Infra-Red Photography
by David Evans

Several years ago, I took a course at Mohawk on advanced photographic techniques, and one of the topics was infrared (IR) light photography. It intrigued me, because it shows a different way of looking at things, and it is also a way of taking pictures at mid-day, since that is when things are hottest and IR light depends on heat. In the right conditions, you can get a nice otherworldly effect. As I explain below, I used a camera that had been converted to infrared or IR to take the picture to the right.

All digital cameras have a large sensitivity to IR radiation. To prevent the visible light from being washed out by the IR radiation, all sensors have an IR blocking filter, called a "hotglass", placed over them. These filters essentially block most IR radiation from reaching the sensor.

That is why it is possible to use a special IR passing filter that blocks visible light and only allows IR radiation through to the camera. However, the exposures become quite long and in most cases require a tripod, not to mention the need to place an infrared filter in front of the lens to block visible light. An opaque filter combined with the camera's anti-IR hotglass will let through about 0.1% of the ambient light. At ISO 200 a bright scene normally requiring 1/500 s @ F/8 would need about 2 seconds or longer @ F/8, so that's about a 10 stop loss.

In addition, focus is difficult, as the filter not only blocks visible light, but as IR light is longer in wavelength than visible light, it focuses differently. That is why some older lenses have infrared focus points: you focus with the infrared passing filter removed, then reattach it and turn the focus to the difference between the current focus and the infrared focus mark.

The other option, the one that I followed, is to have the camera dedicated to IR. In this process, the hotglass over the sensor is removed and replaced with an opaque (visible light blocking) filter that only lets IR light through. It is much easier to focus using a converted camera, as you can see what you are looking at, and as part of conversion they do *focus calibration*, so the different qualities of IR light are automatically taken into account. There are no special considerations other than trying not to blow out the reds.

I used my old Canon Digital Rebel and had it converted by Lifepixel.com. Because of the focus calibration, the conversion is very specific for both lens and camera. Anybody with the classic "nifty fifty" 50mm F/1.8 lens is in luck, as that works very well with Rebels, for instance. I had sold my F/1.8 to get the F/1.4, but that lens does not work well for IR conversion. It has a bad hot spot in IR. As they explain on the Life Pixel web site, "Lens hot spots are the most common problem encountered when shooting infrared light. They usually manifest in the form of a bright circle, sometimes in the shape of aperture leaves directly in the center of the image. The problem is exaggerated as you stop down, with the spot becoming more prominent and defined." However, my 10-22 zoom works okay, so they calibrated it at 10mm. Any IR pictures I take have to be with that lens at the 10mm setting.

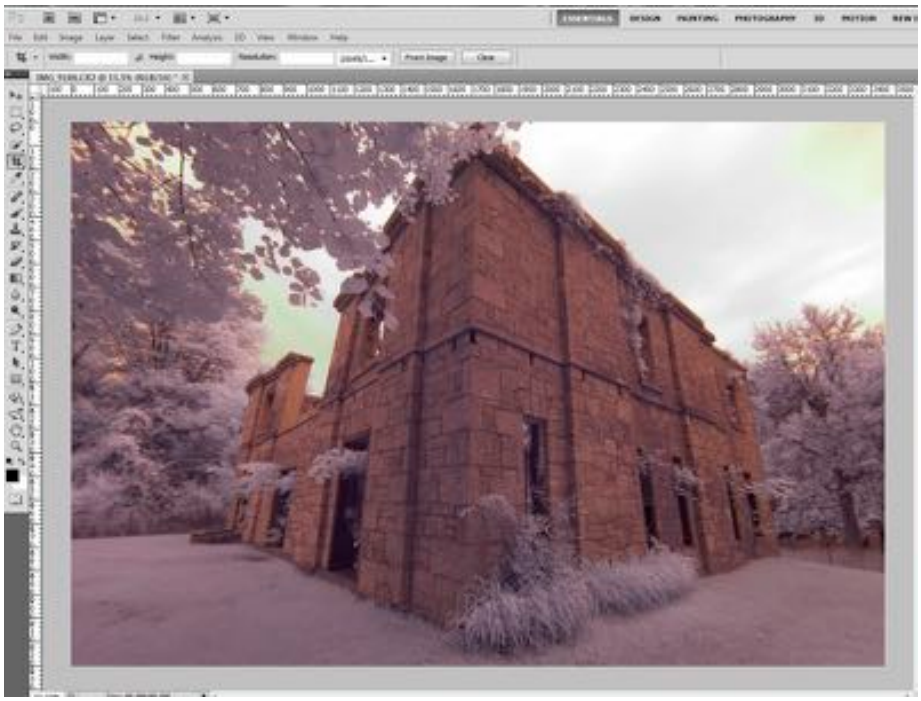
My old Rebel does not have "live view," but if you convert a camera with live view, then you have many more options regarding lenses and are not so restricted.

