Take off the camera lens cap.

Folder setup

- Open Windows Explorer, shown as a yellow folder icon on the task bar at the bottom left of the laptop screen.
- Select the External Hard Drive Nevis HD01 Prime on the left-hand side and then select EAP794/Generated Data/Images/RAW in sequence on the right.
- Now right-click, select New Folder from the menu. This will give you a new folder within C:/EAP794/Generated Data/Images/RAW
- Rename the folder to the document being photographed, as PROJECTCODE_ItemName_Date, for example: EAP794_CRDB_1706

Camera settings

- The camera should be set to Aperture Priority (Av) using the mode dial. All other settings can be adjusted from the laptop. The mode dial is on the top of the camera to the left.

Starting the software

- A shortcut to Canon EOS Utility (a camera icon) is on the desktop of the laptop. Should this not be present it can be found in Windows by pushing the Windows button (bottom left of the keyboard with the Windows symbol on it) and typing ‘eos’. It will appear in a list of software on the left of the screen.
- Double click the shortcut or software title.
- Make sure the camera is turned on. On the menu click Camera Settings/Remote Shooting (If the camera is turned off this option will not be selectable). If the computer does not pick up the camera, switch the camera off and then on again.

Canon Camera Control Settings

- Set the output folder – click the folder symbol on the right of the Camera Control window. In the popup browser window select the folder you created within C:/EAP794/Generated_Data/Images/RAW. Close the browser window when finished.
- If necessary, other settings can be changed by double-clicking or right-clicking on the point in the window displaying that setting.
Setting up the document

Documents should be handled using proper care and support at all times. Hands should be clean and gloved and all equipment coming into contact with the document should be clean and free from sharp edges.

- Ensure table is clean. If it is not, clean with a brush or cloth.
- Centre the sliding table under the camera by moving it left or right until the black centre mark on the rear is aligned with the column.
- Place the document on the table with its longest side running back to front. If the table is not large enough the camera will have to be rotated to shoot in landscape, i.e. rotated 90 degrees so the top is facing the operator.
- The document’s centre line should line up with the centre of the table. In bound volumes this is the centre of the spine when open. In unbound documents this is simply the centre line of the document. This alignment does not have to be exact.
- Ensure the document is square to the table; this will be finally adjusted when viewed through the camera.
- **Start Live View** – click on the Live View Shoot button at the bottom of the EOS Utility window. This will open a larger preview window showing what the camera is seeing.
- In this window select Flexizone multi under the focus option, with Continuous AF off and unticked.
- Using live view, slide the sliding table left or right until the centre of the document is centred in the view (for bound volumes this will be one page or the cover).
- Again, using Live View as the guide to the image, adjust the zoom on the camera lens (rotate the rubber ring around the lens; this is marked 18mm to 55mm) and the front - back position of the document on the table until the whole of the document or individual page is within the field of view.
- If the image is not orientated correctly, use the ‘rotate’ arrow in the Live View window to rectify this.
- Place a colour checker card into the field of view, ensuring it is square with the document. For two-page documents place two colour checker cards, one for each page, and bluetack them in place.
- Refocus the camera using the ON button in the focus section of the Live View window. Green boxes will highlight the points of focus.

Checks

- Document is square in the image.
- Document has the minimum of clean black space around the edges.
- Colour checker card/s are included and square and have clear black space between the card and the document; no shadow from the book should fall on the colour card.
**Camera Settings**

- **Camera mode** – Av (this is set on the camera)
- **Aperture** – F10 (alter this by double clicking the ‘F’ box); toggle up/down using the arrows
- **White balance** – AWB
- **ISO** – 100
- **Output** – RAW
- **Output mode** – Computer (should be a small computer symbol)
- **Exposure correction** – Set to the centre zero position
- **Focus** – AF

**Adjusting lighting**

Check the lights are securely positioned and turned on (see setting up equipment).

Where a document is completely matt, with little or no reflective surfaces, it is usually possible and desirable to provide direct lighting. For this, the lights should be turned downwards to face the document with the vertical extension raised as high as possible.

Where there are reflective elements, particularly repair tapes, tooled leather or laminated or glossed surfaces, it will be necessary to provide indirect diffuse lighting. To do this, white card should be suspended from the camera support column and angled in and down towards the document. The lights should then be pointed upwards bouncing the light off the card and back down onto the document.

In either case, the lighting should be carefully adjusted to avoid shadows or bright spots on either the document or the colour checker card.

**Shooting images**

- Images can be captured either by clicking on the large round black button at the top right of the EOS Utility setting window or by pressing the laptop space bar when this window is active (this is achieved by clicking anywhere in that window).
- Once photographed, the document is either swapped out and the process begins again or the sliding table is used to change pages and another image is taken. For bound volumes each page is taken in sequence until the volume is complete (Remember to take the front and back covers and all inside surfaces).
- The first photograph you will shoot will be an ID Shot. This will give the name of the document, the date (or dates) during which it was photographed, and the name of the photographer. The last photograph you will shoot will be a Description and Comment Sheet. Here you will record information that will be used in the Listing document. These will include physical characteristics of the document (dimensions, binding type, description of the cover, state of preservation), together with any other observations you have made during photography.
- If the plane of focus (the height of the document) changes significantly between shots (more than 5mm) then the image should be refocused by clicking on the ON button in the Live View windows focus section.
- When all images are shot, close EOS Utility, which will also shut off the camera.
- Unplug lights.
- Turn off camera to preserve battery life – remember that using live view uses battery. Whenever you are not using the camera, close live view of EOS Utility to shut down the camera and preserve the battery.

**Checks**

After the first two or three photographs that contain text, check that the images are ok.

Open Irfanview, select an image, check the book is framed correctly, with the colour card visible, and that the text is sharply focused.
Stage 1b Checking the images

In Windows Explorer
Open the folder in Windows Explorer using the folder icon on the task bar at the bottom left of the screen. Use this view to check:

- Are the photographs being saved in the correct folder?
- Are the photographs in RAW CR2 format?

