

# DIGITAL PHOTOGRAPHY

**THE DIVE TRIP IS OVER AND YOU HAVE A BUNCH OF GREAT IMAGES EITHER SITTING IN YOUR CAMERA'S CARD, ON YOUR COMPUTER OR, IF YOU'RE SHOOTING FILM, IN A LITTLE PLASTIC BOX. NOW WHAT DO YOU DO?**

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**A**ssuming that you've gone through the most important of steps mentioned in the last article in this series, namely to edit out every photo that is not tack sharp, correctly exposed and of some visual merit, then you're ready to decide what you want to do with your photos.

If you're shooting film then your options are limited without digitising your photos (turning them into digital files by using a film scanner). You can project them or print them. If you're going to use a slide projector then keep in mind that prolonged exposure to that white hot projector lamp will fade your slides. If you feel that your photos are priceless and irreplaceable or they're going to be projected for long periods of time (i.e. a home slide show where you rabbit on for hours on end) then you should get duplicates made. They're never as sharp as the original, tend to be a bit grainy and often with slightly inferior colour, but they are cheap insurance for your precious originals.

If you want to make colour prints, then send them off to your local lab with printing instructions. If you just want some small prints to pass around at the next dive club meeting then your local 1-hour store will be fine. If you want good quality display prints then you need to go to a professional colour laboratory. The prints won't be cheap but you will get far superior results and a really good lab will allow you to talk to the person printing them.

Want them printed in a magazine such as this one, just send the slides along with your text. If you're concerned about losing your slides then send duplicates. Again, they won't be as good as the originals, being noticeably less sharp, but if they're lost you'll only be out of a few dollars, not an entire dive trip. An alternative is to keep the dupes yourself and send the originals. That way you have a copy and the printer has the best quality materials to make your work shine. Make sure that each slide has your name and contact details on the mount.

If you want to do more than the above then you'll need to scan your slides, transforming them into digital files. You can either get someone to do this for you, usually your local colour lab, or do it yourself.

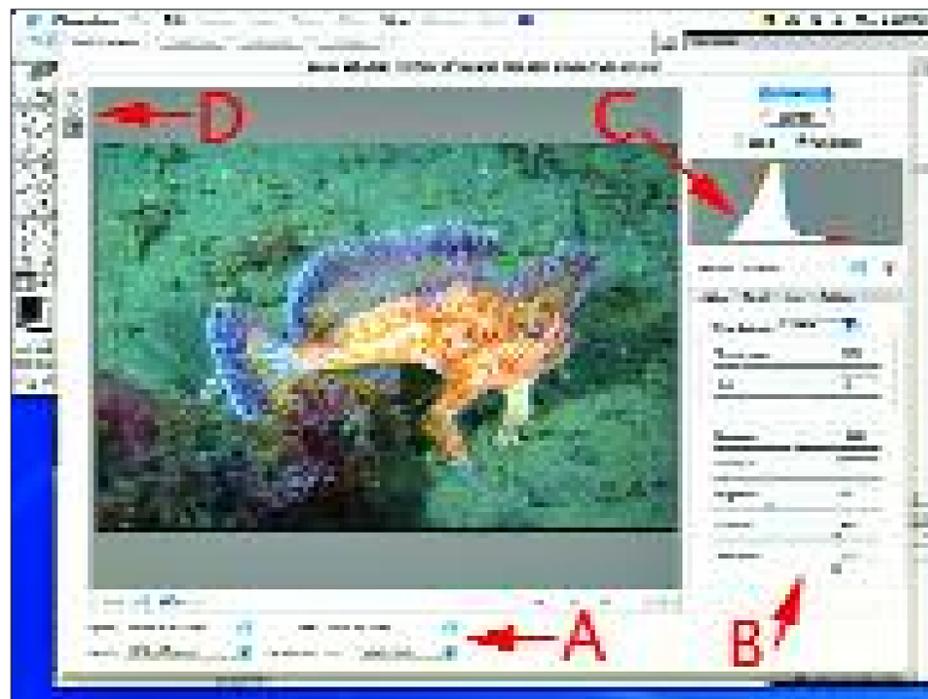
## SCANNING

In previous articles I've touched on the matter of quality. If photography is not an

