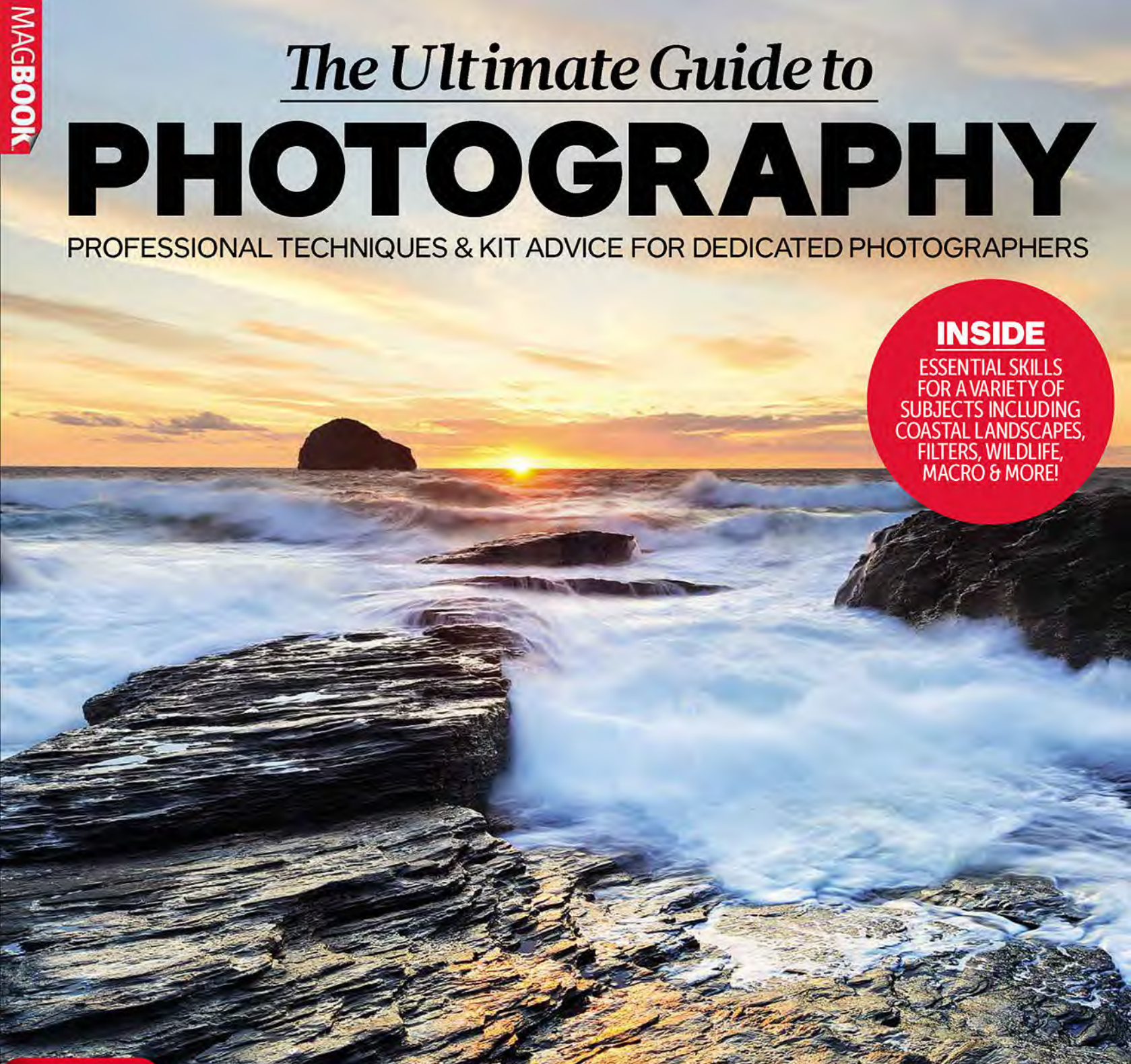
MAGBOOK

The Ultimate Guide to PHOTOGRAPHY

PROFESSIONAL TECHNIQUES & KIT ADVICE FOR DEDICATED PHOTOGRAPHERS



INSIDE

ESSENTIAL SKILLS FOR A VARIETY OF SUBJECTS INCLUDING COASTAL LANDSCAPES, FILTERS, WILDLIFE, MACRO & MORE!

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HARNESS THE POWER OF RAW

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ULTIMATE KIT: TESTED & RATED

HELEN DIXON

Welcome...

"More people than ever are using digital SLRs (and CSCs) to take control of their photography and capture stunning photographs. Not only are cameras, lenses and accessories better quality than ever, they are also more affordable too, allowing more people than ever the chance to develop a passion for photography, develop their skills and capture sharp, well-exposed images. *The Ultimate Guide to Photography* is aimed at those looking to take their photography to the next level by learning skills and techniques for a variety of subjects. It is packed with expert advice from many of the UK's leading professional photographers, with emphasis on key in-camera techniques rather than post-processing techniques. With topics covering everything from macro to travel to coastal landscapes, the photographic possibilities are wide and varied. Throughout the guide, we bring you our choice of photo equipment to suit the topic, while at the rear you'll find an extensive set of reviews. From ND graduated filters to premium optics, our authoritative tests ensure you get maximum value by choosing the best kit for the job. Follow the expert advice in this guide and you'll soon see a marked improvement in the standard of your photography. All the best!"

Meet our expert team of photographers

All our experts are regular contributors to *Digital SLR Photography* magazine. For expert advice and inspiration to help you improve your photo skills, pick up the latest issue, available on the second Tuesday of every month. For further information, visit: www.digitalslrphoto.com

ROSS HODDINOTT
Ross is an award-winning photographer with many years of experience capturing the diverse beauty of Britain's landscapes and wildlife.
www.rosshoddinott.co.uk

HELEN DIXON
Helen is living the dream, having given up her job to become a professional photographer. She is one of the UK's brightest talents.
www.helendixon photography.co.uk

LEE FROST
A pro for two decades, Lee Frost's one of the best-known names in the UK photography business, with 20 books to his name and worldwide image sales.
www.leefrost.co.uk

ADAM BURTON
A highly successful landscape photographer with an extensive portfolio of images, Adam is the author of the photography book The Dorset Coast.
www.adam-burton.co.uk

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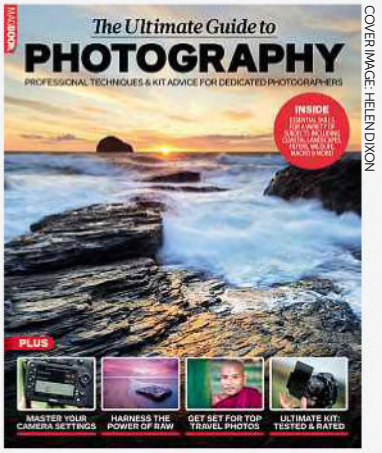

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Produced by *Digital SLR Photography*
Editorial queries: enquiries@dslrphotomag.co.uk
Online: www.digitalslrphoto.com

Editorial

Editor **Daniel Lezano**
daniel.lezano@dslrphotomag.co.uk
Art Editor **Luke Marsh**
luke.marsh@dslrphotomag.co.uk
Senior Contributing Editor **Caroline Schmidt**
caroline.schmidt@dslrphotomag.co.uk
Contributing Editor **Jordan Butters**
jordan.butters@dslrphotomag.co.uk
Editorial Consultant **Jo Lezano**
jo.lezano@dslrphotomag.co.uk

Other editorial contributors:
Adam Burton, Helen Dixon, Ben Hall, Jon Hicks, Lee Frost, Brett Harkness, Ross Hoddinott and Richard Hopkins

Advertising & Production

Display & Classified Sales: 020 7907 6651
Commercial Brand Manager **Alex Skinner**
alex_skinner@dennis.co.uk
Account Manager **Finan Tesfay**
finan_tesfay@dennis.co.uk
Senior Production Controller **Anisha Mogra**
anisha_mogra@dennis.co.uk
Digital Production Manager **Nicky Baker**
nicky_baker@dennis.co.uk

Management

MAGBOOK PUBLISHER **DHARMESH MISTRY**
OPERATIONS DIRECTOR **ROBIN RYAN**
MD OF ADVERTISING **JULIAN LLOYD-EVANS**
NEWSTRADE DIRECTOR **DAVID BARKER**
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CHIEF EXECUTIVE **JAMES TYE**
FOUNDER **FELIX DENNIS**

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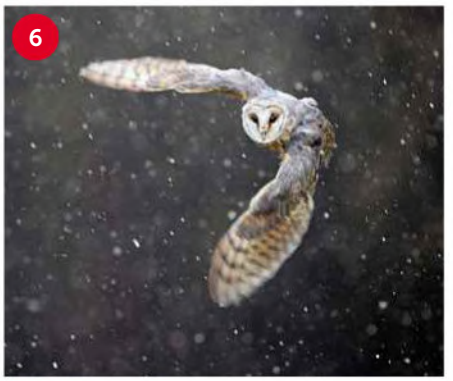


TURN TO PAGE 112 TO FIND OUT ABOUT OUR FANTASTIC SUBSCRIPTION OFFERS

GO WILD!

THE NATURAL WORLD HAS LONG FASCINATED PHOTOGRAPHERS, BUT IT'S NOT AN EASY DISCIPLINE TO MASTER. WILDLIFE PHOTOGRAPHY TAKES PATIENCE, SKILL AND A DASH OF LUCK

WE ARE FASCINATED by nature. We enjoy watching the TV documentaries, we love seeing wildlife with our own eyes, and as photographers most of us enjoy capturing nature through the lens. There is probably no subject more challenging or diverse than wildlife, but that certainly hasn't affected its popularity. The fact that wildlife is rarely obliging just adds to the sense of achievement when you capture a great shot. Birds and mammals can be erratic, elusive and unpredictable, so whether you are photographing big cats in the Maasai Mara or small birds in your own back garden, the quest for the 'perfect' image is never-ending. Patience is the name of the game. You can't pose animals or politely request they perform for your camera, so you need to put yourself in the right place at the right time and then wait for the best opportunity.

However, the right kit, good technique and field craft are also essential. Our guide will help you master the art of photographing wildlife and inspire and encourage you to capture better wildlife shots than you've ever taken before...

IMAGE: ROSS HODDINOTT

Basic wildlife techniques

BEFORE YOU START SHOOTING, WISE UP ON THE TECHNIQUES THAT WILL HELP YOU BAG SOME GREAT SHOTS. HERE ARE A HANDFUL OF STARTING POINTS...

ROSS HODDINOTT

1 Baiting your subject One of the most reliable ways to entice wildlife close to your lens is through 'baiting' – using food or water to attract birds or mammals to a predefined place. Setting up a 'feeding station' will give you far more control over lighting and the look of the subject's background. It is important to use suitable food – for example, carrion for foxes or buzzards; or nuts and seeds to entice small garden birds. Water is another good way to attract wildlife. Subjects will use it to either drink or bathe – and you can capture striking images of subjects along with mirror-like reflections.

Feeding stations can be very simple to set up. If you already hang out nut feeders for the birds in your garden, you are already halfway there. A couple of nut or seed feeders on poles in your garden are all you need. Think about the sun's position in relation to your feeding station – in which direction will the light be at the time that you will be taking photos? Do you want your subject to be front-lit (ideal during the golden hours), backlit or lit from one side? Place your set-up accordingly. Ensure there is a distance of at least six metres between your subject and its background to ensure your backdrop is clean and diffused.

Position 'props' close to your feeding station to make images appear more natural and interesting. For example, when shooting garden birds, place lichen-clad branches or sprigs of blossom close to the feeders. Pre-focus your lens on the perch so you are primed and ready to take photos when birds momentarily rest on your 'prop' between feeding. To conceal your whereabouts, use a dedicated hide or – if taking photos in your garden – shoot from the garden shed or even from a house window.

BEN HALL

2 Research your subject Fail to prepare; prepare to fail. If you want to capture stunning wildlife images, you first need to know your subject. Without an understanding and passion for your subject, you will never truly capture its character or be able to anticipate key behaviour. Simply venturing out with your camera in hand, just on the off-chance that you might find and photograph something, will produce very limited success. Instead, research potential subjects thoroughly online first. Discover what types of habitats they prefer, their diet, and any key behaviour – like courtship displays or migration. Also, find out if their coat or plumage varies depending on the season, and when do they breed and have young? The answers to these types of questions will greatly help your pursuit of the 'perfect' picture and prevent you from wasting time and effort. Once you are armed with the right knowledge, research suitable habitats and reserves. In the UK, www.rspb.org.uk and www.wildlifetrusts.org are good places to begin.

Camera settings

AF mode: Predictive Focus
When photographing moving subjects, switch to predictive AF, which makes it easier to capture good shots. By keeping your finger half-pressed on the AF or shutter button, the lens will track the subject, adjusting focus continually to keep the subject sharp in the frame.

Exposure mode: Shutter-priority mode
A wildlife photographer's priority is achieving a sufficiently fast shutter speed. Using shutter-priority (S or Tv) gives control over shutter speed, while the camera will select the corresponding aperture. Many also favour using aperture-priority.

Metering mode: Multi-segment metering
Multi-zone metering (Canon's Evaluative or Nikon's Matrix) is so good that you will rarely want to use anything else. However, spot metering is useful in situations where you wish to meter for a small, specific area – like plumage.

ROSS HODDINOTT

3 Back-button focusing

Good focusing technique is essential for wildlife. Opportunities will be fleeting when photographing animals – so the speed and accuracy of your focusing can be the difference between success and failure.

Your camera's centre focusing point is typically the most accurate and sharpest of all the available focusing points – regardless of camera make or model. Therefore, this is the point you predominately want to use. However, rarely will you achieve the best composition with the subject positioned centrally in the frame. To photograph subjects off-centre using AF you could focus manually, or shoot in single shot/AF-S mode and keep the shutter release button semi-depressed, or use the AF-lock button. However, when shooting wildlife, none of the above are particularly well suited. Also, you ideally want to have your camera set to AF continuous shooting mode. A far better option for wildlife photographers is to switch to back-button focusing. Doing so takes focusing away from the shutter button – instead a button on the back of the camera is assigned to the job. Typically this button is either the AF-ON or AE-L button – but consult your camera's manual. While it might take you a short while to get accustomed to the switch, you will find separating focusing and releasing the shutter a far better technique.

Point the central AF point at your subject, press the rear focus button using your thumb, and then recompose your shot with your subject placed wherever you want in frame. Now, when you depress the shutter button, the camera won't try to refocus on the background or any other elements.

Back-button focusing also means you don't have to fiddle around with any dials should you wish to switch to manual focus. Effectively, all you need to do is not press the back-button AF button – just adjust the focusing ring and take your photo.

4 Stalking and fieldcraft

One of the most important skills wildlife photographers must learn is fieldcraft – the art of avoiding detection. If your subject hears, sees or smells you before you are within picture-taking range, it will disappear long before you've taken any photos.

A hide is the best disguise, though stalking is often the only way to get close to subjects. Wear muted colours, avoid noisy fabrics and don't clean your 'stalking' outfit – the dirtier it is, the more it will disguise your scent! Deer, foxes and hares have a particularly acute sense of smell – so approach downwind. Move slowly and watch your subject closely – if it shows signs of unease, or looks directly at you, stop and remain motionless until it looks away again. Part of the skill is being able to identify and use natural cover – look for areas of dense vegetation, bracken, trees and hedgerows to conceal your whereabouts.

When stalking, a monopod or beanbag is far easier to use than a tripod. Travel light – just take a camera, telephoto lens and keep accessories in your pockets.

Dawn is typically the best time to stalk wildlife, when animals are preoccupied with feeding. The light is also better at this time, too.

ISTOCK PHOTO

White Balance: Auto

Auto WB produces very good, accurate results in most situations. If you are shooting Raw – which we would always recommend to ensure you capture the most detail in your images – you can fine tune colour temperature during post-processing.

Release mode: Continuous

Many cameras are capable of shooting upwards of 5fps (frames-per-second) – some are as fast as 12fps. By holding your finger down on the shutter release button, you can capture large continuous bursts of images. This is ideal when shooting movement or action.

ISO RATINGS: ISO 400-6400

Typically, wildlife photographers require a fast shutter speed due to subject motion or to eliminate their own movement when shooting handheld. Although you should always use the lowest practical ISO, faster ISOs allow you to capture fast movement and work in low light.

Animals in action

ADD EXTRA IMPACT TO YOUR WILDLIFE IMAGES AND RECORD NATURAL BEHAVIOUR BY CAPTURING ANIMALS IN ACTION. HERE ARE THE BASICS...

FOR NATURE PHOTOGRAPHERS, there is nothing more satisfying than capturing a great action shot! There is no shortage of opportunities – birds in flight, courting, singing or arguing; as well as animals running, jumping, swimming or fighting. Animal action is often brief, though, so you not only need to demonstrate good technique, but be able to anticipate and react to your subject's behaviour too.

Images of behaviour look far more interesting than standard portraits. Through the use of a fast shutter speed you can suspend motion – highlighting every muscle, sinew and detail. To freeze fast motion, a shutter exceeding 1/1000sec is normally required, but remember speed is relative – you need to match the shutter speed to your subject. To generate fast times, select a wide aperture and higher ISO. How high will greatly depend on the available light – in good light, ISO 400 or 800 should suffice, but in dark or overcast conditions you might need to opt for a sensitivity of ISO 3200 or higher.

Shoot large bursts using continuous shooting mode. The more frames-per-second (fps) you can capture, the better your chances are of getting 'the shot'. A battery grip can be a good investment if you intend to do a lot of action photography – these allow you to shoot more frames and sometimes boost your camera's fps limit. Keep your finger on the trigger and take a large number of frames. Doing so increases the odds of you capturing your subject in focus and in the right position. File sizes are large today, so use memory cards with a fast write speed – for example, 600x 90MB/s.

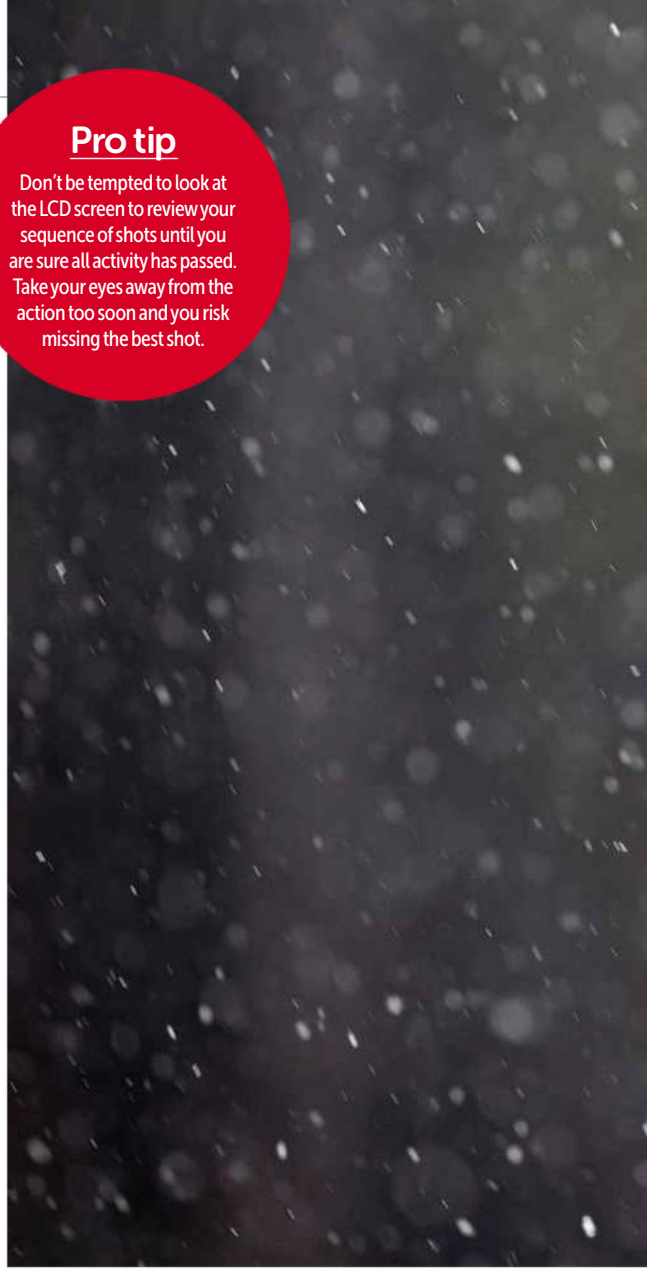
Predictive autofocus is designed to maintain focus on the subject, so it is the best option for action shots. Camera brands give different names to their AF modes, such as AF-C or C-AF, while the number of focusing points and sophistication of the AF system varies depending on the camera make and model. Consult the manual to see which one on your camera is best for tracking movement. Become familiar with your camera's various AF options – practise and experiment by photographing a dog running about or visit a wildlife park.

You don't have to capture movement sharply. Slow shutter speeds imply motion and can convey more about the subject's behaviour and energy. Blurring movement is a popular technique – and in overcast light may be the only option. A degree of trial and error is needed to get the right effect however. The optimum shutter speed depends on the speed of the movement, but start with 1/60sec – this should be slow enough to blur the tips of beating wings or the legs of a running mammal.

You'll find that you experiment a lot, though, and will end up taking a large number of wasted and poor images, but it's worth it to get the results with just the right combination of sharp detail and blurred movement that looks striking and boasts energy and motion. Capturing perfectly-timed action images isn't just the result of good technique and a fast camera – your ability to anticipate an animal's behaviour is also key, so know your subject. A good understanding of your subject's behaviour will enable you to be ready and waiting to capture amazing shots.

1) Continuous shooting mode gives you more of a chance to get that perfect shot you're after. **2)** A slower shutter speed can be used artistically to convey real feelings of movement that a static doesn't. **3)** A fast shutter speed freezes a moment in detail.

BEN HALL



Pro tip

Don't be tempted to look at the LCD screen to review your sequence of shots until you are sure all activity has passed. Take your eyes away from the action too soon and you risk missing the best shot.

Pro view

STEVE BLOOM

Steve Bloom

"I love slow shutter speeds where everything is a bit blurred; it's very difficult to get right. The eye is the most important element – I track the eye, keeping it in the same place in the frame throughout so it stays still while the legs and body blur with motion. I always use autofocus and have my Canon EOS-1Ds Mk III set to One Shot and a shutter speed of about 1/4sec, but it depends on how fast the animal is moving; if it's a running cheetah you'll get blur at 1/100sec."

BEN HALL

1

MARK BRIDGER

3

Wildlife Q&A

ROSS HODDINOTT

Q How do I get better at changing my camera settings quickly?

Practice. To ensure you never miss a great photo opportunity again, adjust ISO, aperture and focus settings. Ideally, you need to get to a point where you can alter key camera settings intuitively without even taking your eye away from the viewfinder. The more you use your camera, the more instinctive it becomes when using it out in the field.

Q Can I still achieve pin-sharp nature shots in dark conditions or poor light?

Thanks to the incredible high ISO performance of most digital SLRs, yes you can. In poor or fading light, select your lens's maximum aperture and increase ISO sensitivity upwards of 3200. This will help generate a suitably fast shutter. Also, switch on image stabilisation and – if possible – use a monopod. If you can't use a support, keep your elbows tucked into your body and the camera firmly pressed to your face to help minimise movement.

Q What is panning?

Panning is when you move the camera in tandem with the subject's motion during exposure. Correctly panned images should result in the subject being captured sharply against a blurred background – implying a feeling of motion. Using predictive AF mode, keep the focusing point over the subject and smoothly pan with it as it moves. By keeping the AF or shutter button pressed, the lens will track the subject and continually adjust focus to keep it sharp. You only require a relatively slow shutter speed – typically in the region of 1/15sec. Ideally, you want to be parallel to the path of your subject for panned images.

Q How do I achieve perfectly composed action images?

When tracking fast movement, achieving the right framing in-camera is very difficult and if you try to frame your subject too tightly in-camera, you risk cutting off bits of the subject, like limbs, wings or feet! Instead, opt for a wider focal length and intentionally leave extra space around the subject. By including a degree of 'spare room', you give yourself margin for error. This is a particularly good tactic when photographing fast or unpredictable behaviour. You can then crop images during editing to achieve the right composition and balance.

Animal portraits

A GREAT WILDLIFE PORTRAIT TAKES CREATIVITY AND SKILL IF IT'S TO BE CONSIDERED ANYTHING MORE THAN A SIMPLE SNAPSHOT

SHOOTING ANIMAL PORTRAITS is understandably popular among wildlife photographers, but in order to capture great portraits, you need to do more than simply fill the frame with your subject. A good portrait should highlight the subject's beauty and reveal something about its character and personality. However, without care and creativity, you risk capturing nothing more than a record shot that lacks any intimacy. Quite simply, you need an imaginative approach to ensure your animal portraits are truly eye-catching.

The key point of focus for any animal portrait is the eyes. They need to be pin sharp, so focus carefully – if you inadvertently focus on the tip of the snout or beak, the eyes won't be bitingly sharp. Strong eye contact is often an integral ingredient to good animal portraits – photographs of animals staring right into the camera can be very striking. It is often best to compose your subject with the eyes off-centre, rather than central in the frame. Placing them on an intersecting third will often create the strongest results.

If you are able to get close enough, you may decide to fill the frame entirely with the subject. For example, photographs of birds with their beak tucked beneath a wing can look really eye-catching when tightly composed; while photographs of just the face of an animal, like a seal or fox, can really highlight detail and reveal expression. However, more often you will choose to contrast your subject against a background. Background choice is important when shooting portraits – if it is messy, distracting or doesn't complement your subject, it can ruin the shot. Pay attention to what is going on behind your subject and reposition yourself if it will produce a more attractive backdrop. To help render your background in attractive soft focus, select a large aperture – in the region of f/4 – and use a telephoto, as longer focal lengths have an inherently shallow depth-of-field. Grass, foliage, water and sky make particularly good, natural-looking backgrounds. If shooting from ground level, you will also be able to blur foreground detail, which will help your subject stand out sharply against a sea of diffused colour. The emphasis will remain on your subject, while its blurry surroundings will help prevent the viewer's eye escaping the picture space.

Another key ingredient is negative space. It is easy to assume that you will achieve maximum impact by filling the frame with your subject. However, you will often create stronger, more stimulating compositions by including space around your subject. Simply speaking, negative space is the area not occupied by the subject. Creating negative space is easy – use a slightly wider focal length or move further away from your subject. How much space you include will depend on the subject, situation and the effect you desire. Negative space normally works best placed in front of the subject – that way, it will absorb the animal's stare or gaze. It can add context,

BEN HALL

Pro view

Steve Bloom

"I believe in the power of the eyes, it's how we communicate, so I try to get animals' eyes lit well and looking at me. You also need to make the animal feel at ease; acknowledge that you're a guest in their territory. Try to use the right body language and approach for the right animals: for a gorilla you have to use soft rumbling noises to make them feel relaxed, but with grizzly bears you need to make some noise as they don't like being surprised. I shoot on aperture-priority mode all the time and set my aperture for the depth-of-field I want and alter the ISO to give me the shutter speed I need. It's important to consider your approach to different animals. When photographing elephants, for instance, I always try to shoot them with the camera as low down as possible: we think of elephants for their size and if you don't emphasise this, you lose something from their majesty."


STEVE BLOOM


2 ROSS HODDINOTT

Pro tip

When shooting tight animal portraits that fill the frame with the face, you should aim for as much symmetry as possible. Keep the face as parallel to the camera as possible and place it centrally in the frame.

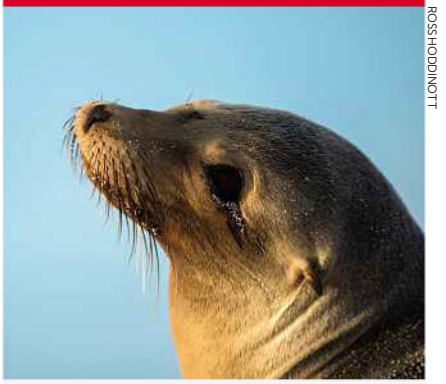
scale or even a feeling of isolation to portrait images. It is normally best to avoid shooting portraits with the subject looking directly out of frame – compositions tend to feel crowded and uncomfortable. However, there are always exceptions to any rule, so always be prepared to experiment.

Light is also key – low morning or evening light will add warmth and beauty to your photographs. Timing is also important.

1) Shoot from low down to blur the foreground as well as the backdrop – it will make your subject stand out. **2)** The time of day is as important a consideration as any. Here the soft evening light envelopes the swan in beautiful pink tones.

Watch for your subject to do something interesting or quirky, like tilt its head, yawn, sing, shout, look up or down, interact with its young, or look alert or inquisitive before triggering the shutter – it will help make your animal portraits stand out from others.

Wildlife Q&A


ROSS HODDINOTT

Q When shooting animal portraits, what is the best viewpoint?
There is no hard and fast rule – the best viewpoint will depend on the subject, its surroundings and the effect you desire. However, generally speaking, a low, eye-level perspective will yield the most intimate and natural-looking results. Therefore, get down low and take photos from your subject's height. Not only do low-level shots look more natural, but also it is easier to support your camera set-up using either a beanbag or your elbows.

Q What is an environmental portrait?
As the name suggests, environmental portraits capture the subject within the context of its environment – for example, an urban fox in a recognisable garden or town setting. They are less generic than tightly cropped portraits and tell a story about the subject and its relationship with its surroundings. If you can get close to your subject, wider focal lengths work best for this style of nature image. Doing so will allow you to distort perspective, with your subject looming large in the frame, but with its environment clearly recognisable behind. Environmental portraits can convey much about the subject – a feeling of isolation, depth and wildness – and are well worth shooting when the opportunity allows.

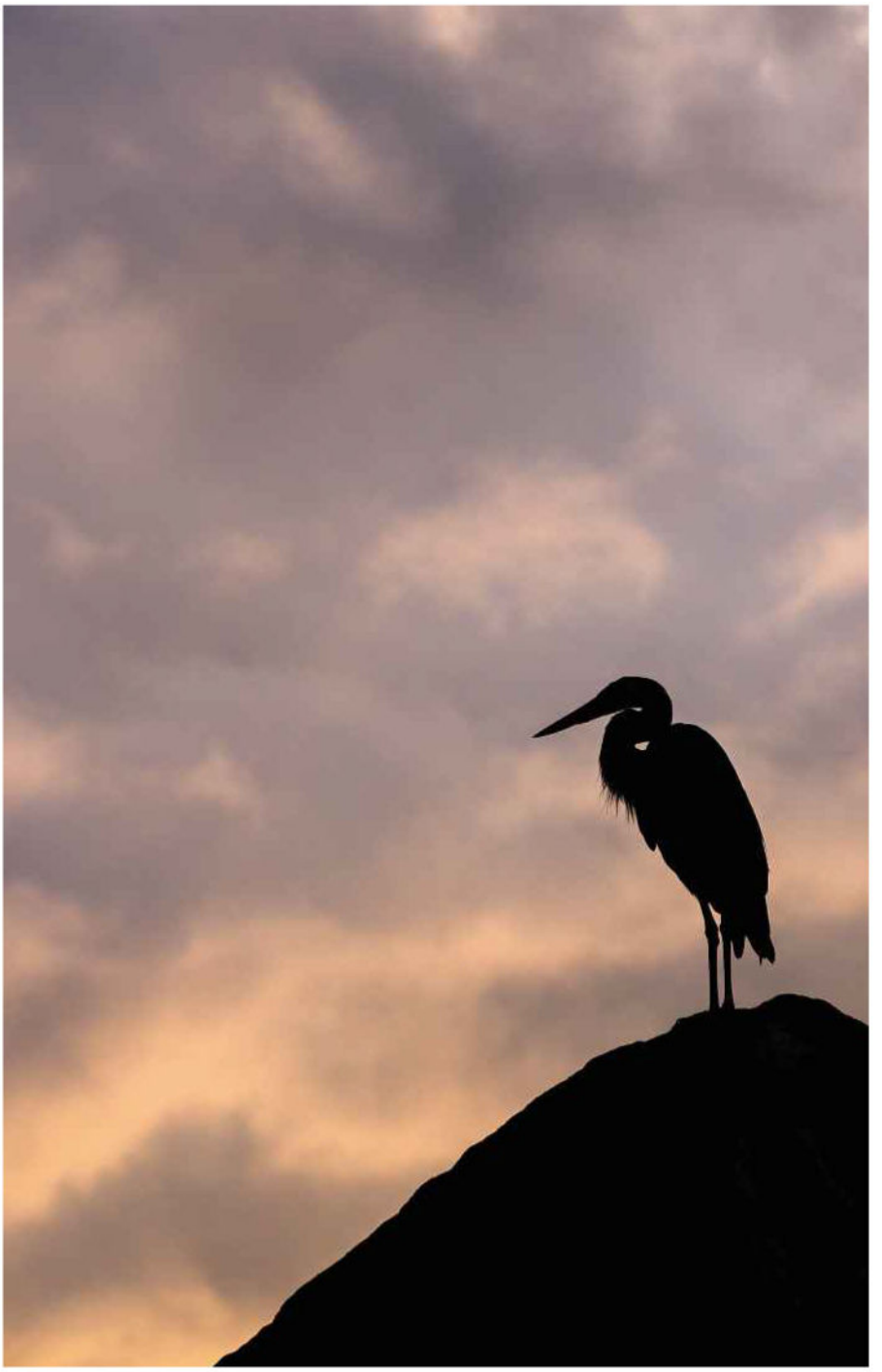
Q How do I bring my portraits to life?
The eyes are the key. We instinctively look at a subject's eyes first of all, so it is important that they are bitingly sharp. A nice catchlight will bring your subject to life. Depending on the sun's angle, you may need to wait until the animal moves its head to one side for a catchlight to appear. If one doesn't appear naturally, though, try using a reduced burst of flash to add one.

Q What's the best focal length to use?
Unfortunately, there is no simple answer to this, as it will depend on the subject's size, your distance from it, and how much of the subject you want to include in the frame – all of it, or just its head? However, generally speaking, the flexibility of a zoom is best suited to shooting portraits – something in the region of 80-400mm will prove ideally suited to most subjects. If your DSLR has a 1.5x or 1.6x factor (ie an APS-C sensor), a 70-300mm zoom should suffice.

Creative wildlife ideas

CHOOSING YOUR SUBJECT IS ONE THING; CHOOSING HOW TO SHOOT IT IS ANOTHER. THESE SUGGESTIONS SHOULD GIVE YOU FOOD FOR THOUGHT

ROSS HODDINOTT

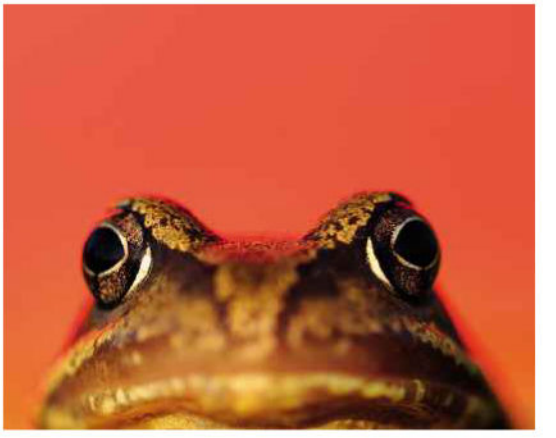


1 Silhouettes Wildlife can look striking in silhouette. It is best to only shoot animals with a clearly recognisable outline – for example, a puffin, owl or stag. Bold, dramatic silhouettes are possible by shooting toward the sun's direction. By correctly exposing for the subject's much brighter background, the animal will be recorded as a simple inky outline. To achieve the correct settings, take a spot-meter reading from a bright part of the scene. Select a viewpoint where your subject stands out against its backdrop – usually the sky – being careful that its shape doesn't merge with anything else. Trigger the shutter when the subject is nicely in profile and its features clearly recognisable. Colour is often a key ingredient. Each sunrise and sunset provides a unique palette of colour to contrast your subject against, and with the sun low in the sky, it is easier to capture the perfect silhouette.

BEN HALL

2 Concentrate on one species If you really want to capture truly intimate and unique wildlife shots, set yourself the challenge of photographing just one species over several months. It will give you the opportunity to get to know your subject intimately. As a result, you can capture a far wider range of shots, from tightly framed portraits to environmental studies. You will be able to take photographs throughout the seasons, in different weathers, and interacting with young. The more time you spend with a subject, the more you will anticipate movement and behaviour. Setting yourself this type of project can be rewarding and productive and by the end of it you should have a series of insightful images that tells a story about your subject.

