

# Focus Stacking for Macro

Chiltern U3A Photography Group

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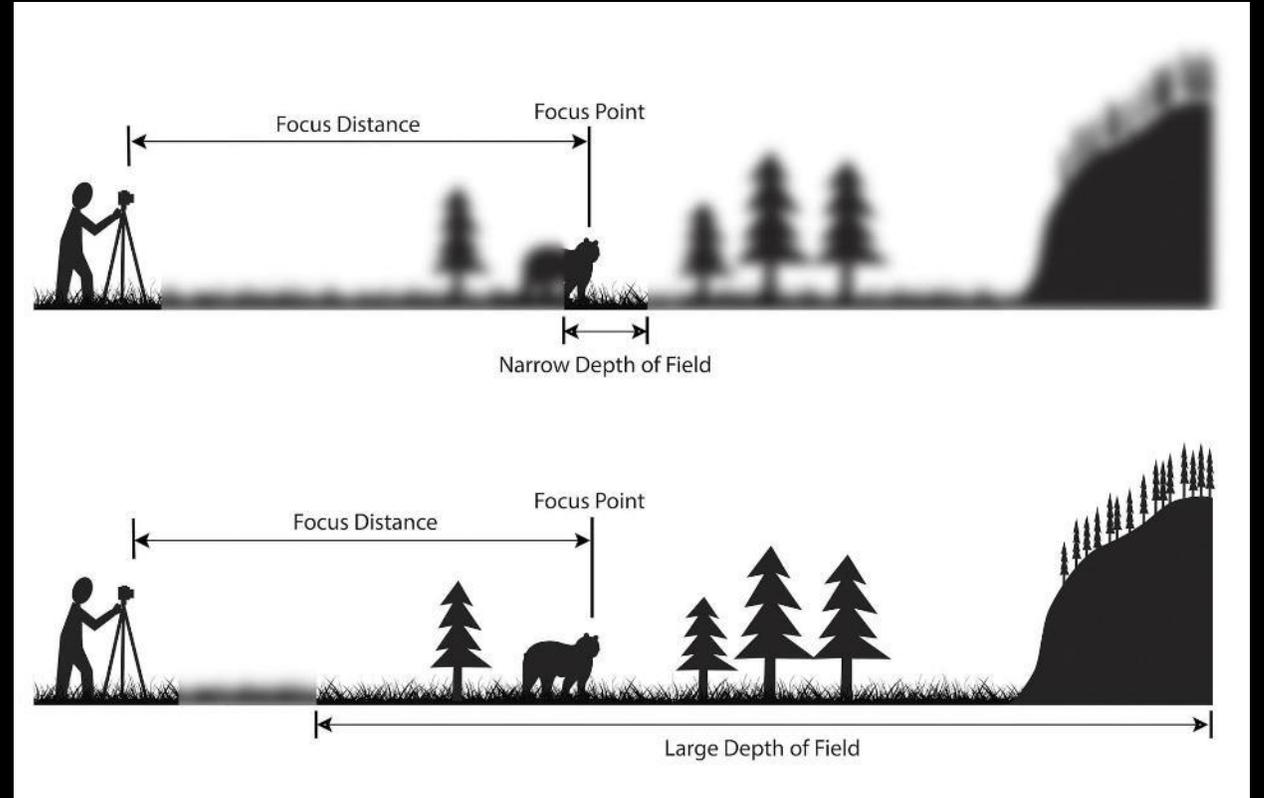
David Pearson

## The Problem

When a camera is focussed on a particular subject, only a certain amount in front of, and behind, the subject is in sharp focus.

This is known as the 'depth of field'

The amount can be large at small apertures but quite small at wide apertures.



## The Problem

This is a particular problem with macro photography where the DoF can be very small.

This subject is taken from a distance of about 50cm and is about 5cm from front to back.

Even at f22, parts of the image are soft.



At f22, only 3.4 cm of the 5cm subject is in focus.