You also have a choice of different IR filters with different effects, ranging from standard IR through super colour IR (what I got) to full spectrum.

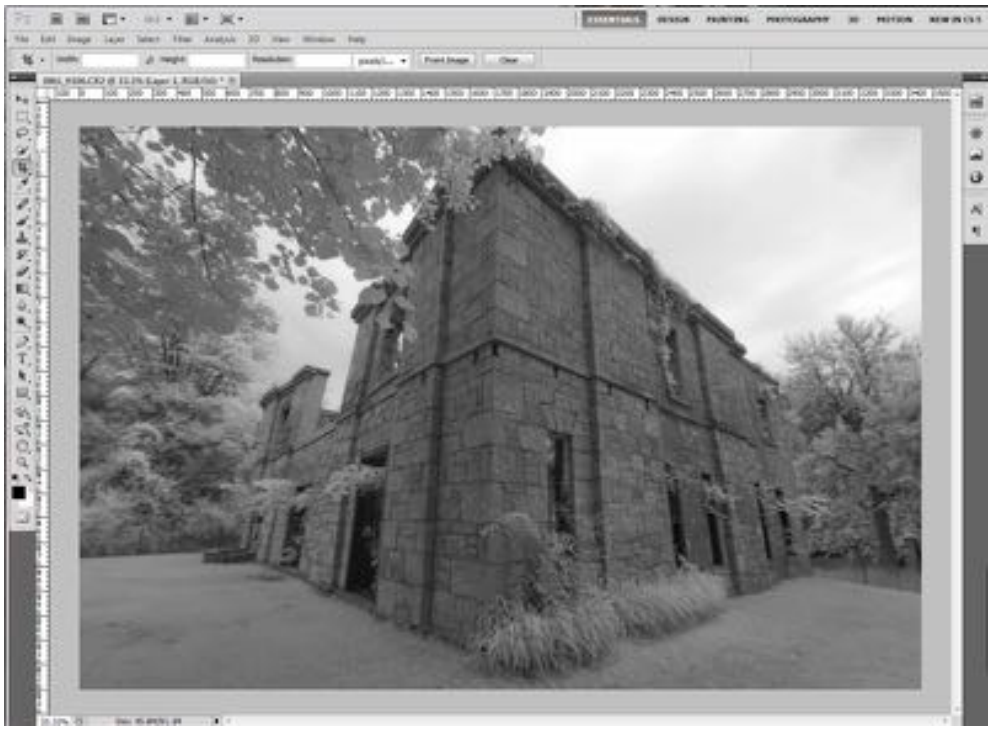
There are some differences between film and digital IR, as digital IR does not have the halation characteristics of IR file. Halation is the spreading of light beyond its proper boundaries to form a fog around the edges of a bright image in a photograph or on a television screen. Digital IR doesn't have the same grain/noise characteristics as film IR either. You can apply effects in Photoshop to emulate IR film characteristics.

I will go through the steps to get a B&W IR image. This was converted from a Camera Raw image.