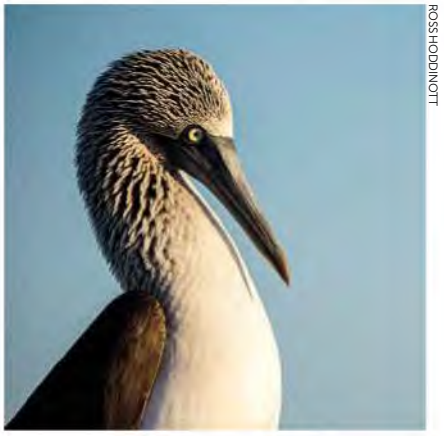
ROSS HODDINOTT



3 Magical macro Nature photography isn't just about shooting birds and mammals – miniature wildlife make for fantastic subjects too. All you need is a macro lens, close-up filter or extension tube to capture magical macro shots. Summer is a great time for close-ups, as insects are abundant. Wetlands, woodland and heathland are all good habitats to find suitable subjects, as is your own back garden. Get down low and close to vegetation. Depth-of-field is critically shallow at higher magnifications, so be sure to focus carefully and try to keep your camera's focal plane parallel to the subject. A reflector can be useful too.


ISTOCKPHOTO

4 Beautiful black & white Black & white is often overlooked for wildlife photography, but once you have seen the work of talented photographers like David Lloyd and Nick Brandt, you will surely think again. By eliminating the distraction of colour, the emphasis of the shot is firmly placed on the subject's character, shape and form. Monochrome is able to highlight fine, intricate detail of a subject's skin, fur, feathers and design. Continue to shoot in colour and convert to mono during the processing stage – doing so will help you capture more tonal levels and image quality. Simplicity and subtlety is often the key ingredient to successful black & white images, so think carefully about your composition and surroundings.


ROSS HODDINOTT

5 Explore new places With travel becoming increasingly easy and affordable, the world is now a much smaller place. Once you could only ever dream of visiting places like the Amazon, Maasai Mara, Antarctica, Yellowstone Park and the Galapagos, but now it is possible to visit such locations relatively hassle-free thanks to well organised wildlife adventures and photography workshops. While not cheap, if you already have all the photo kit you will ever need, investing in a trip to photograph wildlife somewhere new and exciting will prove money well spent. Not only will the experience be extraordinary, but you will return with hundreds of fresh images, learn new skills, meet like-minded people, and return home inspired and motivated to shoot the wildlife found a bit closer to home.


BEN HALL

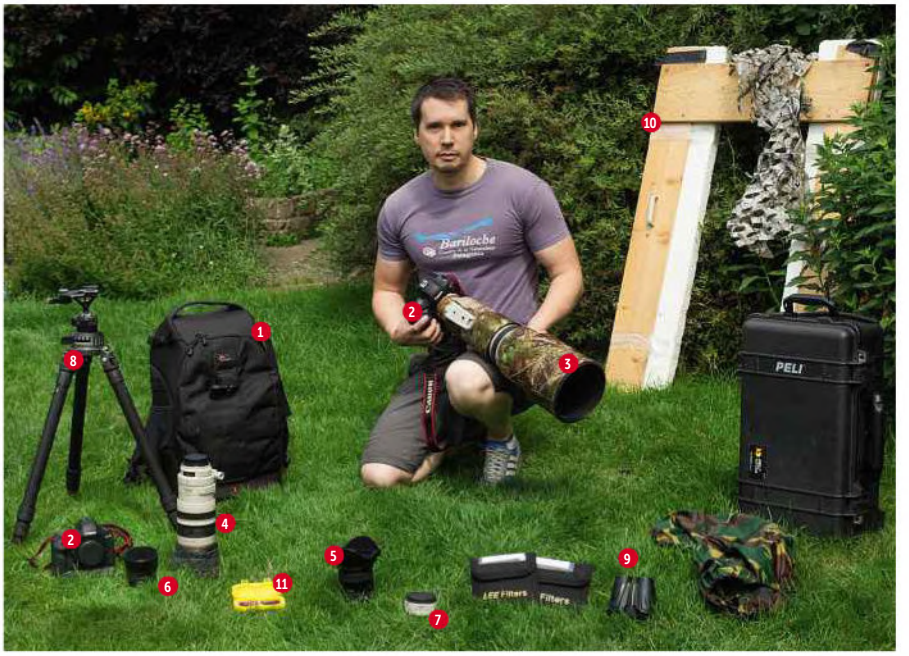
6 Shoot in bad weather Weather conditions can have a huge influence on the look and feel of your wildlife shots. There is no such thing as bad weather for wildlife photography. Wind, rain and snow might not be fun to work in, but such conditions can produce unusual and unique photos. Bad weather can add atmosphere to nature shots and convey a feeling of wildness, desolation and extremity. For example, by capturing an animal sheltering from heavy rain or snowfall, you can highlight its hardiness. Slower shutter speeds will render falling snow and rain as streaks, adding interest to photos. Although many cameras are weather-sealed, always protect your kit with camera and lens covers.

MASTER OF WILDLIFE...

Ben Hall

Biography

Ben Hall is one of Britain's best wildlife photographers. He is a specialist bird and mammal photographer and has won numerous international awards, including category wins in the British Wildlife Photography Awards and the Windland Smith Rice Awards USA. In 2009 he was named 'Geographical Photographer of the Year'. He has appeared on numerous radio and television programmes including BBC's *Walk On The Wild Side* and is a member of the 2020VISION photo team. He has co-written *The Wildlife Photography Workshop* with Ross Hoddinott. He is described by *Living Edge* magazine as 'a passionate and experienced wildlife photographer, with a perfectionist's eye for detail'.



"I BEGAN MY full-time wildlife photography career in 2002. The industry has changed significantly since then, with the biggest development being the advent of digital. The subsequent impact on photography and the industry in general has been huge. However, despite the changes, my passion for wildlife and photography hasn't dwindled and my philosophy remains the same as it did in the days of shooting film – simply to keep striving for that perfect shot!

"My work is always varied. It is also very seasonal, with my busiest period typically falling between autumn and spring. Winter is unquestionably my favourite time of year, while summer is normally a little quieter. During summertime, the light is harsh for long periods and wildlife tends to hide away and become more elusive. This doesn't mean I can rest on my laurels, however, as there is always stacks of office work to do. Processing and captioning images, feature writing, drawing up invoices, answering emails and other general admin takes up a great deal of my time, so much so that sometimes it feels like I have little time to actually go out and capture any fresh shots!

"Although I still spend a great deal of my time photographing UK wildlife, my work takes me all over the world. I lead photography workshops during winter and spring and am frequently away from home. While I enjoy visiting exotic and new locations, I still gain the most rewards from shooting the wildlife close to home. Like most outdoor photographers, I plan my week according to the weather and the light. I find that many of my favourite images are the ones taken in the worst weather conditions! The atmosphere that storms, snow and even rain conjures up can be truly magical. I will also visit the same locations time and time again, which helps me to become familiar with the landscape and its inhabitants. This in turn allows me to better predict the subject's movements and behaviour, something which is paramount to being in the right place at the right time. I also use the landscape as an integral part of the picture. By showing the subject in context I find it easier to tell a story through my images... and ultimately help them to connect with the viewer."

Ben's kit bag

1) Lowepro Flipside 500: This bag fits my 500mm with a camera body attached and extra lenses. It can also be taken on flights as carry-on luggage, which is a must for me!
2) Canon EOS-1Dx & EOS-1D Mk IV: These fast DSLRs are perfect for capturing action. The EOS-1Dx is also great for shooting in low light.
3) Canon EF 500mm f/4 L IS: Perhaps my most used lens. It offers exceptional optical quality and focuses fast, making it perfect for both portrait and action shots.
4) Canon EF 100-400mm f/4L IS: This lens is very versatile. The focal length is perfect for images of the subject in the landscape.
5) Canon EF 17-40mm f/4L: This is my main landscape lens. It offers great quality and a flexible range.
6) Canon EF 50mm f/1.4: I am very fond of this lens, although I don't use it much for wildlife, it is perfect for taking portraits of my kids!
7) Canon Extender EF 1.4x II: Converts my 500mm to a 700mm!
8) Gitzo 3541LS Systematic: This tripod offers the perfect combo of stability and (relatively) light weight.
9) Nikon Travelite EX binoculars: Useful when stalking subjects.
10) Floating hide: A homemade device I use for photographing birds on water. Great for staying out of sight and also gives me more options for backgrounds.
11) SanDisk Extreme CF cards: These cards are both fast and reliable. When shooting in extreme climates this is so important.
Canon EF 100mm f/2.8 Macro: The large aperture of this lens is perfect for abstract close-ups.
Gimbal head: I use this head with the 500mm lens; it takes the weight out of the lens while allowing quick adjustments to the composition.
Beanbag: I like to use one for ground-level subjects. It offers a rigid support with greater freedom of movement than a tripod.

ALL IMAGES: BEN HALL

1) I'll often return to locations to learn in great depth about the inhabitants and ensure I capture behaviour.
2) Urban environments are home to wildlife too, so keep an eye out for hedgehogs, peregrine falcons and foxes.
3) Shooting subjects in the context of their environment helps me tell a story about them.

"My favourite technique..." Shooting in bad weather

"Weather can create a wonderful sense of atmosphere. Images taken in harsh weather conditions such as snow or rain can also give a powerful insight into the subject's life. They can show the type of conditions that the animal must face in order to survive. Weather also adds an extra element to a shot, which can alter the viewer's perception. Falling snow and rain can look dramatically different depending on the shutter speed used, so I always experiment to find the most suitable results for each image. I am often asked how I protect my equipment when shooting in wet weather conditions. I must admit I don't go to any extraordinary lengths, but I permanently keep a neoprene cover on my longer lenses. This helps to protect the lenses on a daily basis, and keeps white Canon L-series lenses nicely camouflaged! I also have a waterproof cover that fits over my camera and lens – even with a 500mm attached. This is a must when shooting near saltwater!"

Favourite subjects

ALL IMAGES: BEN HALL

1) MOUNTAIN HARES I spend a lot of time in winter capturing mountain hares. By December their coats are almost pure white making them look beautiful against a snowy backdrop.

2) GREAT CRESTED GREBES One of the first subjects I concentrated on when my interest in wildlife photography started. These stunning birds display an amazing array of behaviour.

3) BROWN BEARS Seeing my first brown bear in the wild is an experience I will never forget. I now teach on several bear workshops each year in the Carpathian mountains in Slovakia.

4) RED DEER I look forward to October, not just for the warm light and autumnal colour, but for the start of the annual red deer rutting season. Hearing the clashing antlers gets my heart racing!

5) ORCAS The thrill of seeing wild orcas is truly unforgettable. Each year I head to Iceland to photograph them against a breathtaking backdrop of snow-capped mountains.

Ultimate wildlife kit

IF YOU'RE STARTING TO GET SERIOUS ABOUT WILDLIFE PHOTOGRAPHY THEN YOU WILL WANT TO INVEST IN KIT THAT'S UP TO THE DEMANDS OF THIS CHALLENGING CRAFT. HERE ARE A SMALL SELECTION TO CONSIDER – BEST START SAVING!

WILDLIFE LENSES

Good pulling power is essential when choosing a lens for shooting wildlife, so be sure to pick a good one. These guarantee great results...

BEN HALL

Sigma 150-600mm f/5-6.3 DG OS HSM/S

£1,500

Sigma's super-telephoto zoom is perfect for wildlife. This dust- and splashproof beast comes equipped with an Optical Stabiliser (OS) function and a array of premium optics. Its HyperSonic Motor (HSM) provides quiet and fast AF – essential for nature photography. Check out the test on page 152.

Tamron SP 150-600mm f/5-6.3 Di VC USD

£740

If you wish to capture intimate close-ups of birds and mammals, Tamron's high-performance super-telezoom might just be the lens for you. It boasts Vibration Compensation (VC) and an Ultrasonic Silent Drive (USD) to aid image quality and focusing. It also has a useful maximum magnification ratio of 1:5.

Sigma 70-300mm f/4-5.6 APO DG Macro

£100

A truly affordable lens for wildlife, this Sigma is compact and lightweight, making it a great choice for travel. 70-300mm is a really useful focal range and its Apochromatic (APO) construction delivers good image quality. Its impressive 1:4 maximum magnification, makes it useful for shooting all kinds of creatures.

Canon EF 100-400mm f/4.5-5.6L IS II USM

£1,900

This is a popular lens among nature photographers who shoot on Canon EOS DSLRs. This is the second generation model – the first can be picked up used for far less. It's a lens renowned in the industry for image quality and superb handling in the field. It also has a handy minimum focusing distance of 1.8m.

Canon EF 400mm f/5.6L USM

£920

Canon users who prefer a prime length should consider this high-performance lens with a constant aperture of f/5.6. Its fast AF and portability make it perfectly suited to shooting wildlife. It weighs a relatively modest 1,250g and the tripod collar makes it easier to switch formats when mounted on a support.

Nikkor AF-S 80-400mm f/4.5-5.6G ED VR

£1,800

This 5x telephoto zoom offers superb image quality for Nikon users. Its Vibration Reduction (VR) technology allows photographers to shoot at up to four stops slower than would be possible otherwise. Although quite chunky, it is comfortable to use and small and light enough to suit handheld photography.

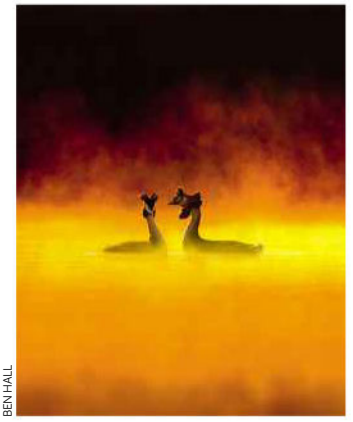
Nikkor AF-S 300mm f/2.8 ED VR II

£4,000

If you need a fast telephoto, look no further. A truly professional, fast, quiet telephoto lens – perfect for shooting fast action and for use in low light. Its Nano Crystal Coasting suppresses ghosting and reduces flare. Nikon's latest 300mm, tested on page 154, offers a more compact option that is also considerably cheaper.

WILDLIFE SUPPORTS

There are just some gadgets that we can't live without as wildlife photographers. These are the ultimate in accessories to prop up your camera, support that heavy telephoto lens and make life easier in general...



BEN HALL

Benbo 2 Tripod

£150

This is a heavy-duty aluminium tripod. Benbo is renowned for its innovative and unique tripod design, which enables them to be positioned in almost any configuration. They are great for low level work and are a popular choice among nature photographers. The Benbo 2 offers extra height thanks to its longer legs.

Gitzo GT3532LS Series 3 6X Systematic Tripod

£580

Another heavyweight performer from Gitzo: the Rolls Royce of the tripod world. The Systematic range is designed without a centre column, making them quick and easy to position low to the ground. Being carbon-fibre, they are surprisingly light and have a load capacity of 25kg.

Wimberley WH-200 Mk II

£520

A specialised head, designed for photographers who use long, heavy telephotos. Its Gimbal-type design enables photographers to rotate telephotos around their centre of gravity, making them easier to manoeuvre. The Wimberley head has become a firm favourite with nature enthusiasts due to its build quality and sturdiness.

Manfrotto MM294C4 carbon-fibre monopod

£60

If you need a monopod, you want one that is lightweight, but remains effective and sturdy. This four-section design is rigid and portable. Its leg locks make adjusting height a quick and easy thing to do. Thanks to its carbon-fibre construction, the support weighs just 0.5kg, so it's perfect for transporting.

Giotto's MML3270B aluminium monopod

£25

An excellent and compact four-section monopod. Fully extended, it is 167cm high and its large foam handgrip makes it a comfortable support to use. It has a weight capacity of 12kg and the camera can either be mounted directly to the top of the monopod, or a head can be attached.

Accessories

✔PORTABLE HIDE
Keep hidden in a freestanding dome hide by Wildlife Watching Supplies. They're easy to erect and pack away, available in different camouflage colours/ patterns and are made from proofed, breathable material.

✔BEANBAG
When taking photos from ground level or another solid surface, a beanbag is a must have. They are cheap, but surprisingly supportive in the right situation.

✔MEMORY CARDS
SanDisk Extreme Pro SDHC cards are some of the fastest on the market. Ideally, opt for 32 or 64GB cards – the added capacity will prove useful when shooting high-speed bursts.

✔BINOCULARS
One of the biggest challenges of wildlife photography is locating suitable subjects in the first place. Nikon's Travelite binocular range is powerful, yet lightweight .

✔WI-FI REMOTE
You don't always have to be sat behind your camera to capture great wildlife shots. A wireless camera control, like CamRanger or WeFe, allows you to control your camera remotely from your iPad, iPhone or iPod Touch.

Contacts

Benbo: www.patersonphotographic.com
Camranger: www.camranger.com
Canon: www.canon.co.uk
Giotto's: www.giottos-tripods.co.uk
Gitzo: www.gitzo.co.uk
Manfrotto: www.manfrotto.co.uk
Nikon: www.nikon.co.uk
SanDisk: www.sandisk.com
Sigma: www.sigma-imaging-uk.com
Tamron: www.tamron.eu/uk/
Weye Feye: www.weye-feye.com
Wimberley: www.tripodhead.com

PHOTOGRAPHING CAPTIVE ANIMALS

WITH A LITTLE VISION YOU TOO CAN TURN A REGULAR TRIP TO YOUR LOCAL WILDLIFE CENTRE INTO A PHOTO EXPEDITION. HERE'S SOME PRO TIPS AND TRICKS TO CAPTURING GREAT ANIMAL PORTRAITS...

A DAY AT THE ZOO is not just for kids – in fact, leave the friends and family at home and spend your day with your telephoto zoom and camera – it'll be much more fun! Instead of being dragged by the trouser leg from one enclosure to another; you can spend all the time that you want photographing the animals.

Most of us might be morally split by wild animals in captivity but, whatever your stance, for many a wildlife park or zoo is the nearest they'll get to seeing these spectacular creatures. We chose to spend a day at ZSL Whipsnade Zoo in Bedfordshire, which has been operating since 1931 and houses an incredible number of species including brown bears, chimps, giraffes, an African lion pride, Asian elephants and the Amur tiger; there really are not enough hours in a day to see them all! Local zoos or wildlife parks are also great options and are often quieter and smaller and while some may lack the bigger animals, still have plenty to offer.

The beauty of a wildlife park or zoo is that you can predict their activity reasonably well based on their schedule. For instance, when it's feeding time you know a tiger may be too preoccupied eating to get a decent shot; but for the chimps it's the best time to visit their enclosure for close-ups. Although you may have a better chance to get engaging portraits of wildlife as you have a captive audience, it still has its challenges; such as shooting through or around obstacles like wire fences and people, working with low or harsh natural light, and from difficult viewpoints. Often the best portraits come with eye contact, a shallow depth-of-field and an eye-level viewpoint to connect the viewer; all much easier said than done, so we've got a few pieces of advice....

Pro tip

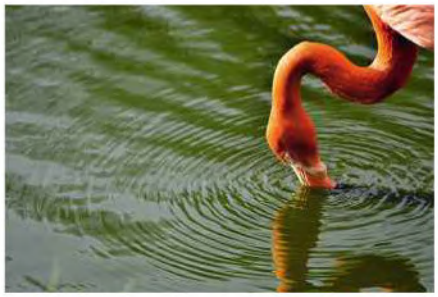
While it's tempting to use flash in dark enclosures, ask permission before you do in case it causes distress to the animals.

ESSENTIAL EQUIPMENT: For the best image quality, you need a camera that performs well at high ISOs and, for most animals, a fast, long lens. Due to the 1.5x or 1.6x crop, an APS-C camera (like the Nikon D7200 or Canon EOS 70D) will turn a 70-200mm f/2.8 into roughly a 105-300mm f/2.8 for greater reach. You might also want to consider one of the 300mm zooms by Nikon, Tamron or Sigma – it will extend your reach to 450mm on APS-C but sacrifices some of the soft depth-of-field you get with the faster f/2.8 telephotos. While handheld is the most flexible way to shoot, camera shake can be a problem when using long focal lengths, so consider a monopod; a tripod can be restrictive in a crowded zoo. A fast 50mm lens is ideal for low light and close subjects, like you'll find in enclosures.

CAMERA SETTINGS: Few animals move fast in captivity, so your biggest consideration is to find a shutter speed that eliminates camera shake. The reciprocal rule should steer you right: if you're using a focal length of 300mm, make sure your shutter speed is at least 1/300sec, especially if shooting handheld. Set your autofocus to single-point so you can focus through fences and be precise with your focal point when shooting with wide apertures. Continuous focusing may also increase your rate of sharp images.

Use aperture-priority or manual mode. Set f/5.6 or wider and a low ISO; increasing it as needed to achieve a sufficient shutter speed. As you may be in and out of enclosures, set your White Balance to Auto as a fail-safe option and tweak in Raw editing, if needed.

"WHILE HANDHELD IS THE MOST FLEXIBLE WAY TO SHOOT, CAMERA SHAKE CAN BE A BIG PROBLEM WHEN USING LONG FOCAL LENGTHS"

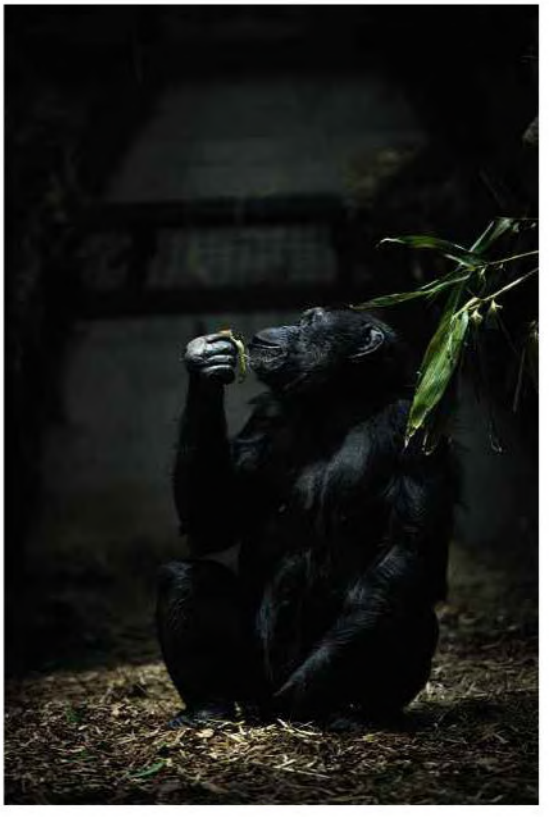


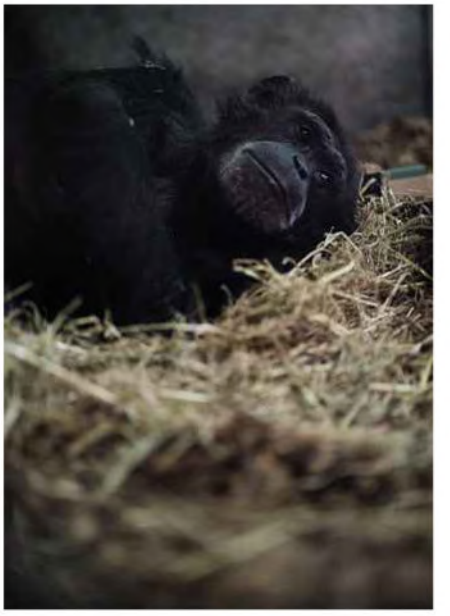
FLAMINGOS: It's tempting to only concentrate on the large mammals, but birds are usually aplenty at wildlife parks. From owls and eagles to exotic parrots and colourful peacocks. Uncaged birds, like flamingos, are often the easiest and most photogenic to photograph though as they cannot fly away and you can incorporate their bright, colourful reflections in the composition, too.

BEARS: These grizzly but majestic creatures are often in enclosures with thick woodland, making it easy for them to hide. The viewing platforms are often elevated, making interesting compositions tricky. Wait for the bears to come out of the wooded areas and get as low as you can. Try to predict the creature's path and get in front of the bear, so when it stops or looks up you can capture your portrait.

THE BEAR NECESSITIES!
Look out for low-level viewing areas with reinforced glass: you'll have to wait for the bear to come to you but it's worth the wait.

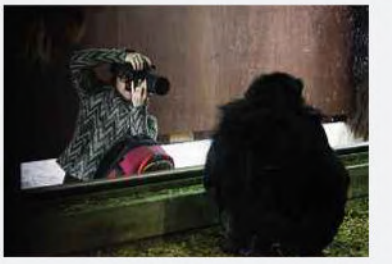
Exposure: 1/1000sec at f/2.8 (ISO 200)





CHIMPANZEES: You'll often need a long lens for photographing chimpanzees outside, but a fast portrait lens is ideal for their indoor enclosure. Make sure you've a front-and-centre spot for feeding time, set a very high ISO (often over 1000) and your widest aperture. The light will be low with natural light falling from above – look for shafts of light and be patient. Often the chimps will come to you.

HOW TO: Shoot through glass



If shooting through reinforced glass, use a polarising filter to control any reflections or try to shield your lens with its lens hood, your hand or – if all else fails – put your coat over your head. Get as close to the glass as possible. The angle of your lens can also aid or worsen reflections, so it's best to keep it parallel to the glass whenever possible. When focusing through thick glass, your images may look softer than usual, especially if the glass is murky from fingerprints, dust and grime. Look for areas of glass that are clean and ensure your shutter speed is fast enough to avoid softening the image further.

LIONS: Whipsnade Zoo has a glass viewing area for its lion pride, which although is challenging to shoot through thanks to paw prints, dirt and grubby fingerprints, allows you to get within touching distance for strong eye contact and detail shots. Big cats are not usually very active, but be at the ready to catch some action and strong eye contact once they're on the move and they turn their attention to you. Use a telezoom with a wide aperture to zoom in to a strolling cat to capture a strong portrait with blurred background. Shooting through crowds of people can also create nice effects, like the image in the top right.

"BIG CATS ARE NOT VERY ACTIVE, BUT BE AT THE READY TO CATCH SOME ACTION AND EYE CONTACT ONCE THEY'RE ON THE MOVE"

BACKGROUNDS: If you want your images to look like they've been taken in the wild, angle your camera to avoid including telltale fences and wooden stakes as well as using a wide aperture to blur the background. Try waiting until the animal moves in front of foliage, get lower than your subject and shoot up towards the sky and/or fill the frame with the animal to increase background blur.

HOWTO: Shoot through fences

If you're using single-point autofocus and your camera is still finding it difficult to lock on to the animal, and not the fence, you either need to get closer to the fence so it's closer than your lens's minimum focusing distance or switch to manual focus. Some lenses, like the NIKKOR AF-S 70-200mm f/2.8 lens, have a focus-limiter switch that lets you set the lens to only focus from a few metres to infinity, which helps.

THE LION KING!
This lion kept walking circuits around its large enclosure, all we had to do was set up and wait for him to walk towards us.

Exposure: 1/1600sec at f/2.8 (ISO 200)

COASTAL LANDSCAPES

FEW LANDSCAPE PHOTOGRAPHERS CAN RESIST THE URGE TO REGULARLY VISIT THE COAST FOR ITS PHOTO POTENTIAL. FROM RUGGED CLIFFS TO CRASHING WAVES, GENTLE SAND RIPPLES AND GLISTENING BOULDERS, IT'S EASY TO SEE THE ALLURE OF THE SEA...

IMAGE: ROSS HODDINOTT

Raise a toast to the coast!

BEFORE YOU HEAD FOR THE COAST, BRUSH UP ON THE ESSENTIALS AND YOU'LL INCREASE YOUR CHANCES OF CAPTURING SOME CRACKING IMAGES

WE MAY COMPLAIN about the weather, Council Tax, the price of fuel and many other things, but living on an island like Britain has its advantages. For starters, how many other countries in the world are there that allow you the chance to reach the coast within a couple of hours' drive? Not many, and if you could, would you want to live there?

The fact is, us Brits are incredibly fortunate. Not only do we have an accessible coastline, but like our landscape, it's also full of variety: bustling tourist resorts, picturesque fishing villages, stretches of golden sand, desolate weather-beaten cliffs, heart-stopping views, pounding surf, tranquil coves...You name it and we've probably got it.

Add to that the vagaries of our climate, which can change the mood of a place in minutes, and you'll see that the coastline offers endless photographic potential. But you need to be prepared if you want to come away with show-stopping results, and this chapter tells you all you need to create your best ever coastal images.

Coastal kit

Wide-angle zoom

A 10-20mm (16-35mm on full-frame) range is ideal. It gives a massive angle-of-view, stretches perspective and depth-of-field is so extensive you can get low and close to emphasise lines and foreground interest. This is likely to be your most-used lens.

Standard zoom

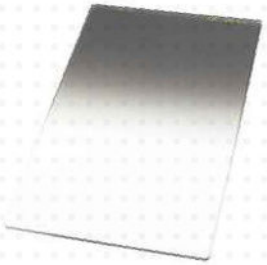
An 18-55mm (24-70mm on full-frame) or similar is ideal for general use when shooting all types of coastal scenery. The wide-end can capture dramatic views while the tele-end lets you fill the frame with details, from patterns in sand and rocks to peeling paint on old boats.

Telezoom

Though less useful than wider zooms, a 55-200mm (70-300mm on full-frame) lets you zoom in on distant parts of a scene, compressing perspective so the planes in a scene appear stacked – ideal for headland shots or scenes with crashing waves.

Tripod and head

The coastline can be a challenging environment so make sure you have a solid tripod and head to keep your camera steady in stormy weather, on wet sand or uneven rocky ground. The bigger the better really – aluminium is heavier but cheaper than carbon-fibre.



Neutral Density filters

ND grads in densities of 0.6 and 0.9 help tone down the sky so it doesn't overexpose. Solid NDs extend exposure times so you can record motion. A 0.6 (two stop) or 0.9 (three stop) is handy for general use, while six to ten-stop NDs allow daytime exposures lasting minutes.

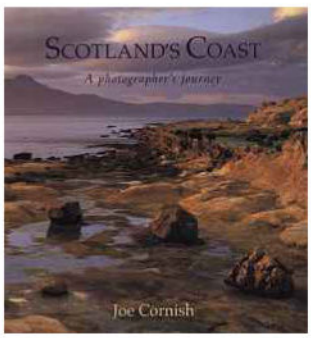
Polarising filter

Use a polariser to eliminate glare and reflections to improve your image's clarity, contrast and increase its colour saturation, to deepen blue sky and enhance cloud detail. A polariser can also be used to increase the exposure by two stops (like a 0.6ND filter) to blur the sea.

Accessories

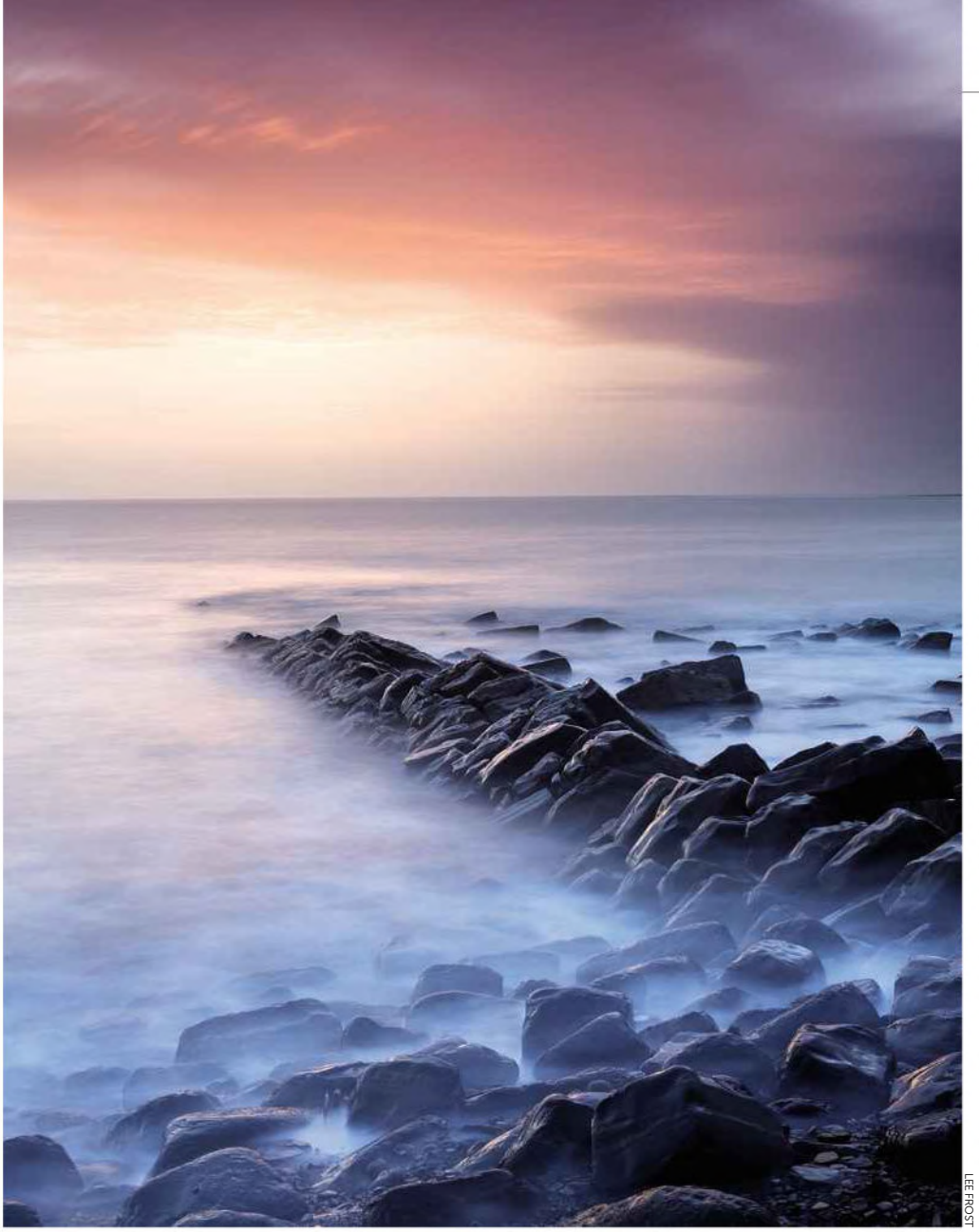
- **WATERPROOF COVER:** It can be a basic polythene cover like an OpTech Rainsleeve or something more sophisticated, but you need to protect your camera and lens if it starts to rain or there's sea spray around.
- **CLEANING CLOTHS:** Use them to keep your filters clean from dirt and water marks. Check filters regularly as they get coated quite easily and wash them under cold water if the film of spray is difficult to shift.
- **SPIRIT LEVEL:** Buy a hotshoe-mounted spirit level (they're incredibly cheap) so you can ensure the horizon is level (or use your DSLR's integral digital level if it offers such a function).
- **COMPASS:** Use this to check the direction you're facing and where the sun is likely to rise and set. You can download apps for your smartphone if a traditional compass is too low-tech!
- **TORCH:** Handy for seeing where you're going and what you're doing when you set out or head back in darkness, and also for painting with light in low light.
- **REMOTE RELEASE:** Use this to trip the shutter without touching it to prevent camera shake. Also for locking the shutter open for Bulb exposures.

Essential reading

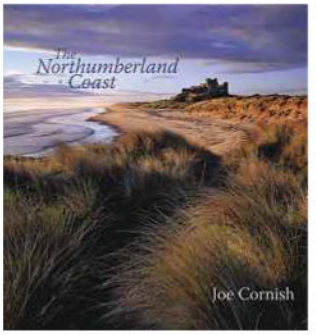


Scotland's Coast £6

No longer available new, but there are secondhand copies on Amazon and other websites. Joe is Britain's leading landscape photographer and this volume contains stunning images of Scotland's often wild and rugged coastline – the perfect companion if you plan to explore the Scottish coast.

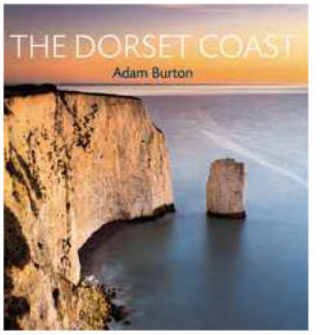


LEE FROST



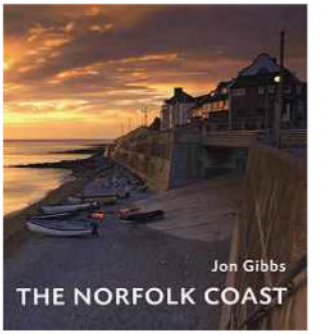
Northumberland Coast £13

Bit of a pattern emerging here, but yet another fantastic book of coastal images by renowned photographer Joe Cornish. This one concentrates on the beautiful, unspoiled coast of Northumberland and contains inspiring images of all the key locations – Bamburgh Castle, Holy Island, Alnmouth and more.