important part of your diving experience then it's perfectly acceptable to buy a low price camera setup (the disposable cameras can provide surprisingly good results) setting everything on auto, jam as many tiny files as you can on one card or use cheap film and have fun blasting away, hoping maybe one or two are useable. But if you want to produce good quality photos either for self fulfilment, to win a competition or to provide a little extra income then your standards need to be set at a much higher level.

The same goes for scanning. A cheap flatbed scanner tossed in with your computer purchase may be fine for what you want to do. However if you want good quality results then you need to either use a decent scanning service or buy a decent quality scanner. Nikon make a great range of quality film scanners, though in the past I've preferred the Polaroid models. There are other brands also but space doesn't allow us an in-depth review.

One thing I can tell you - whatever scanner you use, it will be set up to give you a scan that is too saturated with a generic method of recording the information from your slide. Again with little effort you can get good results but a bit of tweaking, especially reducing colour saturation, will give you better scans. A good scan (one that has as much information off your slide or negative as possible) will always look a bit flat, without lurid colours and when you check your highlights (the brightest areas of your scan) you will have some colour information. More about this later.



Colour saturation is a form of colour purity. A highly saturated colour is very pure. A red laser beam is an example of a pure colour, emitting a beam of light with a single or very narrow wavelength. An unsaturated red will have a variety of wavelengths including some other colours in the green and blue spectrum. It's very rare to have a pure saturated colour in nature. What this all means is that if you produce a scan which is highly saturated, you'll lose detail as the other colours, which provide the impression of texture in an image, will be removed. So a scan which is not too saturated will have all of the colour information in the subtle textures while an over saturated scan will lose that detail.

## DIGITAL FILES.

For those of us using digital cameras we have more options open to us including photographic prints, projecting an image show, sending by email, uploading onto a web page or other internet service, creating digital image displays (i.e. computer desktop wallpaper, screen savers, phone screen wallpapers, SMS attachments, etc), reproducing in a magazine or other printed item plus other uses. Lets look at making prints and how to prepare your images for optimum quality.

Before we go on, this series of articles is far from comprehensive. I could write a very thick book on digital photography and many qualified people have (along with a few unqualified ones as well!). If you want more information about a particular point or practical help with a particular aspect of digital photography I'd recommend using the internet to pick other peoples brains. Web sites such as adobe.com feature free online tutorials, forums where you can ask questions or search for answers given to other travellers on the digital highway. Other help can be had from web sites that specialise in hardware, software or underwater photography. See the side bar for examples.