N.B. Windows Explorer will not show the images themselves – only icons.

In IrfanView
Check:

- Is the image focused and sharp throughout?
- Is anything in the picture that shouldn’t be? Pens, fingers, lamp feet, uncovered table top or the support column.
- Is lighting even and free from shadows?
- Are the colour checker cards fully included and square?
- Is the document square to the shot and included with a small border?
- Have all pages of the volume been captured? (Check the page count and that facing pages are in sequence, i.e. left-right, left-right)

Outcomes
If no errors are found, proceed to Stage 2. However, if any images are found to contain errors then they should be reshot and rechecked.

File naming after correcting an error
When you have to re-shoot a page, make a note of the file name of: a) the image with the error; and b) the file name of the replacement image.

In Windows Explorer, manually rename the replacement photograph so that it will appear immediately after the one with the error. For example, your original is DSC943; rename your replacement file as DSC943a. Delete the original.
Stage 2 – Renaming and organising the files

Once a batch of photographs is captured they need to be renamed to comply with the correct naming convention.

- Open Rename Expert.
- Click Add, then select Files from the drop-down menu.
- Navigate to the folder of photographs you wish to rename, i.e. EAP794_CRDB_1706. Click on one image icon. Select All (Ctrl + A). Click Open.
- A list of files will appear in the main window. Click on the topmost of these: this will bring up a preview of that photograph. Ensure that the files are in the correct order. The earliest/first image should be at the top of the list (usually the ID shot). If any files are not in the right place (e.g. if you have had to re-photograph a page) it can be moved to the correct position using the up/down arrows in the top-right part of the screen.
- Ensure all files are ticked.
- In Actions click the + icon then select Replace. A dialogue box opens in Actions Settings.
- Under ‘What to replace?’ select ‘the whole name’ from the drop-down menu.
- Under ‘What to replace with?’ select numbering/consecutive from the drop-down menu.
- In the Prefix box, type the file name that will be used for the photographs of this volume, e.g. EAP794_Wills_1795_1798_. (The last underscore is important – don’t leave it off!)
- In the boxes below, ‘initial value’ should be 001 and ‘step’ should be 1. Leave the ‘suffix’ box empty.
- The new name will appear in green text in the main window. Note that at this stage this is just indicative: the name has not yet been changed.
- Click the ‘Apply’ button in the top right of the window. A new window opens confirming what the changes will look like. If you are happy, click ‘Start’. (If something needs changing, close the box (red x in top right corner) and make the necessary alterations). When the rename process has completed, click ‘Close’.

Checks

Open windows explorer and navigate to C:/EAP/Generated Data/Images/RAW and select the folder you are working in.

Click the View menu at the top of the window and select Sort by and then Name.

- Are the photographs named correctly?
- Are the photographs in the correct order and all present?

If you are happy with the changes, close Rename Expert. If there is an error, click the ‘Restore’ button, which will open a dialogue box that allows you to return the names to their original form.
Stage 3 – Exporting photographs

Once the photographs are renamed they need to be converted from the RAW image format to TIFF and exported at the correct resolution and with the colour corrected.

Import the photographs into Lightroom

- Start Lightroom by clicking on the grey Lr icon on the task bar at the bottom left of the screen.
- Select the Library option at the top right of the screen.
- Click the Import button on the bottom left of the screen.
- Navigate to the correct folder on the left hand side C:/EAP/Generated Data/Images/RAW and select the folder you are working on.
- Select Add in the centre top of the window.
- Scroll through the images to make sure all of them are included (images already imported will be greyed out).
- Click Import on the bottom right of the window.

Develop the images

- The images you just imported will now be displayed. If you want to work on more images than you just imported then these need to be selected in the Library.
- To select more images to view select Grid View which is a small icon showing a grid of white squares below the image window towards the bottom left of the screen.
- Now, using the Folders pane (on the left under Folders) navigate to the folder where all the images are stored: C:/EAP/Generated Data/Images/RAW and then the current folder name.
- Select the Library pane at the top right.
- Select the Grid View at the bottom left of the image window.
- Select All (click on first image, then Ctrl+A). Rotate the images using the arrow button at the bottom of any of the images. Rotate so that the photo has the correct orientation.
- Double click on the first image.
- Apply the Saved Preset EAP794 on the Quick Develop pane on the right-hand side.
- Select the Develop pane at the top right.
- At the bottom of the Presets section of the left pane, click on EAP Develop under the User Presets group.
- On the top of the right pane, under Basic, click on the Eyedropper Icon at the top left and select a neutral grey on the colour card in the image (this is the bottom left of the colour card). This will set a white balance that is correct for any images that use this lighting setup. If there is more than one lighting setup in a group of images, they will have to be developed and exported separately.
- Go back to the left column and find the EAP Develop setting under Presets, right click on this setting and select Update with current settings.
- Check that the settings correspond with those listed in the box below. In particular, confirm that the Lens Profile is ticked and the Camera Calibration setting is Camera Neutral.
- Select the Library pane at the top right.
- Select the Grid View from the icons at the bottom left of the image window.
- Click on the first image and hold Ctrl and press A to select all the images in the folder.
- If all the images need rotating click the small rotate arrow that appears at the bottom of any of the images when the mouse pointer hovers over the image.
- Select EAP develop from the dropdown list under Saved Preset within Quick Develop in the right column. This will apply the correct white balance and setting to all of the images in the folder.

**Export settings**

There should be a set of export settings already saved. However, if this is missing, follow these steps to recreate it. If it is present skip this section.