The Dorset Coast £12

A surprising number of pro landscape photographers live in Dorset, including Charlie Waite, Adam Burton, David Noton, Mark Bauer and Guy Edwardes. There are many good reasons for that, and the excellent images in Adam Burton's book cover most of them, from The Jurassic Coast to Golden Cap.



The Norfolk Coast £14

Norfolk is renowned for its quieter coastline – dunes, salt marshes, endless shingle beaches, broad sandy bays and picturesque villages – so it's a great place to head if you fancy an alternative to wild and rugged! Jon Gibb's book is full of inspiring images that will point you and your camera in the right direction.

Coastal Q&A

Q Is it worth taking a professional workshop?
There are lot of workshops covering UK coastlines. Contributors Lee Frost and Ross Hoddinott lead numerous workshops in Scotland, Northumberland, Dorset, Cornwall & Devon throughout the year and if you check the classified ads in *Digital SLR Photography* magazine you'll find more. Email Lee on info@leefrost.co.uk and Ross on ross@dawn2dusk photography.co.uk

Q What time of year is best to shoot the coast?
Regardless of the season, every day brings something different as the coast is in a constant state of flux. Summer's perhaps the least favourable season as the light and weather can be bland (and there are more tourists too!) but other than that you can take amazing shots any time.

Q What causes the tide to advance and recede?
Tides occur due to the gravitational forces from the moon and, to a lesser extent, the sun. The moon's gravitational pull causes the oceans to bulge towards it so in some parts of the world the tide is high and in others it's low. As the earth is rotating on its axis, this means the height of the tide is constantly changing as a location changes in relation to the position of the moon.

Q Is it more difficult to shoot the coast than inland?
The same techniques can be applied to all types of landscape – composition and the quality of light should take priority and you need to have a reasonable understanding of depth-of-field, the use of ND grads, ND and polarising filters and lots of patience. And a bit of luck!

Exposure considerations

OBTAINING THE CORRECT EXPOSURE AT THE COAST IS ONE OF THE MOST IMPORTANT ELEMENTS WHEN IT COMES TO GOOD IN-CAMERA TECHNIQUE...

GETTING THE CORRECT exposure is important regardless of the subject you're shooting, but you need to be even more careful when shooting coastal scenes as exposure error is more likely. This is mainly because the tonal range of a typical costal scene is brighter than a conventional landscape due to the reflectivity of the sea. Sand is also highly reflective and relatively light in tone so beach scenes can be problematic too. Underexposure is likely because your camera tries to record the scene as 'average' in its tonal range but many coastal scenes are brighter than average so they come out too dark. The brighter and stronger the light, the greater the error is likely to be, especially if there's sunlight reflecting off the sea and creating shimmering highlights.

This is nothing to worry about providing you're aware that it's likely to happen and ready to correct any error. The key is to check not only your preview image but also the histogram for that image because the preview image may not give you a true rendition of how the image has actually recorded whereas the histogram will. You can then use your exposure compensation facility to increase the exposure. Increase it in 1/3 stop increments so the histogram is either centred or biased towards the right side – a histogram biased to the left usually indicates the image is underexposed, which you should try to avoid. Often you'll only need to add +1/3 or +2/3 stop, but in more extreme situations – or for creative effect – you may need to increase the exposure by +2 stops or more. As your confidence grows, you'll know exactly what to do to get the best from a scene.

Aperture choice normally takes priority over shutter speed when shooting scenics, because you need to ensure you have adequate depth-of-field to achieve front-to-back sharpness. However, once you head to the coast, shutter speeds must also be given consideration as they control the amount of blur recorded in the sea and this can have a strong influence on the success of the final image.

The shutter speed you use will depend on the type of scene you're shooting and the effect you're trying to achieve. If you want to capture the drama of waves crashing onto cliffs, for example, you're going to need a fast shutter speed to freeze the flying water droplets – anything from 1/500-1/2000sec, depending on how ferocious the sea is and how big those waves are in the frame. Basically, the bigger and closer the waves are, the faster the required shutter speed.

At the other end of the range, long exposures of anything from a few seconds to a few minutes are often used by coastal photographers to smooth out the texture of the sea or transform it into an atmospheric mist so it contrasts with static elements in the scene, such as piers and jetties. The effect can look stunning.

Between these two extremes the options are many and varied and if you're a fan of coastal photography, it's worth experimenting with different shutter speeds on different sea conditions to see how they affect the way the sea records. You can check each image as you go and if you're not quite happy with the effect, shoot again using a slower or faster shutter speed. The 'milky' sea effect looks great, but don't be tempted to always use long exposures – sometimes it pays to record a little texture in the sea and for that you may only need an exposure of 1/4 or 1/2 second, especially if waves are washing across the foreground and you're using a wide-angle lens. Similarly, at dawn and dusk, while a 30-60 second exposure will give you nice misty effect on breaking waves, see what happens when you only expose the scene for five to ten seconds.

Timing is important too, especially with shorter exposures. If you want a streaky effect in the sea it usually pays to trip the shutter as a wave is receding rather than approaching as the 'draining away' effect tends to work better photographically,

Exposure Q&A

Q How do I stop overexposing the sky when I shoot coastal scenes?
You need to use a Neutral Density (ND) graduate filter. Align it carefully so that it covers the sky and reduces the sky's brightness to stop it overexposing. Usually a 0.6ND grad (two-stop) does the job but at dawn and dusk you'll usually need a stronger 0.9ND grad (three-stop) to cope with the higher contrast.

Q Will an ND grad confuse my DSLR's metering and cause exposure error?
No, putting the grad on the lens will even out the contrast of the scene and if you use your DSLR's multi-pattern metering (Evaluative for Canon, Matrix for Nikon) it should making getting the exposure correct even easier.

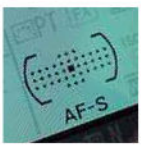
Q Is there any point in setting my DSLR to manual exposure mode?
Only if you want to ensure the exposure remains fixed – when shooting images for a stitched panorama, say. But generally, all manual mode does is slow you down so there's no benefit to using it.

Q How can I work out the exposure for a ten-stop ND filter?
Multiply the indicated exposure (without the ten-stop) by 1000. There are apps to do this, but if you remember that 1/30sec becomes 30 seconds the rest is easy because you just keep doubling from there – 1/15sec becomes one minute; 1/8sec becomes two minutes; 1/4sec becomes four minutes and so on.

Q Is a coastal scene ever likely to lead to overexposure?
Underexposure is more likely due to the fact that the sea and sand reflect a lot of light, but if the tones in a shot are predominantly dark then you may find your shots come out too light and you have to reduce the exposure to rectify this error. If there are dark rocks filling the foreground, for example.

Camera settings

AF mode: Single Shot/One Shot



Stick to Single Shot and use the focus lock, or select a focus point away from the centre of the frame, so you can control exactly where the lens focuses.

Exposure mode: Aperture-priority (A/Av)

This is the best mode for landscapes as it lets you choose the lens aperture to control depth-of-field and the camera sets the correct shutter speed.

Metering pattern: Multi-zone

Your camera's multi-zone pattern is the most reliable for general use. Canon uses Evaluative metering while Nikon's is called Matrix.

LEE FROST

Above: To ensure perfect coastal exposures like this, take a test shot and review the image and histogram on your LCD.

especially if the sea is streaked by white surf.

If the shutter speed you need to achieve a certain effect isn't slow enough, even with your lens set to its smallest (minimum) aperture and the ISO at its lowest, you'll need to use neutral density (ND) filters to cut the exposure. A 0.6ND increases the exposure by two stops (so 1/4sec becomes one second); a 0.9ND by three stops; a 1.2ND by four stops and so on. The ten-stop ND filter has become very popular for coastal photography as it increases the exposure by 1000x so you can open the shutter for several minutes in broad daylight and turn the sea to milk. If ten stops aren't quite enough, there's even a 16-stop ND filter now from Hitech called The Firecrest!

Pro view

Ross Hoddinott

"Living close to the coast, I learnt my photo mettle capturing the beauty of the Cornish coastline. One of the first things I learned was how achieving the correct exposure was a little more involved than when shooting landscapes inland. The risk of underexposure is far greater, due to the highlights being reflected off the water's surface, so greater care needs to be taken in terms of ensuring the scene is correctly recorded and detail isn't lost. The other key factor with exposure is the choice of shutter speed as this affects how water is recorded – I'm a massive fan of water being captured as a milky blur, so love to use long exposures."

ROSS HODDINOTT

White Balance: Auto (AWB) or Daylight

Auto White Balance is reliable but you may prefer a fixed preset, in which case use Daylight. Shoot Raw and you can change it during post-processing.

ISO Rating: ISO 100

Use the default low ISO setting for your DSLR, usually ISO 100, to ensure optimum image quality and only increase if you need a faster shutter speed.

LiveView

Use LiveView to aid critical focusing by magnifying the scene. It also helps accurately align an ND grad if you struggle doing it via the viewfinder.

Coastal composition

IT'S NO GOOD FINDING A STUNNING SCENE IF YOU'RE NOT SURE ON HOW TO MAKE THE MOST OF IT. FOLLOW THIS SIMPLE COMPOSITIONAL ADVICE...

COMPOSITION IS KEY in any coastal landscape, but how you tackle that will depend on a number of factors – what foreground features you have to work with; if there's a focal point in the scene; if the tide is in or out; how much sea you want to include; if the sky is interesting or bland; whether you're high up or down at beach level; the quality of the light, the time of day and sun position, the type of image you're hoping to produce and the lenses you have to work with.

If you're heading to a familiar location you may have a clear idea in mind of what you want to come way with – a wide-angle sunrise with sand ripples in the foreground, for example, or a long exposure shot with the sea washing over rocks. But you also have to keep an open mind because conditions may not be as expected when you arrive, or you may see the potential for a totally different shot. Assuming you do get exactly what you went for, there may also be the time to seek out other images – once you've got your sunrise, don't be too eager to dash off for a bacon roll and instead stick around for longer while the light is good.

The great thing about most coastal locations is that they present many opportunities for interesting images if you're willing to remove your blinkers and work the scene. Spend some time walking the beach and checking out your options – this is why it's worth arriving nice and early, so you've got time to spare instead of rushing around to find a viewpoint before the light goes.

Use different lenses to change the angle-of-view and perspective. Wide-angle lenses are generally more useful, but a telezoom can be used to home-in on crashing waves, for example, and to compress perspective so the receding planes and tones in the scene are crowded together. Look at the scene from higher or lower viewpoints – just kneeling down can make a big difference compared to standing up when it comes to emphasising foreground. If you place your camera close to the ground, even small sand ripples or rocks will dominate the foreground.

Check out different foregrounds too – rock ridges, pebbles, boulders, ripples in the sand, pools of water reflecting the sky or waves washing in front of you. Wait for the tide to come in or go out and see how that affects the scene. When the tide's high you may find that the beach disappears, but then as it recedes, rocks, pools and other features start to appear.

Man-made features can add compositional interest. Wooden groynes make great lead-in lines as they cut across the beach and at high tide are partly submerged. Shoot from an angle so they travel diagonally across the frame, or stand directly behind one so it forms a straight line towards the sea. Weathered concrete jetties and outflow pipes also create strong lines.

Piers are a feature of the great British coastline and though numbers are dwindling, there are still plenty around, especially on the south coast of England. You can shoot piers in many different ways – from beach level and off to one side; from underneath to capture the intricate pattern of struts and poles; from close up with a wide-angle lens or far away with a telezoom; from on the pier itself looking along the boardwalk. Sunrise and sunset are great times to photograph piers, in semi-silhouette against the fiery sky, but they also make good black & white subjects and are perfect for long exposure images with a ten-stop ND filter to record motion in the sea and sky.

An important factor when shooting wide-angle views is making sure you record everything in sharp focus. If you focus the lens on infinity, chances are the foreground will be out-of-focus, and if you focus on a point too close to the camera, distant features will be unsharp. To avoid problems, use hyperfocal focusing to maximise depth-of-field for the focal length and aperture you're using. This involves focusing the lens on a

FOR FULL-FRAME SENSORS

	16mm	20mm	24mm	28mm	35mm
f/8	1.1m	1.7m	2.5m	3.5m	5.5m
f/11	0.8m	1.3m	1.8m	2.5m	4.0m
f/16	0.6m	0.9m	1.3m	1.7m	2.7m
f/22	0.4m	0.6m	0.9m	1.3m	2.0m

FOR APS-C SENSORS

	16mm	20mm	24mm	28mm	35mm
f/8	1.8m	2.8m	4.0m	5.5m	8.5m
f/11	1.3m	2.0m	2.9m	4.0m	6.2m
f/16	0.9m	1.4m	2.0m	2.8m	4.3m
f/22	0.7m	1.0m	1.5m	2.0m	3.0m

Above) Hyperfocal distances for popular focal lengths – focus at the distance shown for front-to-back sharpness.
1) The coast has no shortage of elements to include in the foreground, including rocks, piers and rock pools.
2) Don't forget that dramatic skies work well too!

Pro view

Adam Burton

"I'm constantly overwhelmed by the variety of possibilities that coastlines present in terms of composition. From finding different viewpoints to deciding how much foreground interest to include, coastal landscapes offer all sorts of challenges and opportunities. Every location is worth revisiting, whether it's at different tidal times or seasons, as you'll always find it offers something different. An ultra wide-angle zoom is the best choice of lens as it's so versatile, but be aware of not always leaving it set at its extreme end. One common problem many newcomers to coastal photography make is to shoot at too wide a focal length, which can lead to exaggerated foregrounds and the middle distance looking empty."

ADAM BURTON

LEE FROST

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specific distance – the hyperfocal distance – so depth-of-field extends from half the hyperfocal distance to infinity. See the tables, above left, for popular wide-angle focal lengths. Of course, the coastline isn't all about sweeping views – it can also be the source of some fascinating details.

Down on the beach, look for patterns created by pebbles, seashells, ripples in the sand, seaweed or weathered old driftwood washed-up by the tide. The colours and shapes in rocks make great natural still-lifes if you move in close with a standard zoom and fill the frame. You could while away hours – once you've taken a few interesting shots it's impossible to steal yourself away.

If you happen to visit a harbour on your travels, look for peeling paintwork on old doors and boat hulls, reflections in the water, coils of rope or lobster pots on the quayside, or crates of fish being off-loaded from trawlers. These kind of subjects are ideal for dull days, when scenes on a larger scale lack interest because the light is flat and the sky drab, and wherever you go on the British coastline, you're bound to find something.

Composition Q&A

ADAM BURTON

Q Is there a rule to how much sky I should include in a coastal scene?

Not really. If you want to play it safe you could divide the image area into three horizontal bands then place the horizon either 1/3 up from the bottom so the sky occupies 2/3 of the shot, or place the horizon 1/3 down from the top of the shot so the foreground dominates. But if the sky is amazing you may want that to take up most of the picture area and if it's boring you may reduce it to a narrow strip across the top of the frame. Heaven forbid, there may even be occasions when you place the horizon across the middle of the frame!

Q Which is best for coastal shots, landscape or portrait format?

It depends on the scene. The landscape format is more restful because it echoes the horizon, but if you turn the camera on its side you can emphasise foreground interest, especially lines. The eye has further to travel from bottom to top so the composition will be more dynamic.

Q How do I know if a coastal scene will make a good black & white image?

Set your DSLR to shoot in both Raw and JPEG, then select the Monochrome capture mode, so the shots you take will appear in black & white on your camera's preview screen and you can assess it there and then. The Raw file will still be colour, so you can convert it later.

Q Where should the focal point be positioned in a shot?

The 'rule-of-thirds' is handy here. Divide the frame into a grid using two imaginary horizontal and vertical lines then place your focal point on the top right or top left intersection. The top right intersection generally works best as we naturally scan an image from bottom left to top right.

What time of day is best?

TIMING IS EVERYTHING AT THE COAST. IT DICTATES THE TIDE, THE CONDITIONS AND, MOST IMPORTANTLY, THE QUALITY AND DIRECTION OF LIGHT...

WHEN YOU'RE SHOOTING coastal landscapes, the time of day is significant. It dictates how high, or low, the sun will be in the sky and, subject to weather conditions, the quality of the light, which is vitally important. The tide's height changes constantly throughout the day. High and low tide times also change each day by some 50 minutes.

The state of the tide influences not only the character and appearance of a location, but also the type of images you take of it, so either get hold of a tide table for the area or check a website such as www.bbc.co.uk/weather/coast/tides/. If you want to capture ripples on a sandy beach at dawn or dusk, for example, the tide needs to be receding so the sand's still wet and the ripples are fresh. By looking ahead at tide predictions you can establish the ideal day to get your shots and plan accordingly. Similarly, for waves crashing against the shore high tide tends to be more dramatic so there's no point turning up when it's receded! There are also serious safety implications where the tide's concerned – you don't want to find yourself cut off by the incoming tide or getting swamped by rogue waves because you assume the tide is going out when it's coming in!

Tides aside, the quality of light is always best at the very beginning and end of the day, but when you visit a particular location will depend on the direction it faces. Dawn shots are generally easy to take on the east coast because you can always find a location that gives you a view towards the rising sun. Heading for a location that faces east at dawn also allows you to shoot north or south and capture the coastline bathed in warm sunlight once the sun has risen over the sea. Equally, if you're on the west coast you shouldn't have any problems finding a suitable spot to shoot the sunset, and then to stay on to capture the wonderful twilight colours in the sky and sea.

That said, don't assume that as you're on the west coast you can't make use of first light, or that on the east coast sunsets are a no-go. The British coastline goes on a meandering journey, so even though you're on the eastern side, there will still be many places where you can shoot sunsets – and sunrises on the west coast. Alnmouth may be on the Northeast coast in Northumberland, for example, but you can shoot fantastic sunsets on the Aln Estuary. Beadnell Harbour a little further up the coast also faces west so it's ideal for sunsets.

Having established that a location is best at one end of the day or the other, make sure you get there early. If you're heading out for a dawn shoot and sunrise is 7am, arrive before 6.30am, so you have time to set-up and to make the most of any beautiful predawn glow, as it could be better than the sunrise itself! This may mean walking to the location in semi-darkness, so pack a headtorch.

Dawn can be breathtaking on the coast. The hues in the sky are reflected in the sea, wet sand and rock pools, filling the frame with vivid colours. Start shooting as soon as you arrive and don't stop – it's amazing how the light changes in 15-20 minutes, but you won't realise that until you see the images later. If nothing appears to be happening, be patient and wait – it sometimes takes a while for colour to appear in the sky. And once the

Pro view

Ross Hoddinott

"One of the toughest things you have to get used to as a landscape photographer are the long days shooting that are required to capture the glorious glow of sunrise and sunset. Throughout the year – in particular during the summer months – my alarm clock is set for very unsociable hours. To capture sunrise properly, I arrive at a location 30 -40 minutes beforehand to capture the predawn light. On mornings when mist is present, I'm presented with even more scope for great images. With sunsets, I follow the same discipline and arrive at a location at least 30 minutes ahead of the sunset time to find the best viewpoint. Then I wait and capture the scene in all its golden glory and hang around for the afterglow of twilight."

ROSS HODDINOTT


ADAM BURTON
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1) On blue-sky days, use a polariser to cut two stops of exposure and to saturate the coastline's colours.
2) Arrive 30 minutes before sunrise for the best light.

sun has risen, keep going. The quality of light during the first 30 minutes after sunrise can be amazing, with a rich natural warmth that kisses the coastline with gold. If the sun's too bright to include in your shots, turn away and capture the coastline side-lit instead.

Dusk shoots are basically the same as dawn but in reverse and minus the early alarm call! You can also anticipate the light more at the end of the day because you're out there, watching the weather, and seeing it change.

The last hour before sunset is often called the Golden Hour due to the richness of the light. Use the scene's long shadows to reveal texture in foreground details, such as sand ripples and capture rocks and headlands bathed in sumptuous light. Once the sun dips below the horizon, if there's broken cloud in the sky you may get to shoot a wonderful sunset. If the sky is cloudless there won't be much sunset action, but it's worth staying put for twilight, when light levels will be low enough for a long exposure to blur the sea into an ethereal mist.

An important factor to bear in mind when planning dawn and dusk shoots is that the position of sunrise and sunset varies quite significantly through the year. It rarely rises due east or sets due west – during summer it rises north of east and sets north of west then as we go through the year it rises progressively further south of east and sets south of west. This makes a big difference to where the sun is in relation to a scene. It's only by returning to locations time and time again that you realise this.

What you do with the day after the sun has come up and until the Golden Hour will depend on the weather. Sunny blue-sky days are pretty rubbish for colour coastal landscapes after 9am, though if there are interesting clouds you can use a polarising filter to saturate colours. You can also produce some great shots in strong sunlight if you have an infrared camera or filter.

Stormy weather is great at any time of day because there's always drama in the sky and the sea looks aggressive. Capture waves crashing on rocks and consider converting the images to black & white. Alternatively, use a ten-stop ND filter to record motion in drifting clouds and choppy sea. Contrast this softness with static features such as rocks, jetties, posts and groynes. Dull, overcast days are also ideal for ten-stop shots, or if that's not your bag, shoot details instead.

The only thing that can spoil your day by the sea is rain, but any other kind of weather can be used to your advantage, so if conditions aren't quite what you expected, dig deep and stay put – if you can take great shots in naff light, imagine how much better they'll be when the light's fantastic!

Time of day Q&A

Q Which forecast website is the best?
No single forecasting website gets it right all the time so your best bet is to check a few, compare what they predict to the actual weather and decide on the best. Try metoffice.gov.uk, metcheck.com and xcweather.co.uk. Cloud cover and precipitation are the main factors – there's no point heading out for a dawn shoot if 98% cloud cover and heavy rain is forecast! During the day you can see the weather and watch it change so if you're out you might as well make the most of it!

Q Are there any apps I can buy that will help me predict the light?
There are several mobile apps worth checking out. The Photographer's Ephemeris (photoephemeris.com) tells you when and where the sun (and moon) will be, from anywhere on earth. It costs £6.99 from the App Store and is compatible with iPhone, iPad, Android and desktop devices. PhotoPills (photopills.com) is similar but more tricksy. Take a shot of a scene with your smartphone and it calculates when the sun will be in prime position. It also includes depth-of-field, field-of-view, exposure and time-lapse calculators and even Milky Way info, all for £7.99. Photopills is only compatible with Apple products at the moment but an Android version is on its way.

MASTER OF COASTLINES...

Lee Frost

Biography

Lee was born in Yorkshire in 1966 but his love of photography – and the coastline – really took hold when he moved to Devon as a teenager. During his early 20s he worked as a writer on various photography magazines before embarking on a freelance career in 1992. Since then he has made a name for himself as both a best-selling author and an accomplished landscape and travel photographer. He travels all over the world, leading photographic workshops and tours, and shoots for picture libraries such as Getty Images. Lee now divides his time between Surrey and the Northumberland coast.

"I'VE ALWAYS BEEN attracted to the coast. On holidays as a child, in places like Skegness or Bridlington, I loved the sound of the ocean and the smell of the sea air. It's good for the soul! In 1995 I was fortunate to be commissioned to shoot a book on Northumbria and spent a year exploring the region. It was the coastline that captivated me most – beautiful, quiet and, back then, relatively undiscovered. So much so that a few years later I relocated to Northumberland with my family.

"Living by the sea and having locations such as Embleton Bay, Bamburgh and Holy Island all within easy reach proved to be a massive turning point in my career and I found myself shooting more coastal images than anything else. I still do.

"What attracts me most to the coastline is that it's in a constant state of change. As with any type of landscape, the weather, seasons and time of day play a major role in defining its character, but the tide also plays a significant role, revealing features as it recedes then covering them again as it rises; eroding, moving and shaping as it goes. You would visit the same beach every day for a year and it would look different on every occasion – ripple patterns never stay the same, rock pools come and go, debris (both natural and man-made) gets washed up then carried away again. It's an ever-changing stage on which to work.

"Planning is key. If I intend to head out I start checking the weather forecast several days before and monitor it daily. For dawn shoots I make a final check the night before to see if it's worth bothering with an early start. I also check the sunrise and sunset times so I know what time I need to be on location and make sure I'm aware of the high and low tide times.

"You need to be open-minded and willing to adapt when shooting by the sea. I usually set out with a goal in mind, but if conditions make achieving it unlikely then I'll happily change tack. In overcast or cloudy weather I'll look for details that benefit from the soft light, such as rock patterns. I also shoot a lot of long exposures with a ten-stop ND filter – that technique suits 'bad' weather – or I'll shoot with the intention of converting my images to black & white. I hate wasting time or coming home without a few shots in the bag, but on the coastline it's virtually impossible not to find something inspiring."

www.leefrost.co.uk

LEE FROST

Lee Frost's kit bag

1) F-Stop Loka with Large Pro ICU: It's the best backpack I've owned – it has loads of space, is well made and it's comfortable.

2) Canon EOS 5D Mk III: Superb image quality, excellent metering and a quality screen make it a joy to use.

3) Canon EF 24-70mm f/4L IS USM: Smaller and lighter than the f/2.8 with IS too. A brilliant all-rounder.

4) Canon EF 16-35mm f/4L IS USM: A great ultra-wide zoom from Canon; cutting-edge optics with image stabilisation.

5) Canon EF 70-300mm f/4-5.6L IS USM: Super sharp and ideal for compressing perspective or isolating details in a scene.

6) Zeiss Distagon 21mm f/2.8 T*: A beautifully made wide-angle prime; the sharpest there is and a great focal length.

7) Samyang 14mm f/2.8: Ultra-wide lens for those big coastal views, great for filling the foreground, sharp and cheap.

8) Lee Filters ND grads: 0.45, 0.6 and 0.9 'hard' grads when the horizon is clear and 0.6 and 0.9 'soft' grads when it isn't.

9) Lee Filters Big and Little Stoppers: I love using long exposures for coastal shots and these six and ten-stop versions make it happen.

10) Hitech ProStop IR ND filters: I have six, eight and ten-stop versions. They're more neutral than the Lee alternatives and also less likely to break!

11) Heliopan slimline 105mm circular polariser: Screws onto the front of my Lee Filters holder via a 105mm threaded ring.

12) Hoya Revo 77mm circular polariser: Another slimline polariser that screws directly onto my 16-35mm and 24-70mm.

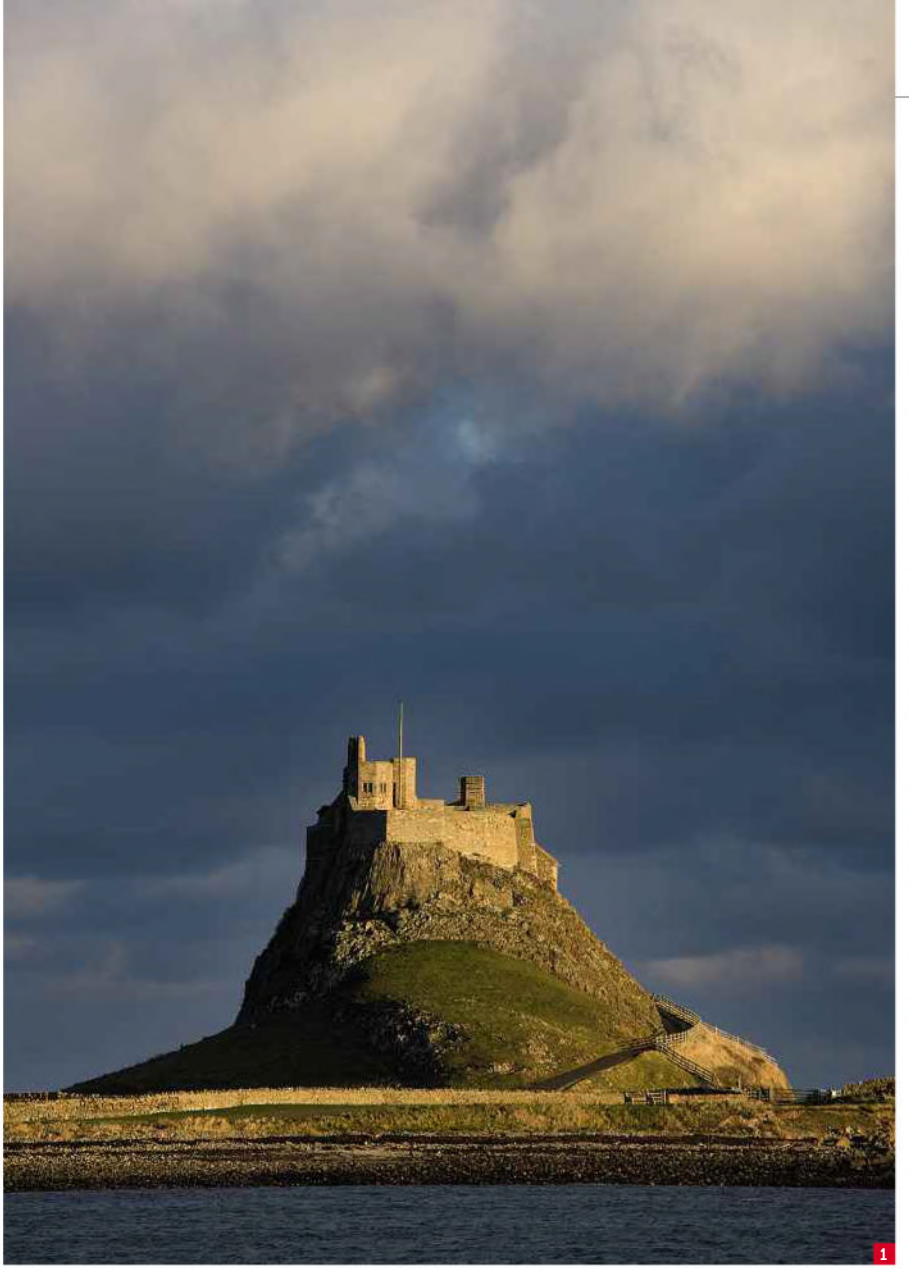
13) Gitzo GT3542LS CF tripod: Heavy duty, super-strong and well made, though the leg locks get choked with sand!

14) Really Right Stuff BH-55 Ballhead: Compact, rock solid and quick to use with the L bracket.

15) Fenix E15 torch: Handy when it's dark, measures only 6cm but delivers up to 170 lumens!

16) Remote release: I'm always losing mine so I buy cheap off eBay!

17) Sun Compass: An indispensable aid for sunrises and sunsets.



LEE FROST

1

Lee Frost's pro tips

LEE FROST

1) Put the odds of success in your favour by planning and preparing – check the weather regularly, make sure you know the tide times for the area, sunrise and sunset times and directions and, importantly, how to get where you're going!

2) There's a tendency to steer clear of well-photographed views (like Dunstanburgh Castle in Northumberland) but they're popular for a reason! Just try to put your own stamp on the shots.

3) Return to the same locations time and time again, in different weather conditions, at different times of day, in different seasons. Get to know them well and seek out new nooks and crannies.

4) Set your sights high. Don't assume that you'll never be able to take photographs as good as those by the top names. You can – it's not difficult! The harder you work, the luckier you get.

5) Do something with your favourite images rather than filling up hard drives. Make big prints and hang them on the wall for everyone to see, admire and celebrate – they're works of art!

1) Living on Northumberland's picturesque coast, Lee hasn't far to travel to capture amazing coastal scenes.
2) Shooting long exposures with extreme ND filters has proven to be one of Lee's favourite photo techniques.
3) The sparse nature of some coastal regions makes them the ideal location for minimalist fine-art images.

"My favourite technique"
Long exposure seascapes

"I started using this technique years ago, long before the Lee Filters Big Stopper was even a twinkle in its maker's eye, and I still love the effect! It produces beautiful fine-art images and works best on dull or cloudy days, which is great because the UK weather is often like that! My favourite long-exposure scenes contain stark man-made elements such as posts, groynes, jetties and piers, because they contrast well with the softness of the sea and sky. The camera has to be tripod mounted and the lens focused manually before the ND filter is attached. I also tend to use an ND grad on the sky and this is aligned first or by using LiveView. Exposures range from one to 15 minutes and I usually convert the images to mono." You can see several examples at: leefrost.co.uk/timeandtide.asp

2

LEE FROST

Ultimate kit for coastlines

FROM LENSES TO CAMERA BAGS AND FILTERS, IF YOU'RE PLANNING A PHOTOGRAPHIC ADVENTURE TO THE COAST AND ONLY THE BEST KIT WILL DO, HERE ARE A SELECTION OF TOP RECOMMENDATIONS FOR YOU TO CONSIDER


ROSS HODDINOTT

WIDE-ANGLE ZOOMS

You're more likely to use a wide-angle lens when shooting on the coast than any other, so it's well worth equipping yourself with a good quality zoom that covers ultra-wide to moderate focal lengths. Here are our recommendations

Canon

If you're a full-frame shooter, the EF 16-35mm f/4L IS USM (£700) is hard to beat. It boasts the latest optics for pin-sharp images corner to corner and has image stabilisation to reduce the risk of shake when handholding. For APS-C the EF-S 10-22mm f/3.5-4.5 USM (£420) covers the same effective focal length range of 16-35mm so it's ideal for those sweeping coastal views with big foregrounds and front-to-back sharpness. Special coatings reduce ghosting and flare.

Nikon

Nikon offers an AF-S 16-35mm f/4G ED VR with similar specifications to the Canon but less expensive (£830). It's Nikon's first ultra wide-angle lens with Vibration Reduction for full-frame cameras. It features a sophisticated optical design to maximise sharpness and minimise aberrations. The AF-S 10-24mm f/3.5-4.5 G DX (£640) is Nikon's APS-C offering with an effective focal length range of 15-36mm and a field-of-view of 109-61° – perfect for dramatic compositions.

Sigma

The 12-24mm f/4.5-5.6 II DG HSM (£600) is an affordable wide non-fisheye zoom for full-frame DSLRs, so if you're into ultra-wide photography it will suit you down to the ground. The latest incarnation also offers the best image quality yet. For APS-C users there's the 10-20mm f/4-5.6 EX DC HSM (£300) or faster £380 f/3.5 variant. Both are popular lenses that do not disappoint, producing crisp, contrasty images, so if you're on a budget, one of these could be the one.


ROSS HODDINOTT

FILTERS

If you want to get it right in-camera, you'll need three main photographic filter types when shooting coastal landscapes – Neutral Density (ND) grads, a polariser and 'extreme' Neutral Density (ND) for long exposure photography

ND grads

Ideally, buy a set of three – 0.3, 0.6 and 0.9 (one, two and three stops). Hard-edged grads are more effective than soft-edged but you need to use them with care if the horizon is broken. The two main brands are Hitech and Lee Filters. A set of three 100mm-wide grads costs £109 for Hitech and £169 for Lee Filters. Cokin are cheaper – P System (85mm wide) grads cost £44 for a set of three, or you can buy Hitech ND grads (£70) and use them in your Cokin holder.

Polarisers

If you have a Lee Filters or Hitech 100mm kit you'll need a 105mm screw-on circular polariser to fit to the front of the filter holder – the Lee Filters 105mm Landscape Polariser (£215), Sigma 105mm EX DG Circular Polariser (£179) or Heliopan 105mm slim circular polariser (£175). If you screw the polariser onto your lens, look at the Hoya Revo (£120 for 77mm), Marumi DHG (£55 for 77mm), Sigma EX DG (£100 for 77mm) and B+W (£175 for 77mm).

Extreme ND

No self-respecting coastal photographer will be without a ten-stop or similar ND filter. Slot-in 100x100mm options include the Lee Filters Big Stopper (ten stop) and Little Stopper (six stop) (£99 each) and Hitech Prostop IRND range (£99 each and all densities to ten stops). Hitech also make a 16-stop Firecrest ND filter (£120). If you prefer screw-in, look at the Hitech IRND (£150 for 77mm) and Hoya ProND 1000 (£79 for 77mm).

PHOTO BACKPACKS

Packing your kit for a coastal adventure? A good quality backpack not only makes carrying your gear much more comfortable but when you're shooting on the coast it will also provide your goods with protection from the elements. These three packs are all up to the job

Lowepro Dryzone BP 40L

£165

If you like to shoot in extreme weather conditions (wind, rain, rough seas) then this is the pack for you. It features a waterproof outer with a roll top which, when used correctly, will prevent water ingress even if you get caught by a rogue wave. It will carry a pro-sized DSLR with standard zooms attached and two more lenses up to 70-200mm, as well as accessories.

F-stop Loka

£260

Think high quality rucksack with a removable padded camera case inside and that's the Loka. You can customise the interior with one or more ICUs (Internal Camera Units) and it will swallow masses of camera kit as well as clothes, food and anything else you need for a day by the sea. Weatherproofing is good too, though an optional pull-on waterproof cover is worth buying.

Tenba Discovery Medium Photo

£85

The price tag will appeal to those on a budget who still want a quality pack. This one will carry up to two DSLR bodies and four to six lenses in the padded bottom section and accessories in the top section. It also has a waterprooof bottom panel, pullover waterproof cover for all-weather protection and the rear compartment can be used to carry a hydration bladder.