## RAW CONVERSION

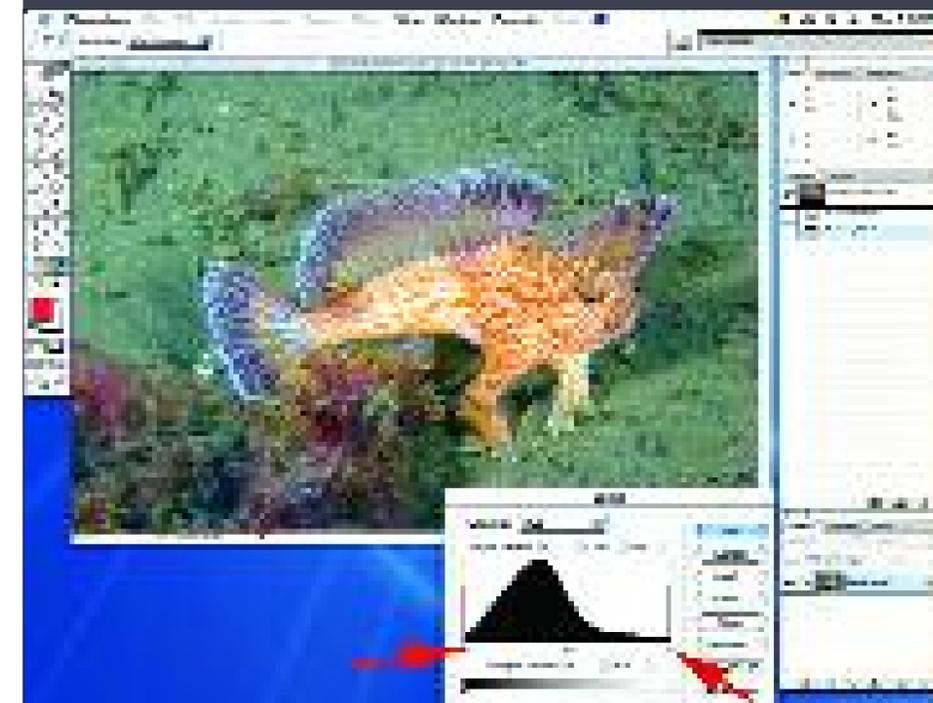
The first step is to get the files into your computer. If you've chosen not to shoot in RAW format as you feel that your uses don't require that sort of quality control, then skip down the page to the section on image preparation. You can also just hand in your card to a photo lab and they can print what you've shot. Some cameras allow you to 'tag' files so the lab knows which ones to print. Also, some

home printers allow you to plug your card directly into the printer, skipping the computer tweaking steps outlined below.

All cameras come with some sort of cable to connect your camera to your computer or printer. Usually you need to do the transfer via the software supplied with your camera which is fine if that's what you want to use. I find it much simpler and faster to remove the card from the camera and use a card reader to load them onto my computer.

The second step is to make a file that can be utilised for any of the above uses. All digital camera manufacturers that allow you to save your files in RAW format will provide software to convert their files. Other software conversion options include plugins for third party image software such as Photoshop, Photoshop Elements and Paint Shop Pro. As mentioned in previous articles, RAW format is a record of all the information gathered by your camera's image sensor. Every camera manufacturer has a different method of creating and recording that information, so RAW image files from one camera

Figure 1: For illustrative purposes we have a nifty shot, rather badly composed, of the increasingly rare Spotted Handfish. Colour balance, contrast, density and saturation have been adjusted and we are ready to find our brightest and darkest points in the image file. The Levels dialogue box is open with the white and black point sliders highlighted with red arrows. Notice that there are no gaps in the histogram although the extreme black and white ends are slightly clipped meaning that I have been a bit heavy handed with the contrast.