- Double click on one photograph, this will open up the photo in a large window.
- Select the Develop pane at the top right of the screen.
- Start at the top of the right-hand column of the screen, you may need to scroll to the top of this section using the scroll bar to the right.
- Select the Eyedropper icon to the left of the top section under Basic.
- Click on a neutral grey square in the colour chart on the image (the neutral grey is the bottom left square of the chart). This will set a custom white balance. This balance is correct as long as the lighting setup remains unchanged.
- The rest of Basic should remain unchanged, which should be set to 0.
- Select the Lens Corrections tab.
- At the top of this section select Profile.
- Check the box Enable Profile Correction.
- Select Lens Profile > Make > Canon. This will automatically select the correct lens and correct for lens distortion and peripheral illumination errors.
- Select the Camera Calibration section.
- Select Camera Neutral under Profile.
- In the window to the far left expand the Presets section.
- Click the Plus sign at the top right of the Presets section.
- Make sure all the check boxes are ticked, with the exception of Auto Tone at the top.
- Type EAP Develop into the Preset Name: box at the top.
- Click Create at the bottom right of the window.
Saving export settings

Within Lightroom it is possible to save export settings to allow them to be reused. This is a good way to ensure consistent results. The EAP export settings are saved within the EAP laptop; however, they can be replicated as follows:

- **Open Lightroom** from the Lr icon on the task bar at the bottom left of the screen.
- Open the Library pane at the top right of the screen.
- Select any image in the folder and click the Export button at the bottom left of the screen.
- In the window that opens select **Hard Drive** in the Export To dropdown at the top.
- Under Export location select Choose folder later.
- Under **File Naming**, make sure Rename To is unchecked.
- Under File Settings select TIFF from the Format dropdown, None from Compression, sRGB from Color Space and 16 bits/component from Bit Depth.
- Under Image sizing check **Resize to Fit** and select **Long Edge** from the dropdown menu. If you select **2800 pixels** as the long edge this will give you a 30MB TIFF file, which is the minimum. Enter **300** into the **pixels per inch** box.
- Under Output Sharpening uncheck **Sharpen**.
- All other settings remain unchanged.
- Now click **Add** on the bottom left of the window.
- Name the Export **EAP794_Export** and click **Create**.

Exporting photos

- **Open Lightroom** from the Lr icon on the task bar at the bottom left of the screen.
- Open the Library pane at the top right of the screen.
- Click on any photo in the folder.
- Hold **Ctrl** and press **A** on the keyboard.
- Click Export on the bottom left of the window.
- Double click **EAP Export** under **User Presets** on the left column of the window.
- Click Export on the bottom right of the window.
- Browse in the new window to the folder **C:/EAP/Generated Data/Images/TIFF** and click **New Folder** (Alternatively, you may make this folder in Windows Explorer, then navigate to it and select it).
- Name the folder to match the working folder in **C:/EAP/Generated Data/Images/RAW**.
- Click Select Folder.
Stage 4 – Backing Up

Principles

The project files will be backed up on Nevis and in the UK, as shown on the diagram on the following page. Data will be transmitted to the UK either via Dropbox, or if that is impractical, by hard drive via mail.

The data will be held on several hard drives. In order to ensure that accidents cannot occur, it is imperative that at no time are the backup drives in the same place at the same time. They must be kept separate. These rules apply to:

HD02 (Backup A, Nevis) and HD03 (Backup B, Nevis)
HD04 (UK export prime drive) and HD05 (UK export backup)

Naming the external hard drives

The photographed images will all be present on HD01 Prime. This is the primary dataset on Nevis from which all backups will be generated.

If you have not already done so, in My Computer, re-name the hard drive to something recognisable, e.g.:

HD02_Backup_A; HD03_Backup_B

Anti-virus software

Protecting the data from viruses is essential. Should a virus be present and not be detected, it has the potential to spread throughout all of the project hard drives as the data is backed up or uploaded/downloaded.

The software on the project laptop is AVG Free/Zen. It is configured to run permanently in the background, and also to undertake a scheduled scan every Friday afternoon at 14.00.

If you ever have any doubts about a virus potentially being present, run a scan of the computer immediately.
Making a new Syncback profile

- Open Syncback SE.
- Click Profiles/New; enter a name (e.g. EAP794 Daily Backup). Click Next.
- Select ‘Mirror’. Click Next.
- Select ‘internal/external drive network path etc’ for both source and destination. Click Done.
- Click ‘Source’ and change it to something specific, e.g. ‘HD01 Prime’.
- Select the location of the source: C:/EAP794. Stop at this top level, so all folders from the project are included. Click Alternatives and select ‘%SERIAL=…’.
- Click ‘Destination’ and change it to something specific, e.g. ‘HD01 Prime’.
- Select the location of the destination: this will be the root directory for the hard drive, i.e. F:/ G:/ etc. Click Alternatives and select ‘%LABEL=…’.
- Click OK.
- Click yes to the offer of running a test. This simulates a backup run, but does not actually copy or delete any files. At the mid-point of the test click Continue Simulation when prompted. When complete the main dialogue box re-opens and the profile will show as having completed the simulation successfully.

Mirror backup profile

A Mirror profile is used when you want one directory or drive (the destination) to be identical to another directory (the source). It is not the same as a Backup because it deletes files if they are only present on the destination directory. It is also not the same as Synchronisation, because it only copies files in one direction.

The advantage of a mirror profile is that it prevents the build-up of obsolete files on the destination directory. Care is needed, however, as the process does involve deletion. Always check the mid-process dialogue box, which will highlight what files (if any) will be deleted from the destination directory.
**Running a profile**

On the main dialogue box, select the profile you wish to run.

Click ‘Run’ on the bottom bar of the dialogue box. Syncback will then scan the source and destination drives in turn. This may take several minutes.

A dialogue box will open showing what changes will be made. Check these to confirm they are what you expected – particularly if any deletion from the destination directory is involved. If ok, click ‘Continue Run’, and click ‘ok’ to the warning dialogue box that opens after. The two drives will then be mirrored. This may take considerable time (up to a few hours) if there are many photographs on the source drive that need to be copied.

When the run is complete the main dialogue box re-opens and the profile will show as having completed the simulation successfully.