Clothing

✔**WATERPROOF JACKET:** This all-important outer layer will keep you dry and warm so don't scrimp and buy a good quality breathable (eg Gortex) jacket that will last for years. All the top outdoor brands produce them.

✔**MID-LAYER:** Light-weight jackets can be worn on their own in mild/dry weather or under your waterproof jacket for insulation in the cold/wet. Fleece is cheap and light, softshell is more expensive but also more effective and down-filled jackets are the warmest but most expensive.

✔**OVERTROUSERS:** Good quality breathable overtrousers will not only keep you warm when the cold wind blows but also stop your legs getting wet if you're shooting in the rain or near the sea. Full length zips up the sides will make it quicker and easier to put them on or take them off when you're wearing boots.

✔**GAITERS:** Wear these instead of overtrousers to provide waterproof protection for your legs to the knee, but if you wear them under overtrousers you'll have even better protection from rogue waves that wash over your boots.

✔**GLOVES:** There's no perfect solution in terms of keeping hands warm and being able to use camera controls. However, the likes of MacWet (www.macwet.com) provide gloves with decent warmth that allow you to operate the camera.

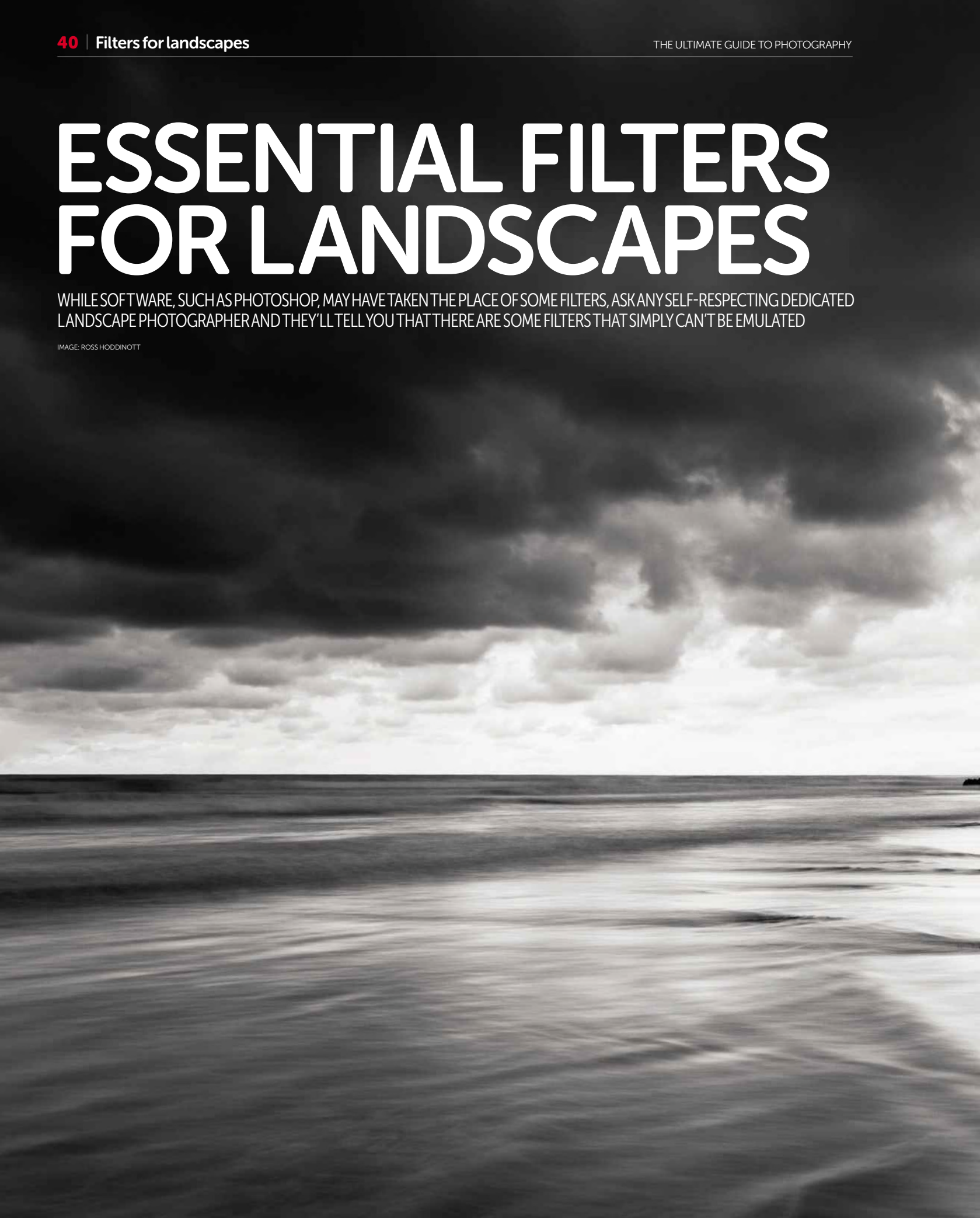
✔**HAT:** Prevent body heat escaping through your head – check out the Sealskinz's £20 Waterproof Beanie.

✔**FOOTWEAR: WELLIES** are the most practical option – look at brands like a Hunter, Le Chameau, Muck Boot or Aigle. Wear thick socks too! If you prefer hiking boots, wear gaiters to keep your feet dry.

ESSENTIAL FILTERS FOR LANDSCAPES

WHILE SOFTWARE, SUCH AS PHOTOSHOP, MAY HAVE TAKEN THE PLACE OF SOME FILTERS, ASK ANY SELF-RESPECTING DEDICATED LANDSCAPE PHOTOGRAPHER AND THEY'LL TELL YOU THAT THERE ARE SOME FILTERS THAT SIMPLY CAN'T BE EMULATED

IMAGE: ROSS HODDINOTT



The essential filters for landscape photography

GETTING IT RIGHT IN-CAMERA IS ALWAYS PREFERRED TO FIXING IT DURING PROCESSING. THE LESS TIME SPENT IN FRONT OF A COMPUTER, THE BETTER...

WHEN DIGITAL PHOTOGRAPHY overtook film, several people predicted the eventual demise of photographic filters. How wrong they were! While it may be true that modern software such as Adobe Photoshop and Lightroom has replaced the need for some specialist filter types, many more continue to play an essential role in photography – particularly when it comes to photographing landscapes. Quite simply, there are some things you simply can't replicate in Photoshop – such as the mesmerising effect of a circular polariser, or the light-absorbing and exposure-extending properties of a Neutral Density (ND) filter. Other filters, like ND grads, are designed to balance the exposure between the land and sky, allowing photographers to capture views authentically in-camera. Others, like UV and Skylight filters, are useful simply due to the physical protection they offer to your valuable optics – there's no software out there that can stop your lens from getting chipped or damaged!

While there is a huge choice of filters available to the photographer today, including special effect filters, coloured grads and soft focus filters, in reality most of these fancy effects are best added (if required) during post-processing, where they can be applied with greater precision and the effect can be easily undone if you decide that you don't like it. Therefore, during this guide, we will concentrate only on the filter types we feel are genuinely essential for landscape photography.

Filters are great corrective and creative tools, with the potential to transform your landscape images from good shots to great ones. If you have not used filters before, it is about time you did – you'll be surprised at the results possible and it will open up a whole world of creative possibilities to you. And, by the time you've finished reading this chapter, you will know everything you need to in order to choose the right filter for the job, use it correctly, and capture great filtered shots in the process.

Main filter types

Screw-in

Screw-in filters attach directly to the lens. They are available in different thread sizes – for example, 58mm, 67mm, 72mm and 77mm are all popular sizes. You simply need to buy a filter compatible with the diameter of your lens. Circular filters are easy to use and, being glass, are normally high quality. But unless every lens you own happens to share the same filter thread, you may need to buy the same filter type in different sizes. UV/Skylight and the majority of polarising filters are circular filters.

Slot-in

Slot-in filters are square or rectangular pieces of glass or optical resin that attach to the lens via a dedicated filter holder. One of the biggest advantages of using a filter system is that all of your filters will be compatible with all of your lenses thanks to inexpensive adaptor rings. Also, some filter types, like grads, are only available as slot-in. Most filter holders are designed with multiple slots, making it possible to combine filters together without vignetting, which is likely if you attach two or more circular filters.

Filter systems

A filter system is a holder – or bracket – that attaches directly to your lens via an adaptor ring. You can then slide square or rectangular filters into its filter slots. Slot-in systems vary in size. The most popular are 84/85mm and 100mm systems, with Cokin, Hitech and Lee Filters being the most popular. Smaller and larger systems are available, but generally speaking are less suited to use with digital SLRs. Some systems, like the Lee Filters holder, are customisable, so you can alter how many slots there are.

Adaptor rings

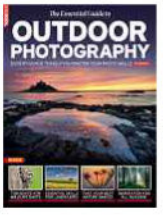
If you invest in a filter system, you will also need adaptor rings to fit all lenses in your kit bag that you anticipate using for landscape photography. Adaptor rings are available in different filter thread sizes. The holder can be quickly and easily attached and removed from the ring – useful for when you want to quickly swap filters from one lens to another. Some adaptor rings have been specifically designed for use with wide-angles, being recessed in order to further reduce the risk of vignetting spoiling your images.

ROSS HODDINOTT

> **“While it may be true that modern software has replaced the need of some specialist filter types, many more continue to play an essential role in photography – particularly landscapes”**

Essential reading

The Essential Guide to Outdoor Photography £9.99



www.amazon.co.uk

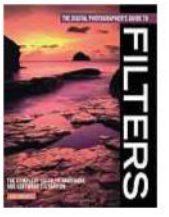
This guide to shooting the outdoors not only dedicates pages to using filters, but also offers advice and inspiration on capturing landscapes and nature. Guaranteed to help you develop your skills and passion.

Creative Optical & Digital Filter Techniques from £10

www.amazon.co.uk

Renowned author Joseph Meehan details how to use optical and digital filters in creative digital photography and gives enough inspiration to ensure you never leave home without a set of filters in your kit bag.

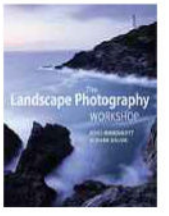
The Digital Photographer's Guide to Filters from £10



www.amazon.co.uk

A definitive book on photogenic filters for the digital age. After reading this book by Ross Hoddinott you will feel encouraged and inspired to explore the creative possibilities of using filters – traditional and digital.

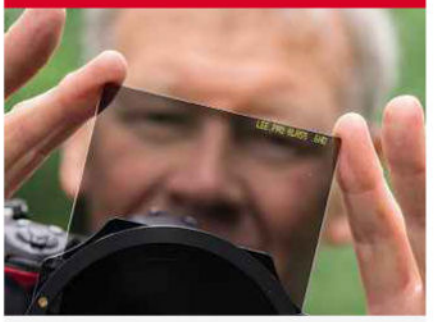
The Landscape Photography Workshop from £9



www.amazon.co.uk

This book aims to take the reader from the very basics of equipment and exposure through to advanced techniques. Landscape essentials, such as filtration, are covered in depth, giving you greater knowledge.

Landscape filters Q&A



Q Can you tell me what do UV and Skylight filters actually do?

They are designed to absorb the effects of ultraviolet light. Although this type of light is invisible to our sensory system, it can reduce contrast. While both filter types share the same role, Skylight filters are also tinted with a weak pink colouring to add subtle warmth to shadows, which can have a pale bluish hue caused by reflected skylight. However, in truth, they are most useful for protecting the front element of lenses. Being clear, they are ideally suited to this role, protecting the lens from dust, dirt, sand, moisture and getting scratched.

Q What are stepping rings?

They are designed to adapt a filter to a lens when the two have different diameters. For example, say you had a 77mm filter, but wanted to combine it with a lens with a filter thread size of 67mm – a suitable step-down ring would allow you to do this. They are relatively cheap and available in a variety of sizes. Step-down rings allow you to attach larger filters to smaller lenses; step-up rings enable you to couple smaller filters to larger diameter lenses. However, due to their nature, step-up rings greatly increase the risk of vignetting, so are normally best avoided.

Q I've heard of something called a 'filter factor'. What is this?

The 'filter factor' is an indication of how much light the filter absorbs. The higher the factor, the greater the light loss. Some filters, like UV/Skylight have no factor at all. However, a polarising filter has a 4x factor, meaning it absorbs approximately two stops of light. TTL metering will automatically compensate for a filter's factor, though, so you do not need to make any manual alterations to exposure when using filters.

Q Does it really matter what size filter system I buy?

Unfortunately, size does matter. The majority of wide-angles today have a large filter diameter of 72mm or 77mm. Therefore, if you opt for an 84/85mm system, the risk of vignetting is high. Due to the size of modern wide-angles, a 100mm system – like the Lee Filters or Cokin Z-Pro system – is a much better option. Although more costly, the larger filter size makes it possible to use filters without problems, even at ultra-wide focal lengths.

Transform scenes with a polariser

ARGUABLY THE LANDSCAPE PHOTOGRAPHER'S MOST USEFUL TOOL. HERE'S WHY YOU NEED A POLARISING FILTER...


1

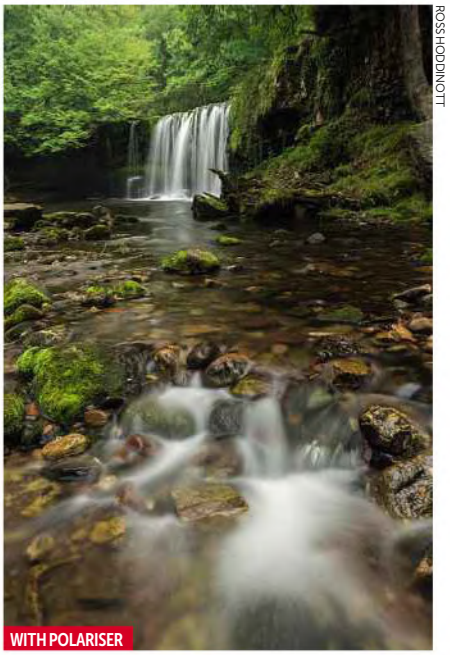
FOR LANDSCAPE PHOTOGRAPHERS, a polariser is a must-have filter. It could be argued that no other filter will have a greater impact on your images and its effect cannot be replicated in post-processing. Simply speaking, they are designed to reduce the effects of glare and reflections. By doing so, they restore natural colour saturation, giving your photographs more impact, vibrancy and 'oomph'.

Polarisers are made from a thin foil of polarising material sandwiched between two circular pieces of glass. By rotating the filter in its mount, you can vary the amount of polarised light passing through. Why is this useful? Well, in simple terms, polarised light causes glare and reflections, which reduces the intensity of a surface's colour. By blocking polarised light from entering the lens, the filter is able to restore natural contrast and vibrancy.

By rotating the filter in its mount while peering through the camera's viewfinder – or via your LCD monitor in LiveView mode – you will see reflections come and go and the intensity of colours strengthen and fade. The strength of the polarisation depends on the angle of the camera in relation to the sun. Metallic objects, like polished steel and chrome plate, do not reflect polarised light and so remain unaffected by the filter.

Using the filter is actually very easy; simply turn the filter until you achieve the effect you like. For landscape photography, the filter is most popular for making blue skies appear more vibrant. The sun contains most polarised light in the areas that are 90° to it. Therefore, taking photographs at 90° to the sun will create the strongest effect – this is known as 'Brewster's angle'. However, the most pronounced effect will not always produce the best result.


2 WITHOUT POLARISER


WITH POLARISER

ROSS HODDINOTT


3 WITHOUT POLARISER


WITH POLARISER

ROSS HODDINOTT

1) Rotating the polariser while looking through the viewfinder will allow you to determine the best result for your image.
2) A polariser is a staple piece of kit for shooting water, reducing reflections and increasing vibrancy.
3) Blue skies are intensified with the use of a polariser, giving colours in your shots more 'oomph'.

Many landscape photographers will invest in a polariser simply for its effect on blue skies. However, the filter has much more to offer besides. Due to how it is able to reduce glare reflecting from leaves and foliage, using a polariser will enhance your photographs of woodland interiors and also rural scenes.

Pro view

Lee Frost

"I always carry polarisers with me when I'm out shooting. I have a Heliopan 105mm slim circular polariser that screws to the front of my Lee Filters' filter holder so I can use it with ND grads, plus a Hoya Revo 77mm slim polariser that I screw on to my wide-angle zooms when I don't need other filters. I don't use polarisers as much as I did pre-digital, but I do find them useful for enhancing the sky in sunny weather, boosting contrast and reducing glare. A polariser also makes a huge difference when shooting water as it removes the silver sheen from the surface, boosts colours in damp weather and is a handy Neutral Density filter due to the two-stop light loss."

4

ROSS HODDINOTT

5

LEE FROST

Polariser Q&A

ROSS HODDINOTT

Q What is uneven polarisation?
This is a common problem you should be mindful of. The effect of a polariser is at its most pronounced at 90° to the sun and least effective at 180°. Therefore, at certain angles, you may find the effect of the filter performs irregularly – with the sky being darker in some areas more than others. This is known as 'uneven polarisation'. Short focal lengths, between 16-35mm, are most prone to the problem due to the broad expanse of sky they are able to capture. To alleviate uneven skies, the best options to try are to reduce the level of polarisation, use a longer focal length or (if possible) adjust your viewpoint.

Q Can you over-polarise a scene?
Yes, you can. The effect of a polariser can be very seductive, but over-polarisation will create unnatural-looking results, so be careful not to overdo the effect. Cloudless skies and photographs taken at higher altitudes are at most risk of looking too dark. You should be able to detect the problem through the viewfinder, but always review your images and check that skies remain natural looking.

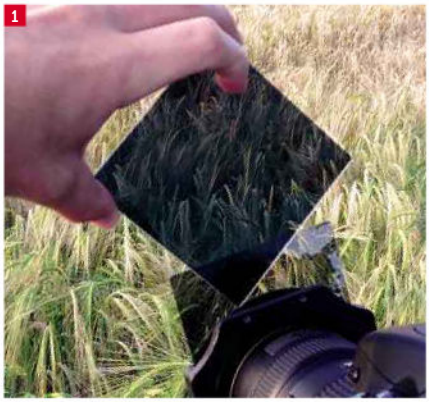
Q What is the difference between linear and circular polarisers?
Only circular polarisers will work properly with modern cameras. Although both varieties are circular screw-in filters, the design of the linear type affects the metering accuracy of digital cameras. This is because autofocus systems polarise a percentage of light in-camera, so if the light has already been polarised by a filter, the metering is affected. Circular polarisers are constructed with a wave-retardation plate, one-quarter of a wavelength thick. This allows the light passing through the filter to rotate and appear unpolarised to the camera's metering system, ensuring you get an accurate meter reading.

Q Do polarisers have a filter factor?
Yes they do. They have a filter factor of 4x, so they absorb up to two stops of light. However, your camera's TTL metering will automatically adjust for this. Due to their filter factor, polarisers can be useful as a makeshift Neutral Density filter, in order to lengthen shutter speeds to creatively blur subject motion, like moving water.

4) Boost blue skies and control reflected light using a polariser – the effect is visible through the viewfinder too.
5) Using a polarising filter can restore natural saturation to your images by cutting through reflected light.

Neutral Density

WANT TO LENGTHEN EXPOSURES IN BRIGHT DAYLIGHT? A NEUTRAL DENSITY FILTER WILL DO THE JOB



ROSS HODDINOTT

AT FIRST GLANCE, ND filters look rather uninspiring. They have a neutral grey coating, designed to absorb all the colours in the visible spectrum equally. In doing so, they are able to change the brightness of light without creating a cast. Therefore, with an ND filter attached, photographers are able to select a slower shutter speed than would have been possible otherwise.

So, why are they so useful? Well, by artificially lengthening exposure time, ND filters allow photographers to creatively blur subject motion – moving water, swaying crops and scudding cloud, for example, which produces landscape images with more interest, life and atmosphere. An ND filter can create the impression of movement – an effect that can only truly be achieved in-camera, when you trigger the shutter.

ND filters are produced in a range of densities, designed to suit different circumstances and needs. They are also available in both slot- and screw-in varieties. The darker grey they are, the more light they absorb. The most common strengths are one-, two- and three-stop ND filters. However, stronger, more extreme ten-stop versions are also popular (see page 50). An ND's strength is normally printed on the filter, or its mount. However, confusingly, brands indicate filter density differently. For example, 0.3 or 2x refers to a filter with a one-stop density; 0.6 or 4x is two stops; 0.9 or 8x is three stops, and so on.

Two or more ND filters can be combined to generate an even greater light loss. However, a 0.9ND – equivalent to a three-stop reduction in light – will often suffice, being strong enough to have a genuine effect on shutter length. For example, using one will lengthen a (unfiltered) shutter speed of 1/8sec to one second. This represents a significant shift in exposure with the potential to greatly change the appearance of the final image. The technique is most popular for making waterfalls or crashing waves appear as an ethereal milky blur.

When attached, Neutral Density filters darken the viewfinder image significantly, so it is best to compose and focus your image beforehand. Your camera's TTL metering will automatically adjust for the filter's factor, so you shouldn't need to make any manual adjustments, simply meter with the filter on.

1) The darker an ND filter, the more light it absorbs. They are available as both screw-in and slot-in types.

Pro tip: Colour casts

Although ND filters should be neutral, some can display a slight colour cast or sometimes an artificial cast can be created when ND filters are combined. The best way to neutralise any unwanted cast is to manually tweak the colour temperature in post-processing. This is relatively quick and easy to do, particularly if you are a Raw shooter. Simply adjust the White Balance and/or Tint sliders until the cast is neutralised.

2) If you want to generate a long exposure to creatively blur motion, select your camera's lowest ISO rating together with a small aperture. In this instance, ISO 100 and f/16 is selected, but the resulting shutter speed of 1/60sec is not long enough to create an attractive or intentional level of movement.

3) By attaching a three-stop solid ND filter, the shutter speed is artificially lengthened to 1/8sec. The longer exposure helps create a more deliberate level of blur that usually proves satisfactory, although on this scene I needed an even slower shutter speed. To achieve this I also attached a polarising filter. Doing so helps saturate the colours in the scene, but also lengthens exposure by a further two stops. The resulting shutter speed of 1/2sec creates just the right amount of implied water motion, achieving a real sense of movement.

4) Moving water adds interest and energy to images. In this instance, a three-stop solid ND filter was used to lengthen exposure time to a couple of seconds, which blurred the water as it dragged back over the beach. In doing so, it has created attractive trails that not only add interest to the photograph but lead the eye into the frame and towards the beautifully blurred wave rolling in, also created by the artificially long shutter speed.

Pro view

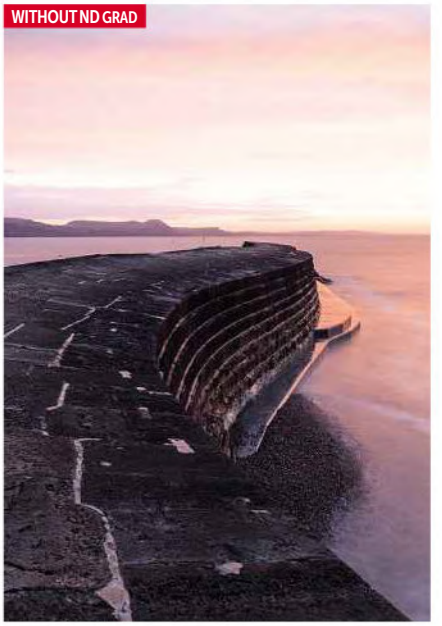
Ross Hoddinott

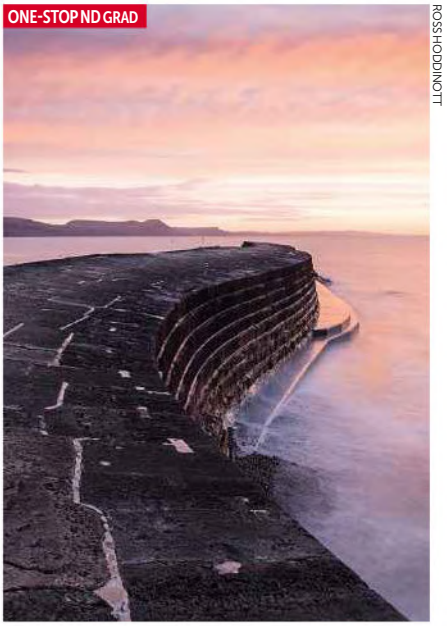
"You either love subject blur or hate it. Personally, I love it. I like the feeling of motion it can imply – a little subject blur can make landscape photographs look far less static and visually far more stimulating. I find I use solid ND filters quite a bit. While I like using extreme ND filters (turn to page 50), their effect can be too pronounced and key detail can be lost altogether if you are not careful. Therefore, I often favour a lower density ND – for example a three- or four-stop version. In the right light, this is enough to create an intentional level of subject blur, without things becoming too blurry. I enjoy shooting coastal landscapes with an exposure length of between 1/2sec and eight seconds, as this is lengthy enough to create atmospheric results, without being so long that detail and texture in the water disappears. My favourite ND is Lee Filters ProGlass three-stop version – extremely high-quality glass, perfectly neutral and optimised for digital cameras."

ROSS HODDINOTT

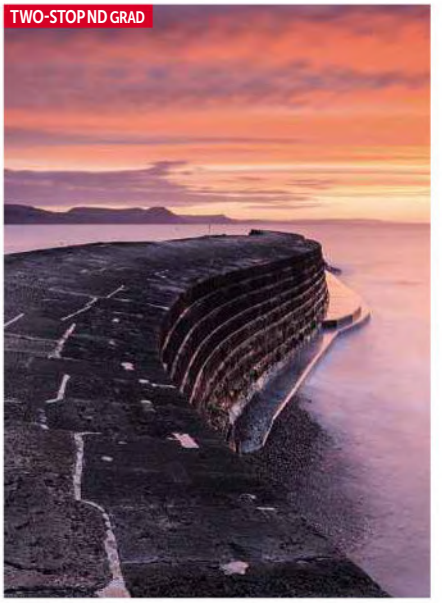
ND grads

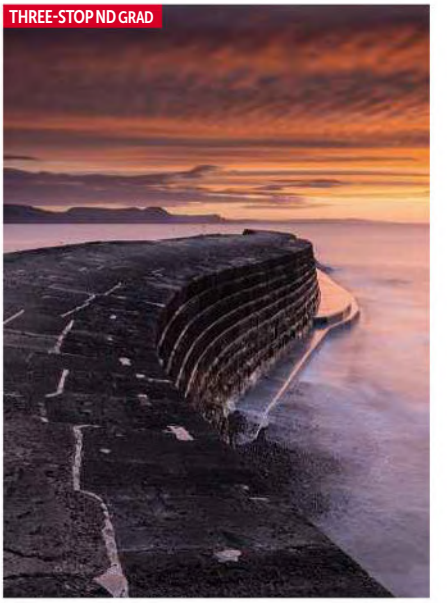
ESSENTIAL IN ANY LANDSCAPE PHOTOGRAPHER'S KIT, ND GRADS HELP YOU BALANCE EXPOSURES





ROSS HODDINOTT





THE SKY IS typically lighter than land, with the difference in brightness often equivalent to several stops of exposure, and the level of contrast being so great that it exceeds your sensor's dynamic range. For example, if you decide to expose for the brighter sky, your foreground will be recorded too dark; correctly meter for the land, though, and the sky will be too light and the highlights overexposed. Does this sound like a familiar problem? So what is the answer? One solution is to take two or more differently exposed images and blend them together during post-processing. However, there is also an in-camera solution. By using graduated ND filters, it is possible to balance the light in high-contrast scenes, allowing you get things right at the moment you trigger the shutter.

ND grads are designed to help photographers overcome the limitations of a camera's dynamic range and therefore remain an essential filter type for the vast majority of landscape photographers. They are typically rectangular, slot-in type filters, and are half-clear, half-coated – with a transitional zone where they meet. Grads are straightforward to use. With your filter holder attached, slide the ND grad in from the top and then – while looking through the viewfinder, or via LiveView – align the filter's transitional area with the horizon. By using a grad of an appropriate density, you are able to balance the contrast in light and bring the entire scene within the sensor's dynamic range – ensuring detail is retained throughout.

One of the most important aspects of

Above) This sequence of images shows how adding different densities of ND grads affects the final image – darkening the sky with each added stop. The three-stop grad is a step too far. **1)** Attaching a filter holder to your lens allows you to slot different ND and ND grad filters on quickly and easily. **2 & 3)** ND grads are essential where the land and sky require different exposures. It's important to align the transitional area precisely with the horizon to ensure you get a perfect result.

Pro view

Ross Hoddinott

"Despite the improving dynamic range of DSLRs, ND grads remain essential tools. The contrast between darker foreground and brighter sky can be several stops, so without grads it would be impossible to achieve a landscape that is correctly exposed throughout. I like to get things right in-camera whenever possible, and ND grads allow me to do this. Blending exposures doesn't appeal to me, as it requires more time on a computer and less behind the camera. I always carry a full set of hard and soft ND grads; I use a hard two-stop grad the most. Hard grads are particularly useful for the Cornish coastal landscapes I shoot nearby. I use Lee Filters: the quality is unrivalled and the larger-sized system is necessary for wide-angle views."

ROSS HODDINOTT

ROSS HODDINOTT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ROSS HODDINOTT


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using grads is careful placement – particularly when using 'hard' grads. If you inadvertently push the filter too far down in the holder – so that the coated area overlaps the ground – the land will be filtered, too, and will therefore look artificially dark. Equally, if you don't slide the filter down far enough, you will create an obvious bright 'band' close to the horizon where the sky remains unfiltered. However, with just a little practice, correct positioning of grads is easy to do and, if you do misalign the filter, the error is normally obvious when you review the image via playback.

ND grads are typically available in one-, two- and three-stop strengths. Which density you require will depend on the lighting. The most precise way to work out which density grad to use is to take a spot-meter reading from both the sky and land, and then calculate the difference between the two. For example, if the reading from the sky is 1/500sec and the one for the land is 1/15sec, the difference would be five stops (a 'stop' is a halving or doubling of an exposure value). This is a fairly typical level of contrast. However, it is worth remembering that our eyes naturally perceive the sky to be lighter than the land, so don't attempt to balance the light evenly. Instead, it is normally best to leave a natural looking two-stop contrast between the sky and land. Therefore, in a situation where there is a five-stop difference between sky and land, a three-stop grad would suffice – combining two grads, in order to generate five stops worth of graduation, would create a very unnatural and flat-looking result, which is best avoided. Similarly, too much filtration can make the sky look too dark or the land artificially light. The key to using any type of filtration is to try to create natural and believable-looking images.

ND grads Q&A

Q What is a soft grad?
Graduated Neutral Density filters are available as two types – hard- and soft- edged. 'Soft' grads have a feathered edge in order to provide a gradual transition from the coated portion of the filter to the clear zone. This makes them well suited to shooting views with uneven horizons, as they don't noticeably darken objects breaking the skyline, like hills, mountains, trees or buildings. However, only approximately a third of the filter is coated with the filter's full density before it begins to fade to transparent. This can be a drawback, as often the brightest part of the sky will be just above the horizon where a soft-edged grad is at its weakest.

Q What about a hard grad?
'Hard' edged grads are designed with a more abrupt transition, with the full strength of their density spread over a greater proportion of the coated region. They can be aligned with the horizon more precisely and allow photographers to reduce the brightness of the sky with greater accuracy than a 'soft' grad. They suit viewpoints with a straight horizon, like a beach scene. On the downside, they are less forgiving should you position the filter poorly, so use one carefully.

Q Can ND grads be used alongside other types of filters?
Yes, there is nothing stopping you from combining different filters. For example, you might attach a grad to balance the light in an unevenly lit scene, while also using a solid ND to artificially lengthen shutter length to blur motion. Different filters fulfil different roles. However, placing pieces of glass or resin in front of your lens will naturally have some effect on image quality – the more filters you use, the more it will be degraded. Therefore, it is best not to combine more than two filters at any one time, and don't ever use them just for the sake of it.

Q Does sensor size affect the effectiveness of Neutral Density grads?
To some extent. When using a camera with an APS-C size sensor, the graduated area effectively spans a larger area of your image. In other words, a grad grows softer the smaller the sensor size. Therefore, 'hard' grads may not be as abrupt as they might seem, while the effectiveness of a 'soft' grad can be slightly diminished. Smaller sensors will often get better results with 'hard' grads.

Extreme ND

WANT TO SHOOT EXPOSURES IN THE MINUTES, EVEN IN BRIGHT LIGHT? EXTREME NDS ALLOW YOU TO RENDER MOTION AS ETHEREAL BLUR

ROSS HODDINOTT

OVER THE PAST couple of years, extreme NDs have quickly become a 'must-have' filter for landscape photographers. With a filter factor of up to ten stops, they allow photographers to lengthen exposure to the extreme – even in good light you are able to employ a shutter speed of several seconds or longer. Their key characteristic is the effect they have on motion, creating surreal, atmospheric and eye-catching results.

Although six-stop (1.8/64x), eight-stop (2.4/256x) and variable ND filters are also available, it is the ten-stop (3.0/1000x) version that is by far the most popular. Using one allows photographers to employ artificially slow shutter speeds. For example, an unfiltered shutter speed of 1/15sec will be lengthened to one minute thanks to using a ten-stop filter – one stop is 1/8sec; two stops is 1/4sec; three stops is 1/2sec, and so on. During an exposure of this length, much can alter: drifting cloud will appear like brushstrokes; moving water will be recorded smooth and glass-like; while crops and foliage can create intriguing, wavy patterns. This is a creative filter with the ability to give your shots oodles of atmosphere. The effect it has on the landscape cannot be replicated during post-processing – this is very much an in-camera technique.

The density of extreme NDs is so great that you can see little, if anything, when you peer through them. Therefore, composition, focusing and any other filtration required needs to done prior to attaching the filter. Alternatively, LiveView can prove a great aid when using extreme ND filters. On some models – although not all – it will provide a clear enough image on the monitor to allow you to tweak composition and align ND grads without having to remove the filter first.

Extreme NDs are great filters – fun to use with the ability to transform a scene. However, like any filter, they need to be used appropriately. When the light is magical and fleeting, extreme NDs are best avoided.

ROSS HODDINOTT

1) A cool blue cast is a common result when using extreme ND filters, although this can enhance your shots.
2) These comparison pictures show how you can take a regular scene to new heights with an extreme ND.

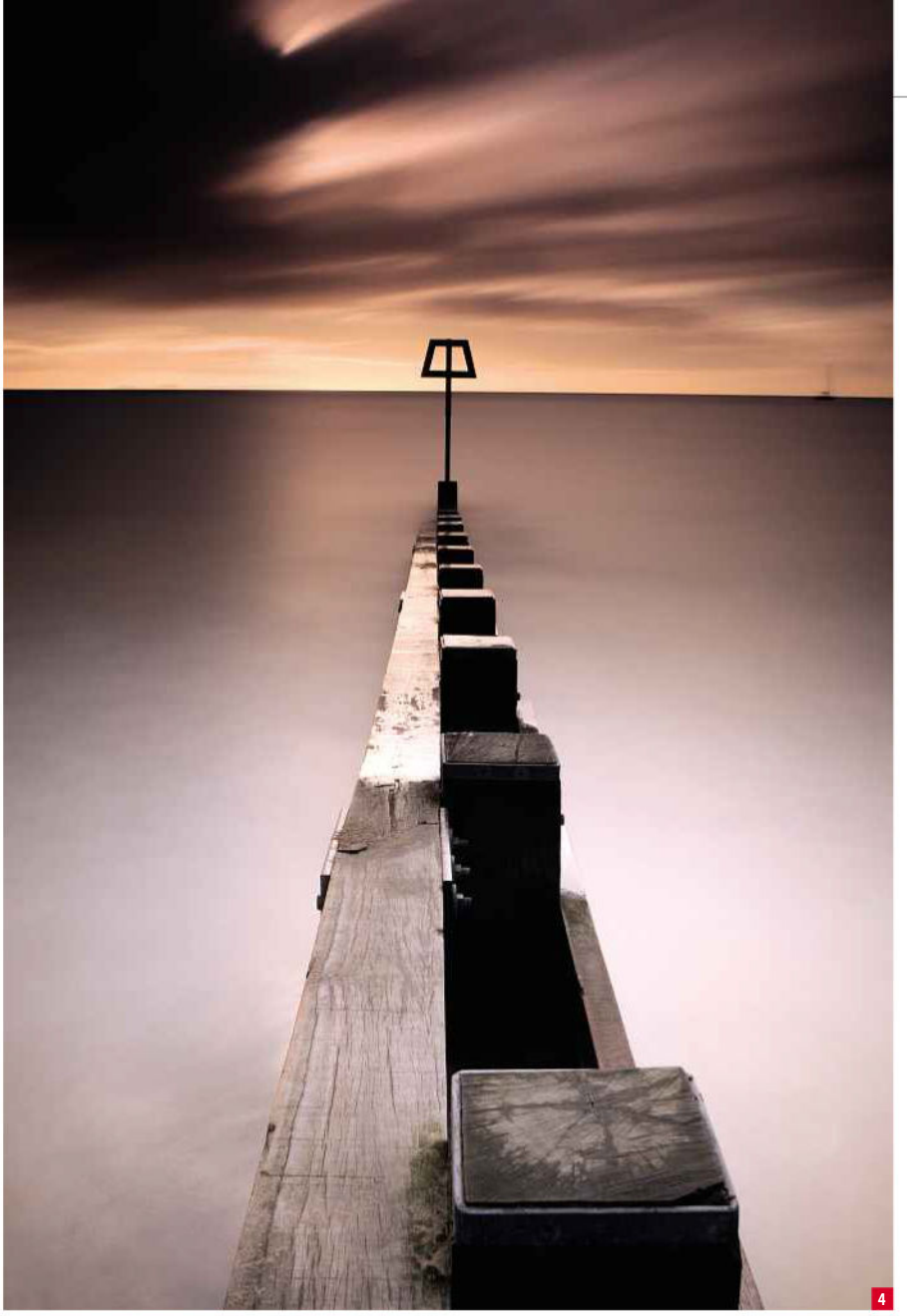
Shutter lengths

This is an example of how shutter length is affected by attaching an extreme ND. You can use this chart to help you calculate the filter's effect. There are also many smartphone apps you can buy to aid you – for example, NDCalc. Another option is to multiply the unfiltered exposure length by its filter factor, which is 1000x for a ten-stop extreme ND filter.

