

INTRODUCTION

This document follows on from an outing to photograph Strawberry Hill house at which we were allowed to use tripods and summarises the content of the workshop held on November 11th.

BEFORE THE VISIT

Before the visit, I suggested that people:

1. understood the relationship between aperture and depth-of-field. See <https://www.exposureguide.com/focusing-basics/>.
2. had a rough idea of how to read a histogram and in particular could tell if highlights are burned out and/or if shadows are blocked. Google "How to read a histogram in photography". Understanding histograms isn't difficult but IS important. See: <https://digital-photography-school.com/how-to-read-and-use-histograms/>.
3. Googled "Real Estate Photography" to provide further insights into photographing interiors. This link is extremely useful: <https://www.hdrsoft.com/real-estate/photographing-interiors-with-hdr-simple-technique.html>

CAMERA SETTINGS

I made the following suggestions about camera settings:

1. Use Camera Raw: it gives far better results than JPEGs. See <https://photographyconcentrate.com/10-reasons-why-you-should-be-shooting-raw/>
If you're not persuaded, you could set your camera to shoot RAW and jpegs simultaneously.
2. Consider whether sRGB or Adobe RGB is more appropriate to your needs
3. Use a tripod – essential as shutter speeds will be low.
4. Make sure the back of the camera is perpendicular to the ground and that the base is horizontal and the sides are vertical. Slight errors can be corrected in software – see the next page.
5. Don't use flash (which is forbidden anyway).
6. Use the lowest ISO possible.
7. Turn image stabilisation OFF (unless your camera/lens guide tells you specifically that keeping it on whilst using a tripod won't cause problems).
8. Bracket your exposures by changing shutter speed (not aperture) to ensure that you've captured detail in the darkest and lightest areas including the windows, their surrounds and outside the building. This could mean six or more exposures at one or two stops apart. At least one image should be slightly overexposed: so-called "expose to the right". Underexposure gives noise as well as lack of detail; over-exposure gives burnt-out highlights

For example, if the camera suggests an exposure of 1 second at f8, take a series of pictures (ideally using Manual) at:

- f8 at 4s (+2 stops)
- f8 at 1s (0 stops i.e. the camera's suggestion)
- f8 at 1/4 second (-2 stops)
- f8 at 1/15 second (-4 stops)
- f8 at 1/30 second (-8 stops).

There is normally no advantage in increasing/decreasing by single stops.

This may well be overkill but it's better to have too many images to choose from than rather than too few. If time permits, check the histograms.

BRACKETING IS COVERED THOROUGHLY IN APPENDIX A. Also covered are the relationships between aperture, shutter speed and ISO

These links explain about:

- **Aperture and shutter speeds (and ISO):**
<https://petapixel.com/2016/06/25/comprehensive-beginners-guide-aperture-shutter-speed-iso/>
 - **Stops:**
<https://www.photographymad.com/pages/view/what-is-a-stop-of-exposure-in-photography>
9. Using a cable-release or self-timer to avoid camera shake is essential. Consider too using "Mirror Up".
 10. Consider using "Live View". Although it uses a lot of battery power, it can make life easier for interior shots particularly if the screen can tilt/swivel. Use it in conjunction with the histogram. Consider using manual focus when using "Live View". If you touch the screen to take the shot, make sure you don't cause camera shake.
 11. Use a sufficiently small aperture (high f-number) for sufficient depth-of-field* BUT remember that the highest f-numbers may give some loss of definition because of diffraction effects. Try f-8 to f-16 for starters. Make sure that everything is sharp from front to back Google "finding a lens's sweet spot)

*Depth of field is defined as "the distance between the nearest and the farthest objects that is acceptably sharp." Note the word "acceptably". There is a more detailed explanation on the next page

MORE ON DEPTH OF FIELD

Depth of field tables (<https://www.dofmaster.com/dofjs.html>) can be quite useful. When you focus on a specific point, a certain distance behind and in front of that point will be in focus (*as a very simple rule-of-thumb in a 2:1 ratio*) – but how much depends on a number of things such as distance of the subject, type of lens, the type of camera (*a full-frame camera has a smaller depth of field than a four-thirds camera*) and how much the image will be magnified when viewed.

When you access the website page, simply choose your camera, the focal length, the f-stop and the subject distance. At that point, the values in the right hand box will be automatically calculated. In this case, with a Canon 7D camera and a focal length of 18mm and an f-stop of f-11, if you focus at 10 ft., everything will be in focus from 3.32 feet to infinity. Note: these figures can't be 100% accurate for the reasons explained in the previous paragraph.

Depth of Field Calculator

Camera, film format, or circle of confusion Canon 7D	Subject distance 10 ft
Focal length (mm) 18	Depth of field
Selected f-stop f/11	Near limit 3.32 ft
Subject distance 10 feet	Far limit Infinity
<input type="button" value="Calculate"/>	Total Infinite
	In front of subject 6.7 ft
	Behind subject Infinite
	Hyperfocal distance 5 ft
	Circle of confusion 0.019 mm

Enter these values... →

...and the values in this box are automatically calculated. ←

For close-ups where depth-of-field is limited, consider the use of focus-stacking. There is an article in the Members' Area of the website about this.

SUGGESTIONS ABOUT COMPOSITION

1. A wide angle lens is essential.
2. If taking a symmetrical view, ensure the symmetry is perfect. A few centimetres either way and/or a slight tilt of camera make a lot of difference.
3. Experiment with angled shots for variety. They're often more interesting.
4. Check your images on the camera's screen, zooming in if necessary.
5. Are reflections present – do they distract from or enhance your picture?
6. Look out for "flare" which can spoil pictures. It's noticeable particularly on oil paintings or because of lens diffraction
7. Look out for detail shots.
8. Look out for abstract shots.
9. There may be opportunities for ceiling shots: consider laying the camera on its back and using the self-timer to do these.
10. Check there are no camera bags etc. visible to spoil your shots or those of others in the room.
11. Don't rush – think before you shoot! It's better to have a few good pictures instead of a lot of poorer ones. We can always revisit if there's sufficient interest.

Here are a selection of pictures taken by people who attended:

I took some back at Strawberry Hill in August. I couldn't use a tripod inside and therefore had to use a wider aperture, slower shutter-speed and higher ISO than I would have preferred.





PROCESSING BRACKETED IMAGES TO CREATE REALISTIC IMAGES OF PHOTOGRAPHIC INTERIORS

1. Process the bracketed images in Camera Raw first in the usual way. Note that Camera Raw in “Photoshop Elements” is quite limited in what it offers.

Be sure to use the invaluable lens correction tab in Camera Raw (Fig 1). (*not available in Photoshop Elements*)



Fig 1 shows the lens correction tab in Camera Raw. Its use is essential for any image with straight lines (including a horizon).

2. Converging verticals and non-parallel lines can be corrected to a very limited degree by using the Transform Tool in Camera Raw (Fig 2; *not available in Photoshop Elements*). However, you will get far better results using the “Free Transform Tool” or “Perspective Crop Tool” in Photoshop or Photoshop Elements which I demonstrated it in the workshop on November 11th and discussed later. Of course, a tilt/shift lens theoretically avoids the problem but a new Canon 17mm EFL shift lens costs over £2000.



Fig 2 shows the Transform tool and its panel in Camera Raw (*Photoshop only not Elements*) but, as I commented above, it really is not very good; the Free Transform Tool and the Perspective Crop Tools in Photoshop and Photoshop Elements are far more useful.

