

From the Editor

James Allan

Welcome to the March edition of Camera Clips, the newsletter of the Blackwood Camera club. You will notice a change in appearance. The banner now portrays a rather stylized photograph of Ray Goulter's large format camera, along with a newer graphic version of the club logo. (We will hear more of Ray's camera later) You will note that Chris Schultz has announced a competition to produce a new banner for the web site. In order to encourage the graphic designers amongst us, I hope to display some of the banners submitted as the header to future editions of Camera clips.

This year started with the successful "postcards" competition and "slide night". A summary of both of these activities can be found on the club website. <http://blackwoodphotoclub.org/> We also had a successful expedition to Henley Beach where the dull sky proved a bit of a challenge. Regardless when "the going gets tough", as the expression states some of the members have produced some good images. (check out the club Flickr group). <http://www.flickr.com/groups/blackwoodphoto/>

In the picture gallery this month (Page 2), I have taken the opportunity to show case some of the insect photography that has been produced by members of the club (Matt Carr, Jim Trice, Chris Schultz, Eric Budworth and myself) I must admit I am quite excited by these images and I hope that you too are drawn into the world of the microcosm. John Duckmanton has been photographing insects for longer than just about anyone in the club and he has graciously written an article on how he developed a light-room for photographing butterflies (and other insects). Check out the images that he has scanned from slide film to illustrate this article. I believe that Matt Carr has also used this technique in some of his Macro work.

Chris Schultz has also kindly completed his 2 part article on whether to shoot in .jpg or Raw. This is a contemporary question with some photographers who shoot exclusively in RAW (Gary Secombe, Keith Seidel) while others feel that it is an unnecessary refinement and find .jpg a sufficient and simpler alternative. Check out what Chris has to say.

Lastly I have contributed an article in advance of our up-coming workshop on GIMP. Some people regard 'manipulation' as the longest 4 lettered word in photography. Unfortunately it has become so ubiquitous that even your camera does it now. For instance when it saves an image as a .jpg, or adjusts the white balance or even selects the exposure for your image. Isn't it better to be in control of this process. If you haven't done any post-production enhancement on the computer—don't fret. It's not all about gain filters and hyper-real effects. I would recommend that you start with GIMP. It's not only powerful but it's also free.

GIMP—Gnu Image Manipulation

- James Allan

Gimp (Gnu Image Manipulation Program) is a free, open source software that can be used to do most of the image post processing that can be undertaken in more expensive commercial programs like Adobe Photoshop and Corel Photopaint, or Corel Paintshop Pro. Gimp has its own way of doing things and it may take time to learn. This however is true of all of the software. Whichever program you use has its own little quirks and sometimes there is a long learning curve before you can use the program with confidence. If you are new to photo-manipulation this may all seem rather daunting. You might as well start with the free program Gimp, and then adjust to the other programs if you feel it necessary to upgrade. Actually Gimp is not necessarily an inferior product. It can produce very good results once you are familiar with its workings.

The program can be downloaded from the homepage; <http://www.gimp.org/> Don't worry about all of the discussion concerning GTK runtime environment (a requisite support program). Just look for the GIMP installers in whichever platform (Windows / Linux / Mac) that you are running. These programs will configure the program and set up the GTK environment without any fuss.

When you first open the program you will note that it operates in 3 separate windows. The smallest one in the centre will house the image once you open it. A long thin window on the left contains all of the usual tools and a dialog box for the available tool options. On the right is another long thin window

Continued page 3

Contacting a member from the club; This month Mark & Jenny
Pedlar : mnjpedlar@biqpond.com

Upcoming Events

March 3—Competition—Food
Glorious Food

March 17—Workshop—Gimp—the
open access image manipulation soft-
ware (Hands on)

March 31—Competition—
Corrugations—not just roads—look they
are everywhere.