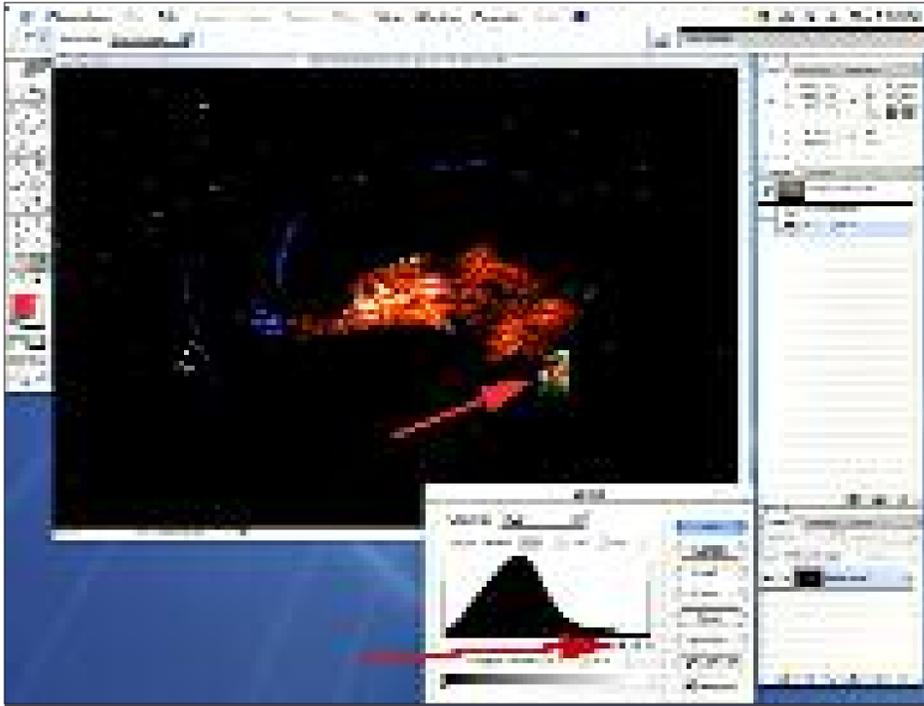


Figure 2: The left hand slider has been moved most of the way across to the right, compressing the colour information and showing us where the brightest point is, in this case it is the rear edge of the pectoral fin.

cannot be opened with conversion software from another camera and sometimes this is so even if the cameras are made by the same company.

Because of company 'secrets', the software provided with your camera will produce the best possible converted image file (usually noticeable in the shadow areas of the file with less evident 'noise') so using their software is an excellent place to start. However, the reason so many people don't use manufacturer's software is that it's much faster and easier to do all your work, including conversion, in Photoshop with the latest plugins able to do batch conversions (applying colour, contrast and density adjustments to multiple images) and other nifty time saving actions without having to switch between software packages.

There are also third party RAW conversion programs which do an excellent job but tend to be a bit pricey. CR Pro is one but is mainly aimed at the well-heeled professional using medium format cameras. If you are smart enough to be using a Mac computer then the new Aperture software by Apple is a screamer.

In the following examples I'll assume that you're using a recent version of Photoshop (CS or CS2) though in principle the steps can be done on any RAW conversion software

**First step is to open the RAW file.** You can tell your computer which program to use. Select any RAW file by clicking it once then right click and choose 'Properties'. You can then specify what program you want to use to open all your RAW files. On a Mac do the same, but **Control-click** the file and set the program to use with the 'Open With...' command. You'll only need to set this once.

When Photoshop or other conversion software initially opens your RAW file, don't be dismayed by the appearance. It should be reasonably close to how it should look but at times it may be way out. That's the nature of taking photos underwater. A RAW file is very,

very flexible. Use the density (exposure) slider to get the density about right then adjust any of the colour sliders to get the colour close to acceptable. I say 'close' and 'about' because final tweaking will always be needed and Photoshop or other image manipulation software is what will do that best.

You may also be provided with options to open the file at **various dpi settings or file sizes.** Set this to 300 dpi at a file size that does not enlarge or reduce the file size. Click OK and the file will open up with your settings intact.

**IMAGE ADJUSTMENTS**

These are 10% technique and 90% art. You can teach people how to do something like adjust colour or density or contrast but that's just the nuts and bolts. The important adjustments are related more to your 'artistic' interpretation of how the image should look. Five people with the same technical training in Photoshop, given a RAW file, will produce five different files which may all be perfectly acceptable.

Assuming you have some knowledge of your software, adjust the colour, contrast and density to your image until you have an acceptable result. A great feature in Photoshop is the **Variations** feature

**(Image>Adjustments>Variations)** - you can see how changing one or more colours will affect your image. When you become more conversant with colour, the **Curves, Colour Balance** and **Levels** dialogue boxes will give you more control. Both the Curves and Levels dialogue boxes give you an Options button which can provide a very effective colour balance adjustment.