The backup is now complete.
**Summary workflow**

**SET UP**
Set up folder on Windows Explorer (RAW) – on HD01 Prime
Camera and lights on
EOS Utility on, including Live View
Set/confirm camera settings
Set Destination Folder
Lay out document and colour cards

**PHOTOGRAPHING**
Photograph ID Shot
Start photographing document
Irfanview: after 10 images, check RAW format, layout and image/focus quality
End photographing document
Photograph Condition/Comment Sheet

**CHECKING/CORRECTING**
View the photos in Irfanview
Check that no pages have been missed
Random spot-check for layout and quality
Photograph any missing pages or pages with errors, stitching in with Windows Explorer

**RE-NAMING**
Using Rename Expert ...

**EXPORTING**
In Lightroom:
Import
Confirm ‘Sort by File Name’
Rotate all
Library: quick develop to EAP794_Develop preset

Develop: adjust colour, check that Lens Correction (on, Canon) and Camera Calibration (Camera Neutral) are applied. ‘Update with current settings’ – EAP794_Develop

Library: develop all (apply EAP794_Develop)

In Windows Explorer:

Make new folder (in TIFF)

In Lightroom:

Go through the Export process

After it has exported about 10 images, check one: TIFF? About 30mb? Looks sharp?

FINAL CHECKING, AND CHECKSUM

Windows Explorer: Check the TIFF folder – correct number of files present?

Make checksum for the RAW and the TIFF folder

BACKUP

.. to the ‘daily’ hard drive (either A or B, whichever is present)
Full-frame or APS?

Either full-frame or APS digital SLR cameras are suitable for EAP projects. However, we recommend APS cameras because they are significantly less expensive.

APS cameras are cheaper than the equivalent quality full-frame cameras. For example, the top of the line Canon APS camera body, the 7D Mark II is currently £1,400 and is broadly equivalent in build quality, weather sealing and essential specification to the full-frame Canon 5D Mark IV at £3,250. The APS camera is more than capable of delivering the quality EAP needs.

It is important to realise that because of the smaller size of their sensors, APS cameras effectively magnify the focal length of the lens in use so you need to consider which lens is most suitable for copying. There is a standard focal length (55-60mm equivalent) macro lens available for both the Canon and Nikon APS cameras. However, there is no standard focal length macro lens currently marketed for Canon full-frame cameras, though there is a 60mm macro lens available for the Nikon full-frame cameras.

Some lenses are made specifically for APS cameras (in Canon the EF-S range, and in Nikon the DX range). These only work properly and give full coverage on APS cameras. However, lenses designed for full-frame cameras (in Canon the EF range, and in Nikon the FX range) will also work on APS cameras of the same brand.

Both Canon and Nikon make a large number of different APS camera bodies. The top of the range cameras (e.g. Canon 7D Mark II and Nikon D500) are good choices. They would be ideal for larger sized projects requiring the digitisation of very large quantities of material or projects that involve moving from collection to collection, rather than being located within a single archive, where their ruggedness may be an important factor.

Both Canon and Nikon also market several cheaper APS cameras that are perfectly suitable for EAP projects (e.g. Canon 80D and Nikon D7200). They are excellent in terms of image quality and overall specification but are slightly less robust, have lower build quality, and their weather sealing against dust and moisture is also of lower quality. Moreover their shutters are less likely to last as long as the more expensive models, though are still designed for over 100,000 exposures. Nevertheless they are very good and well-constructed cameras. They would be ideal for smaller to medium-sized projects especially those located within a single archive. However, the very inexpensive cameras in

\[2\] All prices are approximate as of March 2018. UK tax (VAT) at 20% has also been included in the price.
the Canon and Nikon APS ranges are to be avoided: though excellent optically, their build quality and weather sealing make them unsuitable for projects in remote locations.

Canon and Nikon also make a number of different full-frame camera bodies. The top of the range professional cameras are extremely expensive and have numerous features that are not needed for digitisation projects. But their semi-professional ranges (e.g. Canon 5D Mark IV and Nikon D810/D850) are good choices. They would be ideal for larger sized projects requiring the digitisation of very large quantities of material or projects that involves moving from collection to collection rather than being located within a single archive where their ruggedness may be an important factor.

If you are expecting to make a bid for a large scale major project following a pilot project, it would be worth thinking strategically about your equipment purchases. Consider, for example, purchasing a cheaper APS camera body (or possibly a cheaper full-frame body) for the pilot project and then purchasing a more professional camera of the same make and format for the major project. The cheaper camera could then operate as a back-up camera and any lens purchased for the pilot project would also, of course, fit both bodies.

Before purchasing any camera and lens combination you should try it out. You should also ideally have a very clear idea of the nature of the material being digitised, specifically its size and scale. The best lenses for copying are fixed focal length macro lenses. Good quality standard lenses (50mm on a full-frame camera) are often perfectly adequate for copying most simple documents and objects, but proper macro lenses are better. Macro lenses or lenses with macro (close focussing) facilities are essential for copying very small objects. Wide-angle to normal zoom lenses are much more flexible than fixed focal length lenses but it is good professional practice to try to avoid using wide-angle settings whenever possible when copying: move the camera away from the object being copied rather than zooming out and only use wide-angle settings when you cannot move the camera further away.

Macro lenses are lenses which focus much closer than normal lenses of similar focal length. But most importantly they are specifically designed for close up photography. Some non-macro lenses that focus close may exhibit very noticeable distortion, causing straight lines to become curved, but macro lenses are optically designed to minimise this problem. Some of this distortion can be corrected in software like Adobe Lightroom if necessary.
APS cameras

A suggested Canon APS camera and lens kit

A kit comprised of a high quality Canon APS-C camera body, macro lens and a close-focussing wide-angle to standard zoom would make an excellent digital camera kit for documentation projects. The kit would also need UV protection filters for each lens, at least one spare camera battery and possibly a spare camera battery charger.

A Canon 7D Mark II body or a Canon 80D body.

Canon 7D Mark II (£1,400)

* An excellent APS camera, capable of producing excellent quality images.
* A rugged camera ideal for tougher fieldwork conditions.
* Fixed LED screen.
* A camera suitable for a very large amount of copying (up to 200,000 exposures).
* Its high level of weather sealing protects against dust and moisture which is important in remote areas, especially when working in multiple locations rather than a single fixed archival institution.

