

The Power of Photoshop

Introduction



Photoshop is the most powerful image manipulation tool on the market and has been since its introduction in 1990. The goto tool of the Film-makers; Special Effects Engineers; the top end printing industry; and, Graphic designers.

The only people that do not use it fully are photographers, which is surprising given that its inventor was an amateur photographer. Had he not been so keen, Photoshop may have never been invented.

It's difficult to understand the Power that Photoshop has without knowing the background of its invention, so the opening part of this talk will be a sort of 'pen-picture' of this.

Afterwards. I'll move onto my use and why I use Photoshop the way I do to process images, starting from setting the camera up to finishing the images.

Time won't allow me to go through everything, but I will give you an insight and show some of the tools that give Photoshop it's power in image manipulation.

I want to also demonstrate Mono Conversion

BWG levels

Safe Dodge and burn

Film Grain

& Sharpening (Advanced and Normal)

Colour clean – original and via HSB

Colour toning

Vignette - & new method

Photoshop – a potted history.

Photoshop was invented by the son of a German immigrant to America. He was a University professor and a life-long amateur photographer

With his encouragement, his sons also became excellent Photographers. One son in particular, Thomas Knoll, was the most accomplished and loved darkroom work.

He spent an enormous amount of time processing black and white before moving on to colour images. He developed the skill to understand the real concepts of image manipulation and was the grounding for him to develop Photoshop as we know it.

Thomas may never have invented Photoshop but for the encouragement from his older brother John, who was working as a Nikon Camera Operator for what is now the 'Pixar' Film Corporation of America.

John had watched George Lucas's Star Wars seven times when it was released in 1977. He was besotted with it and decided to become a Special Effects Camera Man. He did just that. As soon as he was old enough he got a job and worked for George Lucas.

As an aside, he fulfilled his ambition by winning an Oscar for best film effects in 2015 for the film 'Pirates of the Caribbean.'

Thomas & John had an exceptionally close relationship. It was said that one could start a sentence and the other would finish it. They had the uncanny knack of knowing what the other was thinking.

Thomas went on to do a 'Masters' degree at the Michigan University. His thesis was in robotics – visual recognition by computer. i.e. getting computers to recognise a single object from amongst a pile of others.

THOMAS & JOHN KNOLL



Thomas Knoll is pictured on the left, on the right is John Knoll.



Based on his darkroom skills, Thomas was able to create a tool which would enabling a computer to find the edges of single items even when 'stacked' upon each other. This became his first tool to be used in Photoshop and remains to this day. (Filter>Stylize>Find Edges)



That inspired him and, with much encouragement and cajoling from John, he went on to develop many other tools. The 'Levels' tool was amongst the earliest and, eventually he had invented a large collection of individual tools, rather than computer application.

Back then, computers were not as sophisticated as today. He was using only 32k of Ram – about as much as the average wristwatch today. It worked in black & white screen, not even grey and everything had to be programmed in every time you wanted to use it. Data was stored on digital tapes, so you had to connect a tape recorder to load it - and hope that the audible signal was good enough for the computer to decipher. The noise was similar to those made by Fax machines.

Thomas completed his studies but needed to 'write-up' his Thesis. He was really reluctant and couldn't get himself motivated to do it. He really hated this part so, as a distraction, he would simply work on his computer and come up with more and more imaging tools.

John knew that Thomas had hit a 'stumbling-block' and, having seen the tools demonstrated just knew they were useful in his line of work – but not as stand-alone tools. They needed to be made into an application or programme if they were to attract substantial financial rewards. It may have been a leap of faith, but he convinced Thomas to abandon his studies and concentrate on doing just that.

John had worked with Steve Jobs at Pixar, & somehow managed to acquire a Mark2 Macintosh computer for Thomas, who then went on to produce his first computer program, simply called 'Display.'

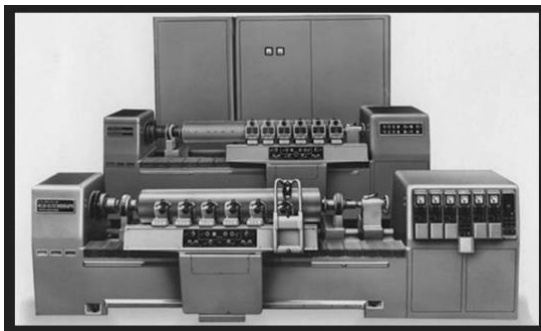


The first Computer screens in colour, on public sale, came out in 1988 with the Apple Mac v 2. (But you needed deep pockets to buy one!)

Using his contacts in the film industry, John set about finding a buyer for Display. He found that interest in it was greater than he had ever imagined but failed to get anyone to buy it. Even Adobe had rejected it.

They eventually did find a buyer, but only on a 'Royalty' only basis. That proved to be fortuitous as it eventually allowed them to sell the programme to Adobe.

That sale saw 'Display' become Barneyscan XP – the name of the Company. They sold Scanners, supplied with the program as part of the deal.



There were no Digital cameras back then, nor any of the things we take for granted today. No internet, No JPEGs, which hadn't been invented and the only way to get an image into a computer was via a Drum Scanner – which would cost anything around the quarter of a million pounds in today's

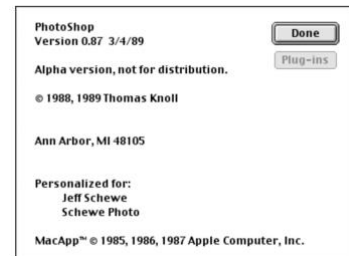
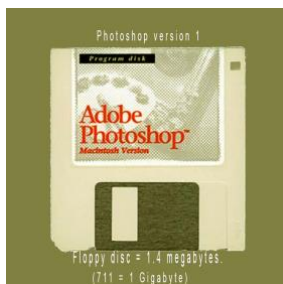
money.