April 14—Workshop—explore your
camera—bring your camera along

April 28—Competition—Nature—
the usual rules apply

May 12—Workshop—Tabletop /
still life and lighting—bring your camera

May 26—Competition—Yellow—
the image evokes the colour (Challenge:
try doing this in monochrome)

June 9—Atkind Technicolour—
Outing to the processing labs

June 23—Competition—Smaller
than a breadbox—something small

July 7—Competition—Interclub—
Edwardstown—Our Turf this year

July 21—Competition—The concept
of 3 - "Think outside the triangle"

August 4—Workshop—Photoshop
workflow



The Gimp Mascot is known as
Wilber



Matt Carr—Spikey Model



Jim Trice —Cookie



Jim Trice —Jewel Bug



James Allan —Hangin on

If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed 10,000 years ago. If insects were to vanish the environment would collapse into chaos. ~Edward O Wilson



Jim Trice —Wasp

Insect photography brings us face to face with our traditional foes. However I am surprised at how intimate the encounter can be. The world is a different place from down there. A bug can walk up a wall but can't escape from a drop of water. Battles take place between hunter and prey, male and female. Antennae need preening, wings need drying. There are a million different strategies for collecting food. Their faces are painted a million gaudy shades, their bodies assume different shapes. With fortitude they live out their lives. I consider it an honour to be invited into their world.



Chris Schultz—Caterpillar



Erik Budworth—Aphids on the March



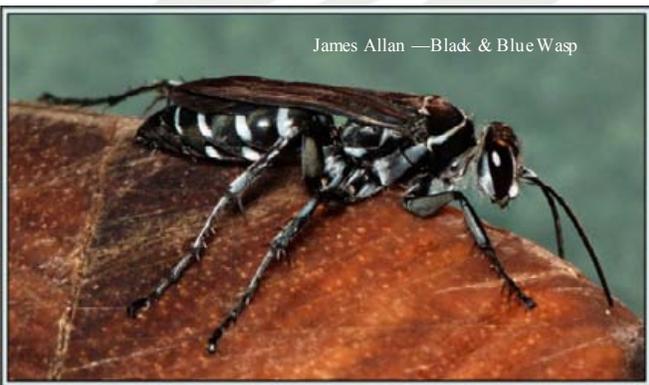
Matt Carr—Spider & Babies



Jim Trice —Skipper



Matt Carr—Grasshopper



James Allan —Black & Blue Wasp

We hope that, when the insects take over the world, they will remember with gratitude how we took them along on all our picnics. ~Bill Vaughan



James Allan —Damselfly

with a wad of different dialogs in tabs. The most useful are the layers dialog, the history dialog and the brushes dialog. Sometimes I accidentally close this window, and it stays gone even if I close and restart the program. This can be very frustrating. You can get it back again by opening the windows menu and looking in “recently closed docks”.

I often open an image by dragging its thumbnail from “my pictures” onto the central window. Be careful of dragging a second image onto an already open image. This will add the second image as a layer, rather than giving it a new window of it’s own. If you want two images open simultaneously open the second image from the open command in the file menu.

Most options are available by right clicking on the image. This includes a bucket load of filters, and scripts (that are called script-fu in GIMP). My most frequently used filters are gaussian blur and unsharp mask. In addition I find a plugin filter called wavelet denoise to be the best noise removal tool. <http://registry.gimp.org/node/4235> You must copy plugins to the plugins folder in order for them to work. On my computer the path is as follows C:\Program Files\GIMP-2.0\lib\gimp2.0\plug-ins There is also a script folder at C:\Documents and Settings\Username\gimp-2.6\scripts.

The colours menu contains the levels, hue-saturation control and curves dialog. My advice is not to bother with brightness-contrast controls. You can get better results and control with levels and curves. If you want to correct a colour cast, the black, white and midpoint eyedroppers can be found in the levels dialog.

For 90 or 180 degree rotation go to the image menu.

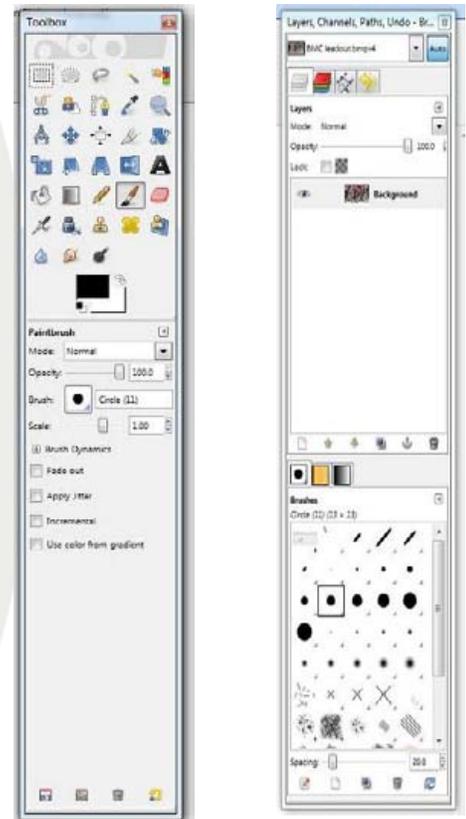
Straightening, cropping and blemish removal are all done with tools in the toolbox. The rotate tool works best if you select “grid” in preview mode. Simply rotate the grid so that the grid lines are parallel to a horizontal or a vertical object, and the image will square up automatically when you press rotate. The cropping tool (looks like a scalpel) can be modified with it’s various controls. You can select a fixed aspect ratio, can crop the whole image or only a selected layer. You can even place guidelines on the golden ratio or rule of thirds for composing the image. (My advice – forget about the guidelines – use your own ‘natural’ aesthetic judgement). To use the done brush effectively you need to adjust the size of the brush. I choose the largest fuzzy circle brush and set the scale to maximum (10). Unfortunately you just can’t adjust the brushes as easily as you can in photoshop or PSP. You choose a source area for cloning by holding down the ctrl key when you click. Interestingly the done point returns to the original point between strokes.