- 3 EITHER Open the processed RAW images in Photoshop and save each as a .jpeg or Tiff OR save directly from Camera RAW.
- 4 You will need to combine the bracketed exposures to give a realistic effect. Later on, I show pictures comparing the results from: (i) HDR in Camera Raw (ii) HDR in Photoshop (iii) HDR Efex Pro 2 and (iv) Photomatrix Pro.

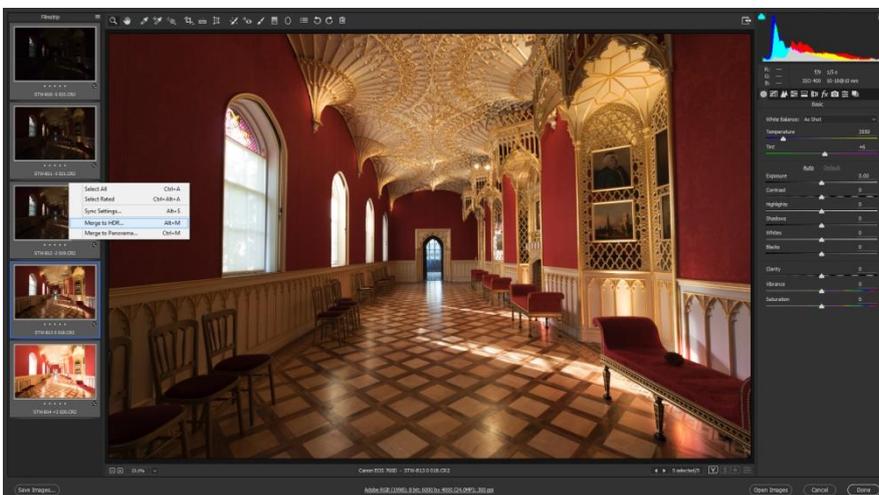


Fig 3 shows the “Merge to HDR” option in Camera Raw .

- 5 I demonstrated standalone Photomatix software (<https://www.hdrsoft.com/>) at the meeting on Monday 11th. It gives good results and is available for an unlimited trial period (although it adds a watermark which can be removed when you buy the product provided you haven't done any further editing). This is the user manual: https://www.hdrsoft.com/support/doc/PhotomatixPro6.1_UserManual_Win.pdf. Aurora HDR AND Easy HDR are excellent alternatives but make sure your graphics card is up to it. See this link: <https://captainkimo.com/hdr-software-review-comparison/> for reviews of all products
- 6 There may well be issues with colour balance. For example, different areas of a wall which are essentially the same colour may have colour casts (e.g. one part of a wall may be yellower or bluer than another). The eye compensates for this but the camera can't. Manual correction on selections may be necessary but this is beyond the scope of this article. You can in the Gallery Room pictures the varying colour of the wall panels.

If you open the Raw Images in Photoshop (or save them and then open in Photoshop), you can access Photoshop's own HDR Pro as shown below in Fig 4 ("Merge to HDR Pro...". You can also see the "Merge to HDR Efex Pro 2..." which is a free plug-in.

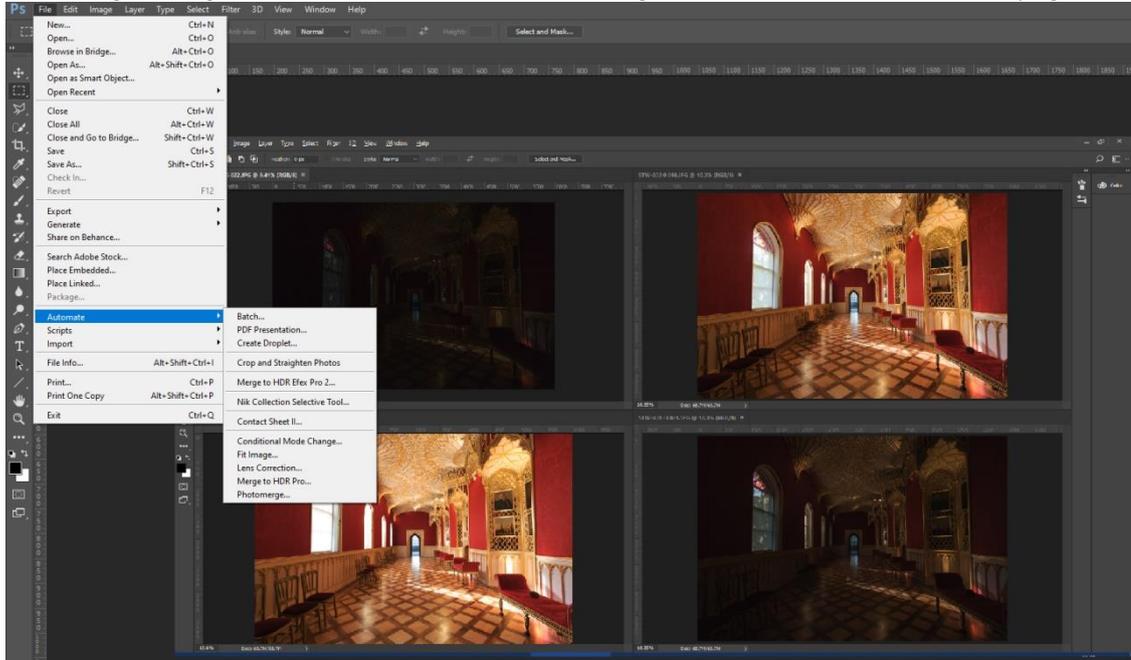


Fig 4

HOW TO COMBINE PHOTOGRAPHS IN PHOTOMATIX SOFTWARE:



Fig 5A (-6 stops)

Fig 5B (-4 stops)

Fig 5C (-2 stops)

Fig 5D (0 stops)

Fig 5E (+2stops)

Figs 5A-5E show five different bracketed exposures after modifying in Photoshop and saving.

Fig 6 (below) shows the effect of combining the saved images in Photomatix Software followed by correction of the verticals and a few additional tweaks in Photoshop.

Note: Photomatix allows you to process directly the original RAW images. However, the results are better if you use images which have been corrected first.

You'll see there is detail in the window areas and the dark areas of the paintings.



Fig 6

On the next page, I describe how to use Photomatix software.

Below is a comparison of the results from different HDR software:



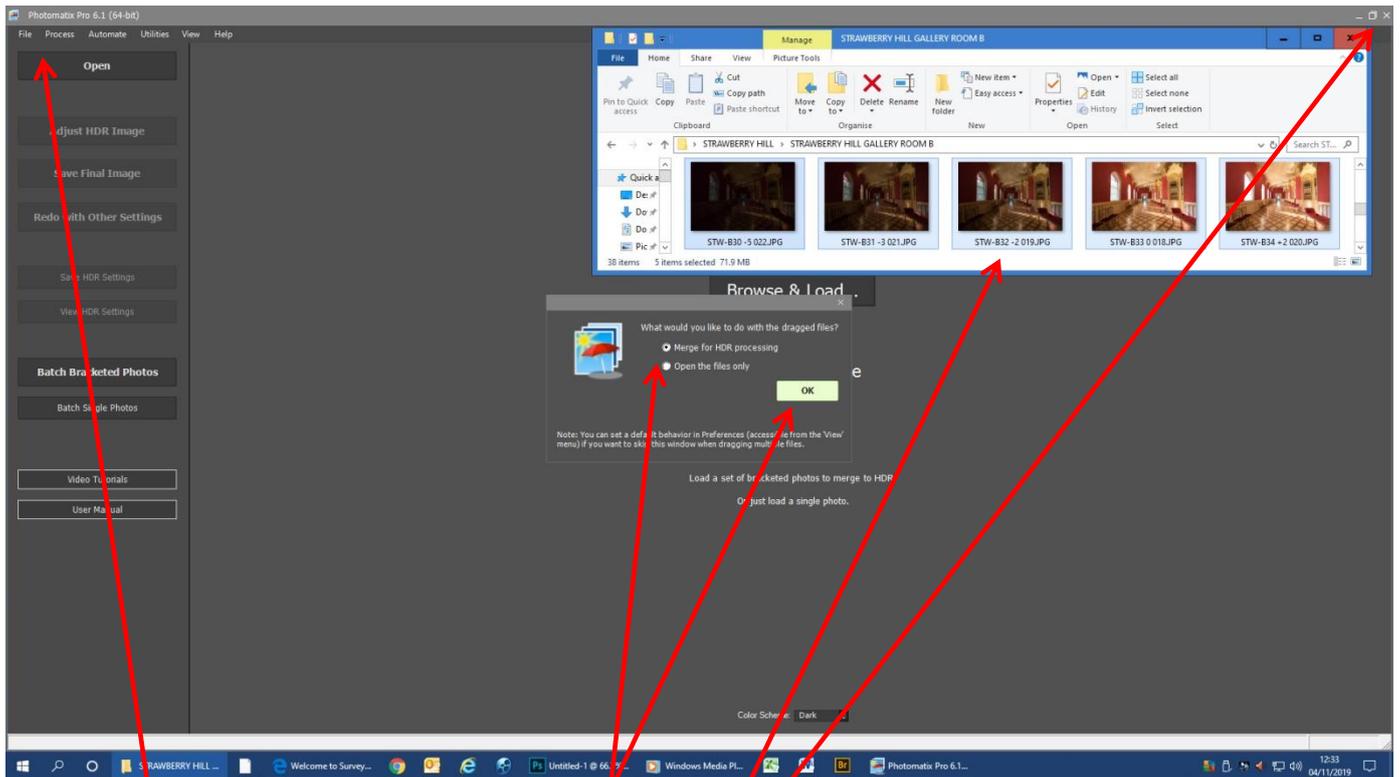
Fig 7A (RAW HDR)

Fig 7B (Photoshop HDR Pro)

Fig 7C (HDR Efex 2)

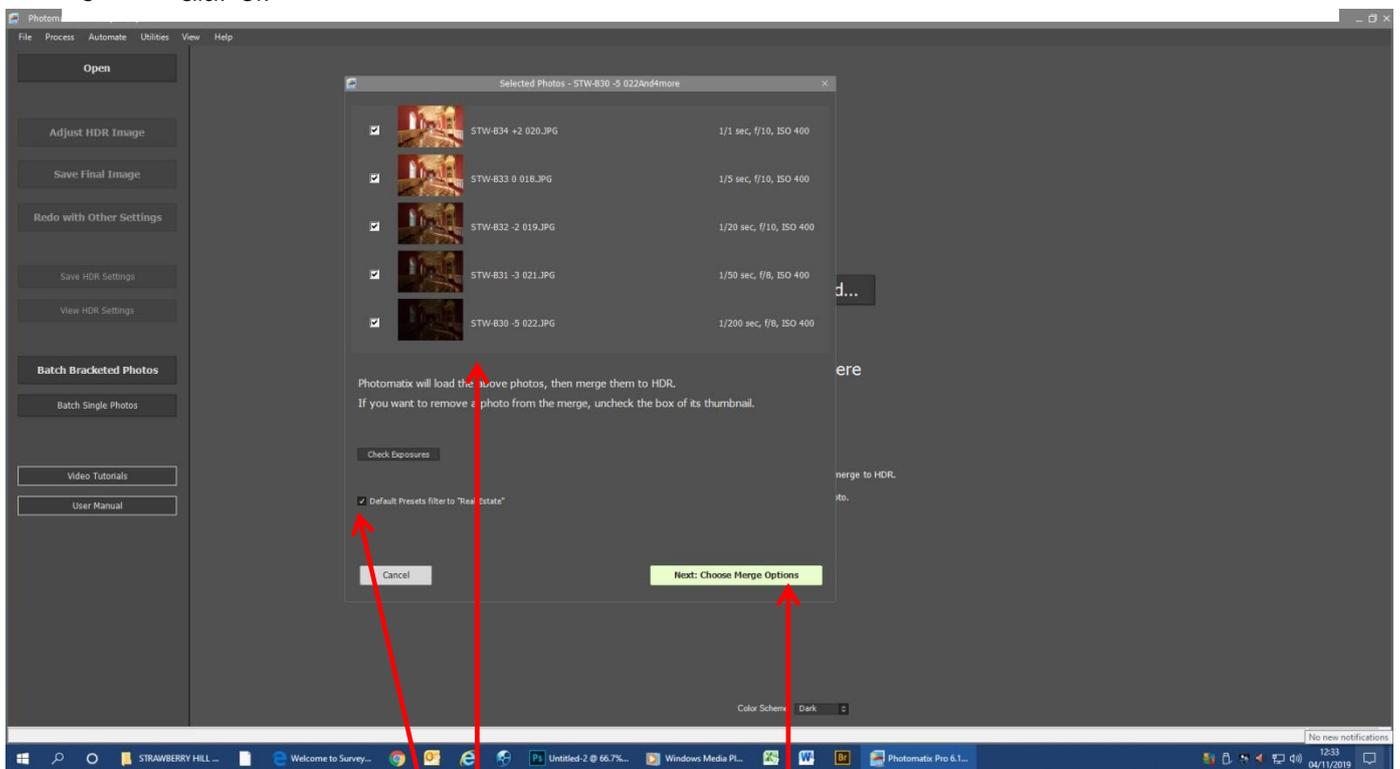
Download Photomatix software (<https://www.hdrsoft.com/>) and study the User Manual and associated tutorials: (https://www.hdrsoft.com/support/doc/PhotomatixPro6.1_UserManual_Win.pdf)

Open the software:

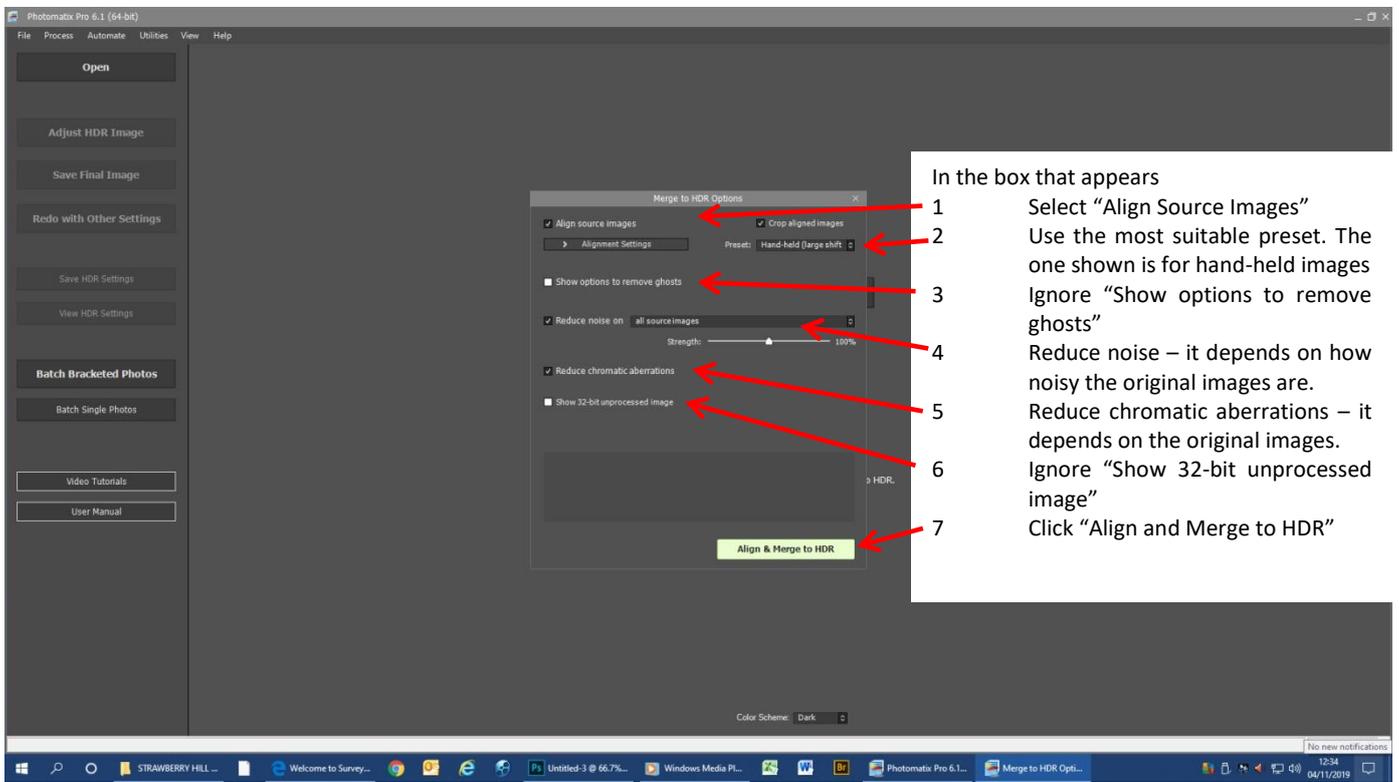


All windows may be resized/minimised/maximised in the normal way

- 1 Drag your pictures into the software. There are numerous ways of doing this: in this example, the files were open in a separate window and I dragged them into Photomatix. You can drag files via the taskbar too)
OR
File → Load photos
- 2 Select "Merge for HDR processing"
- 3 Click "OK"

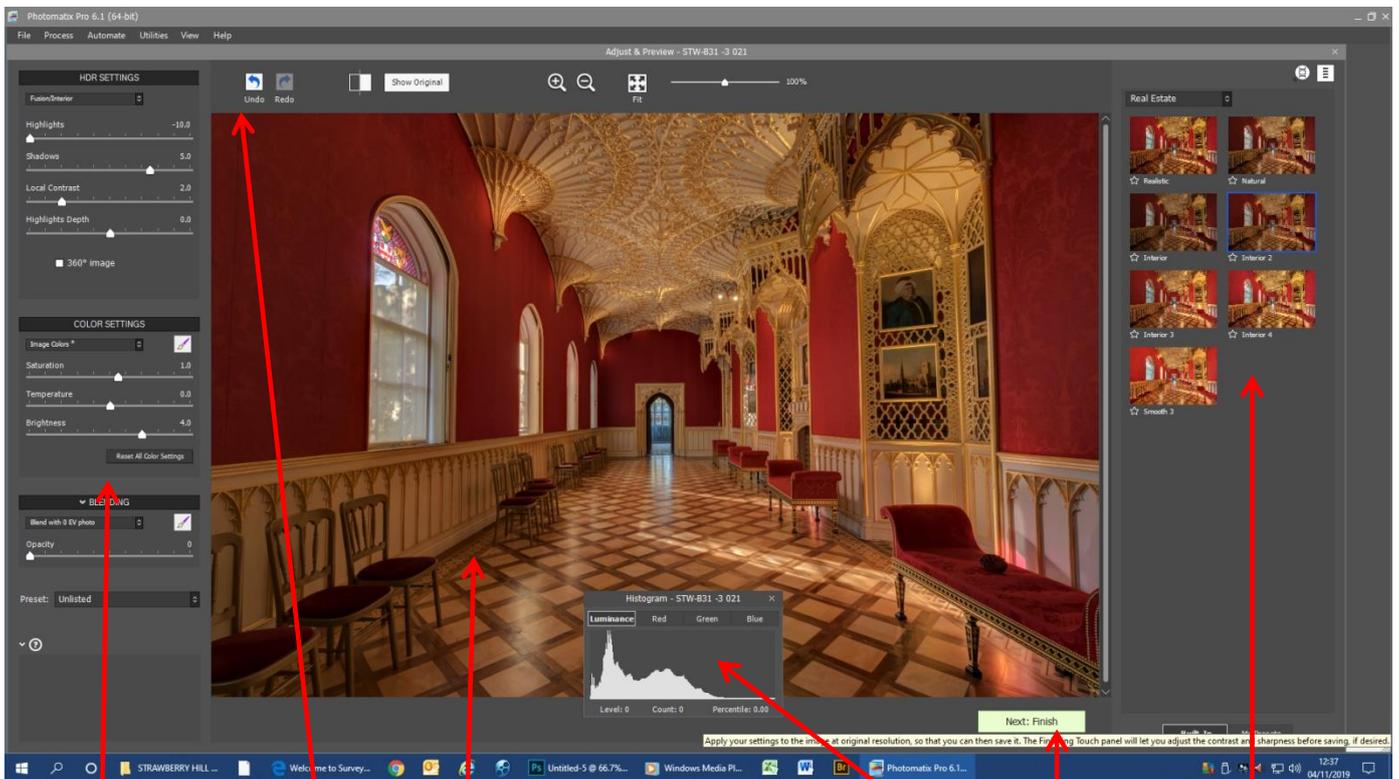


- 1 The five thumbnails will appear in a new box.
- 2 Set the Default Presets filter to "Real Estate" for interior architectural shots
- 3 Click "Next: Choose Merge Options"