The CCD hadn't been invented either but, instead, a Scanner used what was called a photo-multiplier tube.

Digital, was solely related to these massive scanners and the cost ensured that only the larger print houses and media organisations could afford them.

The original scanner screen couldn't show colour images. They were seen as four black and white channels, as used by the print industry- Cyan, Magenta, Yellow and Black. Those originated as printing 'plates', used in printing.

Machine operators had to adjust colour images by interpreting what each channel would look like in the final colour image, and that took real skill.



Photoshop .87 Splash Screen (Barneyscan XP)



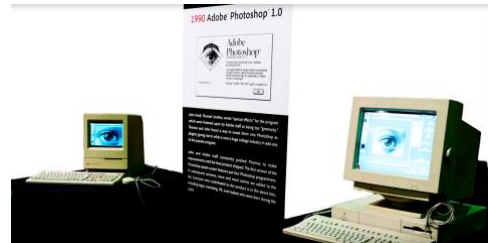
Photoshop .87 Alt Screen



The success of the software on 'Barneyscan' machine soon became noticed and, in September 1988, Adobe purchased the now renamed Photoshop. Thomas Knoll was retained with

it, to develop it further, and he was in charge of all 'Imaging' until 1993, when the role was taken over by Computer Programmers.

What this meant was that it was a photographer who had developed the photographic software up to and including version 3, but Thomas was retained as an Advisor and collaborator.



What is less well known is that Thomas Knoll was also responsible for Adobe Camera RAW, which was later installed as the Development Module in Lightroom. The original RAW image was DNG file (Digital Negative,) first used in 2005. Camera Raw was added to Photoshop in 2006 in order for it to be able to handle the RAW data files that had become in widespread use by the photography industry.

Originally called Shadowland, Lightroom was bought by Adobe from its ex-employee, Mark Walberg, who had been a member of Thomas Knoll's development team. Shadowland (Lightroom) had, prior to its purchase by Adobe, only been a limited success commercially. It was only used in Fax machines.

Adobe saw the advantage of its easy to use interface which could be easily manipulated by photographers who didn't need the full power of Photoshop and were known to be reluctant to learn its complexities and intricacies. They recognised that photography formed a big market place and, with photographers 'on board', their income would increase. Only true professionals were really using Photoshop then.

Tools from Photoshop were adjusted - making them easier to use with the 'sliders' in Lightroom's interface, in the knowledge that photographers would be attracted to the less complicated way of operation. The whole programme was aimed at the 'Non-professional' market.

Lightroom Version 1.0 was released in February 2007.

The aim of the Lightroom development team seems to be 'to have one-stop operation' – with only a minimum input from the user to produce a good image. Thank goodness that they haven't achieved it (Yet!).

Lightroom has become a huge commercial success as it uses only the minimum of Photoshop's tools, in an easy to understand way, to make an acceptable image.

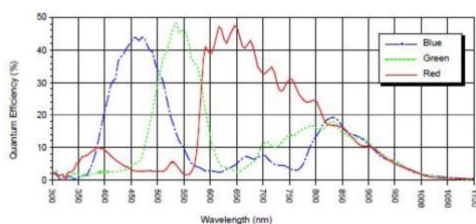
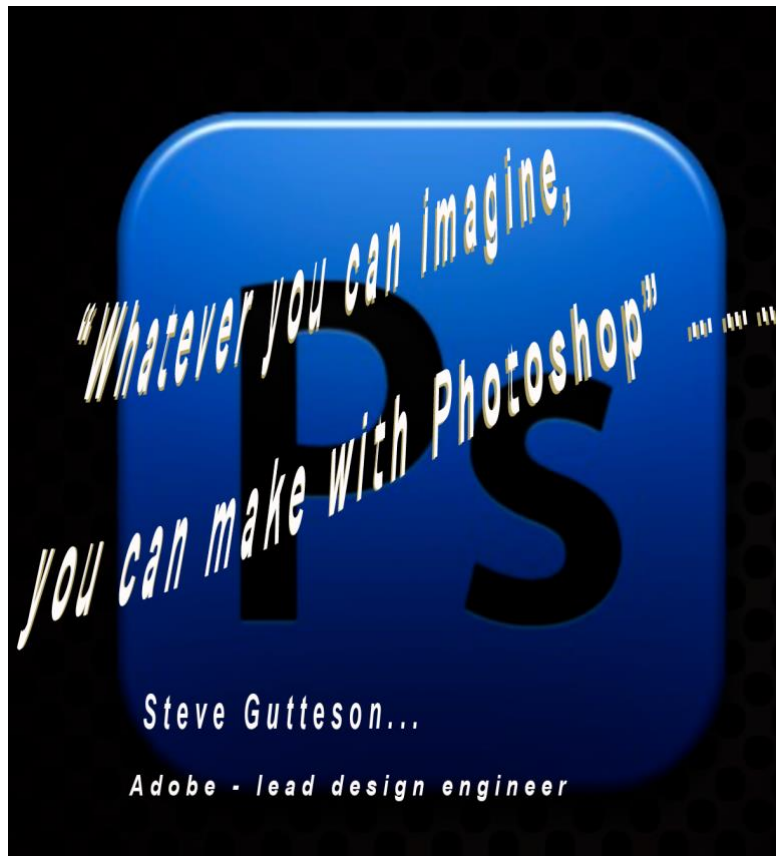


Fig. 18: acA2000-50gc, acA2040-25gc Spectral Response (From Sensor Data Sheet)