Upon opening, you can see the red shift. This would be similar if you used an opaque filter on an unconverted camera



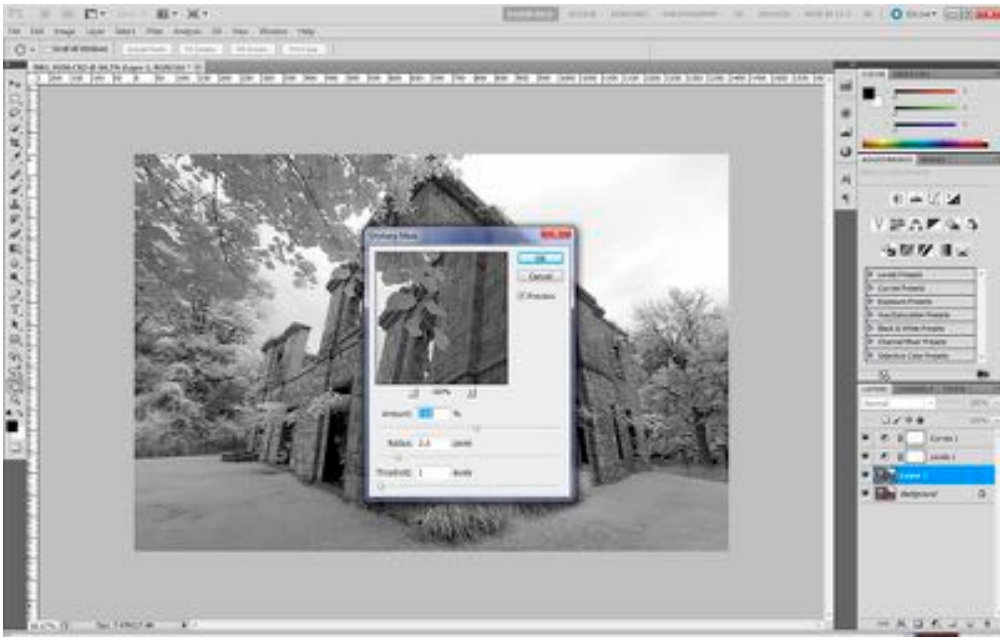
Next, desaturate. Image > Adjust > Desaturate



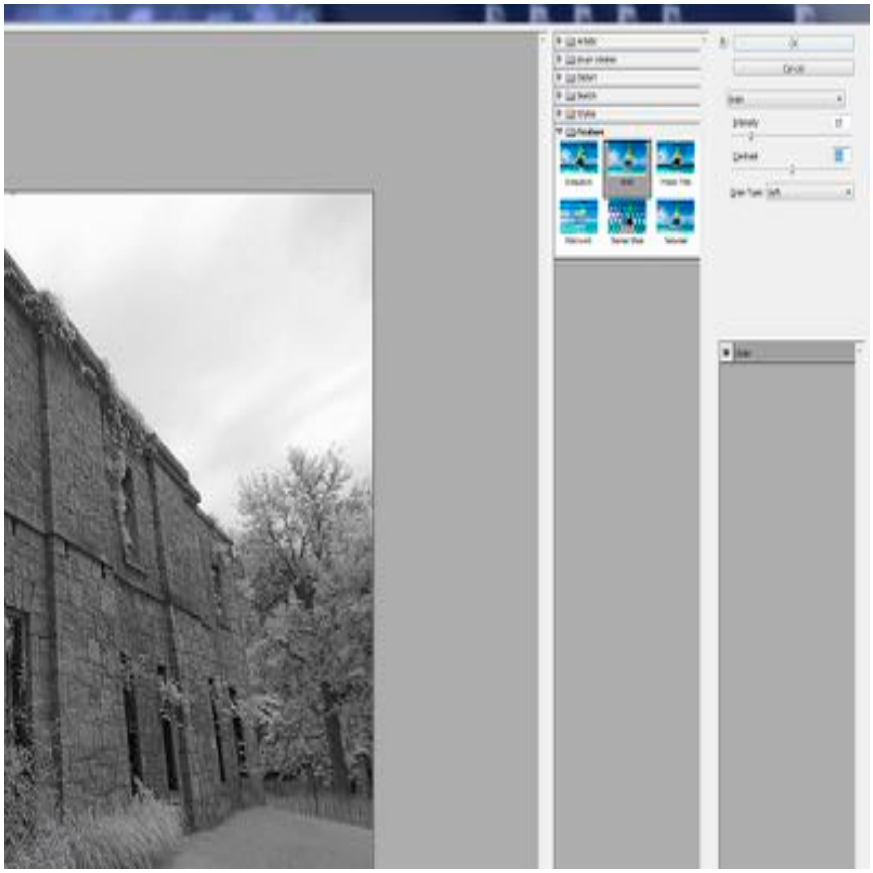
The image will be a bit flat, so you need some levels.