## Depth of Field Calculator

<b>Camera, film format, or circle of confusion</b> Canon 5D (Mark II, Mark III) ▾		<b>Subject distance</b> 50 cm
<b>Focal length (mm)</b> 90 ▾		<b>Depth of field</b>
<b>Selected f-stop</b> f/22 ▾		<b>Near limit</b> 48.3 cm
<b>Subject distance</b> 50 cm ▾		<b>Far limit</b> 51.8 cm
		<b>Total</b> 3.44 cm
		<b>In front of subject</b> 1.66 cm (48%)
		<b>Behind subject</b> 1.78 cm (52%)
		<b>Hyperfocal distance</b> 1202.2 cm
		<b>Circle of confusion</b> 0.03 mm

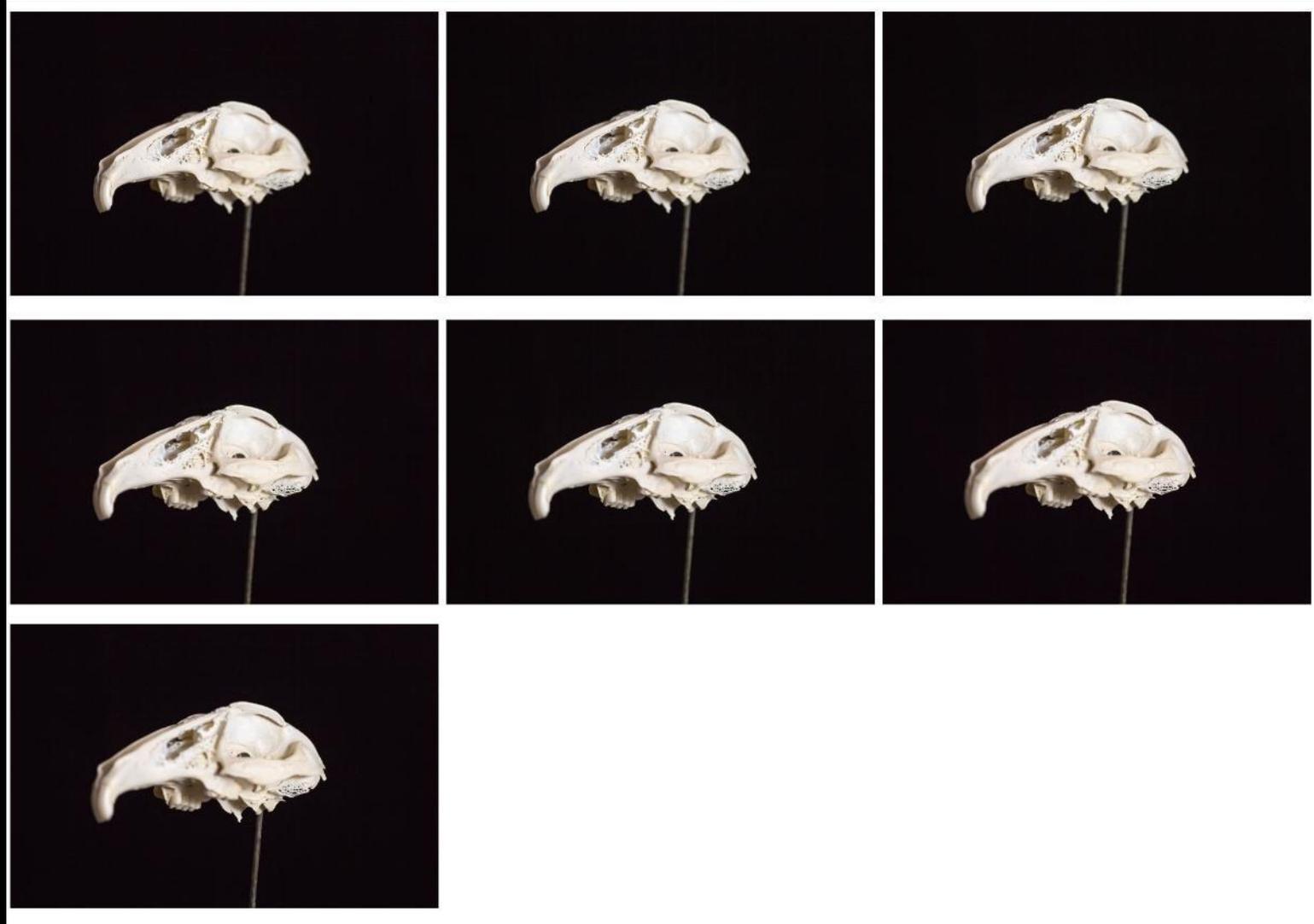
At f8, where the lens works best, the problem is worse, with only 1,2 cm in focus.