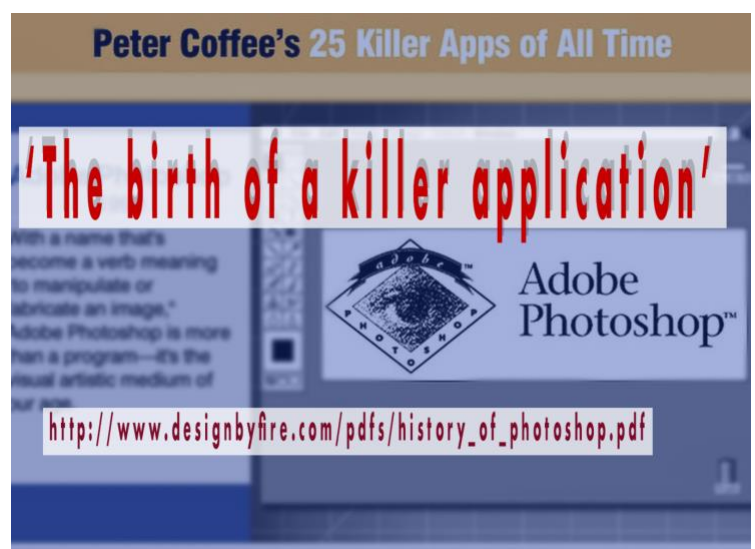
According to Steve Guttesson, Adobe's current lead design engineer, the difference between Lightroom and Photoshop, is that Lightroom moderates an image by adjustment, whereas Photoshop can completely alter each and every pixel within an image.



Gutterson is also responsible for quoting that “Whatever you can imagine, you can make with Photoshop”

I wonder therefore, it is your own imagination that is the real **Power of Photoshop** and why it is so widely used (and often abused) by the professional imaging community.

Should anyone wish to read further into this, there is an article named ‘The birth of a killer application’ published on the internet. http://www.designbyfire.com/pdfs/history_of_photoshop.pdf



Part Two

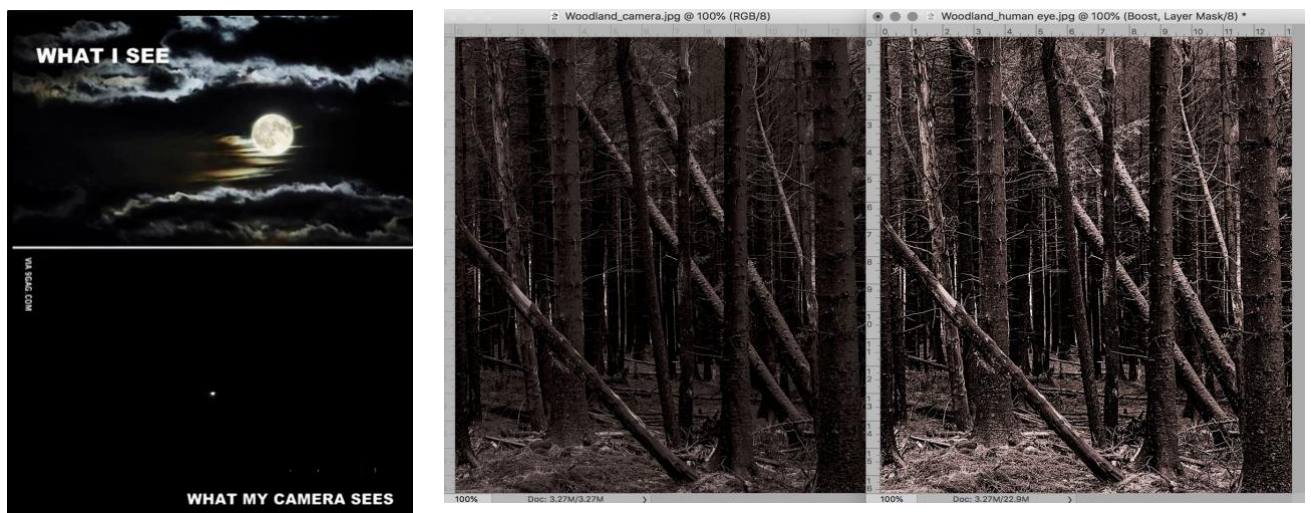
Prelude to Processing

The Camera – My way of setting it up.

As much as we like to think of it differently, our modern and expensive cameras all have built in limitations that are incompatible with human perception.

Put simply: -

- They see things completely differently to us,
- they don't see colour in the way we do, and,
- they don't have our range of vision.



I don't wish to repeat everything from my last, but I must remind you that we humans see in 28 shades and our eyesight is equivalent to a CCD of 580 megapixels.

Currently, the best camera sensors can around 40 thousand pixels per square centimetre. The cones (fovea) in the human eye has 150 thousand or colour receptors per square centimetre. That figure doesn't include the rods, which look after black and white contrast.