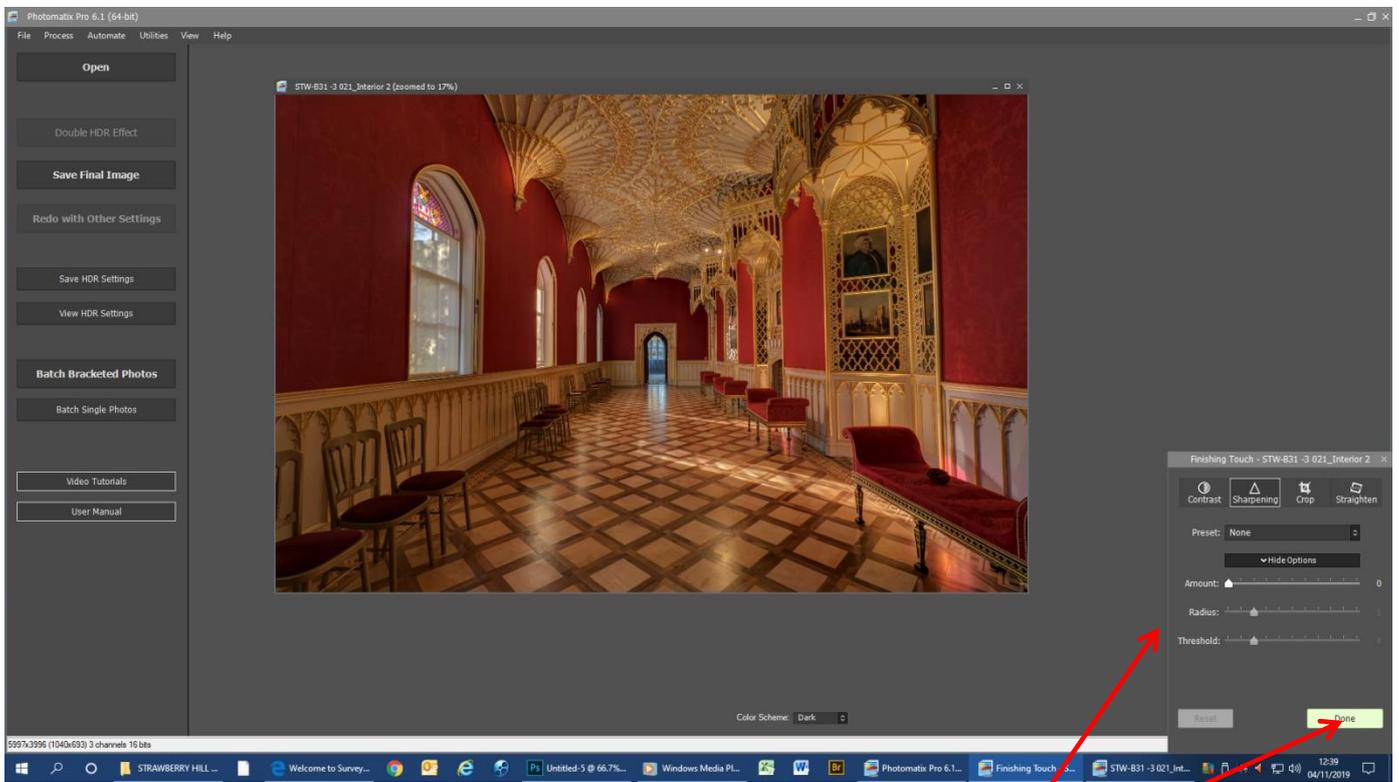
In the box that appears

- 1 Select "Align Source Images"
- 2 Use the most suitable preset. The one shown is for hand-held images
- 3 Ignore "Show options to remove ghosts"
- 4 Reduce noise – it depends on how noisy the original images are.
- 5 Reduce chromatic aberrations – it depends on the original images.
- 6 Ignore "Show 32-bit unprocessed image"
- 7 Click "Align and Merge to HDR"

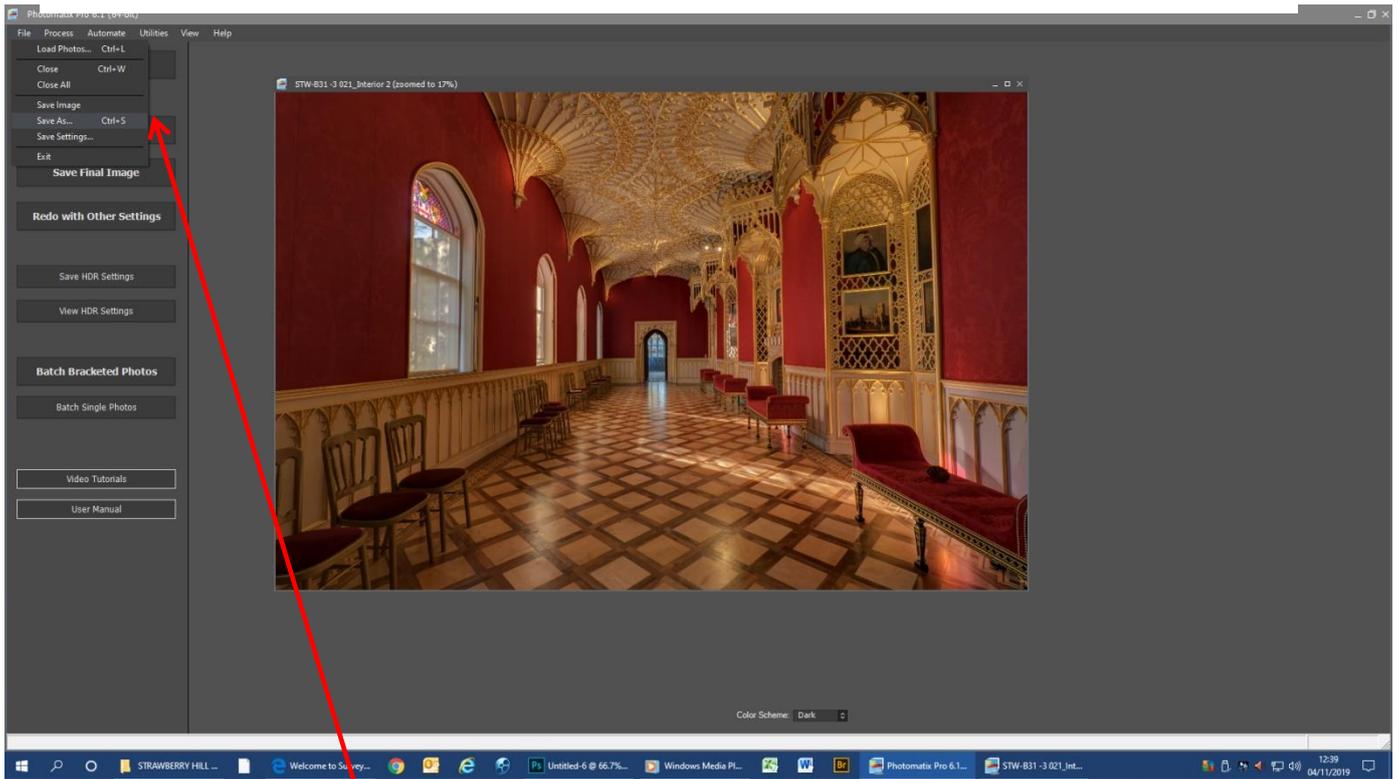


- 1 After a minute or so, the processed image will appear, together with a histogram and some thumbnails of alternative results.
- 2 Decide which thumbnail is **nearest** your preference. Often it will be "Interior 2"
- 3 Use the "Undo" key and/or click on different thumbnails to experiment.
- 4 When you're happy, click "Finish"

There are numerous settings on the left-hand panel. If you don't have Photoshop, you can explore them. Otherwise, I suggest you ignore them and do any editing in Photoshop (and/or Camera Raw) where you'll have complete control. It doesn't really matter which of the thumbnails you choose as no information will be lost.



- 1 After a minute or so, the "Finishing Touch" box will appear, usually with a histogram.
- 2 Ignore the settings in this box as you can edit fully in Photoshop
- 3 Click "Done"



- 1 Now go to File → Save As...
- 2 In the options that appear, decide on a file name and whether to save as a .jpeg or .tiff
- 3 Then close the image so you're ready to proceed with the next set.

Remember that if you edit a .jpeg, every time you save it there will be some loss of quality. After twenty or so saves, the picture is almost unusable.

Tiffs are lossless.

CORRECTING PERSPECTIVE ERRORS

If the camera is tilted, even slightly, then vertical lines will converge. You'll have seen this on the pages four to nine.