## Depth of Field Calculator

<b>Camera, film format, or circle of confusion</b> Canon 5D (Mark II, Mark III) ▾		<b>Subject distance</b> 50 cm
<b>Focal length (mm)</b> 90 ▾		<b>Depth of field</b>
<b>Selected f-stop</b> f/8 ▾		<b>Near limit</b> 49.4 cm
<b>Subject distance</b> 50 cm ▾		<b>Far limit</b> 50.6 cm
<input type="button" value="Calculate"/>		<b>Total</b> 1.21 cm
		<b>In front of subject</b> 0.6 cm (49%)
		<b>Behind subject</b> 0.61 cm (51%)
		<b>Hyperfocal distance</b> 3384 cm
		<b>Circle of confusion</b> 0.03 mm

## The Solution

We take multiple images, each focussed at a different point and then combine them, using just the parts which are in focus.



## Method 1 - Refocus

With the camera fixed, take an image focussed on the front (or slightly in front of) the subject.

Adjust the focus to take a second image focussed a little further in.

Repeat several times until focussed on the back of the subject.

Can be very difficult to make such fine adjustments.



## Method 2 – Move the Camera

Take one image focussed on the front of the subject.

Without altering the focus, move the camera slightly nearer the subject and take second image.

Repeat several times.

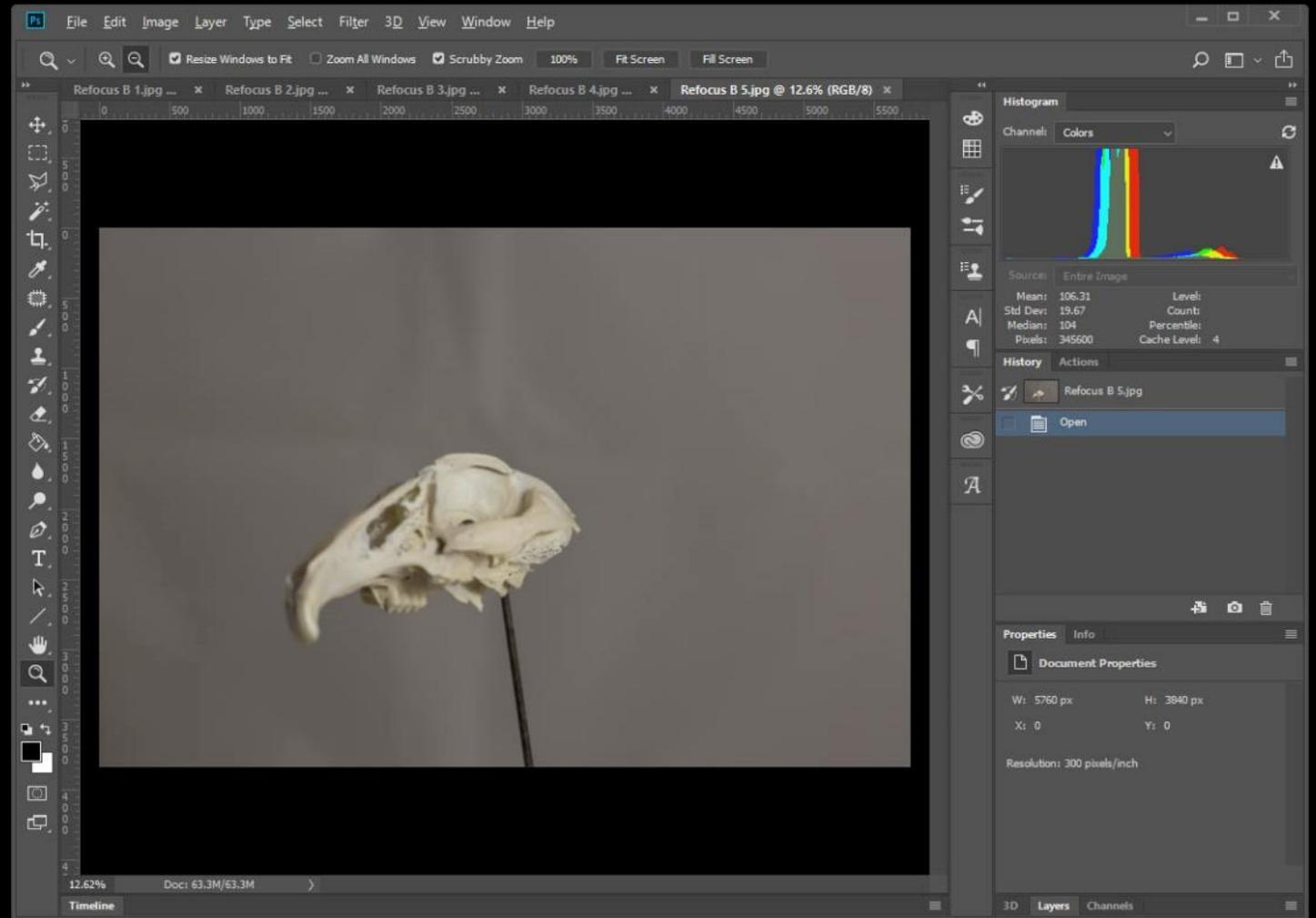
A focussing rail enables this to be done with millimetre accuracy.