And also some Curves

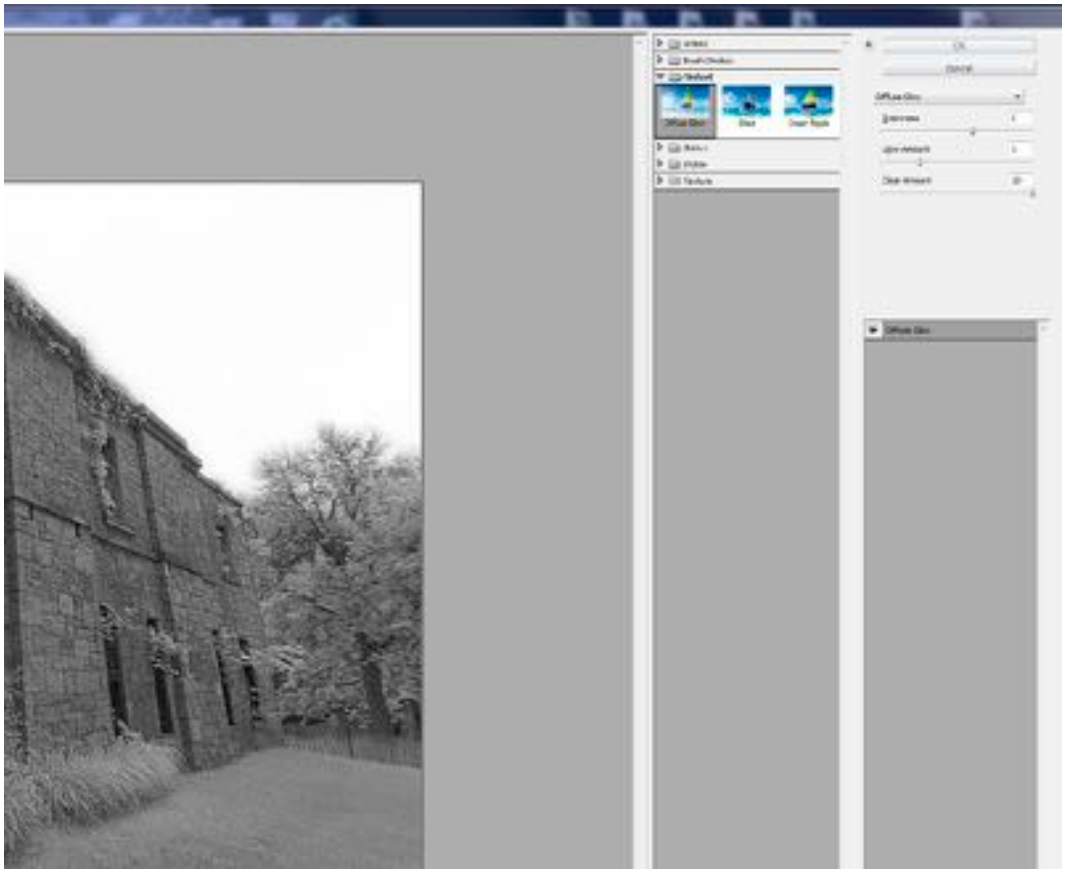
Then some sharpening could be used after resizing, starting with Unsharp Mask, amount 100 radius 2 threshold 1 and tweak as needed.



Now, you can add some noise or grain to emulate the look of traditional IR film. You can try Filter > Texture > Grain at soft, 15% intensity, 50% contrast.