The Canon 7D Mark II is a camera with excellent build quality, excellent weather sealing and a reliable long lasting shutter, rated for 200,000 exposures. This is not a full-frame camera but an APS-C camera so the stated focal length of all lenses will be effectively “cropped” by a factor of 1.6, when compared to a full-frame camera. It is ergonomically very well designed and highly recommended. It does not have a tilting LED screen, though this is not an issue if the researcher is planning on using tethered shooting.

Canon 80D (£1,030)

* A very good APS camera, capable of producing excellent quality images.
* A lighter weight camera of slightly lower build quality than the 7D and therefore slightly less robust and perhaps less suitable for tougher fieldwork conditions.
* A camera suitable for a large amount of copying (up to 100,000 exposures).
* Good level of weather seals against dust and moisture but not as good as the 7D.
* Its tilting LCD screen may make this a better choice than the 7D for some projects.
The Canon 80D is a camera with very good build quality and weather sealing. It is marginally cheaper and lighter than the Canon 7D Mark II. Its shutter is rated for 100,000 exposures compared to the 200,000 exposures of the 7D but this would still make it perfectly suitable for most EAP projects and a good choice for pilot projects or as a second camera for larger major projects. One significant advantage over the Canon 7D is the inclusion of a tilting LCD screen which would help when used on a tripod or copy stand where the position or height of the camera can often make viewing a normal viewfinder or fixed LCD screen awkward. (This is not relevant if you are planning on using tethered shooting). This is not a full-frame camera but an APS-C camera so the stated focal length of all lenses will be effectively “cropped” by a factor of 1.6, when compared to a full-frame camera. It is ergonomically very well designed and highly recommended.

**Canon EF-S 35mm f2.8 Macro IS STM lens (£400)**

A very sharp, fixed focal length, true macro lens, which is optically and mechanically designed specifically for focusing close up and is therefore ideal for copying. It will copy objects and documents at close distances with minimal distortion. Its focal length approximates to the “standard” macro copying lens (the equivalent of a 56mm lens on a full-frame camera). This makes it ideal for photographing most documents and objects. Combined with a wide-angle to standard zoom, this will form an ideal and flexible copying kit. The lens is lighter and not as robust as the Canon L Series lenses. This lens is designed specifically for Canon APS-C cameras and will not work on a full-frame camera. It should always be used with a UV protection filter.

**N.B. This lens has an inbuilt light with an on/off switch which should not be used as a light source for copying.**

**Canon EF-S 60mm f/2.8 Macro USM lens (£380)**

An alternative to the Canon 35mm macro lens described above. A very sharp, fixed focal length, true macro lens, which is optically and mechanically designed specifically for focusing close up and is therefore ideal for copying. It will copy objects and documents at close distances with minimal distortion. Its focal length is significantly longer than the “standard” macro copying lens (the equivalent of a 96mm lens on a full-frame camera). This makes it ideal for photographing very small objects and very small documents where the longer focal length allows for greater separation between the object and lens. It is consequently not as ideal for copying larger texts and objects, where the camera will have to be much further away from the subject than the 35mm macro lens. The lens is lighter and not as robust as the Canon L Series lenses. This lens is designed specifically for Canon APS-C cameras and will not work on a full-frame camera. It should always be used with a UV protection filter.

**Canon EF 17-40mm f/4 L USM lens (£650)**

One of Canon’s L Series lenses which have excellent build quality and weather sealing. It is heavier and bulkier than cheaper lenses but will better withstand the rigours of usage in remote locations. It focuses very close. The zoom range when on the 7D body (or other Canon APS-C bodies) is the
equivalent of approximately 28-65mm on a full-frame camera. The lens is best used in the 35 – 40mm range for most copying with the wider angle settings restricted to more occasional use when subjects are too large to copy easily. This lens can be used on both Canon APS-C and full-frame cameras, should the researcher wish to upgrade to a full-frame camera for a later EAP major project. It should always be used with a UV protection filter.

**Canon EF 24-70mm f/4 L lens (£730)**

One of Canon’s L Series lenses which have excellent build quality and weather sealing. It is heavier and bulkier than cheaper lenses but will better withstand the rigours of usage in remote locations. It focuses very close and also has a macro setting for extreme close up. The zoom range when on the 7D body (or other Canon APS-C bodies) is the equivalent of approximately 38.4-112mm on a full-frame camera. The lens is best used in the 35-40mm range for most copying with the wider angle settings restricted to more occasional use when subjects are too large to copy easily. This lens can be used on both Canon APS-C and full-frame cameras, should the researcher wish to upgrade to a full-frame camera for a later EAP major project. It should always be used with a UV protection filter.

**A suggested Nikon APS camera and lens kit**

A kit comprised of a high quality Nikon APS-C camera body, macro lens and a close-focussing wide-angle to standard zoom would make an excellent digital camera kit for documentation projects. The kit would also need UV protection filters for each lens, at least one spare camera battery and possibly a spare camera battery charger.

**Nikon D500 (£1,800)**

* An excellent APS camera, capable of producing images of excellent quality.
* A rugged camera ideal for tougher fieldwork conditions.
* A camera suitable for a very large amount of copying (up to 200,000 exposures).
* Its high level of weather sealing protects against dust and moisture which is important in remote areas, especially when working in multiple locations rather than a single fixed archival institution.
* Its tilting LCD screen may make this a good choice for some projects.

The Nikon D500 is a camera with excellent build quality, excellent weather sealing and a reliable long lasting shutter. This is not a full-frame camera but an APS-C camera so the stated focal length of all lenses will be effectively “cropped” by a factor of 1.5, when compared to a full-frame camera. It is
ergonomically well designed and highly recommended. One advantage over the Canon 7D is the inclusion of a tilting LCD screen which would help when used on a tripod or copy stand where the position or height of the camera can often make viewing a normal viewfinder or fixed LCD screen awkward. (This is not relevant if planning on using tethered shooting). Interestingly this camera can save direct to TIFF files. (The 7D will require the user to convert RAW files into TIFF files).