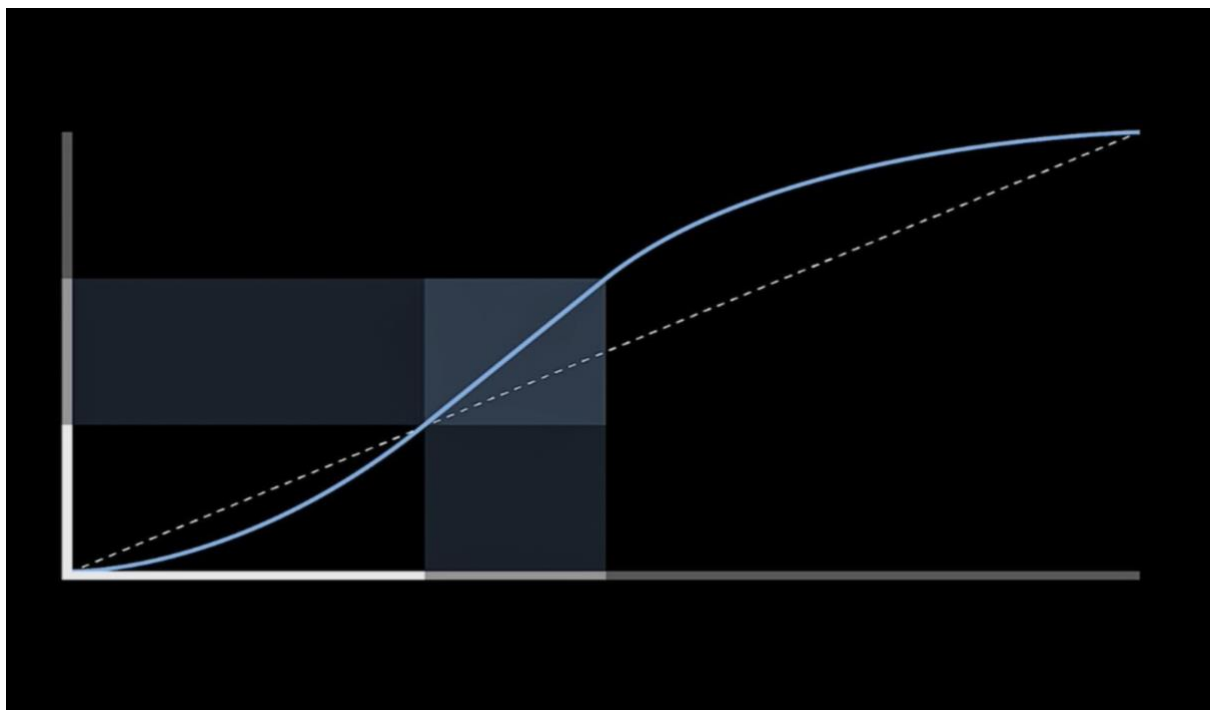


That puts the camera at a complete disadvantage and, as a consequence, the camera is forced to compress what we see through its viewfinder, into its own very limited range. This is done through what is termed a 'Compression Curve.' It's the thing you use in software when you want to make an 'S' curve to create Contrast.

Compression curves are nothing new. They were around in the days of film and, if anyone can recall, when we bought a 35mm film it came in a little cannister. Wrapped around the actual film was always a piece of paper, showing us how it should be developed. On that paper was also an image of the compression curve that was built into the film.



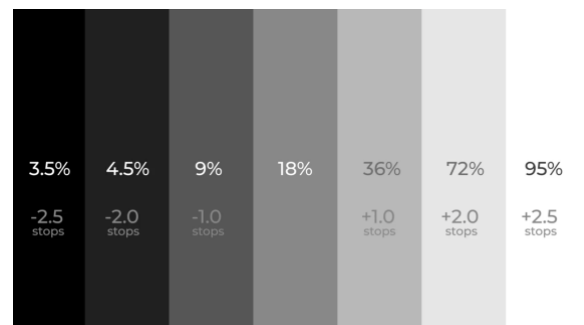
Manufacturers were able to use compression curves to a good advantage - human eyesight isn't good at differentiating the extremities of light & dark. Consequently, the differences between shades of either black or white can be much wider than in the mid-tones, without us really noticing. We can spot the difference in some shades 4 or 5 units apart in the mid-range, but nothing like that at either end of the scale.



18 Percent Grey. (Image)

The other thing we need to know is that all modern cameras take their base measurement from the 18 percent grey. That became standardised in 1956, when it was universally accepted, following scientific assessment of the millions of images in the Paul Getty collection.

Before that, standards varied depending on which country you were in and what film you used.



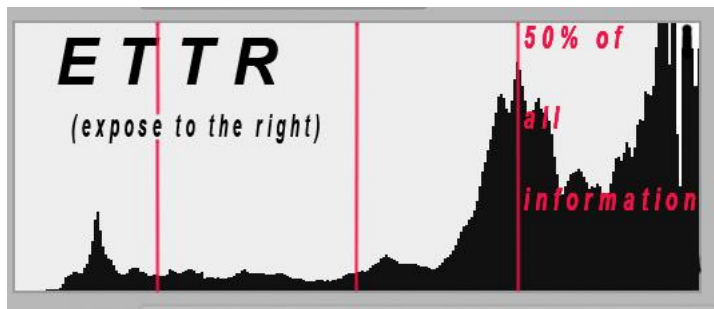
Those Scientists had discovered that, with very few exceptions, all images averaged out to a scale of 18 percent grey. Thus, it was accepted as the International Standard. (Then ASA or DIN – Now ISO)

18 percent grey is also the amount of grey reflected from a 50% grey card, but all grey is subjective to the observer. We all see a different shade of grey.

Not until 2016 was it found that the standard was flawed, and scenes only reflect 12 % or 13 % of the incidental light that falls on them.

They also found that the grey in digital images varied according to the camera and the lens being used, and that the average was between 12 and 15 percent grey - NOT 18%. That means that every camera and light meter ever made reports a reading that is actually slightly under-exposed.

This isn't a major problem – we just need to compensate by over-exposing by around a quarter of a stop.



Better still is to adopt the 'ETTR' (expose to the right) technique as advocated by everyone who has anything to do with photography.

The biggest problem of under-exposing is it lacks detail in the shadows and under-exposed shadows always contain noise.

All images have noise in them anyway, the trick is for it not to be seen.

Light areas also contain noise, and lots of it, but the human eye can't see that as easily as we can in shadows.



For these reasons, I always set my camera set to one stop over exposed, unless I am using a flash.

I take advantage of a full frame mirrorless camera which has a terrifically wide dynamic range. *(see note 2)*

I am also quite lazy, and I hate having to continually alter settings between shots. That's why I only shoot in RAW.