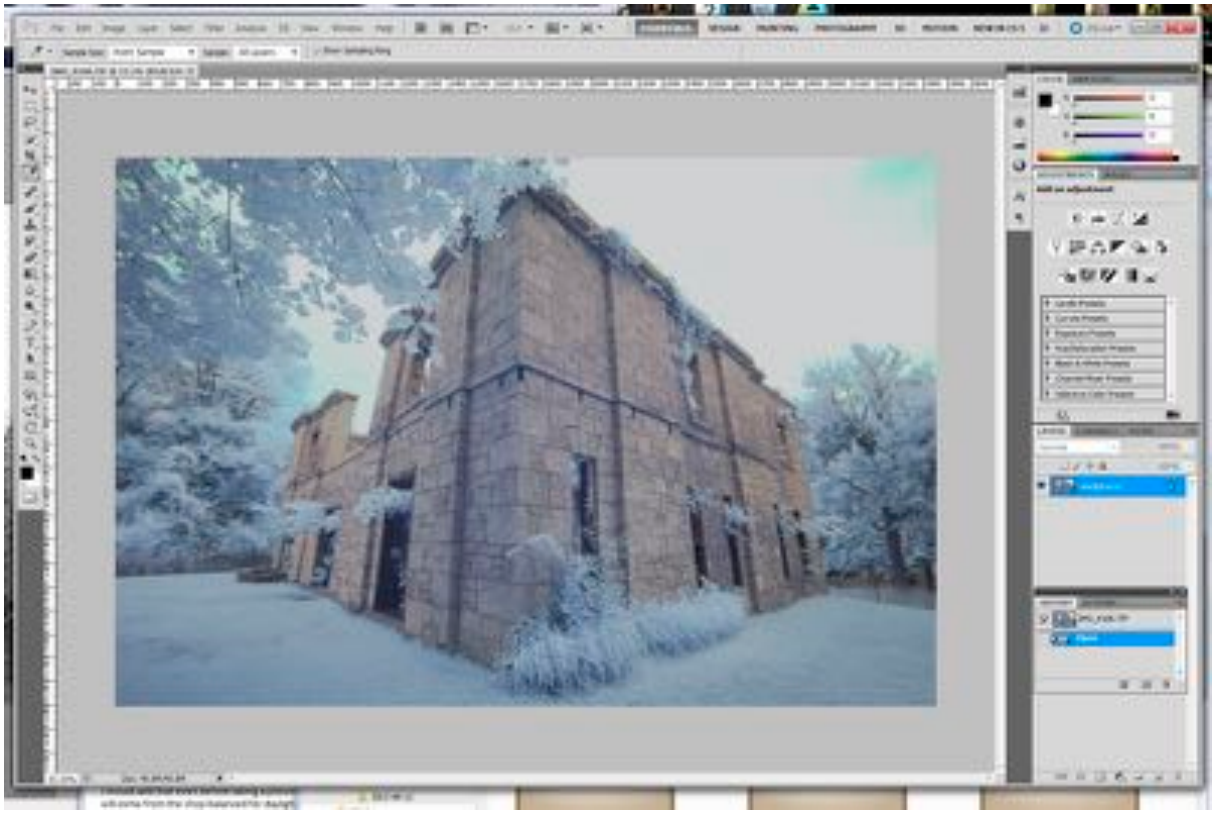
Finally, you can apply the digital halation effect using Filter > Distort > Diffuse Glow starting with values of 6 for graininess, 5 for glow amount and 20 for clear amount.