If you intend to make a colour print you need to ensure the highlights (the brightest part of the image) and the shadows (the darkest part of the image) fall within a range that the printing device can handle. There are no absolutes here as all printers are different - even the same make and model may give a different result - but the generic settings I give below are a great starting point

Before you check the bright and dark points of your image, make sure you have this setup correct:

Click on the **eyedropper tool** to select it. In the **Sample Point** option at the top of the screen select '3x3 Average'. Then make sure the Info palette is active and visible. **Make sure the Info palette settings are:**

**Mode: Actual Color**  
**Second Color Readout: CMYK Color**  
 You will only need to do this setup once.

Most of the following is illustrated in the screen shots printed with this article. To check the highlight points reduce or enlarge the file on screen so it's as large as possible without cropping out any areas. In Photoshop open the **Levels** dialogue box. Drag the left hand slider to the right. The image will darken and will show you where the brightest point of the image file can be found. Cancel the dialogue box and then enlarge the file to 100%, scrolling the image to where the brightest point was. Open the **Curves** dialogue box. Place the cursor over the bright point you just found (**arrow A in our Handfish photo**). In the Info palette the colour readings will be

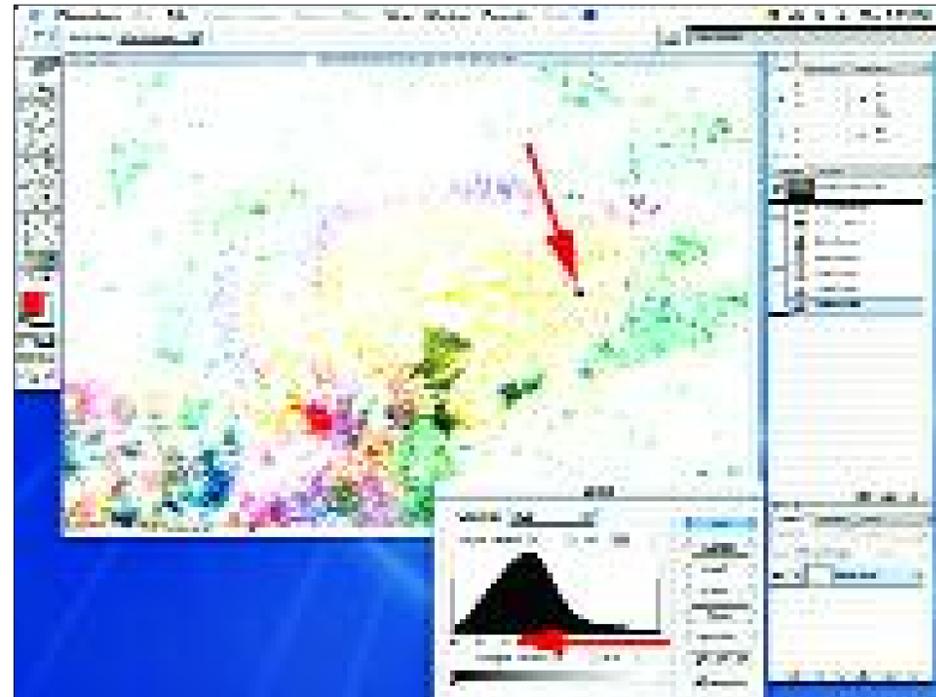
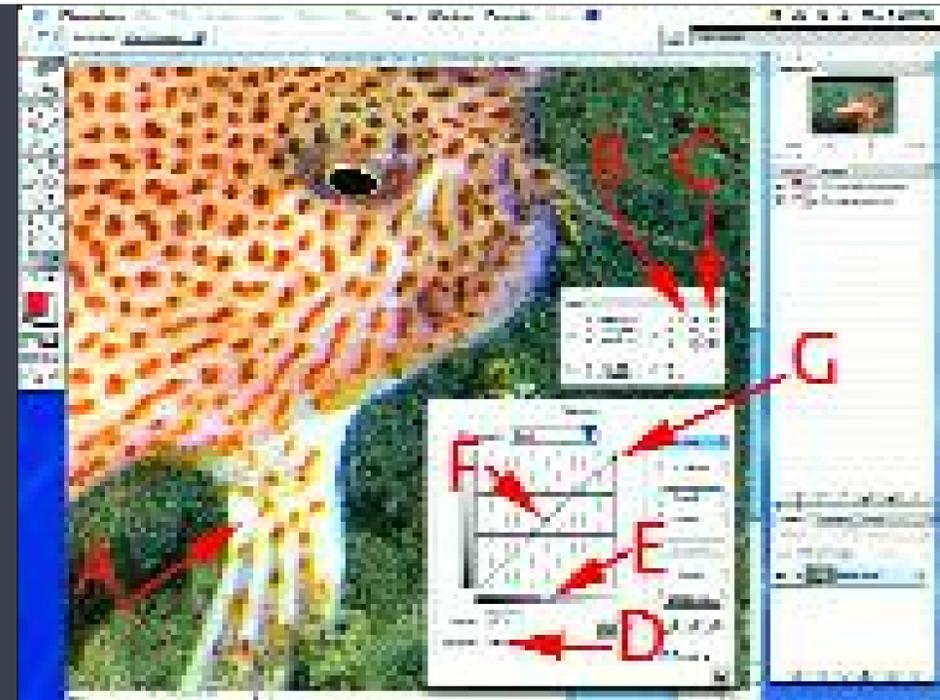