If you wish to add a border by increasing the canvas size (image menu), I found that you had to master the controls in order for it to work effectively. First I unlock the aspect ratio by clicking on the little chain. Then I add the same number of pixels (around 25 – 100 pixels) to both the vertical and horizontal canvas size. You must type the total into the box. ie for 1024+ 25 you type 1049, and for 768 + 25 you type 793. Next you must centre the image. Lastly you must select “resize all layers” in order to get a border filled by the background colour. If you fail to do this the image will be surrounded by a transparent border that you cannot select or paint into.

Gimp seems to adjust canvas size and layer sizes independently of each other. When they get out of step it can cause a lot of difficulty. You can correct this problem by adjusting the layer size (in the layer menu or by right clicking a given layer in the layer menu).

Some people complain that GIMP is light on in features. That may be the case. However many of the features of photoshop have been written for GIMP as plugins and scripts. There is a registry of GIMP plugins at <http://registry.gimp.org/>. The most useful I have included in the following table.

Well I hope that is enough of an introduction to get you started. Explore the menus. Try all of the filters and scripts. Play around with it and see what you can do. I would be keen to see your results on the club Flickr group with the tag “GIMP”. Best of luck.



Function	Filter name	Download from
Import from RAW	UFRaw (Unidentified Flying RAW)	http://ufraw.sourceforge.net/
Converter to use Photoshop plug-ins in GIMP	PSPI (Photoshop plug-in)	http://tml.pp.fi/gimp/pspi.html
Noise reduction Filter	Wavelet Denoise	http://registry.gimp.org/node/4235
Panorama Tool (manual image matching)	Pandora	http://shallowsky.com/software/pandora/
Decompose image into multiple layers of different sharpness – can mask out unwanted sharpness eg portrait work	Wavelet Decompose	http://registry.gimp.org/node/13549
Bundle of scripts and filters	Scripts that work	http://www.gimphelp.org/script24.shtml

Working in the macro area we need to consider composition of course, depth of field, degree of magnification, lighting and, very importantly, background intrusions.

Working distance, that is the distance between the front of the lens and the subject, is also critical if we want to get close to our subject.

As all of my early work was done using slide film, setting up my system and seeing what results I got was a somewhat lengthy affair as I had to wait several days to get my slides back from the developer.

I started with close-up in the usual way with stacking dioptres which screw onto the front of the lens and extension tubes which enabled me to get life-sized images on the slides (plus the dioptres to get really large) but this approach had drawbacks. The main drawbacks were lack of a flat field and light loss, particularly with the tubes. With a 50mm extension behind a 50mm lens this light loss is equivalent to one full stop; effectively f22 becomes f32.

Close-up with early zoom lenses, usually 70-200mm, left a lot to be desired.

Depth of field is also a problem with macro photography. For a butterfly at half life-size on the focal plane the area of sharp focus is about 0.4mm in front of and behind the subject at f2.8-3.5. The wings have to be exactly parallel to the focal plane to get an acceptable picture. At f32 the DOF increases to +/- 1.5mm which allows for latitude in focussing and possible insect movement.

A fast shutter speed is also helpful with a moving subject and this can be achieved by either using a very high ISO or, as I did, using flash which fires at around 1/5000sec with a modestly ISO rated film.

Kodachrome 64 was my choice in film and, using a Tamron SP60 macro lens with the flashgun I had at that time, I got great results at f32 and hand holding the flash at 200mm – the shortest working distance for that particular lens – so that the front of the lens and the flashgun were on the same plane.