Unfiltered exposure	Exposure with ten-stop ND
1/500sec	Two seconds
1/250sec	Four seconds
1/125sec	Eight seconds
1/60sec	15 seconds
1/30sec	30 seconds
1/15sec	One minute
1/8sec	Two minutes
1/4sec	Four minutes
1/2sec	Eight minutes
One second	16 minutes

3) Compose and focus before attaching your filter.
4) Water becomes a magical blur with a ten-stopper, though it's a look you'll either love or hate. We love it!

However, in constant or overcast light, when photographing subjects with strong, bold shapes like a pier, lighthouse or groyne, they have the potential to enhance your shots beyond recognition. They perform very well in grey weather and long-exposure images will often suit conversion to black & white.



ROSS HODDINOTT

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Pro view

Lee Frost

"I started using ten-stop ND filters years ago, long before the Lee Big Stopper appeared. I loved the work of photographers like Michael Kenna and Josef Hoflehner and wanted to achieve a similar effect digitally without relying on low light. I bought a B+W 110 3.0ND filter and never looked back. I mainly use long exposures for coastal images as there is always movement in the sea and I love the contrast between the smoothness of the water and the sharpness of objects when the shutter has been left open for several minutes. I also find the unpredictability of the technique fascinating – instead of freezing time, with an extreme ND filter you record the passing of time so you never know how the image will look until the shutter closes at the end of the exposure. It's a wonderfully calm approach to photographing the landscape."

LEE FROST

Extreme ND Q&A

ROSS HODDINOTT

Q What is a variable ND?
It's a circular screw-in type ND that is designed to absorb light like other NDs. However, unlike other solid ND filters, variable NDs have a rotating front lens – like a polarising filter – that allows you to adjust the filter's strength. For example, Tiffen's version provides two to eight stops of light control, giving you the convenience and flexibility of having several ND filters in one. Hama, Heliopan, Hoya, Polaroid and Tiffen are brands to look for. In basic terms, they are two polarising filters stuck together. They can be useful, but they often suffer from vignetting and a cross-pattern effect at wider focal lengths. Variable ND filters are also known as 'faders'.

Q Are extreme NDs neutral?
No. A number of brands produce extreme NDs – Lee Filters, Hitech and B+W. Due to the density, they all tend to display some cast. Lee Filters Big and Little Stoppers both add a cool blue cast to images. Don't worry, though – the cast is easy enough to neutralise in post-processing by adjusting colour temperature. That said, there will be times when you will want to retain the cast as it can add extra mood to your images. Many photographers convert extreme exposure shots to black & white, so colour casts are not a concern.

Q What do I do if shutter length exceeds 30 seconds? How do I expose for longer?
With extreme NDs, the required exposure time may exceed the camera's longest automatic shutter speed of 30 seconds. If so, you can select a higher ISO or wider aperture, though neither of these options are ideal; upping the ISO will increase noise, while using a wider aperture will reduce depth-of-field. Instead, switch your camera to Bulb (or 'B') mode, calculate the shutter length needed, and time your exposure manually, using a remote release to lock the shutter open for the shutter's duration.

Q Do extreme NDs always absorb exactly the amount of light they say they do?
Not always. Due to their extreme density, their strength can vary slightly. For example, the value of a ten-stop ND can range from anywhere between 9.5 to 10.5 stops. Therefore, when using extreme NDs, always review the histogram and be prepared to lengthen or shorten the exposure accordingly.

MASTER OF FILTERS...

Adam Burton

Biography

Adam Burton is one of the UK's leading landscape photographers, regularly supplying imagery and undertaking commissions for a wide range of clients. He has photographed five of the seven continents and now specialises in the landscapes of the UK, particularly South West England. He has worked for many prestigious organisations, companies including BP, The AA, *The Times* and *National Geographic*. He also regularly offers group and one-to-one workshops and has authored five books, including *The South West Coast Path,* and is a multi-award-winning landscape photographer.

1

"I HAVE BEEN working full-time as a professional landscape photographer since 2008. After several years of running my photography business part-time while also having a day job, turning full-time was an ambition of mine that I was fortunate to make reality.

"I spend much of my time out on location in the south-west of England photographing atmospheric landscapes to be marketed through my libraries and directly through my website. The images I capture are reproduced in magazines, books and calendars all over the world. When I am not shooting for stock, I am either working on commissions or carrying out landscape photography tuition both in the UK and overseas.

"Filters are as essential to my photography business as my cameras or lenses. I purchased my first set of filters back in 2003 soon after I became interested in photography; ever since those early days I have never been anywhere without them.

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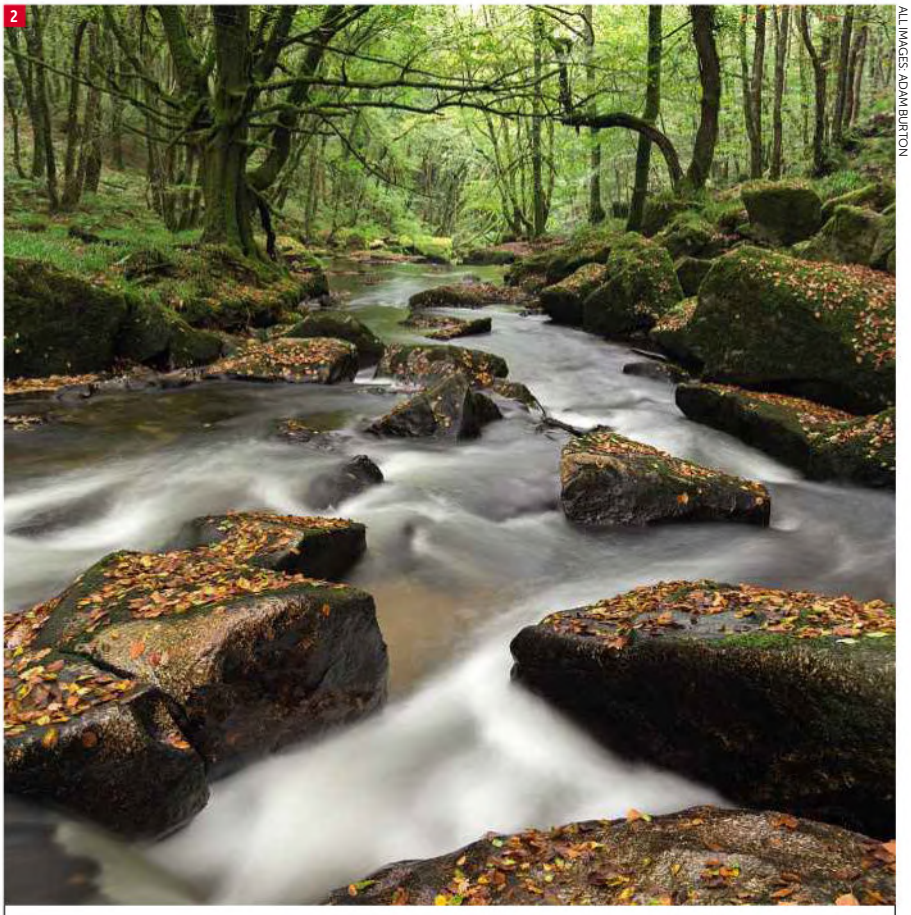

ALL IMAGES: ADAM BURTON

"My favourite filter..." Polariser

"After ND grads, the filter I use the most is a polariser. The first time I fitted a polariser and rotated the front element I was astonished by the effect. Even today, it still brings a smile to my face when I attach a polariser and then look through my viewfinder.

"I love the results you can achieve when shooting with a polariser inside woodland, especially forest areas with rocky streams. Woodland is difficult to shoot for many reasons and pictures can appear dull and lacking in colour. One reason for this is light reflecting on countless thousands of leaves, not to mention bright highlights reflecting on white water, which fools the camera into underexposing the scene. When shooting in these situations I always attach my polariser and rotate the front element fully to remove reflections. Once the glare is removed, the camera is able to correctly expose and the true magic of the scene becomes apparent on the camera's LCD monitor.

"The result is a beautiful forest photograph with rich colours and verdant foliage only possible because of the polariser. A polarising filter is a wonderful tool to boost the impact of your photos and its popularity is sure to endure; there is no digital alternative or processing effect that rivals shooting with a polariser."

"Even in today's age of digital photography, I firmly believe there is still room for filters in every landscape photographer's bag. In fact, far from facing extinction, low stock levels and long waiting lists would suggest that filters are more popular than ever!

"For me landscape photography is about capturing the outdoors as authentically as possible. I want my images to be a faithful rendition of the landscapes I witness, the colours representative of the light and no more. It seems to be the common perception amongst many non-photographers that filters are used to introduce artificial colour into an image, but the truth is quite the opposite. Most photographers utilise filters to enable their cameras to record landscapes faithfully, something they would be unable to achieve with the camera alone.

"Of course, there are many weird and wonderful filters out there that you can purchase if you like that type of thing. But for me, there are only three types of filter necessary for my photography. In order of importance these are: ND grads, the polarising filter and solid ND filters."

1) My most used filters by far are the 0.3, 0.6 and 0.9 'hard' edge ND grads, as well as the circular polariser.
2) Woodland almost always calls for the use of a polariser to reduce glare and increase contrast.
3) Sometimes the use of a filter can totally transform the feel of a scene and boost the mood of your shots.

Adam's favourite subjects for landscape filters

1) **SUNRISE & SUNSET:** During dawn and dusk, the sky can be bright and the landscape dark. Cameras always struggle in these situations, and the end result usually overexposes the sky, or unnaturally darkens the foreground. By carefully aligning one or more ND grads over the sky, I can select a shutter speed to correctly expose the dark foreground, while retaining the colours in the brighter sky. I carry six grads: one-, two- and three-stops in both soft and hard edge.

2) **BLUE SKIES:** It is no secret that polarisers work well with blue skies. When shooting at right angles to the sun, a polariser noticeably boosts the saturation in the sky. I particularly like using one when the sky is filled with puffy white clouds. The clouds break up the intense blue and the result is striking. Be aware of your focal length when using a polariser for this purpose; if you are shooting with a wide-angle lens you may notice uneven polarisation across the sky.

3) **WATERFALLS:** When shooting waterfalls, in order to smooth the water I like to select a shutter speed of several seconds. As many waterfalls are located in dark woods, sometimes my camera can achieve this slow shutter speed without assistance, but if not then I will attach a solid ND filter to extend the exposure time. The long-exposure effect on moving water is a bit of a Marmite thing; some people really do not like the effect, but personally I love it!

D750

COOLPIX S9900

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TRAVEL PHOTOGRAPHY

THE WORLD IS FULL OF INCREDIBLE SIGHTS, PEOPLE AND ADVENTURES, SO WHY LIMIT YOUR PHOTOGRAPHY TO JUST ONE PART OF IT? PREPARE FOR AN ADVENTURE INTO THE EXCITING WORLD OF TRAVEL PHOTOGRAPHY...

IMAGE: JON HICKS

Be prepared for your photo adventure!

BY FAILING TO PREPARE, YOU ARE PREPARING TO FAIL. WHEN YOU'RE TRAVELLING ACROSS THE GLOBE, A LITTLE RESEARCH CAN GO A LONG WAY

THERE ARE FEW things in life that are more exciting than planning a trip to somewhere new. The world is a much smaller place than it was just a few years ago, with relatively low-cost travel accessible to all. There's more to travel photography than showing up and pointing your camera in the right direction, however. Preparation is half the battle, and it's now easier than ever before to research your destination before your arrive. Being in the right place at the right time and equipped with the right skills will help stack the odds in your favour.

You don't have to be heading to the other side of the world, or anywhere especially exotic, but the anticipation of all those new sights and sounds is thrilling and inspiring. As photographers, there's an extra attraction to being able to shoot brand new scenes and subjects. This section is packed with everything you need to prepare for your trip, make the most of the opportunities and return with amazing images.

LEE FROST

Plan & prepare

1 Travel guides such as *Lonely Planet* and *Rough Guides* are always a good starting point as you can find out lots of information about destinations – when to go/when not to go, the expected weather/climate, currency, visa requirements, what to see and getting round, as well as where to stay and where to eat.

2 Visit image-sharing websites such as Flickr or 500px, then search your destination, sit back and admire loads of great images that will give you an idea of the scenery and subject matter you're likely to encounter. You could even contact some of the photographers for top tips.

3 Find out the sunrise and sunset times for the places you'll be visiting, so you have an idea of when to get up and how late you'll need to stay out. If it's relevant, tide times should also be investigated, and it's always worth checking the weather forecast the day before you set off.

4 Use the internet to gather information on specific things, such as carnivals, festivals and celebrations, where and when they take place, how to get there and so on. It may also be worth finding a local guide to assist you – this can be organised from home by contacting the relevant tourist board, or when you arrive at your hotel.

> **"Being in the right place at the right time and equipped with the right skills will help stack the odds in your favour"**

5 Compile a file of reference material that you can take with you. This can be printed sheets, or you can create a document on your laptop or tablet. Drag and drop images or take screengrabs of inspiring images/visual ideas you've found online and put them into an album and note useful names, addresses, times, dates etc.

6 Make sure you take the right clothing and footwear – you don't want to be too hot or too cold, and blisters on tired feet can hinder creativity! Always pack some blister plasters, as well as ordinary plasters and painkillers. A hat is essential for hot climates plus factor 30+ sun cream!

7 Before embarking on an overseas trip, check with your local GP or practice nurse if you need any vaccinations. Regular travellers are likely to be up to date with jabs for things like Tetanus, Polio, Typhoid and Hepatitis B. You may also need shots against Malaria, Yellow Fever or Rabies.

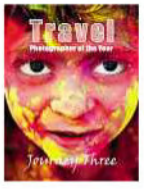
Essential reading

Lonely Planet travel guides From £12

www.amazon.co.uk

Lonely Planet travel guides are incredibly popular – their broad range of expert advice and insight into popular locations around the world makes them a must-have for travel photographers looking for a wealth of information and inspirational images. Try one – you'll be impressed!

TPOTY From £7.99

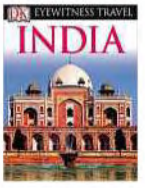


www.tpoty.com

There are six volumes in the *Travel Photographer of the Year* series of books – *Journeys 1-6*. Each one contains winning entries to the TPOTY competition for a specific year, so they're packed with amazing images from all over the world and are a great source of ideas and inspiration.

JOHN BIRCH

Eyewitness Travel From £7.99



www.amazon.co.uk

These travel guides by publisher Dorling Kindersley are well worth checking out – they're not only packed with essential information about a destination, but also well illustrated with colour images to give you an idea of what's there, plus maps to find your way around.

Within The Frame £24.19

www.amazon.co.uk

Written and illustrated by David duChemin, this book is all about finding and expressing your photographic vision with specific reference to travel. It's a great tome to take on your travels as it's full of ideas and inspiring images so you can refer to it when your creativity is wearing thin.

Digital SLR Photography £5

www.digitalslrphoto.com

Don't forget your favourite photo mag when you head off to distant shores! We are available in electronic format for the iPhone, iPad and Kindle Fire and we're currently offering five issues for just £5 – giving you plenty to read and lots of ideas to try while you're travelling the world!

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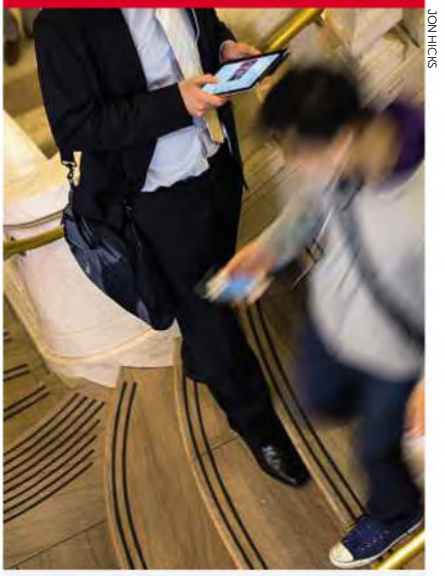
Travel Q&A



JON HICKS

Q Do I need to take proof that I own all the camera equipment I take with me?

It shouldn't be an issue, but when entering some countries you may be questioned about why you have lots of gear. If you're concerned, take copies of your receipts, or a list of all the items, to save time at customs if you get hassled.

Q Where can I get visas from?

It used to be that you applied to the relevant ministry in your own country, but these days you can use the services of Visa HQ which takes all the hassle out of getting visas for virtually any country in the world – head to www.visahq.co.uk for more info.

Q Should I let someone know where I'm going before I set off?

If you're travelling alone, especially anywhere remote, it's worth letting friends and family know your itinerary and plans – give them a copy so if they don't hear from you they at least have an idea of where you should be.

Q Will my mobile phone work abroad?

It should, but check with your service provider first as if it's a new phone and you've never used it overseas it may need to be activated. If you're going to spend weeks in a country it may be worth buying a sim card locally to save on phone charges or maybe even a cheap phone and sim.

WELCOMIA/SHUTTERSTOCK

Q How can I find out in advance if a destination is dangerous?

The Foreign Office issues travel advice for all countries and territories and this resource is updated on a regular basis, especially for places where there is political unrest or outbreaks of disease. Visit https://www.gov.uk/foreign-travel-advice for more info.

Be kit smart!

DON'T PACK EVERYTHING BUT THE KITCHEN SINK – SMART TRAVEL PHOTOGRAPHERS PACK LIGHT AND ONLY TAKE WHAT THEY THINK THEY'LL USE...

TRAVEL PHOTOGRAPHY IS all about capturing the character of a place by documenting anything and everything that catches your creative eye, so you need to make sure you have the right gear to do just that. At the same time you need to put together an outfit that's portable and usable, because whatever you take you're going to have to carry, and nothing saps your energy and enthusiasm more than sweating under the weight of an overloaded pack. Luggage weight limits imposed by airlines also have to be considered too if you want to avoid hefty excess baggage charges at check-in – paying extra to take something that you end up not using is a total waste of money and is definitely avoidable if you thoroughly plan ahead.

Trip duration doesn't really matter because whether you're going away for a week or a month, you'll still encounter the same subjects and you'll need the same equipment. Spend time working out which items you'll get the most use out of.

Essential items

Digital camera

Any make or model of camera is suited to travel as most share common features you'll need. Pro bodies are robust but they're also big and heavy. There's a lot to be said for the smaller, lighter DSLRs and CSCs if you put decent lenses on them. If you have two bodies, take both in case one packs up or gets damaged/stolen.

Tripod

This is a must for predawn and post-dusk shoots or when you're indoors and light levels are low. You don't have to carry it everywhere every day, but you will need a tripod! Go for a compact (preferably) carbon-fibre model that's not too heavy but stable and equip it with a ball head, which will again keep weight and bulk down.

Backpack

A decent backpack should accommodate all your kit for the journey out, then when you reach your hotel you can remove the items you won't need all the time and pack them in your suitcase or lock them away to lighten the load. There are several great models – we recommend some of our favourites later in this guide.

Memory cards

Ideally, you want enough cards so that you don't have to reformat during the trip. For some, three 16GB cards or half a dozen 8GB cards will be sufficient for a fortnight-long trip, whereas others will need 16GB+ per day. It depends on your camera and how trigger-happy you are! If in doubt, take more than you think you'll use.

Lens choice

Ultra wide-angle zoom

Invaluable for architecture, landscapes where you want to emphasise the foreground, and any subject where a monstrous angle-of-view and distortion can be used to add impact to your shots. For full-frame we're talking 14-24mm, 17-40mm or 16-35mm, and for APS-C 10-20mm or 11-22mm etc.

Standard zoom

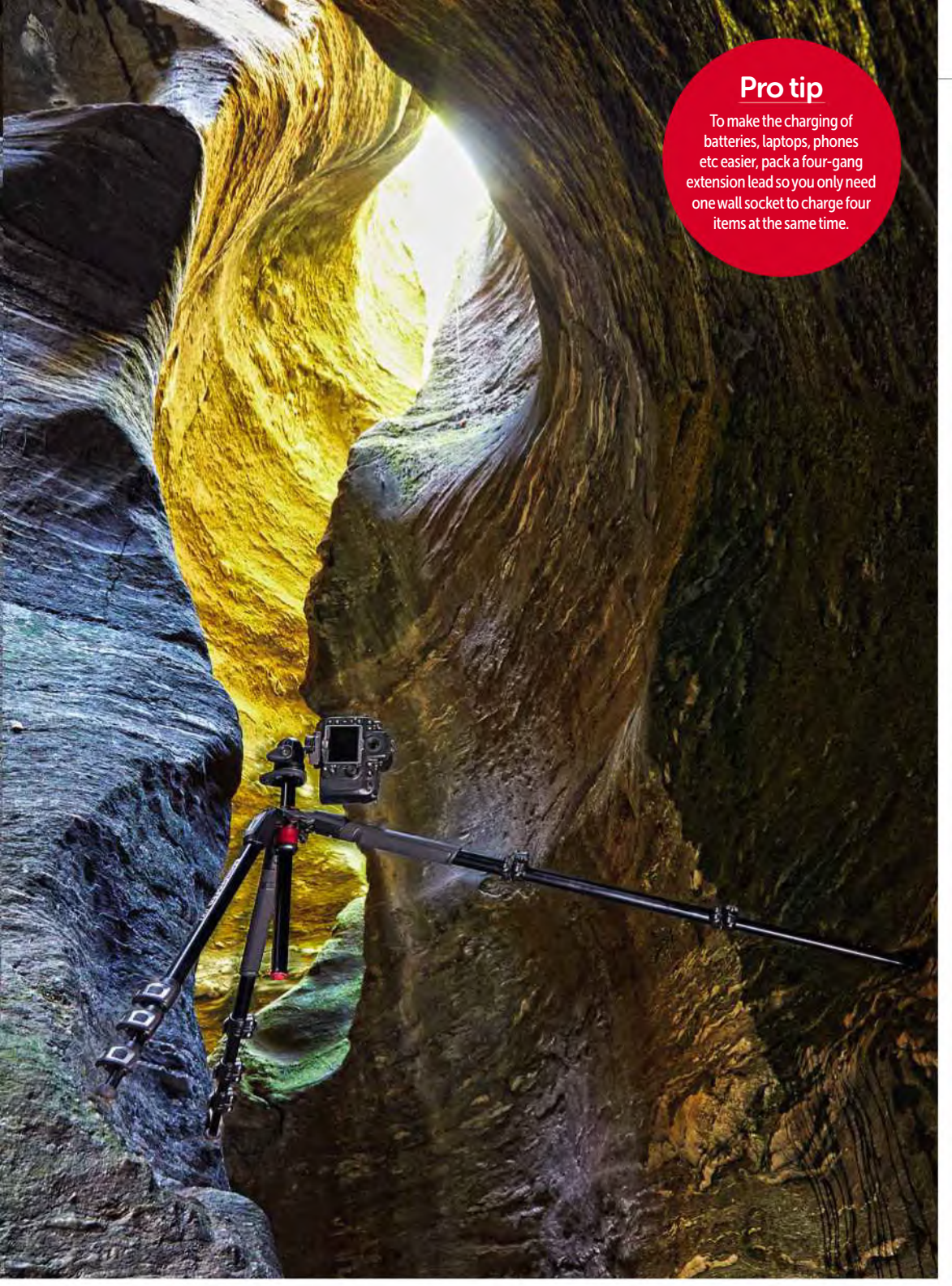
For general use, a standard zoom ideally extending from modest wide-angle, for architecture and scenics, to short telephoto for portraits. Close focusing also makes it useful for details, patterns and abstracts. You'll use this lens more than any other. A 24-70mm for full-frame and an 18-55mm zoom for APS-C.

Telezoom

Though big and heavy, so you may opt to leave it in your hotel room some days, a telezoom can be invaluable for candids and portraits, isolating details in architecture and the landscape, and shooting wildlife and action. For both full-frame and APS-C a 70-200mm or 70-300mm will do the trick.

Fast prime lens

A cheap 50mm f/1.8 (or 35mm for APS-C sensors) standard lens can be invaluable for shooting handheld in low light. These lenses are compact and light so they take up minimal bag space, and you'll be able to keep shooting once your zooms become too slow. Prime lenses are also incredibly sharp.



Pro tip

To make the charging of batteries, laptops, phones etc easier, pack a four-gang extension lead so you only need one wall socket to charge four items at the same time.

Don't forget...

Laptop & hard drive

A laptop or netbook is useful as you can download your memory cards to it, or onto a portable hard drive, so you have all your images backed up as well as on the memory cards. You'll also have access to the internet and email plus the facility to process images while away.

Cleaning kit

Cameras, lenses and filters get grubby when you're travelling, and dust and sand can play havoc with your kit, so pack some basic cleaning items – an anti-static brush, cleaning fluid, sensor swabs, microfibre cloths and a blower to keep everything clean.

Filters

A circular polariser is a definite must-have, plus a couple of ND grads – 0.3 and 0.6 can be used individually or together. If you're into shooting long exposures also pack your ten-stop (or similar) ND filter and maybe a weaker ND with a density of 0.6 or 0.9 for more general use.

Travel Q&A

Q Is equipment covered by household insurance when I'm abroad?
It should be, but make sure you know the limits and restrictions – you may need to specify items of high value and also check you're covered for international travel rather than European only. For specialist cover, check with www.gloverhowe.co.uk, www.towergateinsurance.co.uk, www.camerasure.co.uk and www.aaduki.com.

Q What's the maximum size for hand luggage on most airlines?
You need to check with your airline as the size limit does vary, but it's usually 56cm long x 45cm wide x 25cm deep. The weight limit also varies from 6kg to unspecified, depending on the airline. Some airlines simply state that you must be able to lift the bag into the overhead locker without assistance!

Q Which is the best place for lens hire?
Try www.lensesforhire.co.uk, www.lenspimp.com, www.calumetrental.co.uk and www.hireacamera.com. Remember to let the hirer know where you'll be taking the lens, in case you need extra insurance cover.

Q Branded batteries are expensive. Are cheaper 'fakes' safe to use?
You'll find cheap alternatives on Amazon and eBay – they often cost a quarter of the price of the maker's own and though they may not last as long, they usually work fine and make it affordable to carry several spares. Always pack spare batteries in your hand luggage and not in the hold when flying – if they cause a fire it's easier to deal with in the cabin!

Q My hand luggage is over the limit – how can I avoid excess charges?
A photographer's vest provides a great way to carry extra camera gear when you're checking in at airports as no one weighs you, and the vest will have lots of pockets where you can 'hide' equipment!

MASTER OF TRAVEL...

Jon Hicks

Biography

Jon was born in Cornwall in 1962. His working life began in HM Dockyard, Devonport, but after eight years as a shipwright he embarked on an overland trip to Kathmandu and launched himself as a travel photographer. His big break came in 1999 when he joined Corbis, and after years of hard work he was able to realise his dream and earn a living as a full-time travel photographer.

"I'VE BEEN VERY fortunate to have had the opportunity to visit every country on my bucket list and then some. The number of countries visited to date stands at around 85 and it would be nice to make it 100 before folding up my tripod's legs for the last time. I tend to go away for up to a month, four times a year, and all trips, regardless of length, are followed by several weeks of endless post-production.

"Life as a travel photographer can be a very lonely existence. I will often go days hardly talking to anyone apart from hotel staff or waiters taking my orders in restaurants. Although the days can pass quite quickly if I'm busy shooting, it's the long journeys or times when the weather's bad that homesickness can kick in. Thankfully this is where Skype can be a great morale booster when catching up with home.

"I always try each year to have some pre-planned trips to new locations or those where an update to my images is required. The rest of the year is open and I will discuss current travel trends with my editor at Corbis before making any further bookings.

"For years, internet sites like Flickr and micro-stock agencies have flooded the market with cheap images and driven down prices. However, after recently speaking to a picture researcher, there appears to be a trend for high-end clients paying fair prices for exclusive rights to avoid the risk of competitors using the same image. I hope he's right!"

1) Shelby Street Pedestrian Bridge, Nashville, USA. Exposure: 1/160sec at f/10 (ISO 100). **2)** New York Public Library, New York City, USA. Exposure: 1/25sec at f/2 (ISO 1250). **3)** A good mix of subject matter increases the potential for stock sales.

JON HICKS

"My favourite technique..." Stitching panoramas

"For me, the world rarely fits comfortably into a 3:2 aspect ratio. Also, the use of a wide-angle lens to encompass an expansive scene can push everything too far away with too much foreground and sky, compared to shooting the scene as a panorama with a longer lens. Before starting, I ensure the rotating platform is levelled and the camera is set to manual to maintain even exposures for each frame. White Balance is set for Daylight, again to maintain consistency. The frames are overlapped at least 30% and stitched with Photoshop's Photomerge. For all lenses other than my 70-200mm, a nodal rail is fitted to the tripod head at the correct position for the nodal point of the lens and the camera attached in portrait orientation. Tilt-shift lenses can also be used for shooting panos by taking a frame at each end of the shift, either up and down or side to side. This technique gives a super-wide field of view with my Canon 17mm TS-E lens."

JON HICKS

Jon's kit bag

1) Lowepro Vertex 200 AW A really good bag that is also airline carry-on compatible.

2) Think Tank Retrospective 5 A shoulder bag for my Olympus OM-D Micro Four-Thirds kit.

3) Apple Macbook Pro laptop For downloading cards and talking to the family on Skype. Movies too on long train rides.

4) Canon EOS 5D Mk III with **Really Right Stuff L-bracket** for mounting the camera vertically.

5) Canon EF 15mm f/2.8 fisheye Handy for tight interiors and astro-landscapes.

6) Canon EF 24-105mm f/4L My choice for shooting on the hoof in markets.

7) Canon EF 70-200mm f/2.8L This zoom is my most used lens.

8) Canon Extender EF 1.4x II For that little extra reach with the 70-200mm zoom.

9) Canon TS-E 17mm f/4L My second most used lens and vital for architecture work.

10) Canon TS-E 24mm f/3.5L II Used less after acquiring the 17mm, but still a handy lens for architecture and panoramas.

11) Canon TS-E 45mm f/2.8 A standard lens that also shifts and tilts. Incredibly useful and my favourite lens for panoramas.

12) Olympus OM-D EM-5 Perfect for 'going commando' when shooting in subways, museums.

13) Panasonic Lumix 7-14mm f/4 A super-wide zoom (14-28mm equivalent). Perfect for interiors.

14) Olympus ZUIKO 45mm f/1.8 A fast telephoto (90mm equivalent) that's razor-sharp.

15) Panasonic Lumix 20mm f/1.7 (Shown on camera) A standard lens (40mm equivalent) that's the size of a lens cap and sharp wide open at f/1.7.

16) Canon right-angle finder Good for very low level work and for shooting looking straight up.

17) Gitzo carbon-fibre tripod I've had it for years and forgotten the model number, but this Gitzo has never let me down.

18) Really Right Stuff BH-40 Mid-Size Ball Head An excellent lightweight head with a good load capacity and no sag.

19) Really Right Stuff rotating platform & nodal rail Converts a tripod head for panos in seconds.

20) Tabletop tripod Very handy for shooting from ground level with one of the TS-E lenses and the right-angle finder.

Pro tips

JON HICKS

1) The only filter I carry is a polariser. It's no big secret that they are great for boosting saturation, removing reflections and darkening blue skies.

2) To get around issues with obtaining model releases from strangers, blur unreleased people with slow shutter speeds to make them unrecognisable. Alternatively, shoot them from behind or try close-ups of hands, especially if the subject is holding something interesting.

3) Shoot against the light whenever possible as it can produce fantastic results. Try positioning the sun behind trees, streetlights or anything else that can hide the glare for some cool silhouette shots.

4) Don't put the camera away when it rains. Rushing pedestrians under colourful umbrellas make for great subjects, as do interesting reflections on wet streets. Remember to keep your gear dry by standing under cover.

5) Once the day's files have been downloaded and backed up (twice), I stitch any panos and process a few images. This gives me an idea of how things are progressing and can also be a morale booster, especially when the weather turns bad or homesickness kicks in.

JON HICKS

Portraits

PHOTOGRAPHING PEOPLE ON YOUR TRAVELS CAN BE ONE OF THE MOST REWARDING PRACTICES...

APPROACHING STRANGERS and asking if they'd mind posing for a few portraits may scare you half to death, but pluck up the courage and you'll find that most people are flattered and happy to oblige. The portraits you take are also likely to be the most memorable of the trip, because interacting with locals offers an insight into lives and cultures that tend to be missed by tourists.

The key to success is to treat subjects with respect. Local people aren't tourist attractions in their country any more than you are in yours, so imagine how you'd feel if someone thrust a camera in your face without warning as you walked down the street! If you see a potential subject, approach them and ask permission. You don't need a lengthy discussion or to speak the local language – point at your camera and say 'Photo?' and most people will understand. If they decline, say, 'Okay, thank you', and walk away. Some people feel uncomfortable about being photographed; others may object on religious grounds, so always ask for permission.

If you get the go-ahead, instead of grabbing a few snaps then hurrying away, try to take control of the situation. The quality of light is important so think about it. If your subject is in full sun, you won't produce great portraits and if they have dark skin, contrast may be a problem. Solve both these issues by moving your subject into shade where the light is softer and contrast lower.

Although you don't want to take up too much of your subject's time, try not to rush. Take a few shots, check them on the LCD screen for focusing, exposure, composition and light. Show the shots to your subject – it helps break the ice – then take some more and keep going until you've bagged a great one. Your subject may be nervous initially, but chat to them as you're shooting so they will relax and you'll capture more natural expressions. Focus on the subject's eyes as they need to be sharp and if the background is cluttered, set a wide aperture of f/4 or wider to throw it out of focus.

It's tempting to always take conventional headshots, but the environment they're in can also add interest so maybe step back or switch to a wider lens so you can include it. Even better, do both – start with tight headshots then go wider. It's amazing how many portraits you can shoot in five minutes when you're determined.

A 70-200mm lens is a good choice to fill the frame from a comfortable distance, throw the backdrop out of focus and benefit from a perspective that flatters features – especially around the 80-135mm range. A 50mm prime is also perfect for handheld portraits in low light while for environmental portraits, a standard or wide zoom will allow you to include your subject's surroundings.


BRETT HARKNESS

1


LEE FROST

2

1) Interact with locals and you'll almost certainly come away with fantastic portraits, especially with children.
2 & 3) Traditional dress and costumes go a long way to telling the story of the country you're visiting.
4) A wide lens is a travel must-have – perfect to capture your subject and throw the background out of focus.

Pro view

Lee Frost

"I rarely shoot portraits when I'm in the UK, but it's a major part of what I do when I'm travelling. I love to meet people from different cultures, spend time with them and interact, and the portraits I return home with often make the trip for me far more satisfying. The human race is amazing!