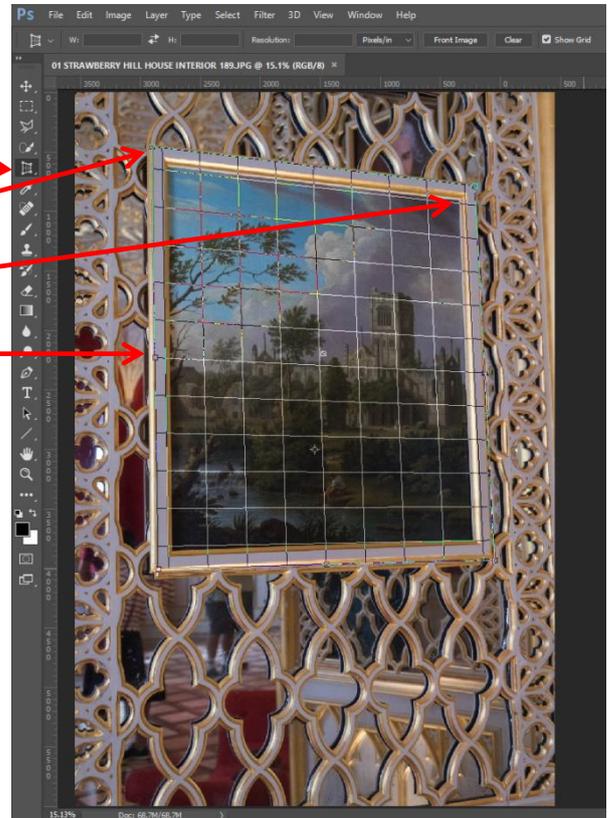
Pre-digital, there was nothing you could do about it. Nowadays, perspective problems can be easily corrected in software.

TRANSFORM TOOL IN CAMERA RAW

At the moment, it's pretty useless. It may improve with future updates.

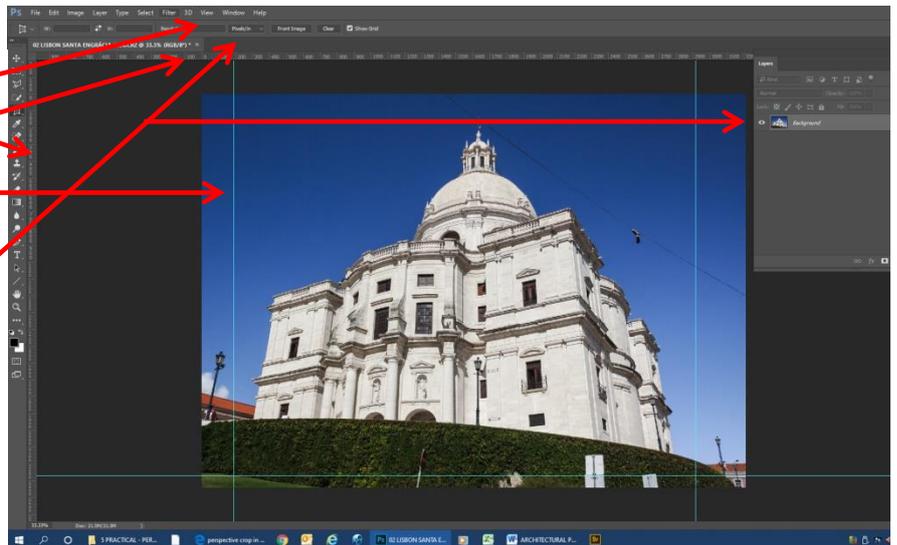
PERSPECTIVE CROP TOOL IN PHOTOSHOP and PHOTOSHOP ELEMENTS

- 1 Part of the Crop Tool choices
- 2 Click on a corner then drag to the second, third and fourth corners.
- 3 Drag at the corners to fine-tune the positions
- 4 To expand or contract the canvas, drag or SHIFT-DRAG the outer lines
- 5 Click the "Tick" (not visible in this shot) OR double-click OR Press "ENTER" to apply.

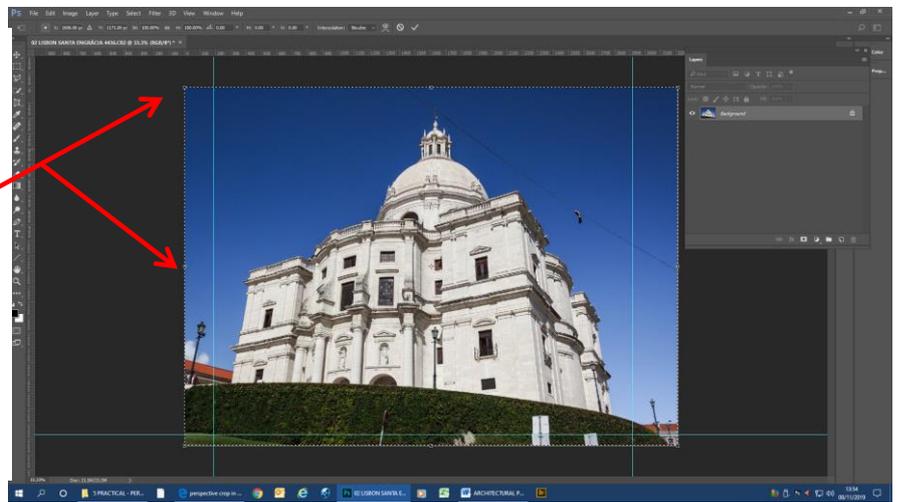


FREE TRANSFORM TOOL IN PHOTOSHOP and PHOTOSHOP ELEMENTS

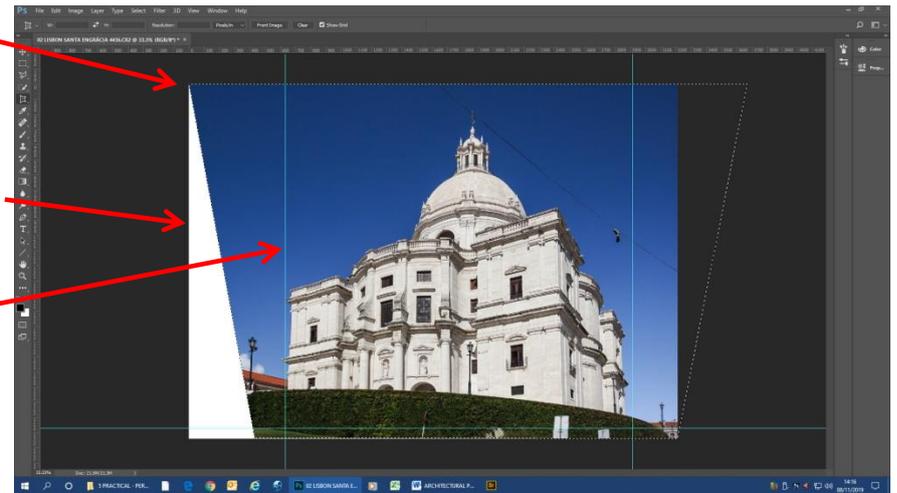
- 1 OPTIONAL View → Rulers to see/unsee rulers
- 2 OPTIONAL CTRL + Drag from rulers to create horizontal and/or vertical guide lines
- 3 OPTIONAL Press F7 or Window → Layers to see/unsee Layers Palette. For this exercise, it sets to the default "Background".
If things don't go according to plan, it may be that you've inadvertently changed "Background" to something else.



