



Stereo (3D) photography

Introduction

After 160 years of development photography almost perfectly imitates our most priceless sense— vision, but today’s color prints or slides still lack one vital element—‘depth’. From a picture we can only guess the distance or ‘solidness’ of an object and we lose the dramatic play of near and far objects that makes live scenes and ViewMaster® reels so ‘real’.

The cause of this limitation is simple: we see in three dimensions (height, width and depth) but pictures have only two (height and width.) To see the world as we do, a camera would need two lenses. Forty years ago such cameras were readily available but the commercial power of 3D never rose beyond a niche market and today 3D cameras are rare.

This paper shows how you can use any camera to capture the illusion of depth by taking two pictures moments apart, one for each eye. All you need is a little patience and a still subject.

Taking ‘stereo pairs’

To reproduce the illusion of depth in your own pictures, all you need is two shots of the same subject that imitate the view seen by each eye. Here’s how to do it.

- Take one photograph then move the camera slightly to the left or right by about two inches¹ and take another picture. Keep the subject centered in the viewfinder.
- Make sure nothing in the scene moves between shots.
- If you want to photograph action in 3D, look for a collectors’ item, such as a Stereo Realist, or make your own 3D camera bracket that holds and fires two small, identical cameras at once. Be sure you use the same film in each camera and have the film developed identically.

Exaggerated 3D

To exaggerate depth try moving the camera further apart than two inches between exposures. This will pull out depth in otherwise flat or distant subjects, but realism will suffer. Next time you fly get a window seat and shoot clouds below or in the distance. The separation between shots will be hundreds of feet, making for a very dramatic 3D cloudscape.

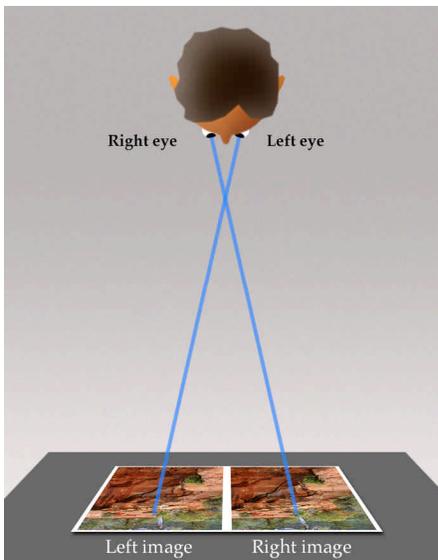
¹ Two inches is the nominal human eyeball separation.

Viewing stereo pairs

The following technique lets you view your stereo pairs with no special equipment, provided your eye muscles are in shape. First identify the pairs that go together. Each pair should consist of two virtually identical images. If you know which you shot first, right or left, mark the images L and R somewhere unobtrusive, like the back of a print, the frame of a slide or in the file name. If you don't remember, relax, it will soon be obvious.

Viewing pairs of prints

- Place the two prints on a flat, evenly illuminated surface directly in front of you, like the top of a table or a wall. Make sure the prints are flat.
- Place the 'left' image on the right and the 'right' image on the left and align them till the horizons are parallel and they are as close together as possible without overlapping.
- Cross your eyes until the two images merge into one. It may take practice for your eyes to become comfortable.



Crossing your eyes so the two images register as one

- If foreground objects appear far away and distant objects seem close, swap left for right.

Viewing slide pairs

- Place the two slides in two hand-held slide viewers designed to be held up to the light. The inexpensive Agfa Guki works well.