"I almost always ask permission first, so I have their attention. I like to work quickly in available light, shooting handheld. I sometimes use a reflector but never flash and instead I put my subject in interesting light. Shade is a safe bet. The entrance to a building is also good if you want a black background, or I'll pose my subject against the light so the images have more contrast. I always tended to focus manually on my subject's eyes, but since switching to a Canon EOS 5D Mk III, which has superb autofocusing, I tend to use single-point AF. I love characterful faces so I tend to gravitate towards older people and I think eye contact is really important, so I mainly shoot with my subject looking at the camera. You can learn so much about a person by 'reading' their eyes."

Travel Q&A

Q Should I pay portrait subjects?
In some countries you will be asked for money, in others not. If you are asked then you should pay, but only a small amount. Small bars of soap, pencils or biros are worth carrying as you can offer them instead of money, especially to children.

Q Should I get my subjects to sign a model release form?
If you want to sell your portraits through picture libraries then you should really get your subjects to sign a model release form, but for most competitions, editorial submissions, or putting them on Flickr, Facebook or 500px etc you don't need a release.

Q Should I send my subjects photos?
That would be a really nice gesture. Many people have email now so you could send images that way. Otherwise, take a note of their address and put a few prints in the post when you get back home.

4

BRETT HARKNESS

3

LEE FROST

Pro view

Brett Harkness

"Getting the time to shoot personal work outside of my photography business is hard, but when I do, I make the most of it. A couple of years ago I travelled to India to document local life within a three-mile radius by the River Ganges.

"My documentary portraits are shot – like my weddings – very quickly. It may be a brief encounter in the street or a slower build-up over a cup of tea. I tend to sit in a place for a while, just allowing people to get used to me. I use a Canon 50mm f/1.2 for most of my travel work, as I find it the best environmental portrait lens. I am a great believer in what I call 'silent acceptance'. By this I mean approaching a subject and just by body language and facial gestures there's a mutual understanding that a picture is permitted. I love that connection and the 50mm lens forces me to invade the subject's personal space so the portrait is stronger. I often place my subject in the centre of the frame as this draws the eye to them. I also shoot people where they've stopped, I don't turn them into better light or pose them. I want to be true to the moment."

Landscapes

THE WORLD IS A WONDERFUL PLACE AND FULL OF INCREDIBLE VISTAS. MAKE THE MOST OF YOUR VISIT

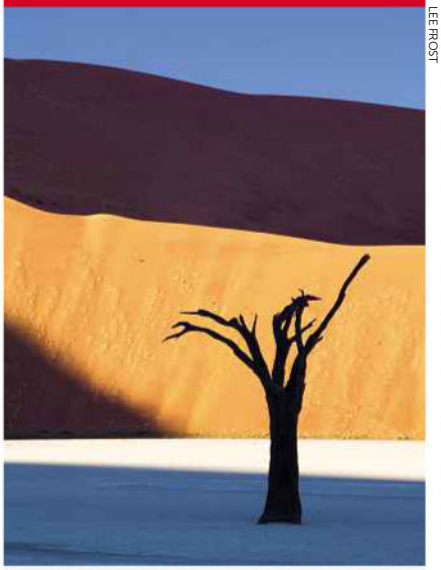
THE MAIN DIFFERENCE between shooting landscapes in your home country and overseas is that more often than not, when you travel to other countries, you'll be visiting for the first (and often only) time, so you need to make sure you return with great shots.

Researching a new destination before heading there is easier now than ever before. You may know fellow photographers who've been so you can pick their brains, there are loads of great guides available and, of course, there's the internet. Image-sharing communities like Flickr and 500px are an invaluable resource simply because so many images have been posted by photographers from around the world.

When to go is as important as where you go in many parts of the world. The Tropics during rainy season provide amazing photo opportunities, but also loses you a lot of time as you can't shoot in torrential rain – and onward travel can be hindered by floods. Similarly, most of Africa is baking hot during summer so is best avoided, Iceland shuts down in the winter months outside the main towns, and Tuscany in Italy is best in spring when poppies are out in full force, the hills are green and the valleys are often filled with mist at dawn. Researching beforehand provides this important information and helps you plan your trip.

Dawn and dusk are the most productive times for landscapes anywhere in the world, but especially in countries where temperatures are high and the light harsh.

Travel Q&A



LEE FROST

Q If I only take one lens with me, which one would you recommend?
A standard zoom (24-70mm on full frame, 18-55mm on APS-C) is probably the safest bet for landscapes but you may want something wider, such as a 17-40mm/16-35mm (12-24mm/15-30mm on APS-C).

Q Should I protect my camera when shooting in a humid environment?
Not really, but when you go from an air-conditioned space to the outdoors your lenses and filters will mist up and can take 10-15 minutes to clear.

Q If it's a choice between sunrise and sunset, which should I go for?
Both can be stunning so maybe do sunrise on your own and sunset with the family, or failing that, alternate – sunrise some days and sunset on other days!

JOHN BIRCH

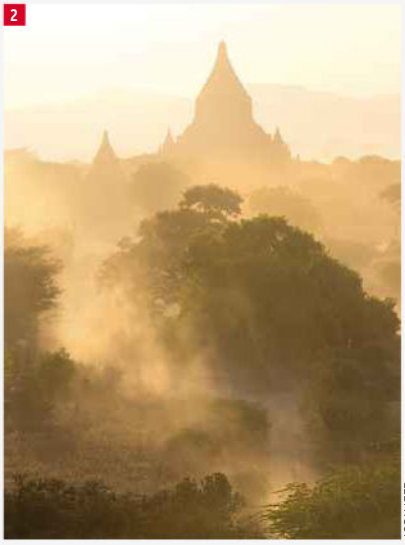
Pro view

Lee Frost

"What amazes me as I travel is just how much the landscape varies around the world. Regardless of the type of landscape, however, photographically my approach is very similar. It's all about the right time, the right place and the right light, which may mean getting up early and staying out late. It's worth the effort because when the light's good at the beginning and the end of the day it's unbeatable and you'll almost certainly take your best shots during the first and last hours of the day.

"I spend a lot of time exploring and recceing. Sometimes you're lucky and in just the right place at the right time, but it pays to give yourself time, and more than one opportunity to get the shot. It's also important to keep an open mind and be willing to change plans at the drop of a hat – often I'll set out with a particular shot in mind but return with something totally different because when the light is magic, or a moment strikes, you just need to capture it."

2



LEE FROST

You can use Google to find out sunrise and sunset times for specific places and specific countries and it's worth noting them. Apps are available too. Photographer's Ephemeris (photoephemeris.com) is a great app that you can download to your smartphone, tablet or laptop and use to establish sunrise and set times, plus much more, for any location anywhere.

The type of shots you bring home and the techniques you use to capture them will depend on the type of scenery you encounter. The desert landscape is stripped bare so

3

LEE FROST

1

1) Early starts are often required to make the most of the morning light. As this image proves, it's worth it!
2 & 3) The soft light at dusk and dawn is hard to beat if you want your travel images to be full of mood.
4) As well as more traditional locations, why not plan a trip to somewhere really amazing – like Antarctica?

compositions will be simple, colourful and graphic – and you need the sun to be low to cast shadows that reveal texture and emphasise shapes. But if you're heading to a tropical destination such as Thailand or the Caribbean, the midday light can be productive when shooting beach scenes beneath blue sky. Overhead sun also works for urban landscapes in pretty much every country.

To make the most of any trip you need to be prepared to work hard – that means getting up early, staying out late, doing a lot of walking around and filling each day with as much photography as you can. Travel is different from holidaying – holidays are meant to be relaxing, but after a successful photo adventure, you'll need a holiday. If you don't you've been taking it too easy!

Pro view

John Birch

"If you're a family man like me, finding time for serious photography can be tricky. A couple of years ago my family and I went on a fly-drive holiday to the USA and it worked really well because everyone got something from the trip. Be prepared to do quite a bit of research and planning beforehand. It's best to involve all the family and let them choose some of the attractions they'd like to visit too – Las Vegas was on our itinerary. The USA is huge and involves quite a lot driving, so I allowed for some chill-out days around the pool. I also hired a 4x4, as some locations were down rough tracks. Sunrise shots involved me sneaking out at 4am in the morning while the family were sleeping, driving to a location in the dark and setting up in the predawn light. Standing on the edge of a wilderness canyon, watching the developing sunrise enfold, is a fantastic feeling – and the family had a great time, too!"

4

Culture

TRAVEL PHOTOGRAPHY SHOULD TAKE IN ACCOUNT NOT JUST PEOPLE AND PLACES, BUT CULTURE TOO

WE TRAVEL TO experience not only different places, but different peoples and cultures. Good travel photography should encapsulate all these things in such a way that your images capture a real flavour of where you've been – a sense of place. This can be achieved not only by shooting landscapes and portraits, but also the architecture, monuments, details and textures, and also making sure those shots are visually strong, creative and unusual rather than simply record shots. Any regular tourist can take snaps, but good travel images are much more than that.

Most places in the world offer visual clues about their identity and character. In Cuba, for example, there are old American cars, cigars, rum, music, the faded grandeur that's visible on every street, murals of Che Guevara, revolutionary posters and much more. By including any of these elements in your images you're capturing the character of the place. Do that in good light, compose the image in a powerful way, and you're well on your way to a winning travel image.

The more you travel, the more adept you'll become at recognising the key clues that should be given priority. You'll often know what many of them are before you leave home, through research and planning, then once you arrive it's a case of immersing yourself in the place and finding them – and also being receptive to others that you maybe weren't aware of. Hitting the streets with a camera and wandering around will give you a good introduction and you can earmark key things.

1

LEE FROST

Going back to Cuba as an example, many of the taxis are vintage American cars and there are a couple of one-way streets in the residential quarter that run east-west, so during morning rush hour you can shoot the cars as they head down streets of dilapidated buildings towards sun, belching clouds of backlit exhaust smoke into the air. A scene like that really sums up the character of the place because it contains many elements and clues. It's only by getting to know a place that you discover these things, but once you have you can work them until you've got some great shots, maybe going back several times until you're satisfied you've taken the best possible images.

Taking clichés and interpreting them in a creative way can also be effective. The Eiffel Tower in Paris is a dead giveaway, for example, but you don't have to capture it in a clichéd way. Even if it's out of focus in the background, its shape is so distinct that the viewer will immediately know where you are. Or instead of shooting the real thing, look for it in different forms – miniature souvenirs on a market stall, say.

Speaking of markets, they are great places to witness culture – in the food and drink, the type of clothing the locals wear and the way they interact. The quality of light in indoor markets can be atmospheric and if you look around you can often find a good viewpoint from which to capture the activity.

Travel photographers are like a dog with a bone – they won't let go until they're satisfied they have got every last bit of goodness out of a situation!

2

LEE FROST

3

1) Local events are ideal for capturing culture, so plan your trip carefully so you can attend a few. **2)** Make a point of photographing customs and subjects that are unique to a place. **3)** You need to work hard to capture images that stand out from the crowd, so find alternative viewpoints. **4 & 5)** Include clues – obvious or subtle – in your travel images that help tell the viewer where they were taken.


PETE ADAMS

Pro view

Pete Adams

"A sense of place is the essence of what I'm trying to capture on my travels, to convey a spirit of the location, a feeling of what it might be like to be there – to almost be able to 'smell' the scene. Before travelling we usually have preconceptions of what a place is like and while they could be labelled as clichés, these are some of the key shots to capture. Travelling to Vietnam recently, my head was filled with images of rice paddies, hill tribes, temples, flower sellers on bicycles etc, but as the world gets increasingly homogeneous it becomes harder to see differences. This is where first impressions are important, before the senses have become attuned to a new environment.

"Get out and start shooting as soon as you can, making mental notes of what you find interesting and specific to the destination. Try not to become blasé about these subject matters and continue to shoot and improve on them throughout the trip. It can be difficult to see a scene that perfectly sums up a place: elements may be there but to make the photograph more interesting it needs a human element. Ask a local to walk through the scene and maybe carry with you an item of clothing for them to wear for added cultural reference."

Travel Q&A


LEE FROST

Q Is it worth paying for a local guide?
It can be if you need to find your way around busy markets and medinas. A guide will know a place like the back of their hand, will get you off the beaten track and overcome any language barriers.

Q Should I go back to the same places more than once?
That can definitely help you get a feel for the place – you can't expect to get the best shots on your first visit. Go back on different days and at different times of day so you can capture the changing mood of a place.

Q Is it worth attending local festivities and carnivals?
Absolutely – they are ingrained in the culture of many places so you'll have lots of opportunities to take photographs that capture the character of the people and their traditions. In Bhutan, for example, festivals are an important part of local culture and take place regularly throughout the year.

Pro view

Lee Frost

"Capturing a place's spirit is what attracts me to travel photography. I love the challenge of arriving and taking images that tell a story, making the viewer feel like they're there. Sometimes it's possible to do that in a single image, but I prefer to create a series of montages that link together like pieces in a jigsaw. Those pieces may be portraits, details, textures, street scenes, landscapes – whatever it takes. It's amazing how evocative and symbolic something like shadows cast across a wall can be in summing up the feel of a place. It doesn't have to be all iconic views. I like to react to first impressions. If something catches my eye then I'll shoot it. I do find that it's better to shoot and edit later than ignore and have regrets."


4 LEE FROST


5 LEE FROST

Ultimate kit for travel

TRAVEL LIGHT AND TRAVEL SMART – IF YOU'RE PLANNING A PHOTO ADVENTURE OVERSEAS AND FANCY INVESTING IN SOME NEW PHOTO KIT, HERE'S A SELECTION OF OUR FAVOURITE TRAVEL TRIPODS, BAGS AND ACCESSORIES

TRAVEL TRIPODS

We always recommend taking a tripod abroad. The following are designed to take up minimal space...

Giotto's Vitruvian VGRN 9225

£160

Vitruvian tripods have reverse technology legs that fold through 180° degrees to surround the tripod centre column and head, making them more compact for storage. Supplied with a ball & socket head. A great range of travel tripods.

Manfrotto BeFree

£140

Another travel tripod with the innovative reverse-leg storage benefit. In its closed position it is only 40cm long yet has a maximum height of 1.4m. Made from aluminium and supplied with a ball & socket head. A good choice if you travel regularly.

Benro Travel Angel II

£200

Benro's Angel range includes this carbon-fibre C2682 TB1 kit, which has a maximum height of 1.64m. It uses the 180° leg storage design too, giving a stored length of 46cm and includes a ball & socket head. It's sturdy, but heavier than others.

Gitzo GK1580TQR5 Traveler

£520

Want the ultimate travel tripod? This carbon-fibre Gitzo weighs only 1.1kg and is just 35cm when stored, yet extends to 1.49m and with the supplied ball & socket head can hold loads up to 5.5kg. Great stability and durability, but at a much higher price.

Travel accessories

✔ **COMPACT CAMERA:** Useful for when a DSLR is too big. A small CSC like Panasonic's Lumix GF7 or Fujifilm's X-T10 is ideal if you want to swap lenses, a premium compact like Canon's PowerShot G16 offers high-quality results whereas an underwater compact like Nikon's AW200 allows you to shoot while submerged or having fun in the pool!

✔ **POLARISING FILTER:** Make the most of blue skies and cut down reflections by using a polariser to maximise colour saturation in your images. Brands worth considering include Hoya, B+W, Cokin, Lee Filters and HiTech.

✔ **SPUDZ LENSCLOTH:** Pop it in a pocket or clip it to your belt or your gadget bag and keep a high-quality microfibre lens cloth close to hand for when your optics need a quick clean.

✔ **MAXELL AIRSTASH:** This useful device allows you to transfer images via Wi-Fi from your SD card to your iPhone or iPad.

✔ **PORTABLE HD:** If you've taken your laptop with you, be sure to back-up your images to a portable hard drive. The Western Digital Passport is slimline and reliable – the portable 2TB drive is incredibly good value at £80.

✔ **SPARE BATTERY:** If you're away from your hotel taking lots of shots, you want to avoid your camera becoming a dead weight because the battery is out of juice. Pack a spare!

Contacts

Benro: www.kenro.co.uk
Giotto's: www.giottos-tripods.co.uk
Gitzo: www.gitzo.co.uk
Lowepro: www.lowepro.co.uk
Manfrotto: www.manfrotto.co.uk
Peli: www.pelican.com
Tamrac: www.tamrac.co.uk
ThinkTank: www.thinktankphoto.com
Western Digital: www.wd.com

PHOTO BACKPACKS

In need of a spacious backpack to hold a medium to large outfit? Consider these comfortable and protective options...

Tamrac Anvil 23

£260

A new, lightweight and high-quality bag. Cabin-friendly, accepts up to a 15in laptop and large DSLR or two with telezoom, several lenses, flashguns and accessories. Also includes a utility belt that can be worn to support the bag, or used separately with pouches.

Lowepro Vertex 200AW

£140

It's been around a number of years but still popular with travel (and landscape) photographers who prefer its conventional design. Holds a couple of DSLRs, half a dozen lenses, laptop and lots of accessories. It's rugged design makes it good for use in tough conditions.

Manfrotto Pro 50

£180

Aimed at serious photographers, this boasts multi-layered protection and can be used with single or both shoulder straps. It's spacious, holding two DSLRs, telezoom, several lenses, flashgun, tablet, laptop, tripod and accessories. Cabin-friendly.

ROLLER BAGS

If you're on a serious photo trip and want the convenience offered by a roller bag, you won't get better than these...

Think Tank Airport Navigator

£175

If you don't need anything too big, then check out this neat roller bag, which despite the smaller size, can hold two DSLRs, at least four lenses and plenty of accessories, plus laptop too. It boasts easy access, a shoulder strap as well as pull-handle. Made to Think Tank's usual high standards.

Pelican Peli 1510

£170

Designed to be waterproof, crushproof and dustproof, Peli cases offer the ultimate in protection. The 1510 meets carry-on requirements for most major airlines and offers a retractable extension handle and strong polyurethane wheels. If you regularly travel with expensive kit, this is an option well worth considering.

Lowepro Pro Roller x100

£265

The smallest in Lowepro's x-series, yet holds a couple of DSLRs, up to six lenses plus lots of accessories. Its modern design includes neat wheel and lock features, high level of protection plus a clever secret – the inner section is removable and converts into a fully-protected backpack!

Manfrotto Roller Bag 70

£300

A great choice if you travel with lots of kit, holding a couple of DSLRs, at least half a dozen lenses, flashguns, laptop, tablet, tripod and other accessories. A nice touch is the retainer straps that hold the front cover open when accessing kit. Stylish, excellent protection and cabin-friendly too!

ENJOY A CLOSE ENCOUNTER!

A WORD OF WARNING BEFORE WE BEGIN – MACRO PHOTOGRAPHY IS HIGHLY ADDICTIVE! ONCE YOU SEE THE WORLD IN ALL ITS INCREDIBLE DETAIL, YOU'LL FIND IT HARD TO LOOK AT EVERYDAY ITEMS THE SAME WAY AGAIN

THE WORLD OF MACRO is one that every keen photographer should experience. Viewed at high magnification, everyday objects look completely different and you'll soon discover a new scope for amazing images. Here, we're offering all the information you need to capture amazing close-up images, so read on for technique and equipment advice for brilliant macro shots.

In frame-filling close-up, you will see the exquisite detail of miniature subjects. By attaching a macro or close-focusing lens to your DSLR or CSC, you will enjoy an intimate, detailed view of small things on an exaggerated scale. So, if you've not shot macro before, prepare to discover a new, fascinating world of endless photo opportunities. As you'll discover, practically anything makes a good subject for macro but, traditionally, flowers and insects are favourites among close-up specialists. However, we have an abundance of other ideas for you to try, too. While you can fill the frame with a subject, at high magnification you can also highlight shape and colour, and isolate small areas of interest and detail. 'Seeing' the shot is arguably the hardest task; while from a technical viewpoint, the inherently shallow depth-of-field gives close-up photography a reputation for being challenging. With our help, however, you will have a constant stream of inspiration and soon be capturing brilliant close-ups.

IMAGE: ROSS HODDINOTT

Getting started: Essential techniques

IMPROVE YOUR SUCCESS RATE SUBSTANTIALLY BY SETTING UP YOUR CAMERA FOR SHOOTING CLOSE-UP SUBJECTS IN DETAIL. HERE ARE THE ESSENTIAL TIPS THAT YOU NEED TO KNOW TO BAG YOURSELF SOME GREAT MACRO IMAGES


ROSS HODDINOTT

1 Apertures & depth-of-field

Depth-of-field normally extends roughly one-third in front of the point of focus and two-thirds beyond it. However, when shooting close-ups, this ratio alters slightly, with the zone of focus falling more evenly either side of the point of focus. Depth-of-field is inherently shallow at higher magnifications, so achieving sufficient depth-of-field is one of the biggest challenges facing macro photographers.

Although focal length and the level of magnification affect depth-of-field, aperture is its overriding control. With depth-of-field being so limited, you might assume that the answer would be to always select a small aperture – for example, f/16. There will indeed be times when this is the best option. However, doing so will not always be practical or desirable. The corresponding shutter speed may grow impractically slow; while a lot of depth-of-field won't guarantee the most pleasing result. For example, for some subjects, lots of depth-of-field will be your priority in order to record your subject sharp throughout; for others, you might favour a shallow depth-of-field to place emphasis on your subject or focal point. The key is to understand how depth-of-field affects your subject – your choice of f/stop should be determined by the subject, situation and the result you want.

LiveView can help determine whether the f/number selected is suitable or not. On some digital SLRs, LiveView gives an honest review of the extent of depth-of-field at any given aperture – adjust the f/stop and the LiveView image will alter accordingly. On other models, you will need to depress the camera's 'preview' button in order to get a 'live' visual of the extent of depth-of-field.


ROSS HODDINOTT

2 Focusing

Depth-of-field is renowned for being shallow at higher magnifications; so there is no room for error when focusing. Ideally, you will be using a tripod. A support not only eliminates the risk of 'shake', but it allows photographers to place their point of focus with great precision. You can use autofocus, but when working so close to the subject, AF can struggle to lock onto fine detail, 'hunting' back and forth. Manual focus is a more reliable option, particularly applied via LiveView.

LiveView is a great focusing aid. Using the 'zoom' button, it is possible to magnify specific areas – for example, an insect's eye – in order to make very fine adjustments. With some subjects you have no choice but to shoot handheld – for example, when stalking butterflies. When working handheld, it can be difficult keeping subjects in focus – nudge even slightly back or forth and the subject will drift out of the focal plane. To enhance your chances of sharp results, opt for a smaller aperture to provide a larger depth-of-field. If the resulting shutter speed grows too slow, increase ISO accordingly.

Camera settings

AF mode: Manual

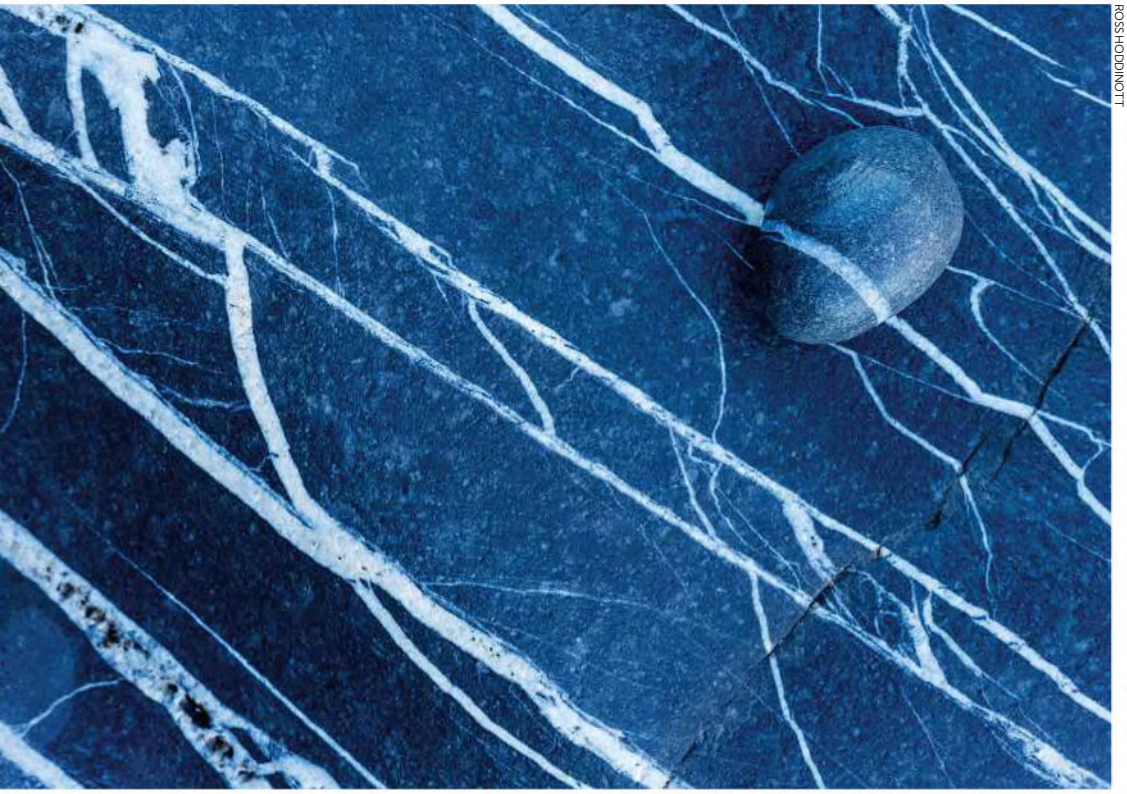
Although for most subjects AF is the best form of focusing, at higher magnifications autofocus can struggle to lock on to nearby objects and fine detail. Manual focusing offers greater precision.

Exposure mode: Aperture-priority

It is important that close-up photographers are in control of aperture selection and can regulate the amount of depth-of-field. Aperture-priority mode is ideal for this reason alone.

Metering mode: Multi-zone

Also often referred to as Evaluative or Matrix metering. It is highly sophisticated and rarely wrong. However, it can be deceived by backlighting and dark or light subjects.


ROSS HODDINOTT

3 Composition

Being a technically competent macro photographer doesn't guarantee your close-ups will be good. The skills of composition are just as relevant to close-up photography – ignore the artistic side, and your macro shots will not be memorable. It's important that you remain imaginative and creative.

One of the biggest temptations for close-up photographers is to fill the frame with their subject. While doing so can maximise impact, avoid filling the frame for the sake of it. Intentionally leaving a degree of negative space around your subject will more effectively convey the subject's size and scale.

Selective focusing can prove a good compositional tool. By using a wider aperture, like f/2.8 or f/4, you can intentionally throw everything out of focus other than your subject or focal point. Doing so can really help direct the eye to your intended point, with your subject standing out sharply against diffused surroundings.

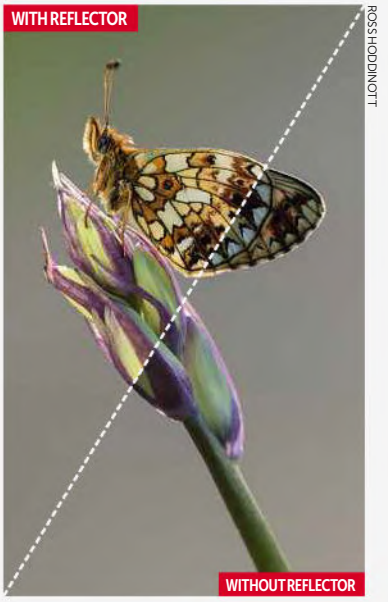
Selective focusing can help imply depth. Look for shape, form and repetition. Macro photographers have the ability to highlight miniature detail and texture. Lines cutting centrally through the frame, such as midrib of a leaf, can look dynamic, particularly when placed diagonally. Don't be afraid to be unconventional and be original.


ROSS HODDINOTT

Arguably, the most important thing to remember is to keep things simple. If you try to cram too much detail into your shots, they will look overly fussy and the subject's impact will be diluted. Simplicity is often the key ingredient to achieving a striking composition in close-up shots.

4 Lighting

You need to think about your position very carefully – otherwise you may block light from hitting your subject. A degree of light is naturally lost at higher magnifications, too. This is less of an issue when shooting static subjects, as a tripod can be used should shutter speeds get too slow. However, if your subject is moving, increasing the ISO is a good way to compensate. In low light, flash is an option. LED, ring- or twin-flash devices which attach to the lens are available, however a reflector used to bounce ambient light onto your subject looks more natural. Overhead light can look harsh; while with front-lit subjects it can be difficult to avoid your own shadow. Sidelighting is better – emphasising texture and defining edges. Backlighting is the most dramatic, though. It will highlight tiny detail, like hairy flower stems, and is well suited to translucent subjects like leaves and the wings of insects. Backlighting can increase the risk of flare and fool metering systems, though, so attach a lens hood and keep a check on the histogram.



ROSS HODDINOTT

White Balance: Auto

Leaving White Balance on Automatic will be fine in most instances. However, when photographing subjects of predominately one colour, it can be fooled, so switch to the appropriate preset.

Shutter: Mirror lock-up/ Self-timer (with tripod)

The tiniest movement can affect critical sharpness. Using mirror lock-up (with a remote release) or the self-timer facility helps maximise sharpness.

ISO rating: ISO 100

When practical, keep your camera's ISO at its native setting – doing so will keep noise to a minimum. When shooting handheld, or photographing a subject with movement, increase ISO accordingly.

Insects

BUGS, CREEPY CRAWLIES, CRITTERS – WHATEVER YOU CALL THEM, YOU CAN'T DISPUTE THEIR APPEAL


ROSS HODDINOTT

SPRING AND SUMMER are the best times of year for photographing insects. Gardens, meadows, woodland and heathland are particularly good habitats for finding and photographing bugs of all types. Thanks to a close focusing lens, photographers are able to capture extraordinary detail. In close-up, some insects appear alien-like, with huge, disproportionate eyes, large, vicious jaws and long antennae. It is no wonder that they're a favourite close-up subject.

Photographing insects isn't easy, though. They can prove difficult to get close to, particularly flying insects like butterflies and dragonflies. Insects have a tendency to fly or scurry away just as you are ready to fire the shutter, so you will need plenty of patience. A 'tele' macro (eg 105mm) is the best choice, providing a larger working distance.

Background choice is a key consideration. Messy, distracting backdrops ruin insect images. Therefore, when taking photos, make sure you allow your eye to properly wander around the frame. Exclude anything distracting by either changing your shooting angle slightly, or by using a wider aperture to generate a shallower depth-of-field.

Although it is easier to locate insects during daytime, when they are busily buzzing about, this is also when they are most active. Getting sufficiently close is more difficult, while you also have no control over where they land or what they will do. Morning and evening is best, when insects are less active, and easier to get close to, due to the lower temperature. Dormant insects may even allow you to set up a tripod, and tolerate you carefully removing background grasses in order to create a cleaner backdrop, so it's well worth getting up very early.

When photographing flighty, easily disturbed subjects, try to always keep your movements to a minimum. For example, the movement of your hand adjusting the focusing ring can be all it takes for your subject to vanish into the undergrowth or flutter away. Therefore, it can be worthwhile prefocusing your lens (on a nearby subject of similar size) and then edge slowly forward toward your subject until it appears sharp through the viewfinder.

Although insect photography can be a fiddly, frustrating business, the results can look truly extraordinary.

Top five insects to photograph

1) **DRAGONFLY:** Large insects that enjoy wetland habitats. They can be territorial, often returning to the same 'perch' to rest or bask. Normally best shot from an overhead angle to show intricate wing detail.

2) **BUTTERFLY:** Photogenic insects, particularly when backlit. Their markings, colour and size vary greatly depending on type. Easiest to photograph when feeding on nectar-rich flowers.

3) **LADYBIRD:** Small but colourful and appealing insects. They are easily moved and manipulated, so can be gently placed in a setting suited to photography, like a vibrant flower head. Just be delicate with them.

4) **BUMBLEBEE:** Bees are difficult to photograph well. Wait next to a bed of flowers, like lavender, and wait for them to visit. Select a small aperture, like f/11, to help achieve sufficient sharpness of your chosen subject.

5) **GRASSHOPPER:** Found in summer meadows among tall grasses and vegetation. Both crickets and grasshoppers make for good close-up subjects.

Summary: Shooting insects

- ✔ In close-up, imperfections will stand out, so only photograph subjects in pristine condition.
- ✔ Photograph insect behaviour. For example, an insect hatching, in flight, or devouring its prey.
- ✔ Mind your shadow, and don't allow it to cross your subject, or you may frighten it and send it scurrying away.
- ✔ Get up early and stay out late when insects are least active, increasing the chance of a successful shoot.
- ✔ Focus on the insect's eyes to ensure they are perfectly sharp.

Creative ideas for insects


ROSS HODDINOTT

Shoot a silhouette

Silhouette your subject by shooting it against a rising or setting sun. Select an angle where your subject's outline will remain clearly recognisable and meter for the background.


ROSS HODDINOTT

Water droplets

After cool, still nights, insects' wings will be smothered in tiny droplets of dew. If you photograph them in the first rays of light, your subject will appear to sparkle.

Insect tutorial: Ross Hoddinott

While the backlighting nicely highlights the wings of this freshly-emerged damselfly, the shadow on its body is ugly (1). The selected aperture of f/16 has generated an unnecessarily large depth-of-field, with the surrounding grasses creating a distracting, fussy backdrop. The insect is also very central, and not dominant enough in frame.

A small reflector is used to relieve the shadow on the damselfly's body and brighten the image overall. A larger aperture of f/8 was selected, to help throw the insect's surroundings out of focus. With the camera carefully placed parallel to the insect, the f/stop still generates sufficient depth-of-field. Lastly, by moving slightly closer, the insect is captured larger in the frame. Placing it slightly to the left of centre strengthens the final composition (2).

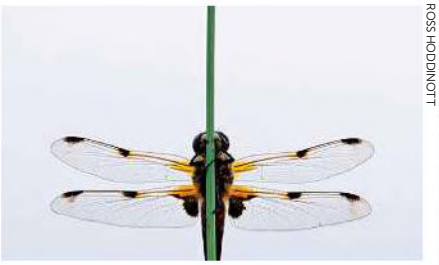
Insects Q&A

Q How do I find insect subjects?
If you have a garden, then this is a good place to start. No doubt, you will find butterflies, bugs and bees hiding among your flowerbeds. Summer meadows, woodland, coastal clifftops and heathland are among the best places to explore. It is worth researching online what nature reserves you have close to where you live. Many sites will list what insect life you can expect to find, together with the best time of year.

Q Won't they move if I get too close?
That is a risk with any wild subject. However, if you approach carefully, you will often get within picture-taking range. With your subject located, gently move into position. Avoid sudden, jerky movements, and try not to disturb the surrounding vegetation – insects are very sensitive to movement and vibration.

Q Is it okay to capture and refrigerate insects to make them more docile?
No, this isn't ethical practice. Wildlife photographers should achieve their photographs through a combination of subject knowledge, good fieldcraft, patience and skill. It is far more satisfying to capture a great insect image in the wild.

Q How do I keep as much of my subject in focus as possible?
In order to maximise whatever depth-of-field is available, try keeping the camera parallel to the subject. This is because there is only one geometric plane of complete sharpness and by keeping the camera parallel you will place as much of your subject in this plane as possible.


ROSS HODDINOTT

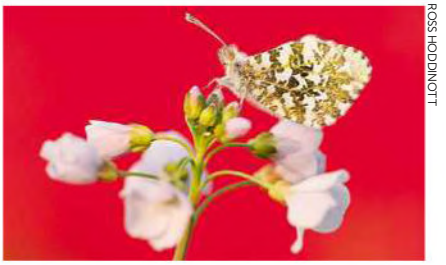
Try a different angle

Insects are most commonly shot from either a side or overhead viewpoint. Try a head-on view instead to capture a more quirky portrait, or try an unusual crop.


ROSS HODDINOTT

Try focus-stacking

Take a series of shots, adjusting your focal point slightly each frame, and then 'stack' the images in Photoshop to extend depth-of-field. Handy at high magnification.


ROSS HODDINOTT

Make your own backdrop

By placing a brightly coloured card or cloth behind your subject, you can add colour impact to your composition. Consider your subject's tones when choosing a colour.

Flowers

THERE'S NO DENYING THE BEAUTY AND VARIETY OF FLORA. HERE'S HOW TO SECURE GREAT CLOSE-UPS...

FLOWERS ARE A favourite among close-up photographers – and they are the perfect subjects on which to hone your skills. Both wild and cultivated flowers are vibrant, interesting and appealing. Flowers vary so much in colour, shape, size, design and structure, that they offer photographers a never-ending supply of photo opportunities. First things first – their condition is important. You will want your subject to be flawless, so pick carefully. If shooting cultivated blooms, ask the florist if you are able to select the flowers yourself.

Before deciding your approach and technique, look closely at the flower's shape and form. Look at it from all angles – get down low and walk all around it. The most interesting viewpoint might be from low down or directly overhead, but often you will want to take photos from either a parallel angle, or a 45° angle looking down on the flower's centre. The type of flower, and its shape, will dictate how you frame it.