- 1 Press CTRL + A to select the image. The Transform Tool will not work otherwise. Note: there are other ways of activating the tool.
 - 2 Press CTRL + T or Edit → Free Transform
- “Marching Ants” appear
- A box appears round the image with corner and centre handles



- 1 CTRL + drag the corners until the sides are parallel. You can alter verticals, horizontals or both
- 2 If you drag one corner inwards, drag the other outwards to avoid stretching or squashing the building.
- 3 Drag the centre handles to stretch or squash the building
- 4 CTRL + drag the centre handles to skew vertically or horizontally
- 5 CTRL + drag the gridlines to move them
- 6 CTRL + H will toggle hide/ show gridlines. You may need to press CTRL + H repeatedly to show/hide selections as well as gridlines
- 7 CTRL + D deselects everything. This is NOT the same as hiding.
- 8 Click the “Tick” (not visible in this shot) OR double-click OR Press “ENTER” to apply.
- 9 Crop as appropriate. If you CTRL + drag the gridlines to the right place, it makes cropping easier.



VANISHING POINT TOOL

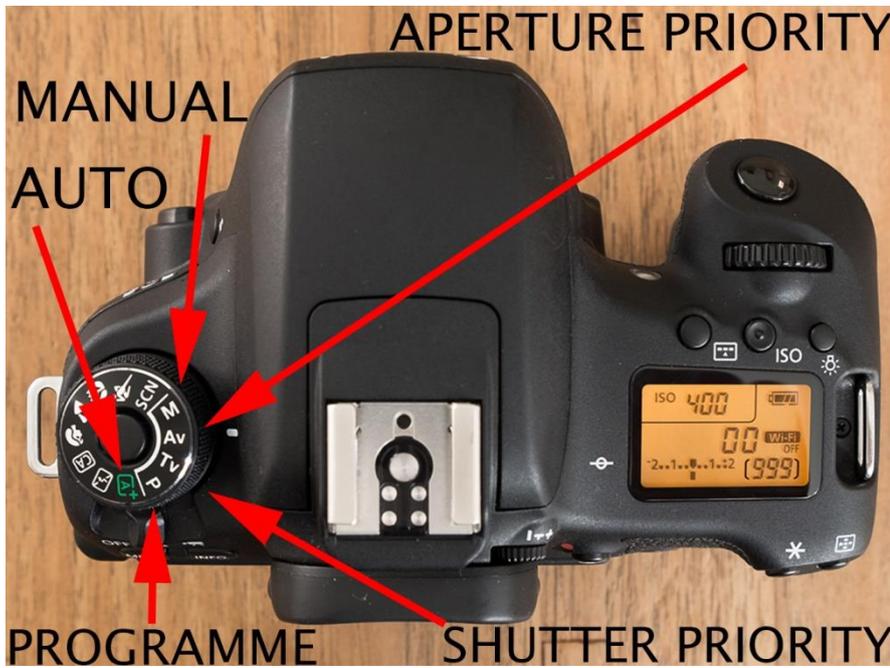
The Vanishing Point Tool offers additional possibilities (Filter → Vanishing Point) but is beyond the scope of this document.

CLEANING UP DIGITAL IMAGES

The article CLEANING UP DIGITAL IMAGES.docx shows how to remove items which detract from the image such as the wires and signs in the picture above.

In the before and after pictures below, you can see how the ropes were removed as well the white triangle in the top right corner.





All dSLRS, most Bridge cameras and many compacts offer these options.

In “Auto” (A+) you cannot override the settings.

Programme (P) is similar to “Auto” but you can override all the settings. As you change one setting, the rest change automatically.

In “Aperture Priority” (Av), you set the aperture and the camera automatically sets the correct shutter speed.

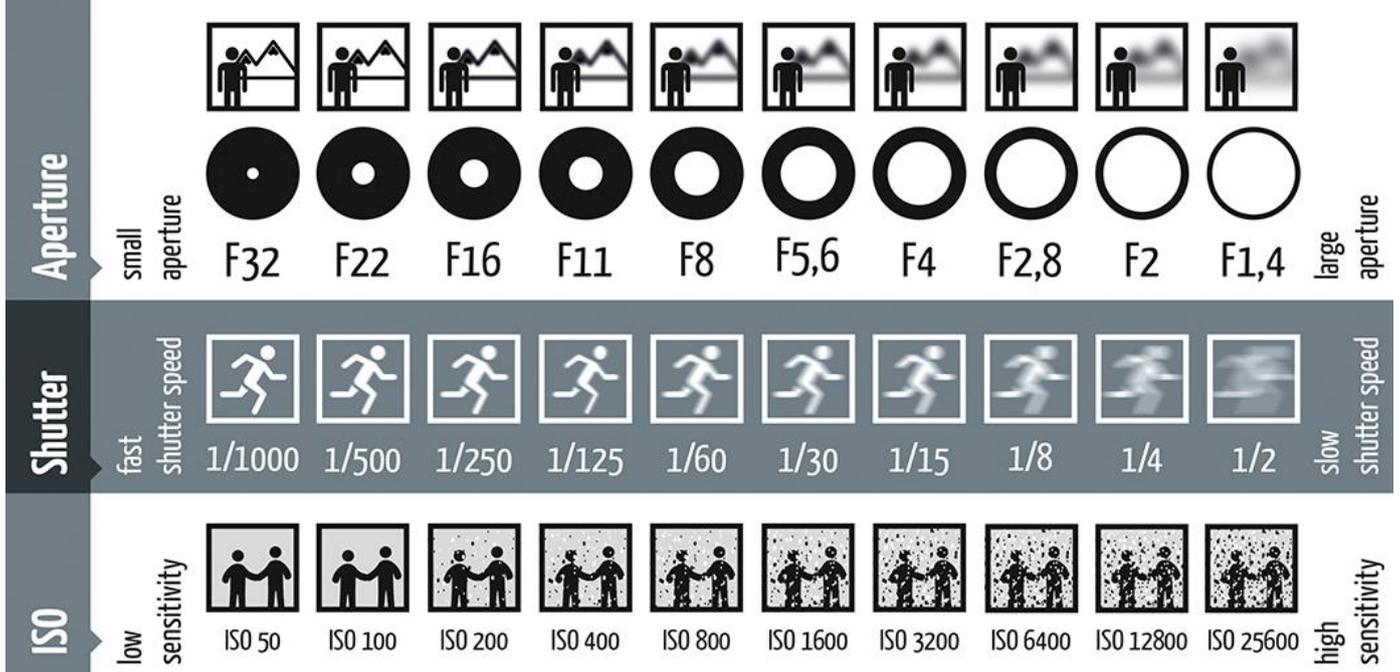
In “Shutter Priority” (Tv), you set the shutter speed and the camera automatically sets the correct aperture.

In “Manual” (M), you decide both shutter speed and aperture. You would normally only use this for special reasons.

There are lots of advantages to having “P” (Programme) as the default mode.

See: <https://www.photographytalk.com/beginner-photography-tips/why-you-need-to-shoot-in-program-mode>

And <http://www.easybasicphotography.com/program-mode.html>



In Aperture Priority, Shutter Priority and Programme, as you change the aperture / shutter speed / either (respectively), the other value changes so that the same amount of light hits the sensor.

You can further override the settings by using Exposure Compensation because sometimes the camera doesn't give exactly the right settings e.g. for very dark, very light or backlit subjects.