My calculations are based on the 'sweet-spot' of the lens used, found around f11.

I only adjust the camera to compensate for the speed of movement - increasing the ISO if need be so that I can use a higher shutter speed.

My camera sees in 'live view,' so I adjust the shutter speed for the EVF shows an image just a little over exposed. Not that I use it, but the histogram should be marginally off the highlight side so that the flashing warning operates. You soon get used to the 'correct exposure' to use, without having to continually check it. By doing that allows you to eliminate noise and increase shadow details in post-processing.

As for the other 'in camera' settings, remember that RAW files don't record shutter speed; ISO; Exposure; colour temperatures; or Contrast. Neither is it sharpened. These are done in post-processing. I only use two white balance settings – Daylight flash (5750deg Kelvin) for outside or, 4500K for inside – usually to compensate for incandescent light.

Notes –

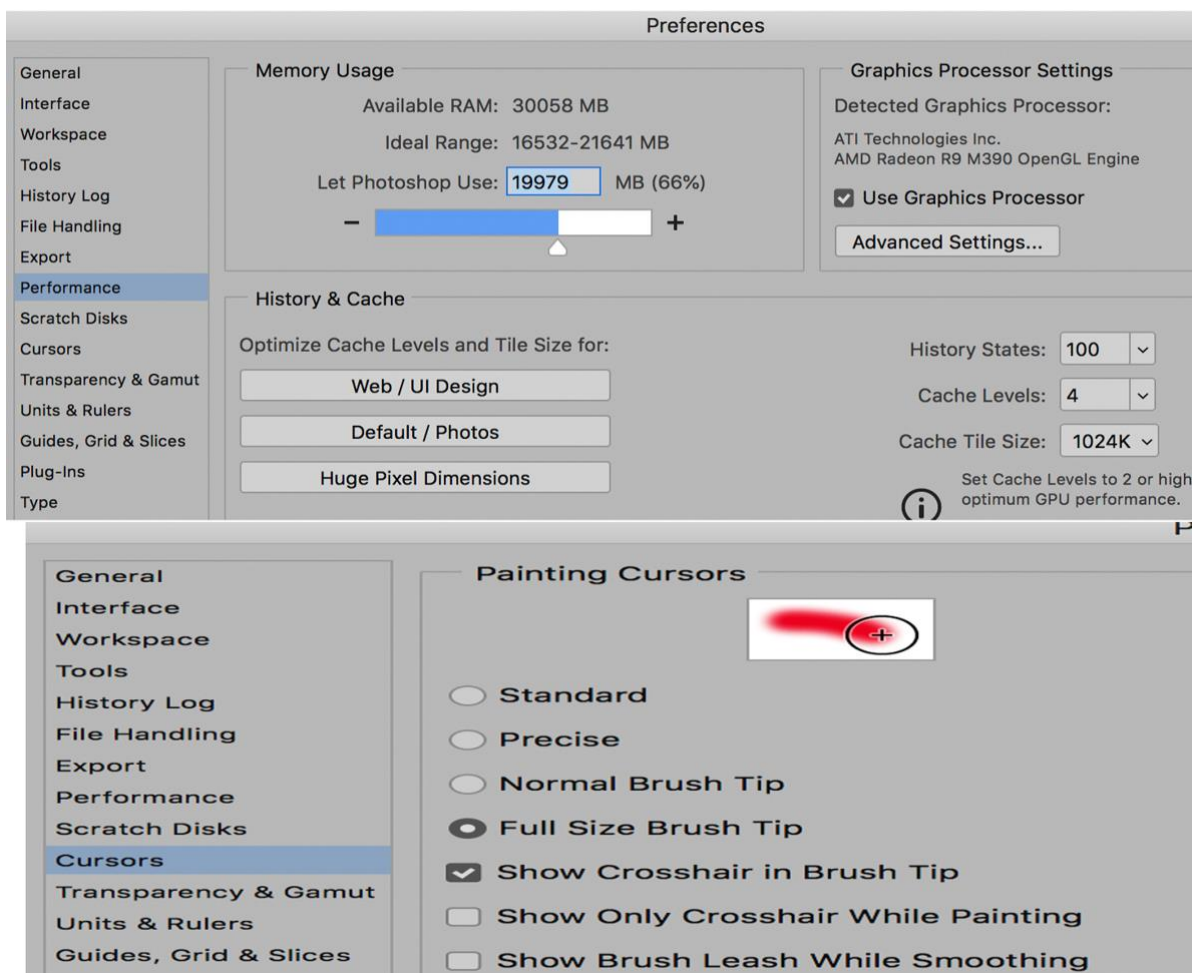
- 1) *The temperature of the sun, at its surface, is 5600k and, providing that you are shooting on the earth between the polar regions (the earth is not round, but an oblate spheroid,) this would be the temperature to use. However, our atmosphere and other issues such as space junk, dust etc, ensure that we must increase this slightly to compensate for it.*
- 2) *Be careful with manufacturers claims about dynamic range. Most are free to leave you with the impression that they are greater than they really are and fail to admit their tests are calculated at the maximum aperture at a shutter speed of (usually) 1/60th second and at an ISO of 50. This only shows the range at which the camera can operate and not the actual range within a shot.*
- 3) *Manufacturers never give the actual dynamic Range within any given shot, which is far less – and the reason we have to shoot for either the highlights or shadows.*
- 4) *Noise is ever present in photography and appears owing to what is known as a circle of confusion and relative to the sharpness of focussing. It is caused by a number of factors, including the different speeds of the various colours of light. We can do little about them save to reduce it to an acceptable.*
Do not confuse NOISE with colour MOIRE. The latter results from your CCD being confused!