In close-up you can highlight and reveal key detail or colour, while if you move closer still, you can abstract it altogether. Shooting cut, cultivated flowers will give you more control. You can shoot indoors, where you won't have to contend with weather or wind. Diffused window light is perfect for flower close-ups, so try shooting in a conservatory, or place your set-up on a small tabletop adjacent to a window. Strong, direct light is normally best avoided – petals and leaves are reflective, so harsh lighting will create unwanted contrast and ugly highlights. As with any close-up subject, the biggest decision regards depth-of-field.

ROSS HODDINOTT

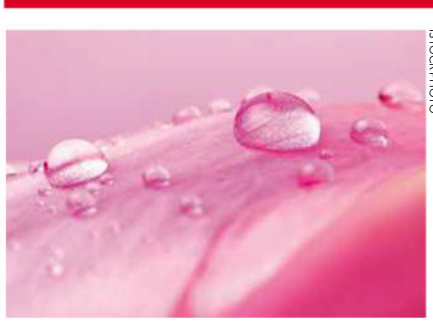
Ask yourself; how much of the subject do you want in sharp focus? When photographing flowers, the most attractive, striking results are often created through using a relatively shallow zone of focus.

By focusing selectively on a key point of interest, and allowing everything else to drift out of focus, it is possible to capture beautiful and colourful close-ups. Unfortunately, there is no fail-safe f/stop that always works. If you are unsure which aperture to set, take a series of images using a different f/number each time. Within the sequence, one image will have just the right level of depth-of-field. Also, by doing this, your understanding of depth-of-field will quickly grow.

Summary: Shooting flowers

- ✔ Explore different viewpoints. Overhead, side-angles and low perspectives work well.
- ✔ Overcast light is well suited to flowers, helping you capture very fine, intricate detail and colour.
- ✔ Try isolating a part of the flower – the sweep of a leaf, the point of a petal or long stamens maybe – to capture abstract results.
- ✔ In windy weather, use a Plamp – or clasp of some variety – to hold your subject perfectly still.
- ✔ As always, background choice is important – so always keep an eye on what is going on behind your subject.

Creative ideas for flowers



ISTOCKPHOTO

Droplets

Adding droplets to petals adds sparkle, interest and scale to your flower images. Add glycerin to your water to thicken it up and stop it rolling off too easily.

ROSS HODDINOTT

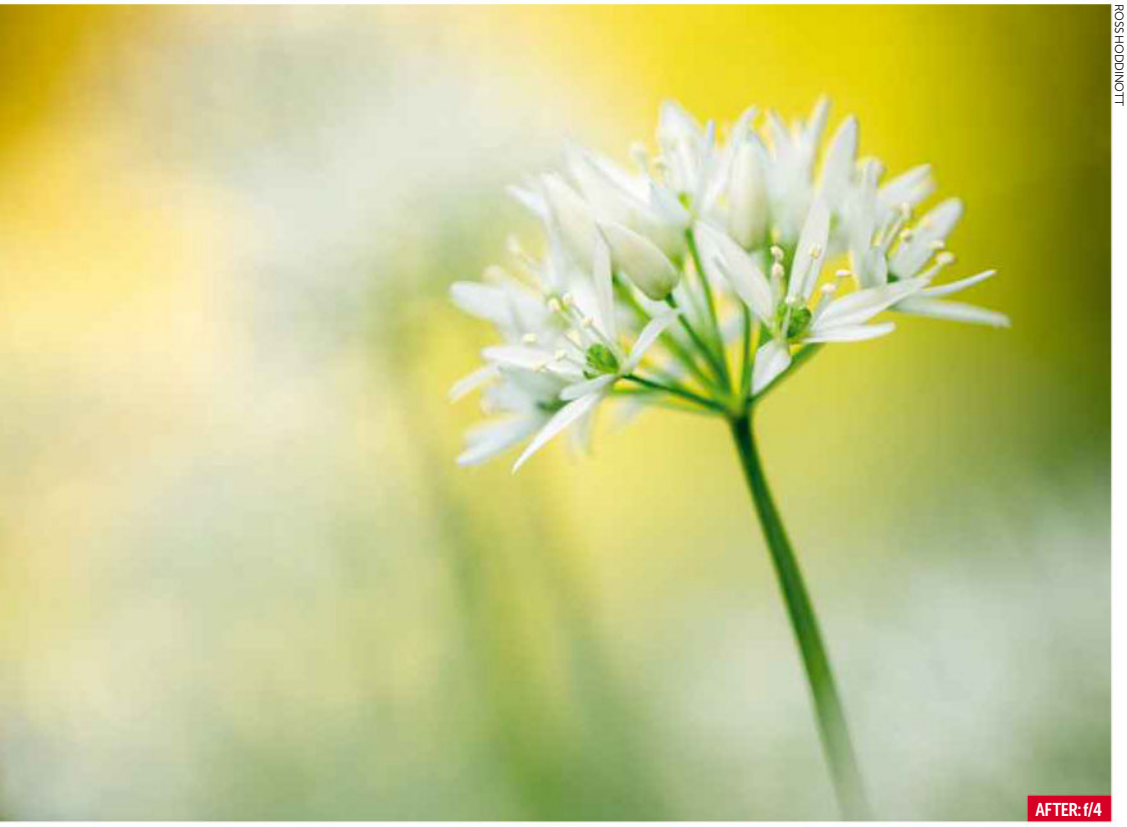
Use a wide aperture

Record everything sharp and there will be no clear focal point. Instead, use a shallow depth-of-field. Your focal point will stand out against blurred surroundings.

ROSS HODDINOTT

Create a background

Create a backdrop by placing a sheet of card behind your subject. White card creates a studio feel; or pick a colour that complements or clashes with your subject.


ROSS HODDINOTT
AFTER: f/4

Flower tutorial: Ross Hoddinott

When shooting flower close-ups, depth-of-field is renowned for being shallow. Therefore, it would seem logical to select the lens's smallest aperture in order to generate the largest possible zone of focus. However, doing so will also render everything else within the frame much sharper, making background elements more distracting (see example, right). In this instance, an aperture of f/22 produces a 'busy' composition and the viewer's eye isn't sure where to settle.

By opting for a wider aperture, it is possible to place much more emphasis on your given point of focus. In the above example, f/4 generates the most attractive, shallow zone of focus. Despite being taken just moments apart, the look of the two images are vastly different. An advantage of using a wide aperture is a faster shutter speed, useful for freezing motion. On the downside, when employing a wide aperture, you need to focus very precisely.


BEFORE: f/22


ROSS HODDINOTT

Shoot detail & patterns

The veins and structure of leaves are particularly photogenic. If possible, shoot them backlit against the sun – this effect will highlight individual veins in fine detail.


ROSS HODDINOTT

Create a soft focus effect

If your camera has a multiple exposure mode, take one photo sharply focused, and then another intentionally defocused. The result will be a dreamy, soft focus effect.

Flower Q&A

Q What exactly is 'gardening'?
'Gardening' is a term macro photographers use for selectively 'tidying up' their subject's background. The practice particularly applies to wild-flower photography, when nearby grasses, twigs and dead foliage can create messy backdrops. Using scissors, you can remove any clutter from the subject's foreground or background that is proving distracting.

Q Do I need to shoot on a still day?
Wind movement is a common problem when shooting outdoors. However, it is easier to rectify with plants, as flowers aren't going to run or fly away if you attempt to stabilise them. For example, an umbrella or windbreak can be placed close by to protect your subject from the elements. By using heavy, clear polythene, held in position by a handful of aluminium or wooden rods, you can create your very own DIY windbreak.

Q Which part should I focus on?
This will greatly depend on the flower, your shooting angle, the depth-of-field available and the effect you desire. However, a good rule of thumb is to focus on the flower's centre, or the stamens closest to the camera.

Q Any tips for image sharpness?
At higher magnifications, even the smallest camera or subject movement is exaggerated. By using a tripod, and triggering the shutter with a remote release, you will prevent camera motion. By enabling mirror lock-up (if your DSLR has the facility), it is possible to eliminate any internal vibrations caused by mirror movement.

Q Is a polarising filter useful for flower photography?
Yes, a polariser can prove very useful, reducing any glare on petals and leaves and restoring colour saturation. The filter absorbs up to two stops of light, but so long as you are using a tripod – and the flower isn't affected by wind – exposure length shouldn't pose any problems.

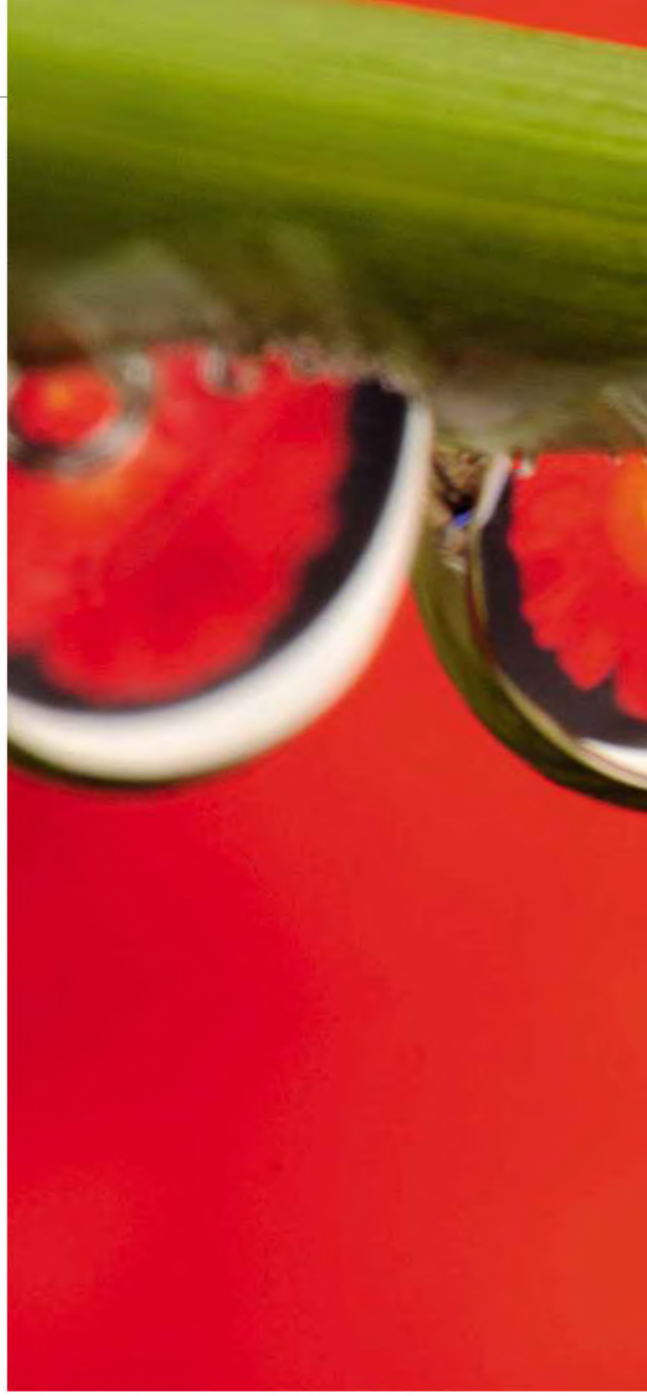
Q Any top tips for making low-level photography more comfortable?
Shooting close-ups often involves lots of kneeling, crouching or lying down. LiveView or a right-angle finder will make composing low-level images easier. It is also worth carrying a groundsheet to prevent your clothing getting grubby. Knee pads make kneeling for prolonged periods more comfortable, too.

Get creative with macro

THERE'S MORE TO MACRO THAN FLOWERS AND INSECTS. TRY OUT THESE CREATIVE IDEAS AND GAIN A NEW PERSPECTIVE ON HOUSEHOLD OBJECTS

1 Lightbox Do you have a lightbox remaining from your film days? If so, dust it off and have fun shooting miniature subjects backlit. Arranged creatively, small, translucent subjects like slices of fruit, sweets, coloured glass and plastic look striking in close-up when backlit. Leaves are a popular subject too. Arrange a few overlapping each other to create a striking pattern effect. For added visual interest, place a single leaf with a different shape or colour in the mix.

2 Refraction Water droplets will reflect and refract a miniature, reversed image of their surroundings and nearby objects. In close-up, you can reveal and capture amazing detail. After rainfall, pop out to the garden and photograph droplets, clinging to grasses and reeds – preferably with a backdrop of flowers to add colour and impact. Alternatively, create a tabletop set-up indoors. You'll have more control over subject and background, and you won't have to contend with wind movement.

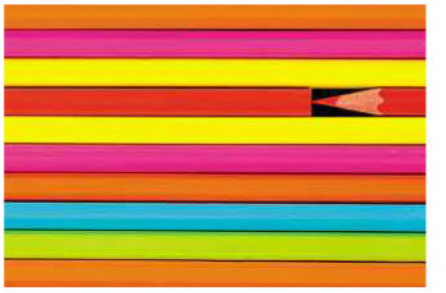


3 Ice patterns Ice looks amazing in close-up. Cracks and air bubbles create intriguing patterns and textures. You don't need to wait until winter to shoot ice. Create your own by freezing water in containers in your kitchen freezer. Distilled water is typically best for producing clear, photogenic ice. For added impact, try using food colouring or freezing an object within the frozen water – a leaf, feather or fruit maybe. Typically, backlighting is best for ice.

ALL IMAGES ROSS HODDINOTT

4 Oil and water abstracts You'll find that by mixing a little oil with water, you can create abstract patterns to shoot. A glass or Pyrex dish is ideal for doing this. Place a little water in the dish and then add some olive oil (or similar). Also try adding a small amount of washing-up liquid – doing so can help give the oil droplets more definition. Place the dish on brightly coloured paper or card to add colour impact to your abstract-looking close-ups.

5 Cross polarisation Sandwiching clear plastic objects – like throwaway cutlery or geometry sets – between two polarising materials results in cross polarisation. The effect produces a kaleidoscope of colours within the stresses of the plastic surface. Computer monitors and tablets are polarised, so set the screen to white and place your object in front of it. Attach a polariser to your lens, rotating it until you achieve just the effect you desire.



6 Colour impact Colour will give your close-ups impact. Your home and garden are full of brightly coloured objects. Toys, pens and pencils, drinking straws, flowers and foliage. When colour is the principal subject matter, the brighter the better. Opt for a frame-filling crop, so the image appears to be overflowing with colour. Red and yellow are particularly striking, advancing colours. Even, shadowless light will often help enhance their vibrancy.

MASTER OF CLOSE-UPS...

Ross Hoddinott

Biography

Ross has been working as a full-time nature photographer since 1997 and is the winner of multiple awards, including the British Wildlife Photography Awards in 2009. He is the author of seven photography books, including *Digital Macro and Close-up Photography*, is a member of the 2020VISION photo-team and is an Ambassador for Nikon UK.

"NO DAY IS ever the same – there is no routine and little repetition. Like any nature photographer, my life revolves around the light and weather. April until October are my busiest seasons for shooting close-ups; wild flowers are in bloom and insects and reptiles are again active. Flowers and insects have short lifespans, so each month presents different subjects and fresh challenges.

"A large amount of time is spent recceing locations and searching for suitable subjects: dragonflies and butterflies are among my favourites. Throughout spring and summer, I visit suitable habitats on still mornings, when insects are dormant. I normally set up a tripod close by to give me more control and carefully consider lighting and background. I prefer working with natural light, but it restricts me to working in very still conditions. If the wind speed is more than 8-10mph, subjects get too wind blown to be able to focus or compose images accurately.

"The summer months are tiring but rewarding: my day starts at 4.30am but I love revealing the intricacies and detail of miniature subjects. I spend most of my day in the office catching up on editing, processing and writing, as the light is typically harsh and insects very active. If the weather permits, I'll finish the day shooting in the warm, evening light until after 10pm. It can be a long day, but photography is addictive – you just don't know when you might capture that special shot you've always been waiting for..."

ROSS HODDINOTT

Ross's kit bag

1) F-stop gear Satori EXP: A large backpack, offering lots of kit room. Exceptionally comfortable.

2) Nikon D800E and Nikon D810: The huge resolution of the D810 is perfect for capturing miniature detail, and the large files allow for a degree of cropping.

3) NIKKOR AF-S 105mm f/2.8G VR Micro: A great focal length for macro. Its size and VR make it the ideal lens for handheld close-ups.

4) NIKKOR AF 200mm f/4D ED-IF Micro: A telephoto macro allows a large working distance, ideal for timid nature. Ideally, this lens should be tripod-mounted.

5) NIKKOR AF-S 16-35mm f/4G ED VR: A great focal length for wide-angle, environmental close-ups showing background habitat.

6) Gitzo Systematic GT3541LS: Solid, sturdy legs. The lack of a centre-column allows me to quickly adjust for low-level work.

7) Manfrotto 405 geared head: The unrivalled precision of a geared head makes it perfect for macro.

8) Heliopan 105mm circular polariser: A polariser is great for photographing flowers and plants, restoring natural colour saturation.

9) Right-angle finder: I don't use an angle finder very often, but I still always carry one in case I need it for low-level work.

10) Nikon MC-36 remote cord: When using a tripod, I will use a remote cord to prevent having to physically press the shutter button.

11) Lastolite reflector: I use a 45cm reflector, which is more than adequate for close-up subjects.

12) Wimberley Plamp: My extra hand! I will often use a Plamp to steady my subject or hold the reflector in place.

13) Lexar SD cards: It is important to always carry plenty of extra storage.

14) Battery: LiveView focusing can drain batteries, so I always carry a couple of fully charged spares.

15) Scissors: Great for when you need to do a little 'gardening' to a subject's background.

ROSS HODDINOTT

ROSS HODDINOTT

"My favourite technique..." Backlighting

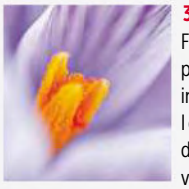
"I love backlighting miniature subjects. There is no better light type for highlighting tiny, intricate detail or a subject's shape. It can be hard to manage, though; the risk of flare is greatly increased by shooting toward the light source, while TTL metering has a tendency to underexpose backlit subjects, so I'm regularly checking histograms and often applying positive exposure compensation. Backlighting suits translucent subjects, like butterflies and damselflies, particularly well. The light's direction illuminates their wings from behind, exaggerating their colour, markings and highlighting every tiny hair on their bodies. It is normally easier to achieve a clean backdrop with backlit subjects, too, as you will often be shooting into an area of shade, which creates a simple dark, contrasting backdrop. There is also the temptation to go one step further and silhouette your subject, which can produce equally striking results."

Ross's macro subjects

ALL IMAGES: ROSS HODDINOTT

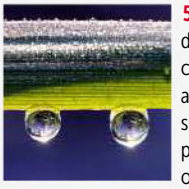
1) BUTTERFLIES: Who can resist them? They are our most appealing and attractive insect. They look best with wings open flat, but don't overlook shooting them when their wings are closed either – their underwings are beautifully marked and look fantastic photographed from a side angle.

2) COASTAL DETAIL: Living close to the Cornish coast, I regularly visit the beach with my macro lens. Things like seaweed, wavy sand patterns and geology might sound a bit dull to photograph, but in close-up you can reveal great texture, interesting shapes and intricate patterns in detail.



3) WILD FLOWERS: Flowers make for great photographic subjects in frame-filling close-up. I enjoy using a shallow depth-of-field to isolate vibrant and delicate blooms against a diffused backdrop of colour. The results speak for themselves.

4) DECAY: There is just something about peeling paintwork, rusty machinery, splintered wood, old ropes and decay that seems to appeal to all photographers. I love highlighting the detail and texture of old things – photographs often have a fine-art or nostalgic feel about them.



5) WATER: Tiny water droplets look great in close-up. They reflect and refract their surroundings, projecting little images of nearby objects. Water droplets can create interesting, abstract patterns on flat surfaces like fallen leaves, metal and glass.

Ultimate kit for macro

THERE'S NO ESCAPING IT – TO CREATE AMAZING CLOSE-UP IMAGES YOU WILL NEED SOME SPECIALIST KIT. YOU NEEDN'T BREAK THE BANK HOWEVER, AS THERE ARE NO END OF BUDGET-CONSCIOUS MACRO ACCESSORIES OUT THERE TOO!

Giotto's YTL 9353 & MH1311 head

£190

A solid all-purpose tripod that's also a great choice for close-ups. The 3D column can be rotated through 180° and along with the low-angle adaptor allows for low-level shooting (19cm). The 1311-652 ball head offers friction control for added precision.

Manfrotto 055XPRO3 & 410 head

£280

The latest in the classic 055 series boasts extra versatility that makes it ideal for close-ups, including a 90° centre-column mechanism, built-in bubble level and minimum height of 9cm. Use with the pro's favourite 410 Junior or the X-PRO three-way head.

TRIPODS FOR MACRO

These general-purpose tripods can be set to very low shooting heights, making them ideal for macro work

Velbon GEO E635D

£265

Made from carbon-fibre and basalt, the GEO offers high stability as well as versatility. The two-section centre-column can be detached for low-level shooting at a height of around 24cm. It comes supplied with a PHD-65Q three-way head.

Gitzo Series 2 Explorer GT2531EX

£460

Made without compromise, the Gitzo Explorer series is the ultimate choice. Made from lightweight and robust 6x carbon-fibre, legs can be set independently at up to 90°, while the reversible centre-column offers even more versatility. The best there is.

Macro accessories

✔ **WIMBERLEY PLAMP:** This flexible arm boasts a clamp at each end and is a must for macro enthusiasts. Clamp one end to the tripod leg and the other to hold an object, such as a plant stem in the wind, or a reflector.

✔ **SMALL SILVER/WHITE REFLECTOR:** An inexpensive collapsible reflector can make a real difference to your close-up images. As well as bouncing light onto your subject, you can also use the white side as a backdrop in your shots.

✔ **RIGHT-ANGLE FINDER:** This handy device allows for comfortable viewing of an image while close to ground level. Of course, if your camera has a vari-angle monitor, you don't necessarily need one! Branded finders can be expensive, so check out budget models from independent makes like Seagull.

✔ **MACRO RINGFLASH:** It's common to shoot in situations where light levels are low and a burst of flash is a welcome addition. A macro ringflash is the best option, using a series of flash heads that sit around the lens to provide decent illumination. The £320 Sigma EM-140 DG Macro is a popular choice.

✔ **REMOTE RELEASE:** Camera shake can be a problem at high magnification, so use a remote release to snag stable shots. Hahnel and Hama make decent models, but our favourite is Yongnuo's £20 TC-80 – a veritable bargain!

Contacts

Canon: www.canon.co.uk
Giotto's: www.giottos-tripods.co.uk
Gitzo: www.gitzo.co.uk
Kenko: www.intro2020.co.uk
Lowepro: www.lowepro.co.uk
Manfrotto: www.manfrotto.co.uk
Nikon: www.nikon.co.uk
Raynox: www.amazon.co.uk
Ring 48: www.amazon.co.uk
Sigma: www.sigma-imaging-uk.com
Tamron: www.tamron.eu/uk
Velbon: www.velbon.uk

CLOSE-UP ACCESSORIES

Don't worry if you're on a budget, the following fantastic bits of close-up kit can be used to shoot high-quality results

ROSS HODDINOTT

Zeikos close-up filter set

£10

Close-up filters are one of the most affordable accessories available for macro photographers. Most sets, like the Zeikos, include +1, +2, +4 and +10 dioptre filters, so you can start taking close-ups straight away. Just be sure to order the correct size to fit your lens.

Raynox DCR-250

£50

A cut-price route into macro photography. This excellent Raynox DCR-250 Super Macro Conversion Lens offers premium performance and a +8 dioptre magnification. The attachment simply clips onto lenses with filter threads from 52mm to 67mm.

Neewer Ring 48 Macro LED

£30

A ringflash is the best artificial light source for close-ups, but it's expensive. Step forward this LED ringlight, which uses 48 small white LED bulbs to provide a bright and constant light to lift colours and add definition. It can fit filter threads from 49mm to 67mm.

Kenko auto extension tubes

£100

While you can buy manual extension tubes for £15, these auto tubes from Kenko boast electronic contacts that retain your camera's metering functions and, in some cases, AF. The Kenko set includes 12mm, 20mm and 36mm tubes for Canon, Nikon and Sony fittings.

WANT TO KNOW WHICH DEDICATED MACRO LENSES ARE WORTHY OF YOUR HARD-EARNED? **TURN TO PAGE 158**

RELEASE THE POWER OF RAW

SHOOTING IN RAW NEEDN'T BE DAUNTING. BY WORKING WITH YOUR CAMERA'S RAW DATA, YOU ARE ABLE TO EXTRACT EVERY LAST BIT OF DETAIL OUT OF YOUR IMAGES AND USE YOUR DSLR OR CSC TO ITS FULL POTENTIAL

IF YOU'VE SPENT any time exploring the depths of your digital camera's settings, then you have probably stumbled upon the option to shoot images in Raw format. If this immediately throws up a huge question mark in your mind, then let us explain. Although Raw may appear to be an acronym for something complicated, it's actually not. It simply refers to a file type that stores the light data captured by your camera's sensor in an unprocessed format. Lost already? Then try to think of a Raw file in a similar way to a film negative. In the days of shooting on film, the camera would capture an image on to a physical negative film strip. Before the image could be properly viewed, this negative had to be processed in the darkroom to create the final print. This is similar to a Raw file, in that the photographer must process the file using digital editing software (like Photoshop or Lightroom) before creating the final image that can be viewed without the aid of specialist software. For this reason, a Raw file is often referred to as a 'digital negative'.

Most photographers, especially landscape enthusiasts, prefer to capture their images in Raw format as it provides them more flexibility and creative potential in post-production compared to a JPEG, giving them greater control over the final appearance of their images. With a Raw file, as you're dealing with the unprocessed information straight from the camera, options such as correcting White Balance, nondestructive sharpening and even applying exposure compensation post-capture are possible. These adjustments would otherwise be incredibly difficult, if not impossible to do with a standard JPEG image without damaging quality. That said, as with most things, there are a few trade-offs that you'll need to consider before using Raw, such as the file sizes, but we'll start to delve deeper in to the pros and cons overleaf...

IMAGE: HELEN DIXON

Understanding Raw

ARE YOU USING YOUR CAMERA TO ITS FULL POTENTIAL? RAW FILES CONTAIN MORE IMAGE INFORMATION THAN JPEGS, BUT TAKE A BIT MORE PROCESSING

THERE ARE MANY advantages, but also a handful of difficulties, when shooting in Raw. As we've mentioned before, high on the list of benefits is that by capturing images in an unprocessed format, you have more control over the appearance of your photos. A JPEG file, on the other hand, although starts life as Raw data, is the result of your camera making automatic adjustments (such as sharpening, increased contrast or applying picture styles) before discarding what it deems to be unnecessary information. When shooting in Raw, the data from the sensor is simply gathered and stored on your camera's memory card with minimal in-camera processing, giving you access to more than six times the amount of data, allowing you to make more dramatic adjustments in post-production than would otherwise ever be possible with a JPEG file, while still retaining image quality.

An easy way to wrap your head around the concept is to imagine that a Raw file is an oil painting where the paint is still wet and malleable on the canvas. If you wanted to make an adjustment to part of the painting you could do so with relative ease by simply manipulating the wet paint with a brush. Whereas a JPEG image could be compared to an oil painting that has dried – trying to make the same adjustments to the painting will be much more difficult, if not impossible.

Pro tip

Raw offers a margin of error for White Balance and exposure, allowing you to concentrate on other elements such as composition

It's easy to see the pros of shooting in Raw, but what are the cons? Well, as Raw files contain a far greater amount of data than JPEGs, the compromise comes in file size, with Raw files tending to be much larger, for instance a Nikon D800 .NEF file is in the region of 48MB, whereas a D800 JPEG weighs in at around 18MB. This means that if you're going to be shooting a lot of Raw images you're going to need a bunch of high-capacity memory cards, as well as plenty of hard drive space on your computer, to store all of this extra data, as well as maybe even a better machine with a faster processor.

What's more, the larger Raw files will inevitably take its toll on the processing power of your digital camera, especially when shooting in continuous burst mode, and you'll generally find that your camera's buffer will fill much faster shooting in Raw compared to JPEG. This can be a pain for sports and wildlife photographers who need to be able to rattle off a high quantity of images in quick succession.

Your decision as to whether to shoot in Raw or JPEG will pivot on the situation at

1

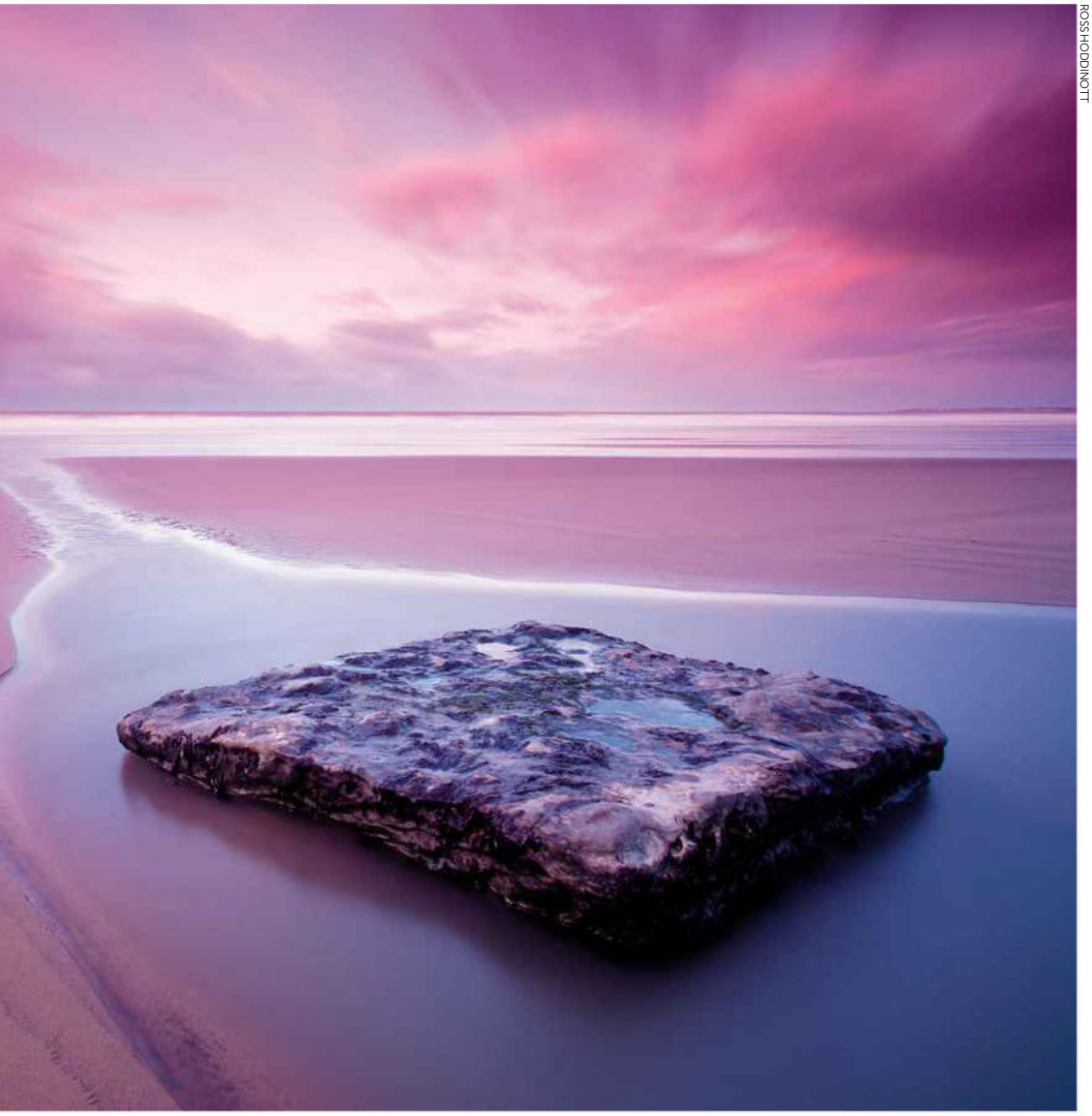
CATHERINE MACBRIDE

2

Pro view

Catherine MacBride

"Years ago I joined a camera club and one of the many pieces of advice I was given was to shoot in Raw. At the time I had no idea why, but I followed the advice only to find that when I went to process the Raw files my outdated photo editing software couldn't even open them! Over time I upgraded my software and started playing around in Adobe Camera Raw. I soon found that rather than trusting what the camera thought my image should look like (the JPEG file), all the detail contained in the uncompressed Raw files allowed me to process and adjust every nuance in the image so it looks and feels exactly as I want it to. Thankfully, as I work in small batches of images at a time, I have time to carefully process each Raw file individually to bring out its full potential. Raw files give me huge creative freedom and are the beginning of my workflow process for every single image that I take."



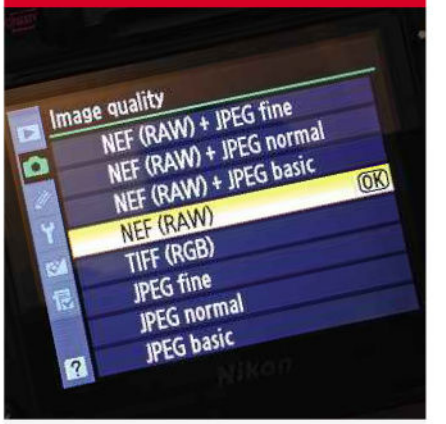
ROSS HODDINOTT

hand. If you want to get the best possible results from your images then in many cases shooting in Raw is the way to go as it offers you much greater control. However, if speed or card space is the priority, then switching to JPEG is the obvious compromise that you'll need to make.

1) Get creative with your image's colours by shooting in Raw and adjusting your White Balance. **2)** Quality counts: Raws are bigger but more detailed. **3)** Changing a Raw file's WB to Fluorescent (left) and Shade (right) both give a nice result.

ROSS HODDINOTT

Raw Q&A



Q Why should I shoot Raw and JPEG?
Most digital cameras allow you to capture images in both Raw and JPEG formats simultaneously. This is useful for anyone wanting to experiment with Raw but not willing to risk diving in headfirst. The downside is that it'll require a large amount of memory to store all of the images in both formats.

Q What can you actually change when processing a Raw file?
Everything you can do to a JPEG, you can do to a Raw file but to better quality. You can adjust the exposure, in a similar way to how you would in camera using exposure compensation, you can correct or be creative with your White Balance as well as sharpen and reduce noise. What you cannot do is change your depth-of-field, focus point or shutter speed. You still need to get these right in camera.

Q How do I set my camera to shoot in Raw?
You should be able to switch your camera to shooting in Raw by heading into the Image Quality settings on your camera's menu system and setting the Format option to Raw or Raw + JPEG. If you're still unsure about how to do this then it's best to consult your camera's manual for further details.

Q Are there different types of Raw files?
Most of the different digital camera brands produce their own type of Raw file; for example, modern Canon DSLRs will produce .CR2 files, whilst Nikon DSLRs generate a .NEF image. Don't worry though, all Raw files operate in the same way when it comes to editing them in post-production.

Essential tools Composition and distortion correction

Lens correction

If you've shot with a wide-angle lens, the Lens Correction tab should be your very first port of call in both Lightroom and ACR to correct any barrel or pincushion distortion, fringing and unwanted vignetting. Click Enable Profile Corrections and select your lens profile from the drop-down menu.

Straighten tool

Forgot your tripod or shot on a slant? Not a problem. Use the Straighten tool (or Angle tool in Lightroom) to correct a wonky horizon; you will lose a little off your image's edges in doing so as the image is rotated, so use this tool before applying any final cropping using the Crop tool. Find this in the toolbar.

Crop tool

Use this tool to change the aspect ratio and to recompose your image. Hold Shift while you click and drag the Crop tool to constrain the proportions. You can also use the Custom function option to select preset aspect ratios, such as 5x7in or 8x10in, or to set your own. You can find this in the toolbar too.

Zoom & Hand tools

Magnify your images to view a specific area in more detail by clicking on the preview image using the Zoom tool. It's useful for retouching images, to evaluate noise and sharpness close up. For moving around a magnified image, use the Hand tool by clicking and dragging on the preview image.

Exposure

ONE OF RAW'S MAIN STRENGTHS IS THE ABILITY TO CORRECT EXPOSURE. IT ISN'T FOOLPROOF HOWEVER...

IT'S ARGUABLY THE main reason why anyone shoots in Raw – this lossless format is almost a fail-safe for exposure. Over or underexpose a JPEG image by a stop or so and you may be able to recover it, but often at the expense of degrading image quality. Under or overexpose a Raw image by even more than that and ACR can help you achieve the best result possible by revealing hidden details in the shadows, recovering definition in the highlights and adding contrast to your mid-tones. At no point while editing a Raw file will your edits be irreversible either – like film, you can make countless reprints of various exposures and effects without ever affecting the original image.