Holding the flash high and to the side gave great lighting on the insect but because of the rapid fall-off of flashlight at short distances the backgrounds were very dark (although this helped to give wings an apparently sharper edge!).

My solution to this was to build an insect studio. For backgrounds I tried using prints of various scenes but details showed through at times. I ended up painting a series of backgrounds using acrylic artist paints and dabbing the colour on. These backgrounds slid into place using slots at the back of the box.



The big job though was to get these backgrounds out of focus in the final picture but well illuminated at the same time. The final size for my studio was 400mm high, 400mm wide and 530mm deep with a sheet of glass for the top. The front doors slid in grooves so that I could open them just enough to poke the lens through and the whole of the inside facing walls plus the base were painted flat white to act as reflectors.

On top of the box sat a 20 watt fluoro tube to aid in focussing and composition. The light level from this played no part in the final exposure. The flash sat on the glass pointing at the subject which was placed on a flower or stick 200mm above the base in the middle of the box. So, I had the flash and front lens element at 200mm from the insect with reflection to illuminate the underside and background and started to get my “perfect” shots.

The secret to getting the insect to pose was to refrigerate it for about 2h in a glass or cardboard container. This slows down its metabolism. Next set everything up in a darkened room with the flash charged and the camera pre-focussed on the perch. Carefully remove your intended subject and allow its feet to grip the perch. You now have 10-20 seconds to fire off your shots before the insect gets too active.

Warning! Do not re-cool your insect as this often kills them and do be careful with handling. I once had a “perfect” study of a jezebel butterfly which had a very readable thumb print on its wing.



Insect Photography by John Duckmanton. These images were originally on slide film and have been scanned specially for this article. Above, Glasswings, below St Andrews Cross Spider.

Before proceeding with the full comparison, we need to finish off one aspect of displaying the captured light - **Colour Space or Gamut**

So now we have a way of building that colour intensity map electronically. Our Bayer pattern sensor has counted how many photons strike each pixel to give a colour map that represents our image.

This unmodified matrix of numbers obtained from the sensor is what we call a RAW image – a bit like an undeveloped photographic film. It contains all of the data obtained by the sensor and must be processed in some way to view the image – not unlike developing a film. Because the matrix is unmodified, and because it stores so much information in a large sensor, RAW files can be very large. A 10 megapixel camera produces a 12Mbyte image, and the latest 16 megapixel DSLRs produce 28Mbyte images. In addition to this size problem, the RAW format from the sensor varies with the camera manufacturer – so specialised programs are needed from each manufacturer, and some manufacturers change their own RAW format every few years.

However, not all photographers want or need to process the image (or store large files) – again like film where we send the film to a processing lab to produce prints. The camera manufacturers have built in a processor in the camera – a mini-lab of your own. All modern cameras process the RAW capture into a JPEG image, which is widely supported by computers and printers. Some cameras let you use the RAW image, whilst others lock it away.

Where did the JPEG come from? In the 1980s the Joint Photographic Expert Group of the International Standards Organisation began work on a method to display images on computer screens, and published its first standard in 1992. The JPEG image was born.

This standard uses 8 bits for each colour ($2^8 = 256$ photons) or 24 bits for full colour (or $2^{24} = 16,777,216$ shades of colour) – which is more than enough if we are displaying an image on a computer screen - often called sRGB. By reducing the number of bits, JPEG images are smaller than RAW images - much less than the 68,719,476,736 colours we have with a 12 bit RAW image (a factor of 4096). Some newer imaging sensors produce 14 bit RAW images giving 4,398,046,511,104 colours or 262,144 times more than a JPEG! Just for perspective, professional image processing often uses 16 bit colour (281,474,976,710,656 colours or 16,777,216 times more than JPEG) or 32 bit colour (79,228,162,514,264,337,593,543,950,336 colours or 4,722,366,482,869,645,213,696 times more than JPEG).

This large difference in colour range means that we are squeezing our visible spectrum into a smaller space. The image at right shows the different colour spaces of sRGB vs professional imaging colour spaces (12 or 16 bit) vs the real spectrum (the horseshoe). You can see that a good part of the spectrum is missing with sRGB compared to other spectra.

The result of this compression of the spectrum is that posterisation and banding may occur in continuous colours. This is particularly important when we print an image. sRGB (24 bit colour) printing will deliver less continuous tones than 16 bit (48 bit colour) – and potentially more detail that is stored in the image.