Part 3

Pre- Demonstration – Setting defaults.

Before demonstrating photoshop, there are a number of things to be point out in the setting of preferences (Shortcut = Control or Command K)

Photoshop is 'legacy' software. I don't know why it, but it still is, so you need to set up the amount of RAM that it uses. By default, it will take 75% of your RAM – leaving the rest for your operating system and any open program. That's not always enough. A good rule of thumb is to use four times the RAM to the size of the biggest image you're working up.



My biggest files are around a maximum 3 gigabytes, so I would set it to a limit of 12 gigabytes of RAM. My machine has 32 gigabytes, so I can afford to let it use more than normal.

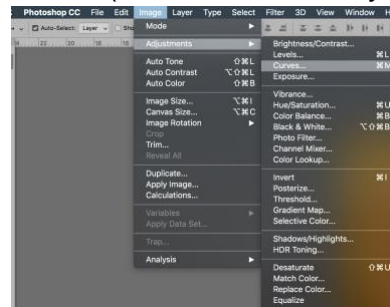
Do not be too concerned at cutting down the amount of RAM to set. If you cut it down too much you will just slow down the processing and force Photoshop to 'write' its data onto whichever 'scratch disk' you have set.

Secondly, set the brush tip as shown as otherwise, you may be painting outside the area.

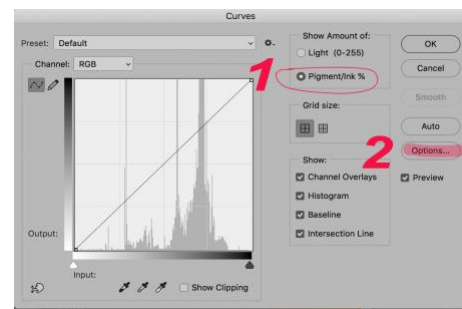
Set up 'Clipping' restraints on Curves.

My 'Curves' defaults are shown in the following sequence. (It will automatically apply the defaults to the levels tool.)

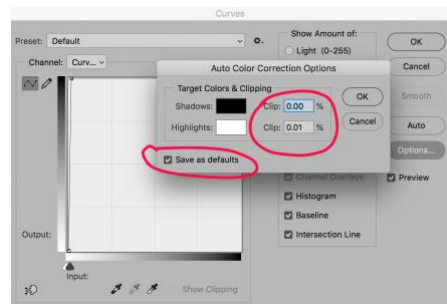
1. Open the Curves tool
(Shortcut is Control or Command M)



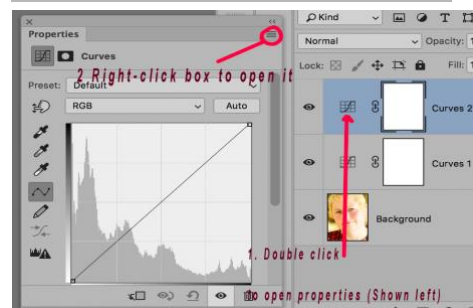
2. Check the box marked 'Pigment' (optional) and then click 'Options.'
NB. Pigment allows you to see the amount of ink being used & shows the curves from highlights at the bottom left and shadows at top right.
This is always preferred by printers.



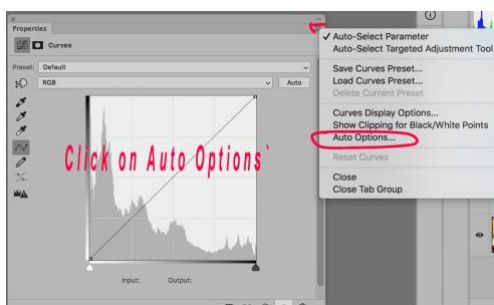
3. Set the clipping restraints as shown. Ensure the 'save as default' is checked & then click 'OK.'



4. Open the curves layer properties by double clicking on the icon in the layer stack. Then right click on the box that will be shown in the properties panel for the curves tool.

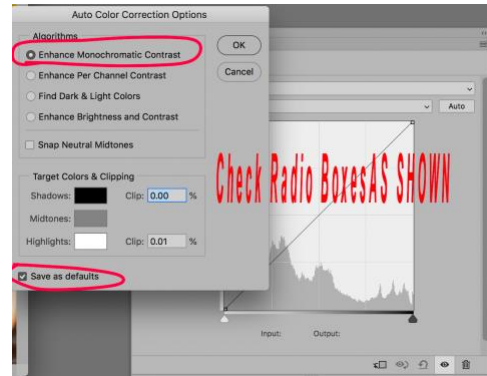


5. Click on 'Auto Options'



6. Check the 'Enhance Monochromatic Contrast' radio button. Ensure the 'Save as defaults' is checked before clicking 'OK.'

The curves defaults are now complete.



Part 4

Processing.

As many Photographers use Lightroom to process RAW files, I will use Adobe Camera RAW for this demonstration as I don't have Lightroom installed.

I rarely use ACR to process my own images. Its results are not as good as other software, which I will demonstrate later.

If you are not aware, ACR is the Development Module of Lightroom – the original was replaced by Adobe when RAW files first came into use.

The tools used in the development module are moderated versions of those already available in Photoshop and the only real difference is the simpler interface.

Thomas Knoll, the inventor of Photoshop, is the 'head' of the Lightroom Project has been ever since Adobe purchased it.

The reason I don't use ACR (or Lightroom) is that up to version 2 (2010), the only way to remove clipping was by use of the EXPOSURE slider.

Post 2010, Adobe built into the software what it called 'Recovery,' which is beyond control of the user.

I will demonstrate this.