Figure 3: Dragging the right hand slider to the left lightens the file, showing us the location of the darkest point in our image. Not surprisingly, it is the pupil of our skittish subject.

Figure 4: With the Curves dialogue box open and our cursor over the brightest point (arrow A) we get a reading in the Info window of "0, 0, 0, 0". The Red channel is selected in the drop down menu at the top of the box, the centre of the curve line has been clicked to anchor it in place (arrow F) and the highlight point dragged down a touch (arrow G). You may find it easier initially to just click the top point to select it then enter in lower values to add colour (arrow D). You will need to keep moving the cursor back over your highlight point to check the readings. The Info palette will show what the values were before you started to make adjustments (arrow B) and what they now are (arrow C).

If, as in this example, you started with straight zero readings you may find that you have to shuffle back and forth between colours and make additional adjustments as moving one colour can affect the others. Don't forget to check that the highlights are on the right. The graduated bar at the bottom (arrow E) should go from dark to light, left to right. Click it once to change it.

Since the area in this example was white or cream, I used the minimum values of 4, 2, 2, 0. With a blue water available light shot the Cyan/Red values may be much higher (80, 2, 2, 0). When you have finished the highlight adjustment, click OK and repeat with the darkest point, moving the bottom left corner of the RGB channel up to reduce black or across the bottom to increase black.



curve line down the right side to add colour (arrow G). Drag it across the top to reduce colour. You won't need to move it very much. You can also type in colour values to give you more control if you have coffee shakes or a bad dose of palsy (arrow D). **Repeat the process for each colour until the values are no less than that stipulated above** (arrow C).

Repeat the same process to bring your shadow areas to within printing range. To find the darkest point in your image file, open the **Levels** dialogue box again and drag the right hand slider across towards the left. **Maximum readings in shadow areas will need something like:**

**Cyan: 94 Magenta: 83 Yellow: 85 Black: 74**

I say 'something like' because all printers are different. Higher quality printers will be able to handle more black as will good quality paper if you're using a printer at home. Ring your lab and ask them what maximum values they require for their setup. To adjust the black point of your image, use the RGB setting in the curves dialogue box as in most cases it will mean less headaches than trying to manipulate each colour.

If you're using a colour printer at home you'll find that not only will your machine print differently than others of the same make and model, but different brands and surfaces of paper will print differently. A 'test target' should be printed to find out how much black your printer can handle. See the side bar for a target download link.

Magazine and book printers use the **CMYK** colours. Shadow values are more limited with these printers so the black settings should be no more than 75. I often supply scans with a black point setting of 65-70. It may look a bit flat but there is no way that paper can provide the same dynamic range as your computer screen or, for that matter, a colour slide. The good news is that CMYK has a separate curve for black (the 'K' in CMYK means black) so you can adjust the black without changing any of the other colour values.