In addition to this, because the JPEG standard was designed for computers (which in the 1980s had low storage and speed), a compression of the image was required. The JPEG defined a method to compress the image for easy transmission which could reduce the size of the image but with the downside that high levels of compression would result in loss of information. So now, instead of a 28Mbyte image, our 10 megapixel camera will produce 4Mbyte images – a huge saving in storage. By increasing compression, this can drop to 2Mbytes.

So from this colour space for JPEG and RAW I have summarised the main points in the following table:

That's a quick summary of each format, but what does it mean in the real world? Lets look at how each format is used in real life to find what it can give us.

JPEG

By default, most digital cameras will produce a JPEG file and store it on the camera memory card. The image will be processed using predefined - often configurable - parameters for colour vibrancy, sharpening, compression, white balance, contrast, chroma noise etc. All the work has been done for you.

The advantage of this is that our image is immediately available for printing and viewing, with no other work required. The saving in time, hardware (storage and computer equipment) and software costs is significant. Many professionals requiring rapid publication of their images will record the images as JPEG – consider a press photographer, social diarist or journalist.

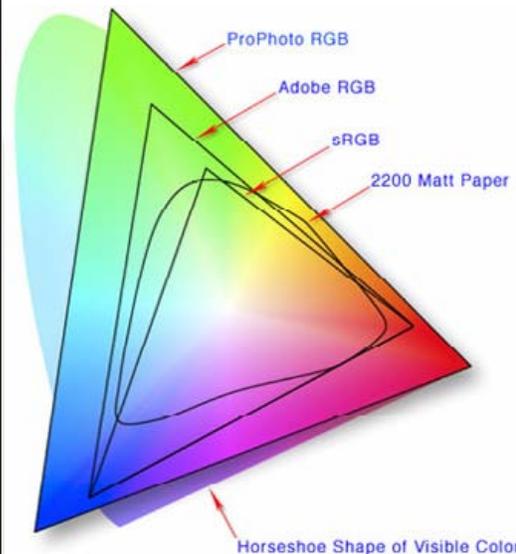
There are disadvantages of course.

The most significant is the dynamic range – JPEG has a dynamic range of 6-8EV compared to films 11EV. Furthermore, JPEG images do not have the ability to recover image detail – highlights tend to be compressed due to the narrower gamut discussed above.

Many of us would like to crop, alter tones or other manipulations – and this is where compression may become a problem. Firstly, the greater the compression in the original image the more image data will be discarded and it is not recoverable. Be careful when you set the compression level – leave it on **Fine** or **High Quality** if you can.

*“Raw files are so named because they are not yet processed and therefore are not ready to be used with a **bitmap graphics editor** or **printed**. Normally, the image will be processed by a raw converter in a **wide-gamut internal colourspace** where precise adjustments can be made before conversion to an **RGB file format** such as **TIFF** or **JPEG** for storage, printing, or further manipulation.”*

From Web forum Photo Camel



JPEG	RAW
<ul style="list-style-type: none"> uses 24 bit colour (8 bits for each colour channel) giving 16,777,216 colours compresses the image meaning <ul style="list-style-type: none"> more images are stored on a device due to reduced file size data (and hence colour and detail) may be lost – particularly with repeated saves of the same file changes are not reversible 	<ul style="list-style-type: none"> Uses 36 bit colour (12 bits for each colour channel) giving 68,719,476,736 colours – with some systems using 14 or 16 bits for each channel Images are minimally or not compressed meaning <ul style="list-style-type: none"> file sizes are commensurately larger and therefore require more storage no data loss occurs the changes are often stored in a table or additional file – meaning changes are fully reversible

Raw or jpeg—Part 2 - Chris Schultz

In film terms, think of it as shooting with a very grainy film compared to superfine grained films. Like film, enlargements of low quality JPEG images are limited in size – and even high quality JPEG images have finite sizes.

The other effect of compression, as mentioned above, is that repeated saves of the same file will result in greater loss of information.

That's because the JPEG standard requires the compression algorithm to be applied to the data each time – and each time it is applied, some more data is lost. To overcome this, always remember to save your editing changes to a new file on each occasion – use the Save As option. This means your original file will remain unaltered.



The 5 images above are low, medium, high, very high and the original image JPEG saves of the same master image (100x100 pixels) – note how the edges become finer and more defined in the image with each image (zoom this document to see the jaggies)

RAW

As discussed above, RAW does give a much greater colour gamut – and therefore more details can be seen in an image. Even when converting the RAW image to JPEG for printing, the image will be sharper (we have ALL the pixels) and have more information per pixel for processing.