See <https://photographylife.com/what-is-exposure-compensation>



From Left to Right:

- 1 Aperture size doubles each time
- 2 Double the amount of light hits the sensor
- 3 Each represents one extra STOP
- 4 Depth of field (amount in focus) decreases*
- 5 No *simple* numerical values between numbers
- 6 Fractional values easily achievable

*depends on camera:four-thirds have more than full-frame

(assuming shutter speed and ISO are kept the same)

Depth of field also depends on type of lens (W/A vs telephoto) and shooting distance



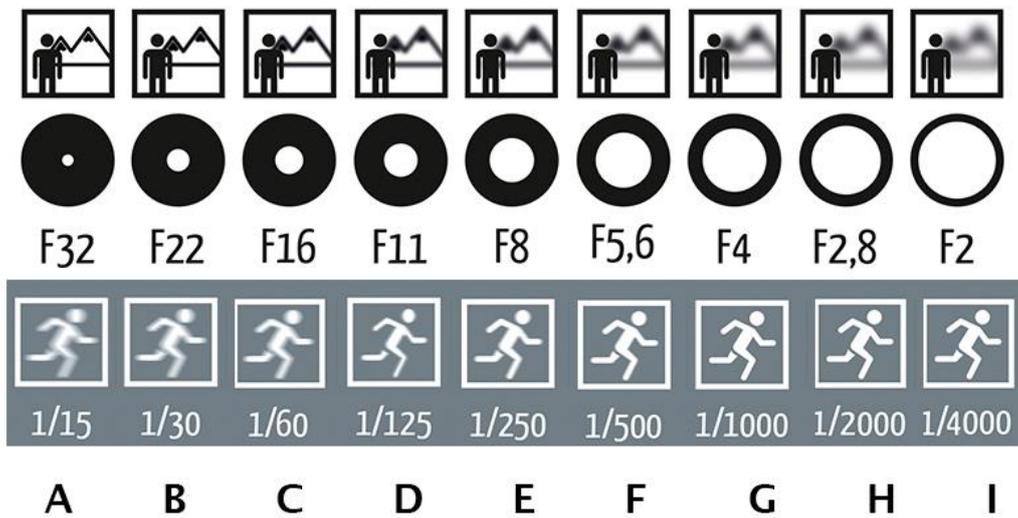
From Left to Right:

- 1 Shutter speed doubles each time
- 2 Double the amount of light hits the sensor
- 3 Each represent one extra STOP
- 4 Risk of blurring/camera shake increases
- 5 Numerical values almost exactly double
- 6 Fractional values easily achievable

Risk of camera shake reduced by IS, W/A lenses and “support” e.g. holding camera correctly, leaning against a wall

(Assuming aperture and ISO are kept the same)

Note: for both the examples on this page, if you change aperture or shutter speed, the other setting is changed automatically by the camera.



On a bright day, a camera on “Auto” or “Programme” might suggest setting “D” or “E”

The same amount of light hits the sensor which ever option you select in “Aperture Priority”, “Shutter Priority” or “Programme”. As one value is set, the other changes automatically to keep the amount of light constant

Any setting might be appropriate: it depends on the subject

Different lighting conditions will require different combinations e.g.
 Bright Sunshine F16 and 1/1000th s. (or F22 and 1/500th s., etc
 Inside a church F16 and 15 seconds (or F8 and 30 s, etc)

Most lenses don’t offer all these combinations

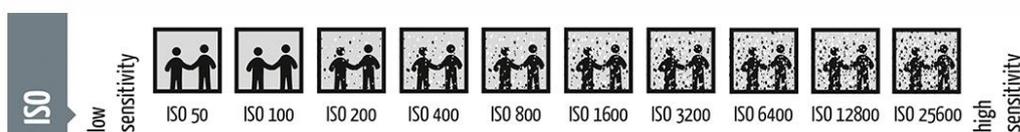
Lenses give their optimum performance at a “sweet spot” of about F11

What happens if you find the lighting is too low to use any of the settings and flash is banned?

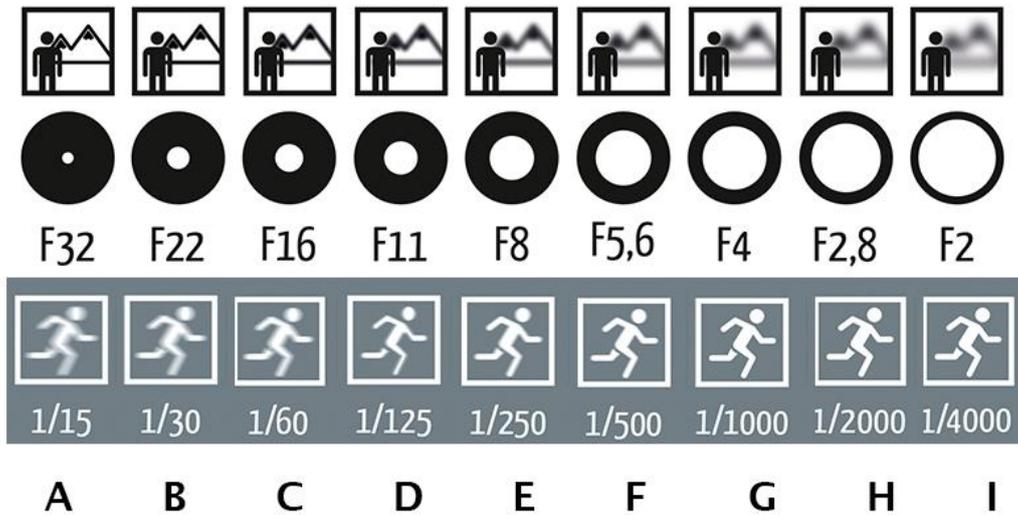
For example, in a night-club, your camera might suggest a shutter speed of 1/8 second at the widest aperture.

You therefore have no choice but to increase the ISO - and increasing the ISO increases the amount of noise.

Noise become noticeable at about ISO 800



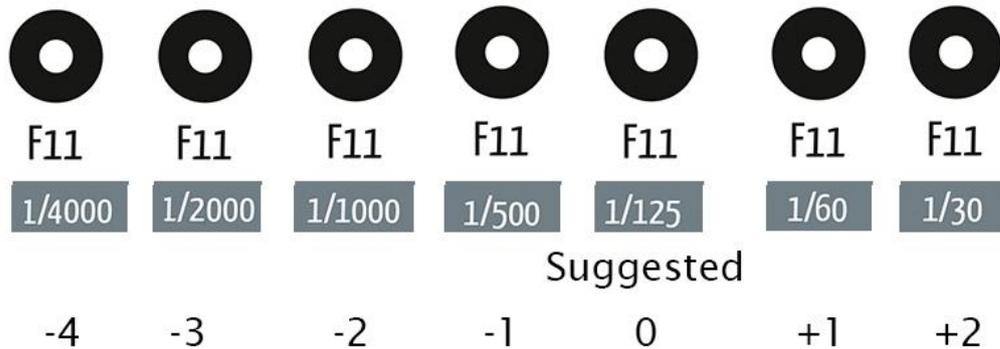
In the following examples, you can see how in Aperture Priority, Shutter Priority and Programme Modes how changing one value causes the camera to automatically change the other.



“Bracketing is to take a series of images at different exposures

This is often done for scenes with too much contrast for a single image to capture (such as interiors). Usually the aperture is fixed and the shutter speed altered (WHY?). Manual (M) exposure is normally used. (WHY?)

The bracketed exposures are combined in software



Sometimes bracketing by 6 stops isn't enough! (WHY?)

I hope this is useful.

Any questions, please email me on philip.smithies@hotmail.co.uk

Philip Smithies November 2019