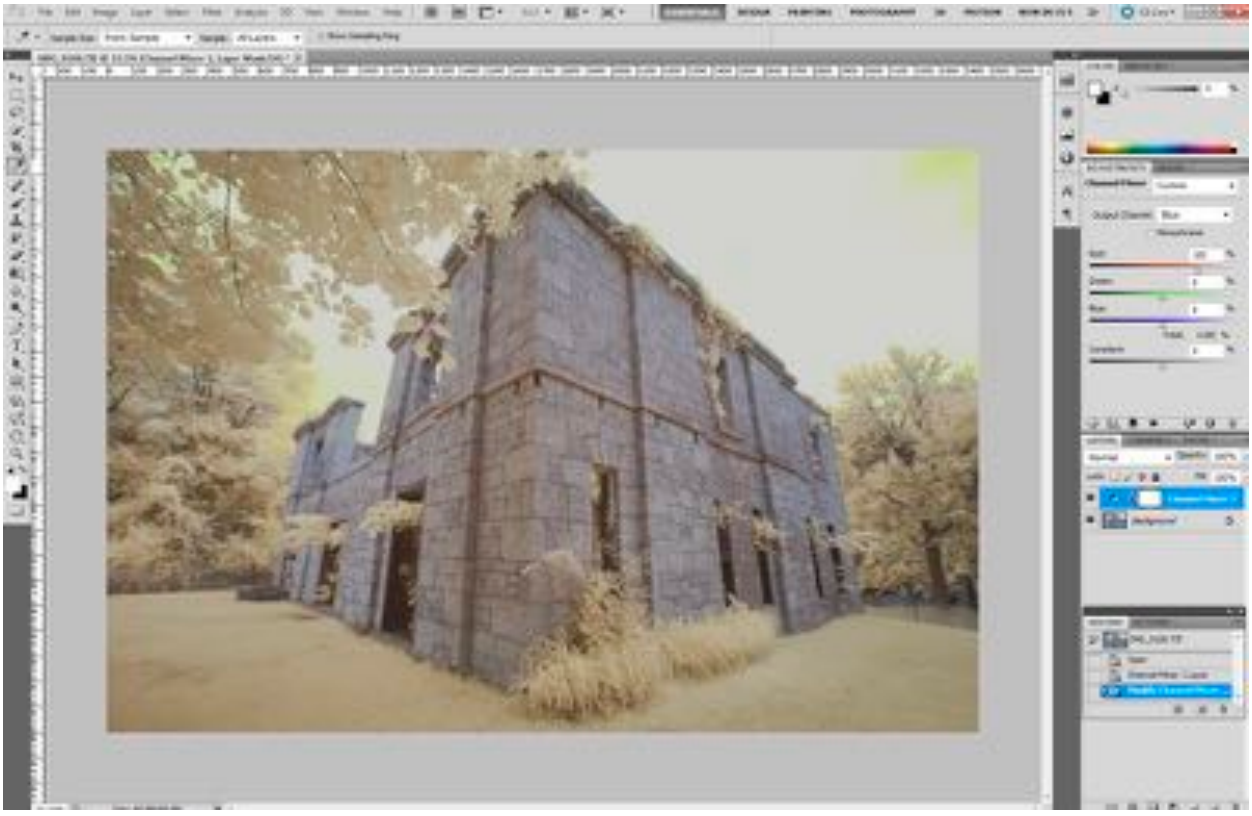
And you see the final result on next page.

I won’t go into so much detail for colour, as it depends on what filter you choose if you go for colour. The Life Pixel web site goes into some detail explaining the process. However, Photoshop does not handle the colour balance well, so it’s best to shoot in RAW and then do an initial conversion inside the software provided by the manufacturer, which is Digital Photo Professional for Canon, a free product. Nikon has a similar product, but it is not free. Alternatively, JPGs in Canons work reasonably well.