Consider the two images below – the image on the left is the JPEG recorded directly from the camera with minimal processing – the image on the right a TIFF image derived from the RAW image.



You can see that the RAW image displays more tonal range and colour. Colour transitions are also smoother, and using RAW has allowed smoothing of colour noise in this long exposure.

Interestingly, this wide range and an EV range of 11 to 12 also means that more information can be recovered in difficult lighting conditions (up to 1 stop in many cases). It even allows for monochrome processing to be more easily managed.

RAW confers yet another very significant advantage – changes made to the image are non-destructive. The changes are stored in either a side-car file (eg and .XMP) or in a table in the RAW file itself. This means that should you choose to reprocess an image – either due to new software or different techniques, you can go back to the original unaltered image and start again.

However, the cost of this flexibility is more processing and a larger file size. Photographers using the RAW format will expend more time in their workflow processing the image – adjusting exposure, brightness/contrast, tone curves, white balance, sharpness, chroma noise, lens defects, saturation etc. This is acceptable for high quality art, reference or fashion images, where the best quality is needed and only a few images will be used, but may be beyond the scope of many photographers seeking simple, effective solutions to their photography. These very high quality images can however be enlarged far beyond the level of a JPEG – many achieving A0 size enlargement.

The larger file size also means larger storage cards are required on the camera, and the burst rate (ie frames per second) is slower than JPEG – compromising action photography.

There is also the negative aspect of each camera manufacturer using their own RAW storage format (although they are similar and based on the TIFF standard). Adobe Systems have developed the DNG (digital negative) format and have made it an open standard making it widely available to other image processing software.

JPEG or RAW?

Which format you use depends on need.

If you require finer control of the image, need more dynamic range and have the time to expend on careful image processing, then RAW is a very useful format.

If however, your camera's JPEG processor meets your needs (or is configurable enough for you), you don't wish or like to process images, or you need to record images rapidly, the JPEG is a good choice.

The choice you make depends on you – and whether your camera gives you the choice of both formats (some cameras can record RAW and JPEG at the same time). The important point is to regard RAW as another tool in your photographic kit bag should you choose to get that little more from your images.

References

- http://en.wikipedia.org/wiki/William_Fox_Talbot
- <http://en.wikipedia.org/wiki/Daguerreotype>
- [http://en.wikipedia.org/wiki/Digital_Negative_\(file_format\)](http://en.wikipedia.org/wiki/Digital_Negative_(file_format))
- http://en.wikipedia.org/wiki/Raw_image_format
- <http://blog.gerardprins.com/blog2.php/2010/06/27/ipq-vs-raw-8bits-vs-16bits-srgb-vs-widegamut-rgb-which-to-choose-when-and-why>
- <http://www.clarkvision.com/articles/does.pixel.size.matter/>
- <http://ajwood.com/2010/08/raw-vs-jpeg-practical-use-for-designers-photographers/>
- <http://enticingthelight.com/2010/06/01/raw-vs-jpeg-an-end-to-the-war/>
- <http://graphicssoft.about.com/od/digitalphotography/a/raworjpeg.htm>
- <http://luminous-landscape.com/forum/index.php?showtopic=42158&h=645d>
- <http://mansurovs.com/raw-vs-jpeg>
- <http://photo.net/learn/raw>
- <http://photodoto.com/raw-vs-jpg-myths-and-misconceptions/>
- http://www.adobe.com/products/photoshop/pdfs/understanding_digitalrawcapture.pdf
- <http://www.arecintophotography.com/blog/photoshop/raw-vs-jpg-vs-png-whats-best-for-me>
- <http://www.creativepro.com/article/out-of-gamut-the-high-bit-advantage>
- <http://www.danheller.com/blog/posts/business-aspects-of-raw-vs-jpg-mode.html>
- <http://www.digital-slr-guide.com/raw-vs-jpg.html>
- http://www.img-galleries.com/articles/raw_vs_jpeg_is_shooting_raw_right_for_me.html#better-format-to-use
- <http://www.philsheard.com/personal/understanding-raw-vs-jpg-files-for-photos/philsheard/>
- <http://x-equals.com/blog/?p=5466>
- <http://www.prophotonlife.com/tech-raw-vs-jpeg-the-real-story/>