**Nikon D7200 (£900)**

* A very good APS camera, capable of producing excellent quality images.
* A lighter weight camera of slightly lower build quality than the D500 and therefore slightly less robust and perhaps less suitable for tougher fieldwork conditions.
* A camera suitable for a large amount of copying (up to 100,000 exposures).
* Good level of weather seals against dust and moisture but not as good as the D500.
* Fixed LCD screen.

The Nikon D7200 is a camera with very good build quality and weather sealing. It is significantly cheaper and marginally lighter than the Nikon D500. Its shutter is rated for 100,000 exposures compared to the 200,000 exposures of the D500 but this would still make it perfectly suitable for most EAP projects and a good choice for pilot projects or as a second camera for larger major projects. This is not a full-frame camera but an APS-C camera so the stated focal length of all lenses will be effectively “cropped” by a factor of 1.6, when compared to a full-frame camera. It is ergonomically very well designed and highly recommended.

**Nikkor 40mm f2.8G lens (£260)**

A very sharp, fixed focal length, true macro lens, which is optically and mechanically designed specifically for focusing close up and is therefore ideal for copying. It will copy objects and documents at close distances with minimal distortion. Its focal length approximates to the “standard” macro copying lens (the equivalent of a 60mm lens on a full-frame camera). This makes it ideal for photographing most documents and objects. Combined with a wide-angle to tele zoom, this will form an ideal and flexible copying kit. This lens is designed specifically for Nikon APS-C cameras and will not work on a full-frame camera. It should always be used with a UV protection filter.

**Nikon 60mm f2.8 D AF Micro Nikkor lens (£430)**

An alternative to the Nikon 40mm macro lens described above. A very sharp, fixed focal length, true macro lens, which is optically and mechanically designed specifically for focusing close up and is therefore ideal for copying. It will copy objects and documents at close distances with minimal distortion. Its focal length is significantly longer than the “standard” macro copying lens (the equivalent of a 90mm lens on a full-frame camera). This makes it ideal for photographing very small documents and objects where the longer focal length allows for greater separation between the object and lens. It is consequently not as ideal for copying larger texts and objects, where the camera will have to be much further away from the subject than the 40mm macro lens. This lens is
designed specifically for Nikon APS-C cameras and will not work on a full-frame camera. It should always be used with a UV protection filter.

**Nikon 16-85 f3.5-5.6G VR ED AF-S DX lens (£630)**

A Nikon lens with good build quality and weather sealing. It is heavier than cheaper Nikon zoom lenses but will better withstand the rigours of usage in remote locations. It focuses close. The zoom range when on the Nikon D 500 body (or other Nikon APS-C bodies) is the equivalent of approximately 24 – 127.5mm on a full-frame camera. The lens is best used in the 35 – 40mm range for most copying with the wider angle settings restricted to more occasional use when subjects are too large to copy easily. This lens is designed specifically for Nikon APS-C cameras and will not work on a full-frame camera. It should always be used with a UV protection filter.
Full-frame cameras

**A suggested Canon full-frame camera and lens kit**

A kit comprised of a high quality Canon full-frame camera body and a close-focussing wide-angle to standard zoom would make an excellent digital camera kit for documentation projects. The kit would also need UV protection filters for the lens, at least one spare camera battery and possibly a spare camera battery charger.

A Canon 5D Mark IV body or a Canon 6D Mark II body

**Canon EOS 5D Mark IV (£3,250)**

* An excellent full-frame camera, capable of producing excellent quality images.
* A rugged camera ideal for tougher fieldwork conditions.
* Fixed LED screen.
* A camera suitable for a very large amount of copying (up to 200,000 exposures).
* Its high level of weather sealing protects against dust and moisture which is important in remote areas, especially when working in multiple locations rather than a single fixed archival institution.

The Canon 5D Mark IV is a full-frame camera with excellent build quality, excellent weather sealing and a reliable long lasting shutter, rated for 200,000 exposures. It does not have a tilting LED screen, though this is not an issue if the researcher is planning on using tethered shooting.

**Canon EOS 6D Mark II (£1,730)**

* A very good camera, capable of producing excellent quality images.
* A lighter weight camera of slightly lower build quality than the 5D and therefore slightly less robust and perhaps less suitable for tougher fieldwork conditions.
* A camera suitable for a large amount of copying (up to 100,000 exposures).
* Good level of weather seals against dust and moisture but not as good as the 5D.
* Its tilting LCD screen may make this a better choice than the 5D for some projects.

The Canon 6D Mark II is a camera with very good build quality and weather sealing. It is significantly cheaper and lighter than the Canon 5D Mark IV. Its shutter is rated for 100,000 exposures compared to the 200,000 exposures of the 7D but this would still make it perfectly suitable for most EAP
projects and a good choice for pilot projects or as a second camera for larger major projects. One significant advantage over the Canon 7D is the inclusion of a tilting LCD screen which would help when used on a tripod or copy stand where the position or height of the camera can often make viewing a normal viewfinder or fixed LCD screen awkward. (This is not relevant if you are planning on using tethered shooting).

**Canon EF 24-70mm f/4 L lens (£730)**

One of Canon’s L Series lenses which have excellent build quality and weather sealing. It is heavier and bulkier than cheaper lenses but will better withstand the rigours of usage in remote locations. It focuses very close and also has a macro setting for extreme close up. The lens is best used in the 40-60mm range for most copying with the wider angle settings restricted to more occasional use when subjects are too large to copy easily. This lens can be used on both Canon APS-C and full-frame cameras, should the researcher wish to upgrade to a full-frame camera for a later EAP major project. It should always be used with a UV protection filter.

**A suggested Nikon full-frame camera and lens kit**

A kit comprised of a high quality Nikon full-frame camera body, macro lens and a close-focussing wide-angle to standard zoom would make an excellent digital camera kit for documentation projects. The kit would also need UV protection filters for each lens, at least one spare camera battery and possibly a spare camera battery charger.