# Processing in Photoshop

Open all images

Select Files > Scripts > Load all files into stack

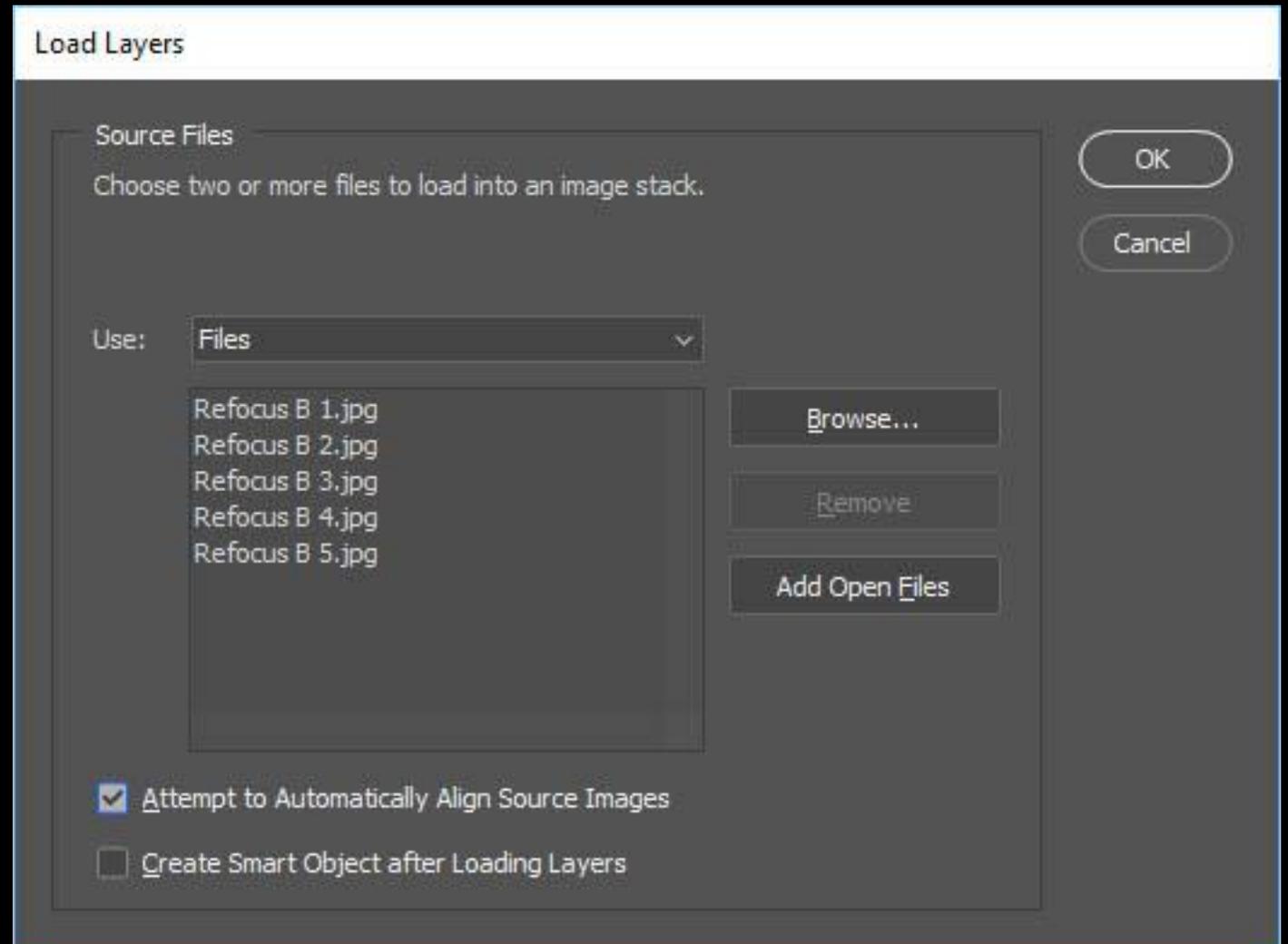


# Processing in Photoshop

Select 'Add open files'

Tick 'Attempt to automatically align source images'

This takes all the images and loads them into a single file as layers, ensuring that they are lined up to compensate for any possible camera movement.