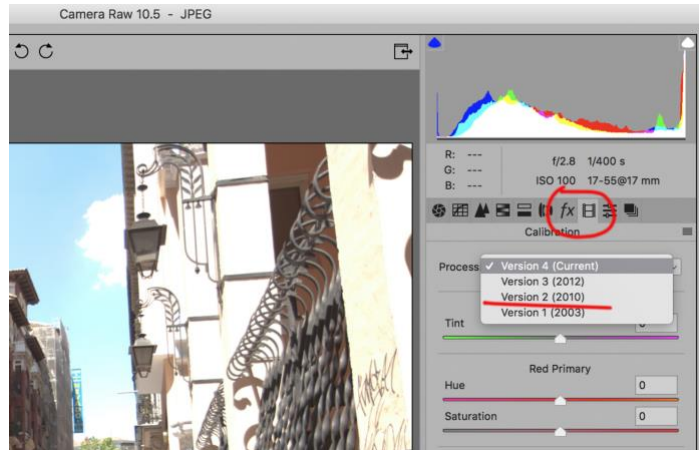
1. Madrid, original RAW thumbnail.



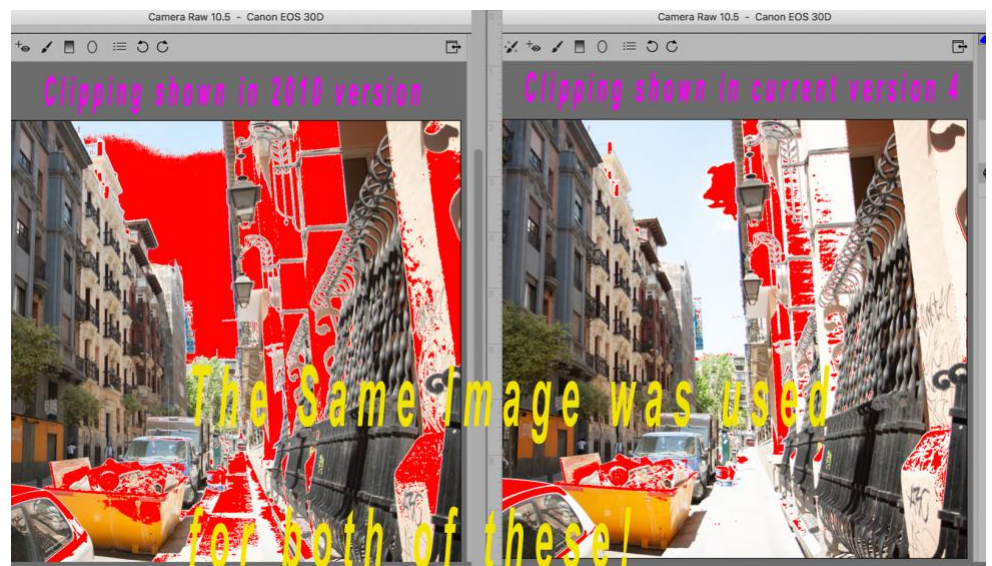
This is the original thumbnail image, as shown in ACR. Note the over exposure!

(Image courtesy of Guy Gowan [www. http://guygowandotcom.wpengin.com](http://guygowandotcom.wpengin.com))

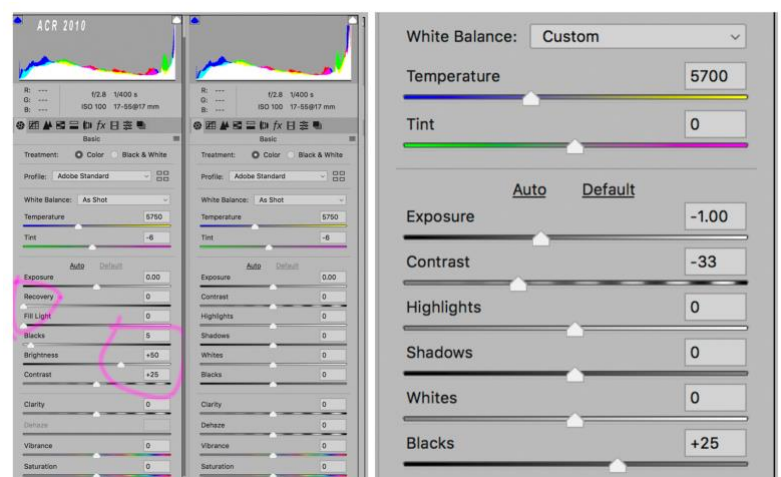
When you open a RAW file in ACR / Lightroom, the software will automatically default to the latest version – currently version 4. You may, however choose an earlier version – as shown.



2. This is the same image shown in both 2010 and Version 4 (current) with clipping displayed.



3. When the 2010 image was 'zeroed' to read as per the figures in the other image and then displayed in in Version 4, the figures on the right were displayed. The image on the right shows the amount of 'recovery' that ACR / Lightroom has applied without any input from you and without you knowing



4. The images (right) is a screenshot of images taken directly out of the Version 4 RAW engine, when compared to both the 2010 version and Canon's own software. The top set is before, and the bottom set is after the clipping has been removed.