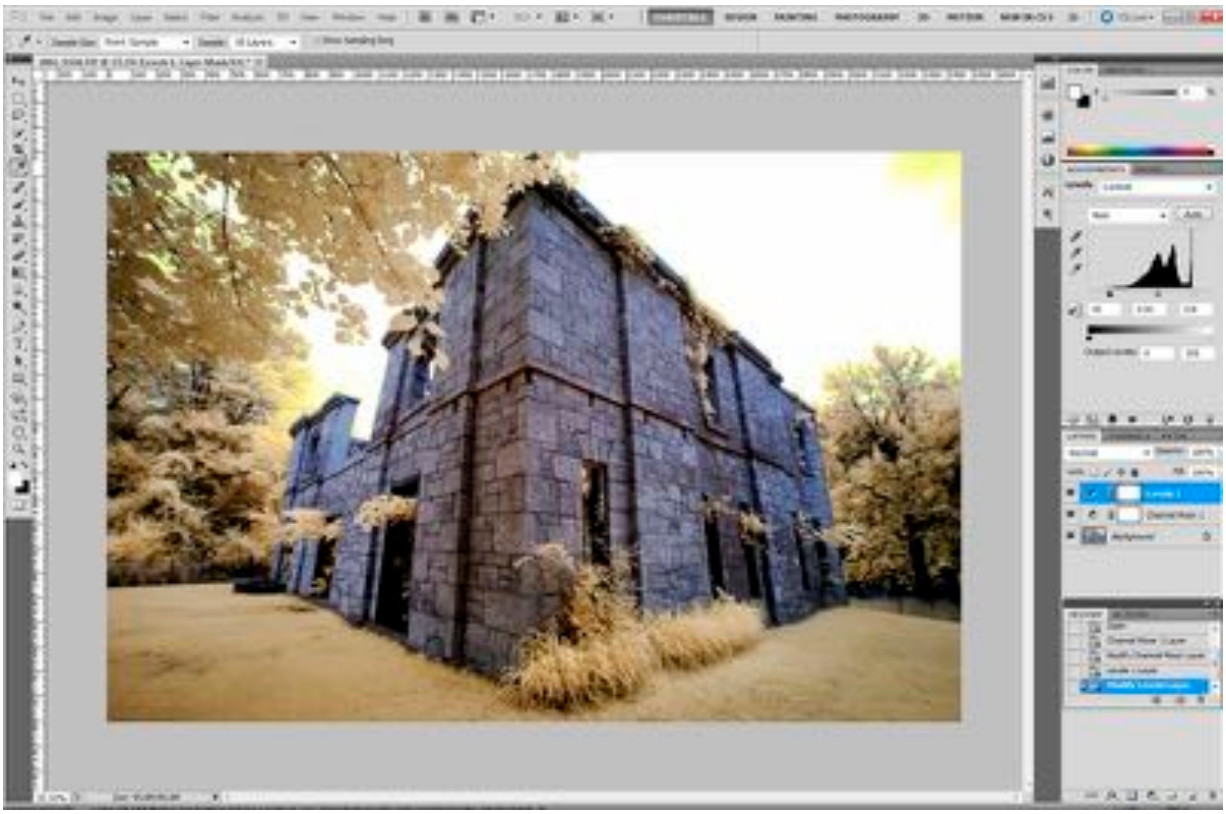
I should add that even before taking a picture you should manually colour-balance the photograph. It will come from Life Pixel balanced for daylight, and really that’s the only time it’s very practical to use IR, so generally speaking you won’t have to change it. After colour-balancing in DPP, you save it as a TIFF file and then bring it into Photoshop. You can see the difference in colour.



Unfortunately, this image doesn't have much of a blue sky, but you can essentially swap the colours so you get yellow vegetation and blue sky. First you use channel mixer and in the red channel make red 0% and blue 100%, then in the blue channel make blue 0% and red 100%.



Then you tweak the levels, overall and for each colour, including the mid-range to hopefully get something worthwhile.



Finally, here’s another picture taken with more sun, so you see the effect better

As mentions above, IR depends on heat, so it's a type of photography you can do mid-day to get the most satisfactory results. I am only beginning to learn how to use it. There is a lot of information about IR photography on the Web, and you can also get books on the subject.

Useful Links

Life Pixel - https://www.lifepixel.com

Wikipedia Article on IR Photography - https://en.wikipedia.org/wiki/Infrared_photography

All You Ever Wanted to Know About Digital UV and IR Photography, But Could Not Afford to Ask - http://www.naturfotograf.com/UV_IR_rev00.html#top_page

Digital Infrared Photography Made Easy - http://www.apogeephoto.com/digital-infrared-photography-made-easy

Digital Photography For What It's Worth - http://dpfwiw.com/ir.htm

Infrared Photography with a Digital Camera - http://www.wrotniak.net/photo/infrared/)

Twelve Tone Infrared Photography - http://www.infraredphoto.eu

Dedicated Infrared Camera Conversions - http://nature-photography-central.com/ then click INFRARED tab, scroll to "Digital Infrared Camera"

Some Books

Digital Infrared Photography by Deborah Sandidge (May 26 2009)

Photographing the Female Form with Digital Infrared by Laurie Klein (Jul 15 2014)

Digital Infrared Photography by Cyril Harnischmacher (Aug 29 2008)

David Busch's Digital Infrared Pro Secrets by David D. Busch (Apr 12 2007)