#### UNSHARP MASK

When all is done and you are ready to burn your files to CD for the printer, you'll need to apply **Unsharp Mask**. Every digital file on the planet will always benefit from at least a little sharpening. Whether you've used a scanner or digital camera to produce your digital files, the three colour channels that make up your image (Red, Green and Blue) will not be perfectly aligned, or one channel may be softer than the others. **Always apply this filter as the absolute final step in your image production.** If you enlarge or reduce the size of your image after applying sharpening, the effect is reduced and you'll need to apply it again, resulting in some rather nasty 'grainy' effects.

First enlarge the image to 100%. Go to **Filters>Sharpen>Unsharp Mask**. As a starting point set the Radius to 1.0 and the Threshold to 0. The Amount setting will vary depending on the physical dimensions of the image. Start with 100% and adjust the slider left or right until you feel that you have the optimal setting. Usually prints on photographic paper



Kelvin Aitken is a Melbourne-based professional photographer and diver with passion for the big blue and all the big sea creatures to be found out there. He's dived from the Arctic to the

extremes of the South Pacific and if there's a new marine dive adventure to be experienced or invented, he's always the first to put up his hand. He's also dived the southeastern Australian continental shelf and photographed shark species nobody knew would be found out there. Kelvin is a BBC Wildlife Photographer of the Year marine category winner and you can explore his unique work on [www.marinethemes.com](http://www.marinethemes.com)

need a little less sharpening than files used on a printing press. All the files I send out for book or magazine reproduction are left unsharpened as they are often cropped or resized to some degree by the printer operator who will then apply sharpening.

Some things to check with your printer are **dpi settings and file types**. Photographic printers may need anywhere from 100-400 dpi files. I often have prints made on a Pegasus printer which uses files at 250 dpi, while other machines need 400 dpi files. Frontier printers may only accept jpg files, other machines may accept jpg, tiff, psd (photoshop) and eps files.

Save your file as a .tif image, burn to disc and send it to your printer. You're all done.

Maybe all this is a bit of a blur? The only way to get the hang of things is to practice and ask questions. There are some excellent books out there including the Dummies, Idiots, Real World and Quickstart series.

Our next article will get us out of the computer room and explore the fun part of photography: using the camera, lighting and composition.

#### LINKS LINKSLINKSLINKSLINKSLINKSLINKSLINKSLINKSLINKS

[www.adobe.com](http://www.adobe.com)

Photoshop and Elements support and examples. Download free trial software.

<http://www.russellbrown.com/>

Corny but excellent instruction in basic and advanced techniques.

<http://www.timgrey.com/ddq/index.htm>

<http://www.timgrey.com/ccdownloads.htm>

An excellent email newsletter. OK, it's also an annoying plug for every book, lecture and conference that Tim is involved in, but there are some good pointers for printing at home, Photoshop use and a free test target.

<http://www.imagexpert.com/site-new/products/test-target.asp>

More printing test targets. <http://www.dpreview.com/>

The latest in cameras, camera reviews, camera software updates and breaking news on the digital front.

<http://www.wetpixel.com/>

Underwater photography site. Great wide ranging site but remember that a lot of the earnest published comments are from people that know a lot less than you.

[www.marinethemes.com](http://www.marinethemes.com)

The world's largest online image library of marine wildlife. The photos in the database are from a wide range of photographers from around the world. Great place to see what animals are out there and how to photograph them. You will find our example (Stimpy the Handfish) there as well.

<http://www.creativepro.com/story/feature/18062-1.html>

More info on preparing files for print. Check out the Related Features list of articles on the same page.

<http://www.luminous-landscape.com>

The home page on this web site is a real mess but down the bottom are a bunch of very useful links to articles about digital file manipulation including sharpening and colour adjustments.