**A Nikon D850, Nikon D810 or Nikon D750 body**

**Nikon D850 (£3,500)**

* An excellent full-frame camera, capable of producing excellent quality images.
* A rugged camera ideal for tougher fieldwork conditions.
* Its tilting LCD screen may make this a good choice for some projects.
* A camera suitable for a very large amount of copying (up to 200,000 exposures).
* Its high level of weather sealing protects against dust and moisture which is important in remote areas, especially when working in multiple locations rather than a single fixed archival institution.

The Nikon D850 is a full-frame camera with excellent build quality, excellent weather sealing and a reliable long lasting shutter, rated for 200,000 exposures. It has a tilting LCD screen.
Nikon D810 (£2,600)

* An excellent full-frame camera, capable of producing excellent quality images.
* A rugged camera ideal for tougher fieldwork conditions.
* Fixed LED screen.
* A camera suitable for a very large amount of copying (up to 200,000 exposures).
* Its high level of weather sealing protects against dust and moisture which is important in remote areas, especially when working in multiple locations rather than a single fixed archival institution.

The Nikon D810 is a full-frame camera with excellent build quality, excellent weather sealing and a reliable long lasting shutter, rated for 200,000 exposures. It does not have a tilting LED screen, though this is not an issue if the researcher is planning on using tethered shooting.

Nikon D750 (£1,750)

* A very good camera, capable of producing excellent quality images.
* A lighter weight camera of slightly lower build quality than the D850 and D810 and therefore slightly less robust and perhaps less suitable for tougher fieldwork conditions.
* A camera suitable for a large amount of copying (up to 150,000 exposures).
* Good level of weather seals against dust and moisture but not as good as the D810/850.
* Its tilting LCD screen may make this a better choice than the D810 for some projects.

The Nikon D750 is a camera with very good build quality and weather sealing. It is significantly cheaper and lighter than the Nikon 810/850. Its shutter is rated for 100,000 exposures compared to the 200,000 exposures of the 810/850 but this would still make it perfectly suitable for most EAP projects and a good choice for pilot projects or as a second camera for larger major projects. One significant advantage over the Nikon 810 is the inclusion of a tilting LCD screen which would help when used on a tripod or copy stand where the position or height of the camera can often make viewing a normal viewfinder or fixed LCD screen awkward. (This is not relevant if you are planning on using tethered shooting).

Nikon 60mm f2.8 D AF Micro Nikkor Lens (£430)

A very sharp, fixed focal length, true macro lens, which is optically and mechanically designed specifically for focusing close up and is therefore ideal for copying. It will copy objects and documents at close distances with minimal distortion. Its focal length approximates to the “standard” macro copying lens. This makes it ideal for photographing most documents and objects. Combined with a wide-angle to standard zoom, this will form an ideal and flexible copying kit. The lens is lighter and not as robust. It should always be used with a UV protection filter.
Nikon 24-85mm f3.5-4.5 AF-S G ED VR Lens (£460)

A lightweight Nikon zoom lens. It focuses very close and is very sharp though exhibits some distortion in the wide-angle and telephoto settings. The lens is best used in the 40-60mm range for most copying with the wider angle settings restricted to more occasional use when subjects are too large to copy easily. This lens can be used on both Nikon APS-C and full-frame cameras, should the researcher wish to upgrade to a full-frame camera for a later EAP major project. It should always be used with a UV protection filter.
**Tripods**

**Benro GoPlus Travel FGP28C Carbon Fibre Tripod (£320)**

Plus

**Manfrotto 496RC2 Compact Ball Head (£70)**

Benro market a series of similarly looking tripods in their GoPlus Travel range constructed in either aluminium or carbon fibre. They are well-designed and very portable tripods. Each allows the centre column to be positioned horizontally which makes it very useful for copying, though it needs counterbalancing to remain stable. (A hook attached to the bottom of the centre column facilitates this). This model is the most expensive in the series and is constructed from carbon fibre, which is lighter than metal and more comfortable to handle in very cold weather. The equivalent aluminium model is half the price and perfectly suitable for most projects. The Benro GoPlus Travel range come with a carry bag but no tripod head.

The Manfrotto 496RC2 Compact Ball head is strong enough to support most DSLR cameras. It has a single locking lever, and a friction control and a quick release plate.

**Copy Stand**

**Kaiser Copy Stand RS1 with Copy Arm RT1 (£550)**

Kaiser market several modular systems of copy stands, each with various columns, baseboards, camera arms and accessories. They are well-designed, very robust and reliable. The RS1 stand is not the most lightweight or portable stand in their catalogue but would be ideal for an institution-based project where portability is perhaps less important. The stand offers vibration-free camera mounting, hand crank operated height adjustment and is highly recommended. Lighter stands are more likely to be less rigid and suffer from vibration more. The RT1 copy arm can be extended to increase the distance between the camera and column, useful when photographing larger objects with a wide-angle lens. The column itself can also be swivelled around by 180 degrees to allow for copying of very large items, with the stand securely weighted on a table and the object being copied positioned at floor level or on a low table alongside. It is highly recommended.

Kaiser R2 series copy stands are smaller, lighter and more portable. The column of one model can be folded flat against the baseboard for transportation.

**Kaiser Lighting Kit**

Kaiser also market continuous lighting kits for use with their copy stands, either with LED panels, high frequency (flicker free) fluorescent tubes or tungsten lamps. LED lights do not heat up, fluorescent lights get warm but not hot to touch, but tungsten bulbs will get very hot. LED panels are smaller than the fluorescent lamps but will not easily light larger documents. All these forms of lighting will need a mains supply. The lighting kits are designed to be clamped to the edge of the copy stand baseboard or alternatively can be clamped to the edge of a small table. The fluorescent lights can be positioned on lighting stands when copying larger objects.
The tungsten lighting kits are the cheapest and are only recommended when budgeting for a pilot project where the researchers are expecting to undertake a major project.

**Kaiser RB 5070DX (£1,080)**

A pair of LED light banks on adjustable arms which are cold to touch when in operation (a colour temperature of 5600K, approximating daylight). Ideal for lighting smaller documents.