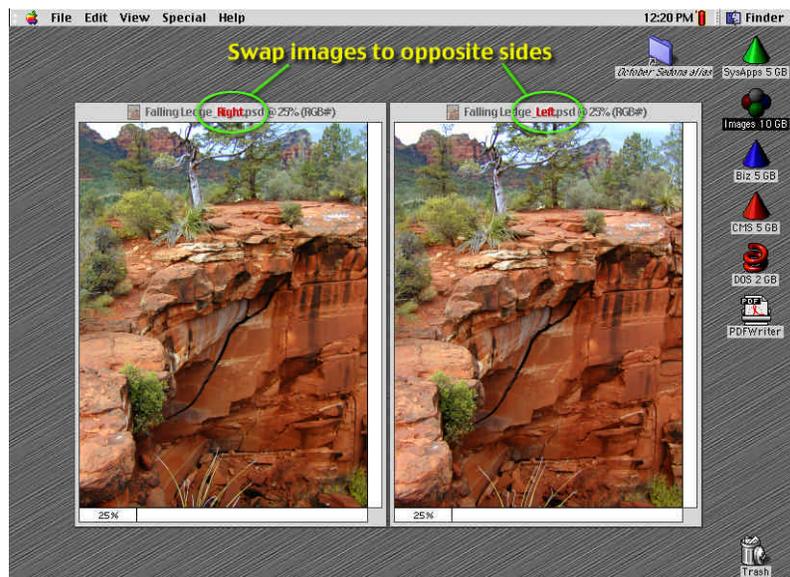


The Agfa Guki viewer: a pair can be used to view stereo slides

- Hold the viewers alongside each other while holding them to your eyes, then rock one viewer forward or back slightly until the two images are aligned horizontally.
- Now swing one viewer left or right until the two images are aligned vertically. The images should now pop into register.
- If foreground objects appear far away and distant objects seem close, swap left for right.
- If your eyes have to strain to register the images, try moving the viewers further together or apart or rock one up or down until the image is 'comfortable' to look at.

Viewing digital pairs

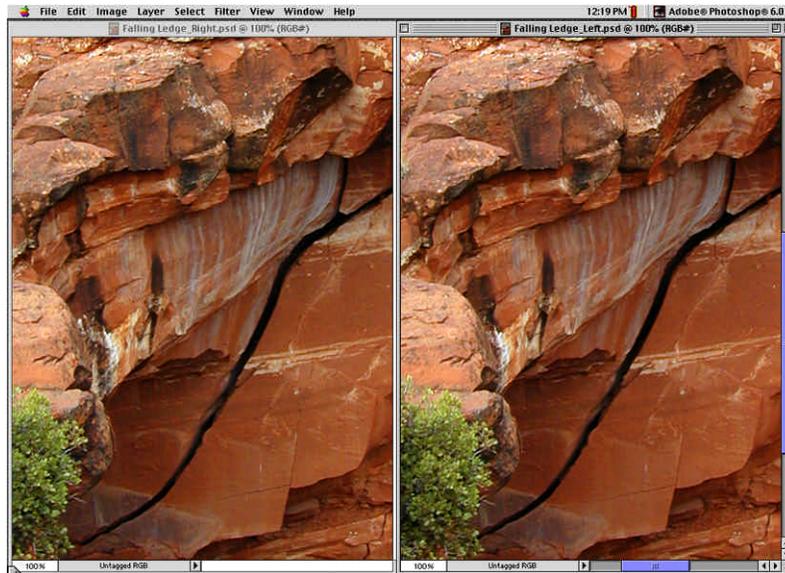
- Open the two associated images in Adobe Photoshop™ or equivalent software.
- Put the LEFT image on the RIGHT of the screen and the RIGHT image on the LEFT.
- Align the windows vertically with each other & hit TAB to hide Photoshop menus.



Two images side-by-side in Photoshop with menus hidden

- Cross your eyes until the two images merge into one.

- If foreground objects appear far away and distant objects seem close, swap left for right.
- For maximum size, scale the windows till each image fills half the monitor's width.
- To see more detail, enlarge selected areas simultaneously in both windows.
- For convenience you can combine the two images into one assembly, but this will make it harder to zoom in on details.



Enlarging sections for close-up stereo viewing

How stereoscopic vision works

Having two eyes set slightly apart lets us judge distance and determine shapes through the miracle of ‘parallax’. Parallax is what happens when the left eye sees objects in a slightly different spatial relationship from the right eye’s view. To align each eye on a near object the brain instructs the eyes to turn inward slightly, while for very distant objects the eyes must be aligned parallel to each other. The brain uses the degree of eyeball swiveling as a subconscious measure of distance. Many such measurements quickly form a ‘3D map’ of any scene or object we view.

We take this miracle of ‘three-dimensional-vision’ for granted, but without it we would always be bumping into things and national monuments like the Grand Canyon would seem much less dramatic.