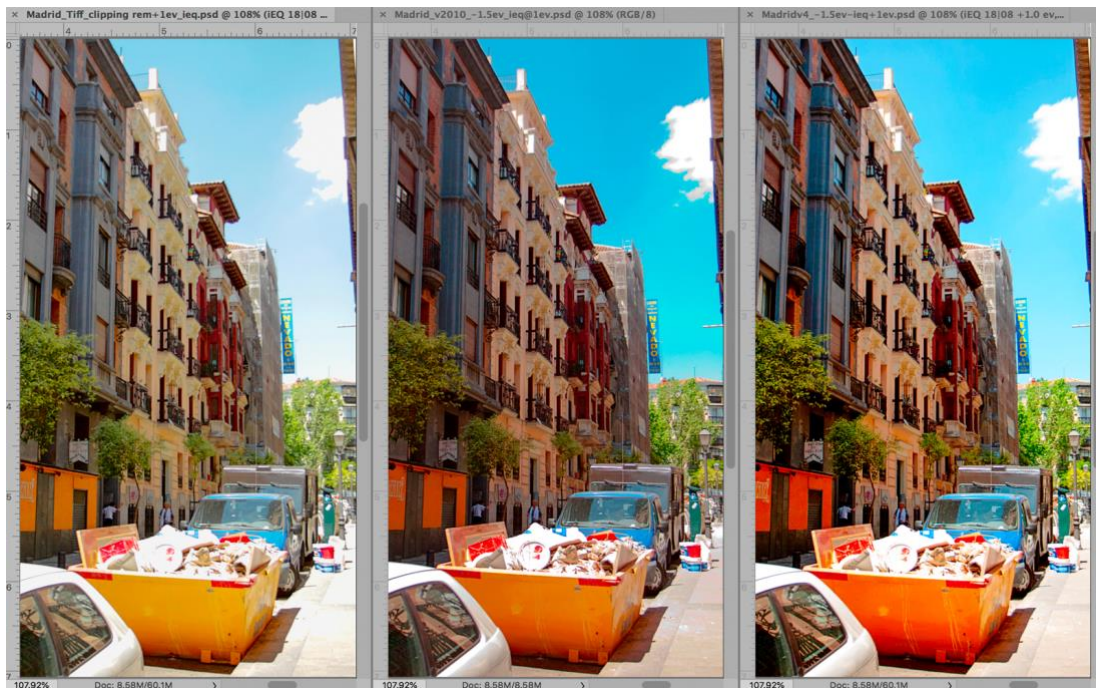


5. This is a screen-shot of the same image, cropped for convenience, each image having been processed in an identical way.

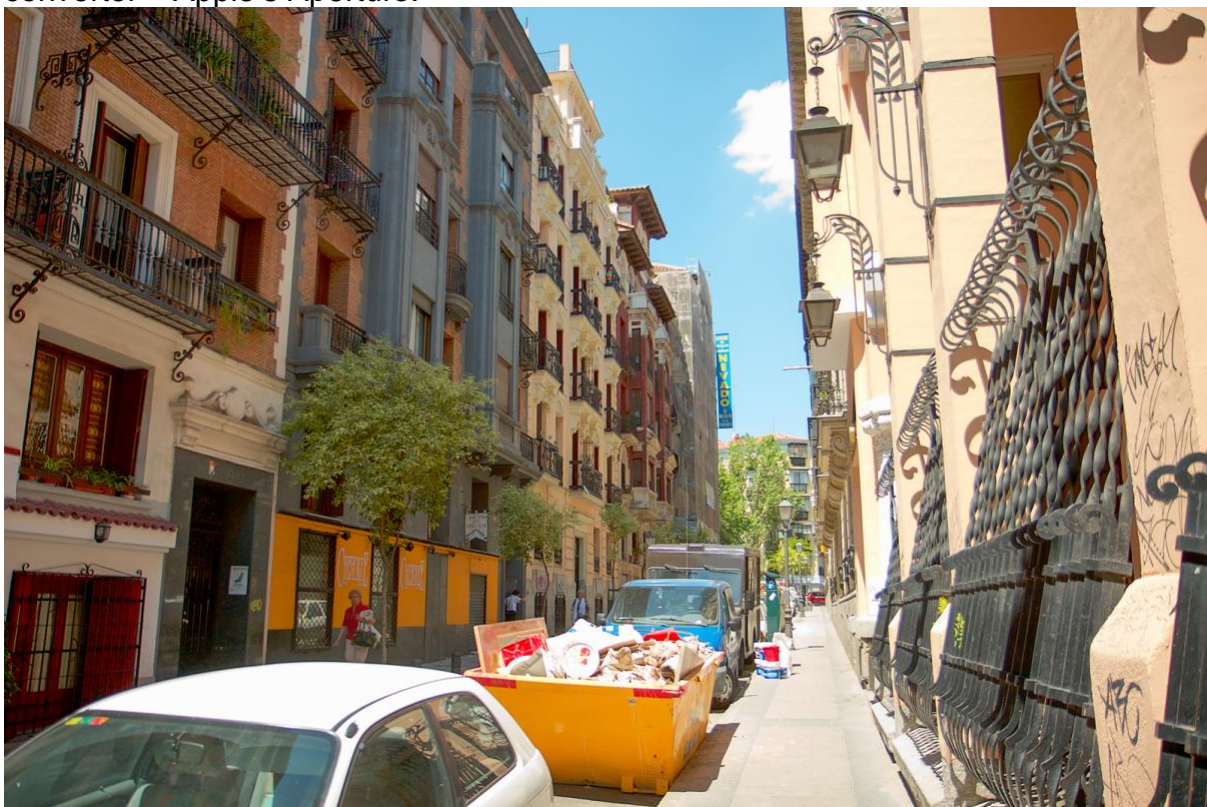


From left to right: - Left – Image processed from the Canon Software
 Centre – image taken via ACR 2010 version
 Right – Image taken via ACR version 4 (i.e. current)

6. Final Image, equality processed. Which would you prefer to work with?



I would choose the one the one processed in the Canon RAW software as it is the nearest representation to the image seen when it was shot.
Here is the full image having been processed via my personal choice of RAW converter – Apple's Aperture.



Part 5

Demonstration

Brief demonstration of pre-processing.

Mono Conversion

BWG levels

Colour clean – original and via HSB

Safe Dodge and burn

Colour toning

Film Grain

Vignette - & new method

Sharpening (Advanced and Normal)