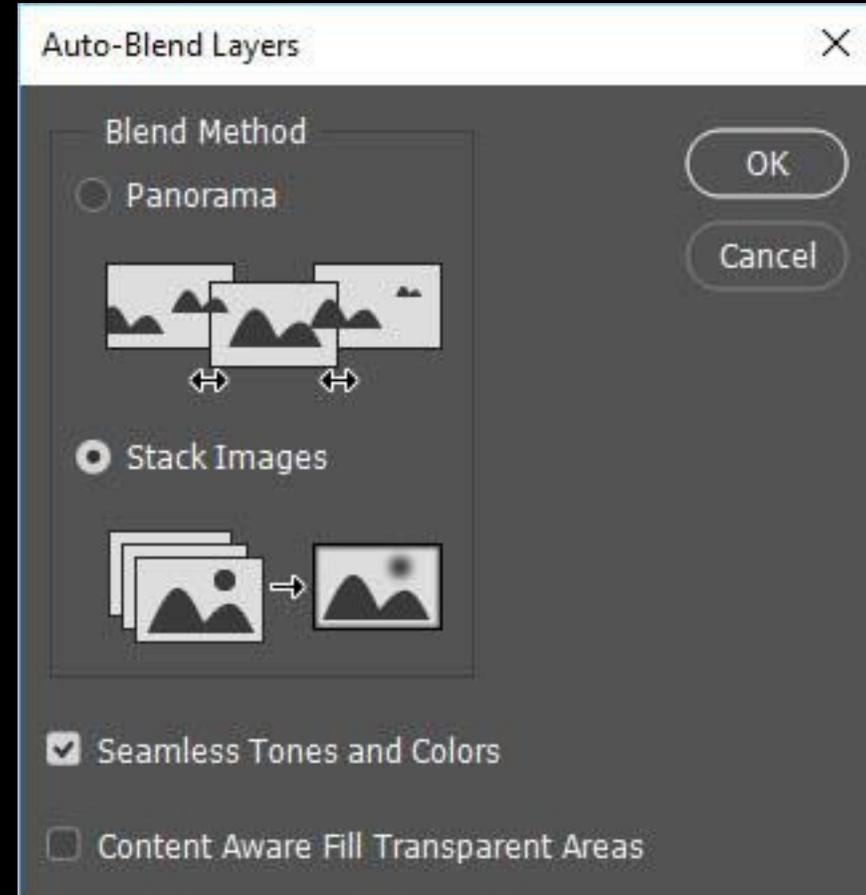


# Processing in Photoshop

Select all the layers

Select Edit > Auto-Blend Layers

Tick 'Stack Images' and 'Seamless Tones and Colours'



# Processing in Photoshop

Composite is produced as a set of layers and masks

Flatten image and perform any tidying up.