**Kaiser RB 5055 HF (£1,340)**

A pair of larger lampheads each containing two 55 W compact fluorescent tubes on adjustable arms, which are warm to touch when in operation (daylight balanced colour temperature of 5400K). Ideal for lighting larger documents.

They can also be mounted on lighting stands.

**Kaiser RB 5004 HF (£745)**

A slightly smaller pair of lampheads each containing two 36 W compact fluorescent tubes on adjustable arms, which are warm to touch when in operation (daylight balanced colour temperature of 5400K). Ideal for lighting most normal size documents.

They can also be mounted on lighting stands.

For large projects in very remote locations it would be worth budgeting for a pair of spare fluorescent tubes of exactly the same size, make and voltage.

**Camera Bag**

**Tenba Roadie Roller Bags**

Tenba makes a small range of excellent quality and well-designed roller bags that will take a full photographic kit consisting of digital camera body and lenses, a laptop and charger and other accessories. Most will fit into aircraft cabin baggage but are also capable of travelling within the hold of aircraft when used with the full padding supplied. These bags are recommended for institution based projects in which the researcher won’t have to carry the bag too far. They are also excellent for storage of equipment within an archive or institution. Lockable zips and additional steel cable with padlock offer a level of security when travelling or when leaving equipment unattended.

**Tenba Roadie Roller 21 Transit Bag (£320)**

The Tenba Roadie Roller 21 Transit is large enough to house the photographic equipment for most projects including some lighting equipment.
Tenba Roadie Roller 18 Bag (£280)

The Tenba Roadie Roller 18 which is smaller and slightly cheaper than the Roadie Roller 21 is large enough to house the photographic equipment for most projects. Highly recommended.

Tenba Roadie Air Case Roller 21 (£360)

The Tenba 21 aircraft model is designed to be very tough, virtually “uncrushable” and can be safely transported within the aircraft hold. However, it is quite heavy at 4 kg.

Tenba Shootout 24L Backpack (£170)

A rucksack style camera bag ideal for projects that involve substantial travel from archive to archive, especially when the researcher may have to walk and roller bags are unsuitable. It is large enough to house the photographic equipment for most projects, including a full photographic kit consisting of digital camera body and lenses, a laptop and charger and other accessories.

External Hard Drive

G-Drive Mobile USB Hard Drive (2Tb) (£100)

A high quality USB 3 drive. It is powered through the USB cable so does not need a separate AC adaptor. This is a conventional spinning hard drive. Research projects at altitudes higher than 10,000ft might budget for an SSD drive.

Scanner

Epson Perfection V800 Scanner (£500-550)

A professional quality A4 scanner. It is significantly bulkier and heavier than cheaper scanners on the market but is of a significantly higher quality. This bulk and weight is not a problem for institutional archive-based projects. The machine warms up and scans quickly. For projects scanning large numbers of negatives or transparencies, a set of spare negative/transparency holders would speed up the scanning process. These cost extra. As this is an A4 scanner, it will of course not scan material larger than A4 (216mm x 297 mm).

Memory Cards

SanDisk 64GB Extreme Pro 95MB/Sec SDXC Card (£60)

Sandisk Extreme Pro are the industry standard CF and SD cards. They are described as waterproof, X-Ray proof and shock proof and are totally recommended. (Don’t buy cheaper cards but also don’t
waste money on the much more expensive Sandisk Extreme Pro 280MB/s cards, as their extra speed is not necessary for documentation projects). Always buy through a reputable dealer as many counterfeit SanDisk cards are circulating.

**Colour Chart**

**Danes-Picta Grey Scale and Colour Separation Chart (BST13)/Kodak (Q13) (£17-£18).**

Excellent and relatively inexpensive charts: a colour separation chart and scale in one unit, a grey scale in a separate unit. These charts are delicate and rather easy to fold, scratch or lose in the field. It is recommended to take a spare and take great care with them both on location.

**Other items you will need for your camera**

UV filters. A filter should be used on each lens at all times for protection.

Camera cleaning kit.

Spare lithium batteries. More than one spare camera battery is advisable if you are working in locations with very unreliable electricity supply.

Silica Gel Desiccant sachets if you are working in a particularly humid area.

**Computer hardware and software**

EAP does not recommend particular brands but do consider the fact that EAP works on PC computers. All material you submit will need to be readable on a PC. Listed below are items you should consider for your project:

Laptop or desktop.

External (non-portable) hard drives (4TB) G-Technology 4TB G-DRIVE USB (£130)

Portable hard drives (see above).

Universal card reader such as Delkin USB 3.0 (£25) or the Lexar Pro USB 3 dual slot reader (£40).

USB cable extension.

Electrical extension cable.

USB Cable splitter hub.

MS Office (Word, Excel).

MS Access (this is a database management system and may be useful for the Archival Partner).

Image editing software such as: Adobe Lightroom. Lightroom facilitates the batch processing, resizing and renaming of files as well as converting RAW files to TIFF format.

Software for backing up your images such as SyncBack SE.
Renaming software such as Rename Expert or Ant Renamer.

**Conservation equipment**

A3 size black card.

Soft hair dusting brush from reputable conservation supplier.

Bone folder.

Snake lead weights.

Plastazote foam LD45 (black 10-15mm thick) for placing around a camera lens as a larger sheet or for cutting into smaller pieces and used to raise one side of a book (refer to figures 29 and 30 in *Remote Capture*).

Plastazote foam LD45 (black 6mm thick) as a cover if using making the book cradle (discussed in Digital Appendix 1).

Acid-free archival storage boxes (they come in various sizes so make sure you know your collection before ordering them).

Perspex pointer for gently putting pressure on the edge of a page for digitisation.

Nitrile gloves.

Dust and mould masks.

Conservation suppliers based in the UK and who ship worldwide:

https://www.preservationequipment.com

http://www.conservation-by-design.com

Don’t forget to budget for the freight shipping costs for getting the equipment to the project site and the courier postage for sending the hard drives containing all your efforts back to the Endangered Archives Office.