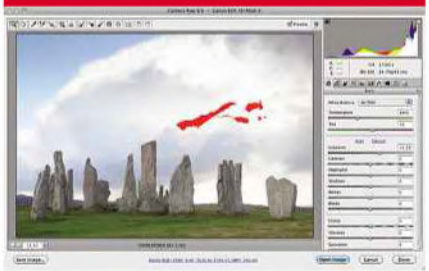
Raw files are notoriously flat, so even if you get the exposure spot on, you'll need to use the Contrast slider or Tone Curve to give it a boost. ACR's sliders all make global adjustments to your image, but if you've specific areas that need attention you might prefer to continue editing in Photoshop or use the Adjustment Brush (see *Pro tip*, right).

The beauty of Raw is the amount of information you can capture as it gives your images fantastic dynamic range, which would otherwise be compressed in a JPEG format.

Pro tip

To make selective adjustments, rather than edit an image globally, use the Adjustment Brush in ACR. Within the Adjustment Brush panel, use the sliders to create your edit, then use the brush to 'paint' the adjustment on to specific areas.

Troubleshooting



Q Why are there flashing blue and red areas on my image?

These are warning signs: the blue areas show you where detail has been lost in the shadows and the red areas are for the highlights. When you see these warning signs, it means the dynamic range of your image exceeds the limits of the histogram and you need to use ACR's tools to recover detail. To activate these warnings, click on the triangles at the top left (for shadows) and right (for highlights) of the histogram. If you're making exposure adjustments, turn this facility on.

As each stop of exposure records half the amount of data that the previous one did, so by the time you reach the shadows, there's little information recorded. For this reason, deliberately overexposing a Raw file to a certain extent allows you to capture more light and therefore more detail that can be revealed once you 'correct' the exposure in ACR. Doesn't Raw rock?

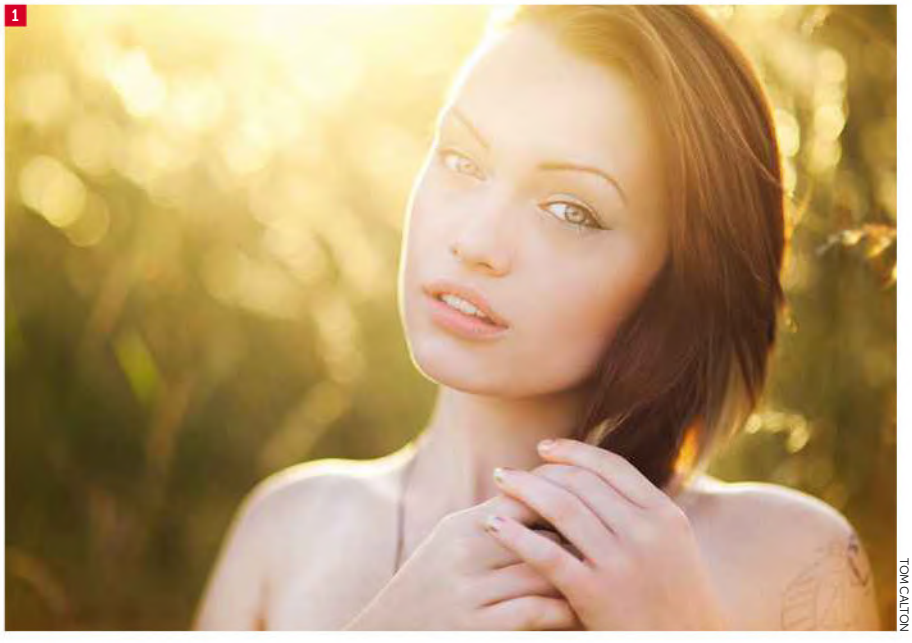
2

1) Correcting tricky exposures is easy with Raw files.
2) Harness the power of Raw; the dynamic range of Raw makes highlight and shadow detail retrievable.

Pro view

Tom Calton

"Shooting in Raw is an absolute must; it allows me to take greater control over my images and get them to look exactly how I envisioned them. Not only does Raw grant me an extra level of creativity, it frees me up when I'm behind the camera as it offers a greater margin of error. For example, if I'm presented with a tricky lighting situation when shooting in JPEG, I know I have to get the exposure spot-on first time or risk losing the shot. However, by shooting in Raw I have the luxury of being able to fine-tune the exposure in post-production later on, allowing me to focus more on bagging the shot and getting the composition right – something you can't always fix later on! The flexibility that Raw offers is a lifesaver and is more often than not the difference between a shot being salvaged rather than scrapped. It's easy to misjudge a scene when it comes to White Balance, too, and whilst that's disastrous if shooting in JPEG, with Raw it's not a problem."



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TOM CALTON

HELEN DIXON

Interface: The Basics tab

Possibly the most useful part of Adobe Camera Raw – the Basics panel holds most of the power to adjust exposure and contrast.

1) EXPOSURE Move the slider to the right to increase exposure and the left to decrease exposure. Use the histogram as a guide.

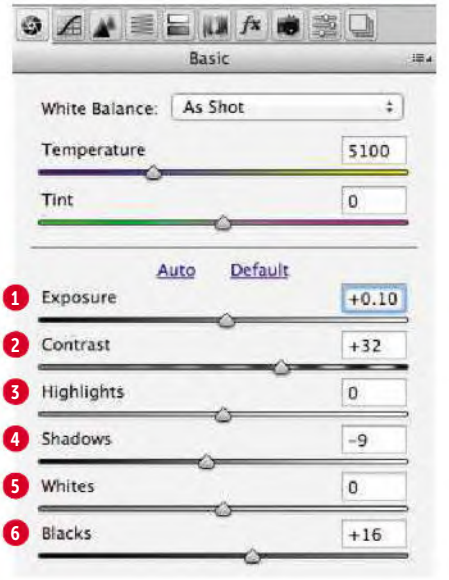
2) CONTRAST Move the slider to the left to decrease contrast by increasing the mid-tones and to the right to increase contrast.

3) HIGHLIGHTS Drag the slider to the left to recover details in the highlights or the right to brighten highlights.

4) SHADOWS Move to the right to brighten shadows and the left to darken them.

5) WHITES Use this slider to limit any clipping of the highlights by pulling it left, or move to the right to introduce specular highlights.

6) BLACKS Targets only pure blacks in your image to add depth. Be careful not to lose detail.



Exposure: Essential tools

Tone Curve

If you're used to Curves in Photoshop, this is similar. It allows you to adjust contrast across the tonal range by adjusting the curve. Or you can use the sliders, which is more akin to Levels.

Targeted Adjustment

If working with sliders is not very intuitive for you, select the Targeted Adjustment tool in the top toolbar, which allows you to make adjustments by clicking and dragging on your image.

Graduated Filter

Draw a line across your image using this tool to apply a graduated effect to any manipulations, such as Exposure, Contrast, Brightness, Saturation and Clarity. Great for darkening skies!

‘Expose to the left’

OFTEN UNDEREXPOSING AN IMAGE IS A RESULT OF USER ERROR, HOWEVER PROFESSIONAL PORTRAIT PHOTOGRAPHER DANI DIAMOND REVEALS IT’S HIS SIGNATURE TECHNIQUE AND IT CAN ONLY BE DONE WHEN SHOOTING RAW

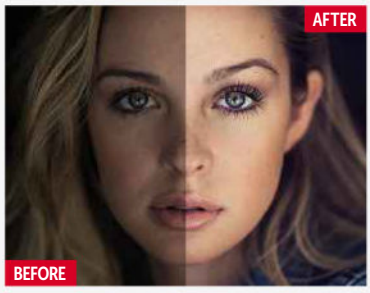
Portraits Dani Diamond

“I approach my portraits in a similar way to how I would if I used flash: underexposing the ambient light before lighting the subject. The difference being that I use only natural light and post-processing techniques to manually recover the exposure exactly where I want. Normally this results in a balanced exposure where my subject stands out against the darker background and I retain perfect control of the highlights on their skin – which is the most important part! When someone views an image, their eyes naturally go to the brightest part first – I always want that to be my subject.

“Good light is vital to my technique; I look for soft, directional light and angle my subject’s face toward it. I shoot using Matrix metering in aperture-priority mode and dial in up to one stop of negative exposure compensation, depending on how my camera meters the scene. I’ll take a shot and then assess the image; if I see strong highlights then I’ll underexpose a bit more. My main focus is the skin, I want it on the darker side and free from hot spots.

“It’s during editing that the image comes alive. Shooting in Raw records incredible shadow detail, which is easier to recover than blown highlights. If you look at my portraits and cover the model’s face you’ll notice the rest of the image is still underexposed. But when you lift your hand, their skin immediately draws your attention and the image registers as well exposed.”

Processing the file



“There’s no one formula for every image. I’ll start by adjusting White Balance and using the Highlights and Whites controls to lift the highlights slightly, before adding a tiny bit of Clarity. From there I import into Photoshop and use Curves and Levels adjustment layers to dodge and burn the image, working with the contours of my subject’s face. I work in very gradual steps over several layers, incrementally making the skin brighter and brighter until I’m happy. This allows me to place the highlights exactly where I want them.”

IMAGES: DANI DIAMOND

'Expose to the right'

IF MAXIMISING DETAIL IN YOUR RAW FILES IS IMPORTANT TO YOU, PROFESSIONAL LANDSCAPE PHOTOGRAPHER LEE FROST'S ARGUMENT FOR OVEREXPOSING YOUR IMAGES MIGHT JUST CHANGE THE WAY YOU WORK FOREVER

Landscapes Lee Frost

"The whole point of shooting in Raw is to capture images that contain as much data as possible to achieve optimum image quality. I do that by 'exposing to the right' (ETTR), a technique where you give as much exposure as you can to an image to move the tones towards the right-hand side of the histogram, but not so far that the highlights are clipped. The reason for doing this is the camera's sensor records much more tonal information on the right side (highlights) of the histogram than the left side (shadows). The images look rather wishy-washy when they're downloaded but this is easily rectified using the Tone Curve slider in Adobe Camera Raw. To produce the 'right' histogram, I increase the exposure for a shot in +1/3 increments using positive exposure compensation until the highlights are about to blow out. There isn't always time to do this when you're working quickly, but when you've time to consider your shot it's a great way to get the most from your sensor."

Reading the histogram on a small screen can be tricky, so to ensure you don't overexpose too much and 'clip' the highlights and lose detail, it can be useful to switch on your camera's highlights warning. If you notice areas of your image flashing, your camera is warning you that the image exceeds the camera's dynamic range and you need to reduce the exposure to avoid losing information in the highlights."

Processing the file

"Every image will need processing in Raw software to achieve a correct exposure. I begin by adjusting the Exposure slider or Tone Curve to evenly distribute the information in the histogram, which will currently be pushed to the far right-hand side. If my image still looks flat, I consider using the Highlights and Blacks sliders to retrieve detail in the extreme tonal areas or to boost contrast further. Finally, use the Vibrance slider, also found under the Basics tab, to boost desaturated tones and to add extra punch to your colour."

IMAGES: LEE FROST

Control colour with ease

RAW FILES ARE NATURALLY LACKING IN COLOUR AND CONTRAST. BUT MASTER RAW PROCESSING AND YOU CAN GIVE ANY COLOUR IMAGE MAXIMUM IMPACT

THE IMPACT OF colour can make or break an image. Raw files, straight out of the camera and devoid of any processing, have a tendency to look flat and lifeless, so enhancing colour should be your next port of call after you've corrected or adjusted the exposure of your image. The main advantage of working with a Raw file is that the primary and most important adjustment, White Balance, can be made without sacrificing image quality. Furthermore, because a Raw file contains more data than a compressed JPEG, it's possible to manipulate colours to a greater degree without the changes becoming detrimental to image quality. It's easy to do too, given the wealth of tools and adjustments ACR puts at your disposal that can help you to perfect the hues and tones within your images.

You can also convert your Raw images to monochrome in ACR by using the tools within the HSL/Grayscale tab. These controls allow you to tweak the luminance of the individual tones in your black & white image, so quite often it's best to convert your image to monochrome at the Raw stage, rather than in Photoshop itself.

HELEN DIXON

1) Raw files can look flat and lifeless straight out of camera. Bring them to life by tweaking the White Balance and boosting colour in Adobe Camera Raw. **2)** Use Vibrance and Saturation to fine-tune the impact of colours in your image.

Essential tools: Colour

HSL/Grayscale

HSL is one the most powerful parts of ACR when it comes to fine-tuning colour, as it allows you to control the Hue, Saturation and Luminance of each colour independently. Remember to make any White Balance corrections before using HSL. From here you can also convert your image to monochrome.

Tone Curve

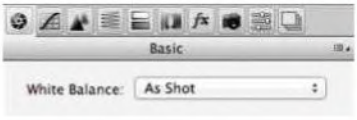
More often associated with exposure control rather than colour adjustment, the Tone Curve tool can also be used to adjust the Red, Green and Blue colour channels. Choose the Point type curve from the Tone Curve panel before using the RGB menu to select the channel that you wish to adjust.

Vibrance and Saturation

There's a key difference between Vibrance and Saturation; the latter boosts all colours equally, while the former is more restrained and intensifies the least saturated tones first.

White Balance

Adjusting White Balance couldn't be easier in Adobe Camera Raw, but there are a number of ways to go about doing it. First off, try using the White Balance menu in the Basic panel – it contains all of the usual White Balance presets that you'll find in camera, as well as a Custom option. The latter allows you to adjust White Balance using the Temperature and Tint sliders below. Temperature adjusts the warmth of your image, while Tint controls the amount of green or magenta present. Alternatively, if your image contains a known-neutral, such as a grey card, or even an area of white or black, you can set the White Balance by simply clicking on that area using the White Balance tool in the top tool bar.



ADAM BURTON

HELEN DIXON

Techniques to try Colour

LEE FROST

Black & white

Converting your image to mono in ACR is similar to adding a Black & White adjustment layer in Photoshop, with the benefit of greater scope for adjustment in Raw. In the ***HSL/Grayscale*** panel, tick ***Convert to Grayscale*** and use the sliders to easily adjust the luminance of the various tones in your image. Simple!

ROSS HODDINOTT

Split-toning

This technique is used to stylise monochrome images. Head into the ***Split Tone*** panel and use the ***Hue*** and ***Saturation*** sliders to add colour tones to your shadows and highlights. A popular look is to introduce a touch of blue into the shadows and a pinch of yellow to the highlights. Don't go too far!

LEE FROST

Presets

If you find a look that you like, save time by storing your settings. After making adjustments, click on the ***Presets*** panel and select ***Save Settings*** from the menu. Pick the adjustments to save, name it and when you want to use it simply go to ***Apply Preset***. Lightroom's ACR offers a large menu of presets to try.

MASTER OF RAW...

Lee Frost

Biography

Born in Yorkshire in 1966, Lee's love of photography really took hold when he moved to Devon as a teenager. During his early twenties he worked as a writer on various photography magazines before embarking on a freelance career in 1992. Since then he has made a name for himself as both a best-selling author and an accomplished landscape and travel photographer.

"WHEN I SWITCHED From film to digital capture back in 2008, I jumped in with both feet and started shooting in Raw from the very start. I didn't see there was much choice. I'd invested thousands in top-end gear so what was the point in not wanting to get the very best from it? It's very rare that my images are used in such a way that had they not originated from a Raw file you'd be able to tell – a JPEG at maximum quality is every bit as good as a processed Raw file. However, if you've paid for something you might as well use it, and for me, shooting Raw is the same as developing your own films and making your own prints instead of sending them off to a lab and having automated machine prints made.

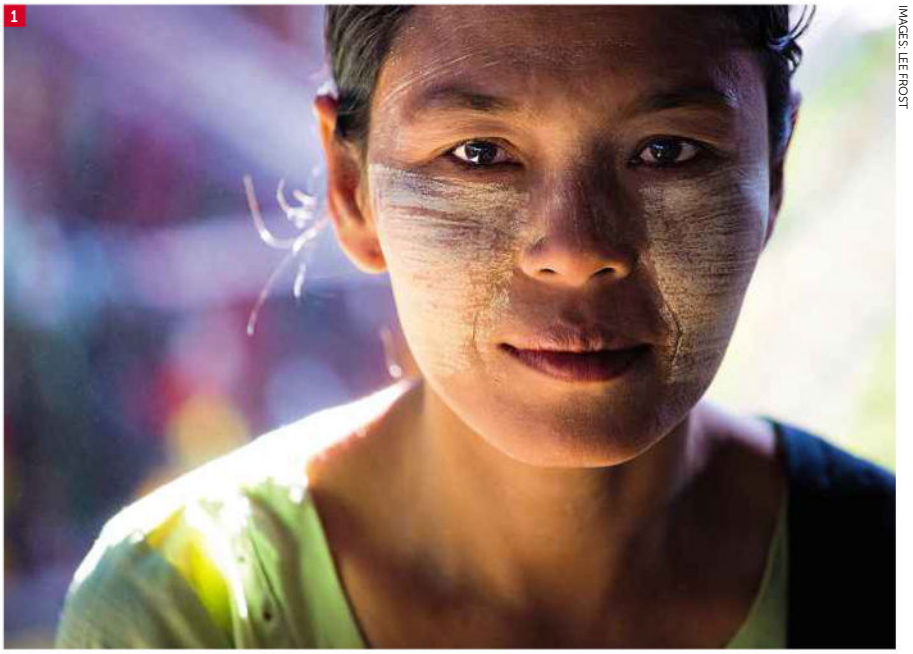
"There's a misconception among photographers that you need loads of experience and knowledge to shoot Raw, but it's nonsense. I had very little digital knowledge, but I took to Raw shooting with no problems. It's actually a much more forgiving format than JPEG because all the raw data from the camera's sensor has been recorded, so it's much easier to correct exposure error or change the colour balance of an image, say, if you're starting with a Raw file. This makes it better suited to beginners, who are likely to make more mistakes.

"While you do need to spend more time at a computer if you shoot in Raw, to process each file ready for printing or publication, I see this time as an investment in my work to get the best from it rather than a waste. Also, any changes you make to a Raw file are nondestructive until you make a JPEG or, preferably, a 16-bit TIFF copy. You can always revert back to the original Raw file at any stage and reprocess it – which I often do.

"There are plenty of photographers who argue in favour of JPEG, but Raw suits my way of working so I'll be sticking with it until something better comes along!"

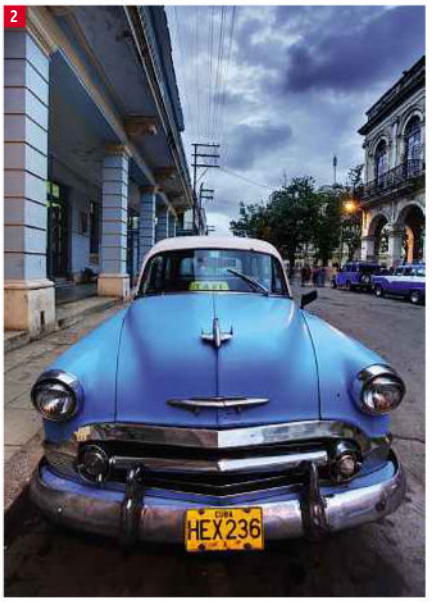
Software of choice

"I process Raw files using Adobe Camera Raw (ACR) in Photoshop. I've always used it and see no reason to change. It gives me results I'm happy with and I'm very familiar with it, which makes processing quick and easy. I subscribe to Photoshop Creative Cloud, which auto updates Adobe Camera Raw on a regular basis."



IMAGES: LEE FROST

1) Raw files contain the best quality your camera can create – so why should you consider settling for anything less? **2)** With Raw, you can make full use of your sensor's dynamic range. **3)** ACR is not a substitute for good camera technique or filtration, but it does offer you more opportunities.



Lee's Raw tips

1) I tend to leave White Balance set to Auto when shooting in Raw as it's easy enough to change the White Balance during Raw processing to whatever colour temperature you prefer – though I find AWB tends to do a great job more often than not.

2) Shooting in Raw doesn't solve every problem, so don't rely on it completely. I still use Neutral Density (ND) grads on my lens to tone down the sky, for example, because if bright areas of the sky blow out due to overexposure, no detail will record.

3) If you want to pull every bit of detail from your Raw files, try reprocessing the same Raw file five times with the exposure slider set to -2, -1, 0, +1 and +2 stops then combine them all to create an exposure fusion image using HDR software such as Nik HDR Efex Pro.

4) I never throw my Raw files away, other than the ones I delete in-camera, unless there's an obvious reason to, such as gross exposure error. I see them as digital negatives that I may return to in the future. Portable hard drives are cheap so storing them isn't a problem.

5) If you want the best of both worlds, set your DSLR to shoot in both Raw and JPEG so you can use the JPEGs for a quick fix but save the Raw files for later, when you've got more time or your confidence and experience has increased.

Raw detail

TAKE CONTROL OF YOUR IMAGES BY FINE-TUNING THEM FOR MAXIMUM SHARPNESS AND INTRICATE DETAIL

RAW FILES CARRY an exorbitant amount of data and the potential for revealing detail without degrading quality or clarity is better than ever with high-resolution cameras. While there are certain things you can do in camera to refine detail, like shooting with a low ISO and achieving an accurate exposure, shooting Raw is really the only guarantee for achieving maximum detail and retaining complete control over the impact of your pictures.

One of the biggest benefits to working with Raw data is that any sharpening you do is nondestructive, straightforward and completely irreversible. You can edit the same Raw file numerous times for different levels of sharpness for different uses, like print or web, without permanently altering the pixels. The same cannot be said for JPEGs: the more you manipulate a JPEG the more data you lose and the more artefacts you're likely to introduce as the quality degrades, so you have to be extra careful. The level of razor sharp detail, and the ability to recover detail through noise reduction, in a Raw file is astounding, so why not make the most of it – next time you shoot, think twice about letting your camera make important decisions for you, like how much to sharpen or the level of contrast and do it yourself in post-production.

Pro tip

If you're still not convinced that shooting Raw makes much difference to the level of detail you capture compared to JPEGs, shoot in Raw + JPEG, then compare the shots. You'll be amazed!

1

1) When it comes to extracting maximum dynamic range and detail without degrading image quality, Raw is king.
2) Raw files respond well to careful sharpening.

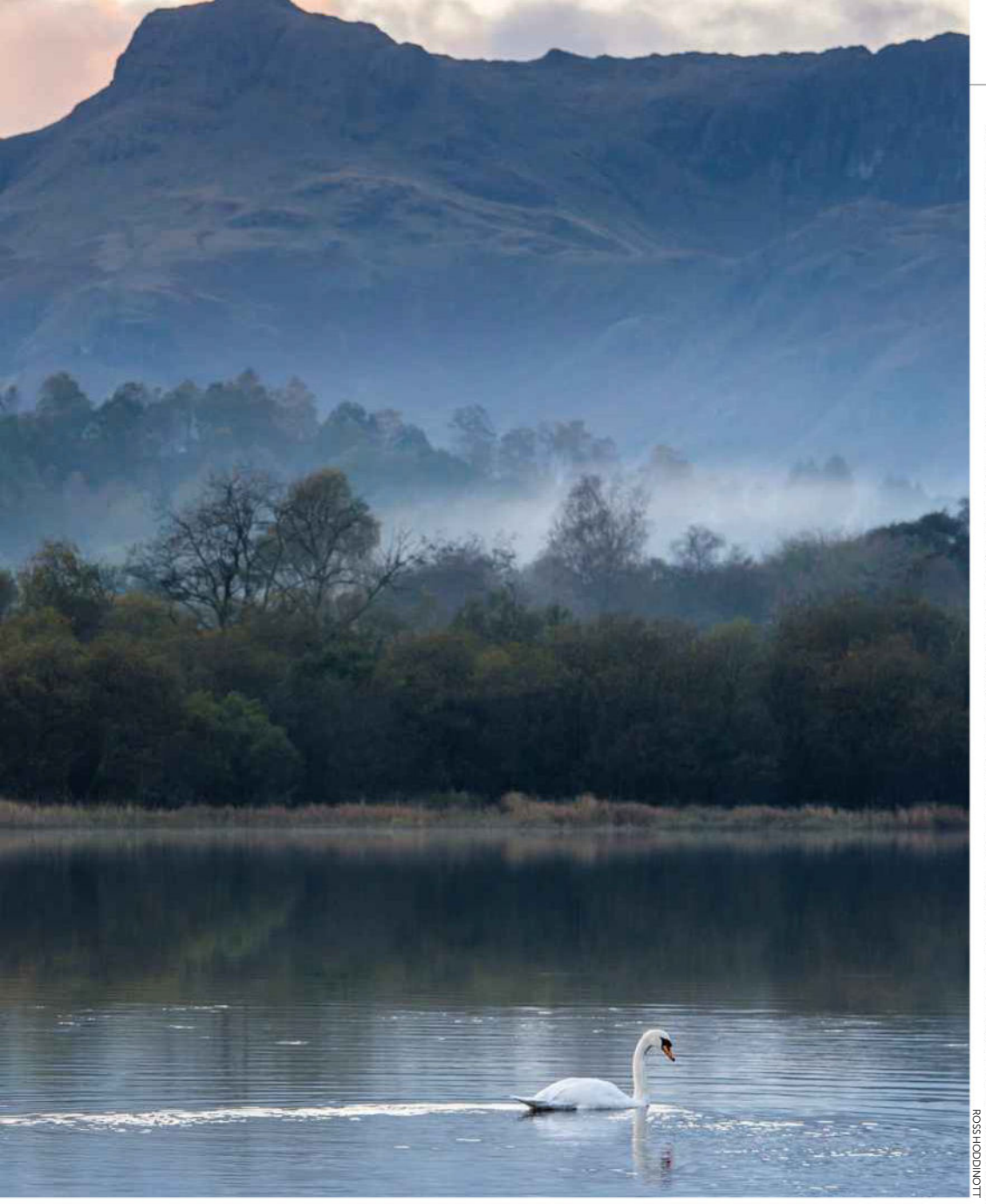
Pro view

Ross Hoddinott

"For nature photographers, the main drawback of shooting in Raw is that burst rate is slower than when shooting JPEG, which is a consideration if you intend shooting fast action. However, the benefits outweigh the disadvantages. Raw files give you optimum control during processing, being more flexible and tolerant to adjustments made to key shooting parameters like exposure, colour balance, saturation and contrast. Raw images capture more levels of brightness, allowing nature photographers to extract more detail from their files – essential when capturing nature. For me, I always have my camera set to capture Raw and while I do a relatively small amount of post-production to my shots, I enjoy being able to fine-tune my images, secure in the knowledge that all editing is nondestructive."

2

ROSS HODDINOTT



ROSS HODDINOTT

Detail: Essential tools

Detail

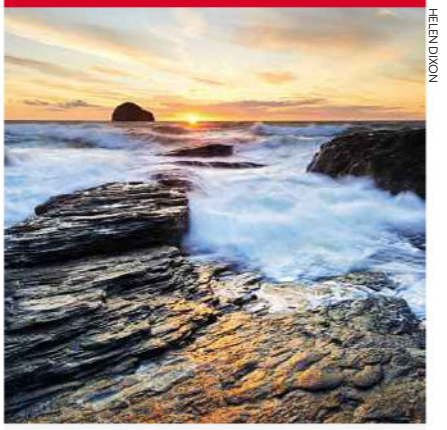
You can access Sharpening and Noise Reduction features via this tab. Sharpening should be used in moderation, and can be used in combination with Clarity. Some photographers prefer to sharpen in Photoshop, but ACR's sharpening tool works in the same effective way as the popular Unsharp Mask, with the benefit that you can re-edit your results for print or web, without damaging image quality. Use the Zoom tool to see the effects of your adjustments.

Noise can be a problem if you're correcting an underexposed image, or have shot at high ISOs or using a long exposure. Noise Reduction can help minimise the snow globe effect caused by hot pixels. While most advanced cameras have great high ISO performance, the higher the megapixel count often the heavier you'll need to make adjustments. Use the Luminance and Color sliders to target the two types of noise and zoom in to your image 200% to see the results. Noise reduction is often at the expense of fine detail and quality as it softens the image. Use the Detail and Contrast sliders to recover some detail, but be watchful of reintroducing noise. Detail is often considered more important than a completely noise-free image.

Clarity

Found in the Basic tab, the Clarity slider accentuates the level of visible detail in your image by targeting edge contrast. It can have dramatic effects, so best to use with extreme caution to avoid introducing halos and nasty edge artefacts.

Raw Q&A



HELEN DIXON

Q What do you suggest for managing workflow and optimising storage?

Try and get in to the habit of deleting scrap shots to reduce wasting valuable hard drive space. Investing in an external hard drive is also a good idea as this will allow you to archive your Raw files, reducing the amount of used space on your computer's hard drive.

Q Why won't Photoshop or Lightroom open my new camera's Raw files?

You have three options. Check whether a free update is available for your software: in Adobe programs do this by clicking Help>Check for updates. If this still does not solve the problem, your software version probably outdates your current camera so you need to either buy a digital update for the software from the provider (depending on how old your version is), buy the latest standalone software or subscribe to Photoshop CC. If you don't want to spend more money on the latest program, you can download a DNG Convertor from adobe.com to convert your Raw files into a generic format that will open in ACR. The pitfall of this is you may lose any camera and lens profiles as the information is often not recognised by the software, however it does mean that in 20 years, if manufacturers decide to stop producing or supporting their individual Raw formats, you'll still be able to access and edit your Raw files as DNG.

Q Can I continue to edit in Photoshop?

Absolutely. While you can do most of your required editing in ACR or Lightroom, many photographers prefer the fine-tuning tools of Photoshop for intricate selective editing and retouching with Layer Masks. Once you've finished editing ACR, click Open Image in the bottom right corner to open the file in to Photoshop where you can then save your edited Raw image in the appropriate format.

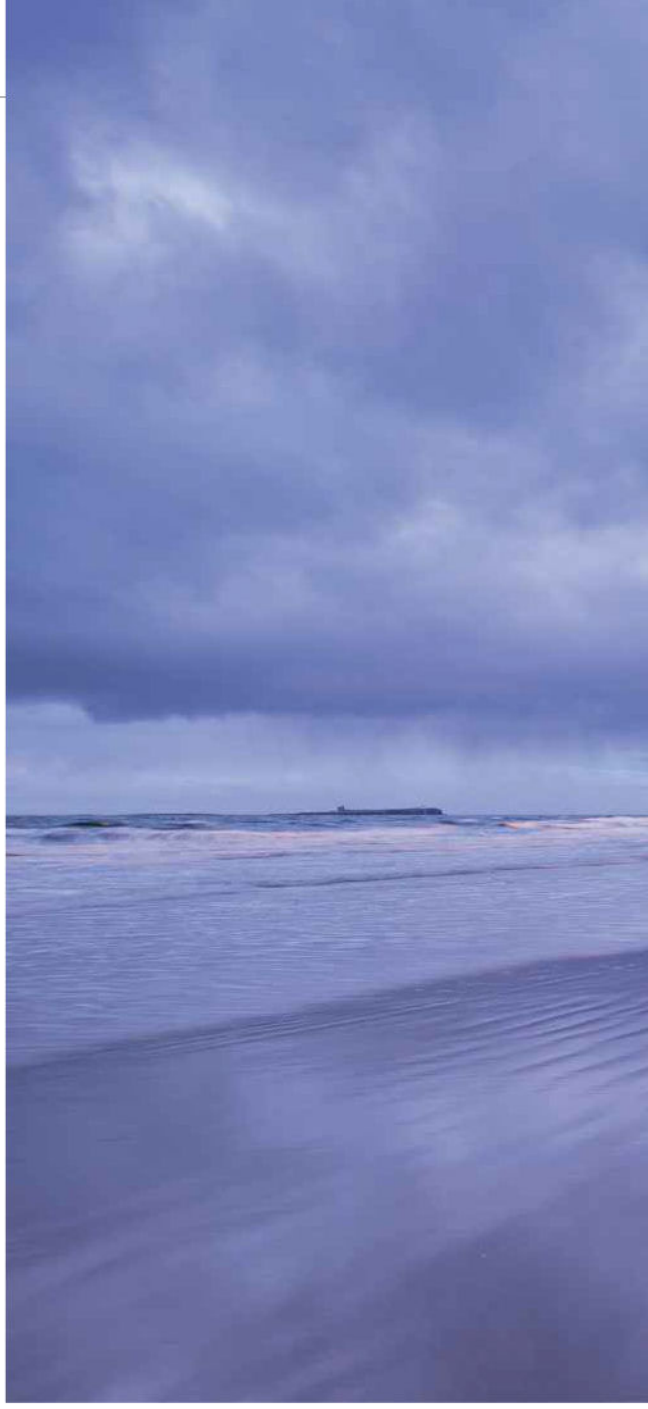
Q How should I best save my Raw files after processing?

Once you've finished making your adjustments to a Raw image in Photoshop, it's best to save the final result as a 300dpi JPEG. By doing this the image can then be viewed on other computers without the need for specialist editing software and is ready to be printed and shared online. Keep a .PSD too, if you think you might want to re-edit your Photoshop layers at a later date.

RAW TALENT

RAW FILES GIVE YOU A HUGE AMOUNT OF SCOPE FOR CREATIVE PROCESSING. WE TOOK A HANDFUL OF RAW FILES AND GAVE THEM TO THREE DIFFERENT PRO PHOTOGRAPHERS TO SEE HOW THEIR APPROACHES DIFFERED

ADAM BURTON



RAW CHALLENGE 1: ADAM BURTON

LANDSCAPE PHOTOGRAPHER ADAM BURTON'S SUBTLE PROCESSING STYLE AIMS TO STAY TRUE TO THE ORIGINAL SCENE

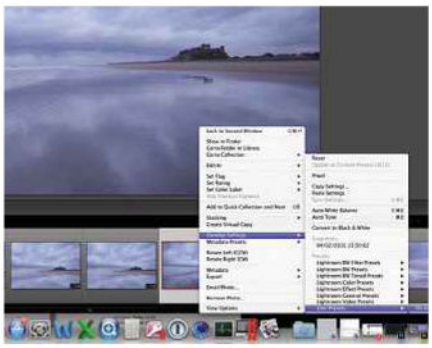
WHENEVER I PROCESS a picture, my priority is to maintain the authenticity of the original scene. It is important to me that I keep my picture true to the conditions that I witnessed, or as far as I can remember and for that reason I try to do minimal processing.

When I say minimal, think subtle. All of my pictures are captured in Raw and, as such, there are certain small adjustments that I apply to every image to bring the file to life. For me it is a case of polishing the picture through a series of subtle changes, rather than creating a very different image through heavy-handed processing.

This image of Bamburgh Beach in Northumberland was captured at the end of a glorious day, when dark menacing clouds rolled in to swallow up a lovely sunset. With just a hint of sunlight reflecting on the castle windows the remainder of the scene was dark and foreboding; this particularly appealed to me and was the reason I fired the shutter.

I was very happy with the wide composition, bringing a sense of space to the picture. But after downloading the image, the Raw file felt a little flat compared to my memory of the scene and this was my main consideration while post-processing.

"AFTER DOWNLOADING THE IMAGE THE RAW FILE FELT A LITTLE FLAT COMPARED TO MY MEMORY OF THE SCENE"



1 STANDARD ADJUSTMENTS After importing the file into Lightroom 5, I apply a series of generic adjustments. I always apply capture sharpening upon import using the *Sharpen – Scenic* preset. Next, I select the *Lens Corrections* tickboxes *Enable Profile Corrections* and *Remove Chromatic Aberration*. As these changes are universal, I have them saved as a User Preset.

2 WHITE BALANCE My camera is always set to Daylight White Balance and for many situations this does not need to be changed in Raw processing. However in low light, such as when this image was captured, Daylight White Balance can give the picture a noticeable blue cast. To compensate for this I manually adjust the *White Balance temperature* from *5150* to *5353*.

3 APPLY A GRADUATED FILTER Although I always use ND grad filters on my camera, I chose to add a digital ND grad filter to intensify the drama in the sky and also to balance the sky with the darker reflections. I reduce the *Exposure* by *-0.30* and increased the *Clarity* by *+16*. The grad is pulled down to just above the castle as I don't want to further darken the building.

ADAM'S FINAL RAW EDIT
While the changes made are subtle and sensitive to the original scene, Adam has added much needed contrast.

4 EXPOSURE ADJUSTMENTS I darken the *Exposure* slightly to *-0.30*, but want the castle to be lighter, so increase the *Shadows* by *+26*. I usually stretch the White and Black points across the histogram until just before each clipping triangle lights up. Here, a substantial increase of *+48* for the *Whites* and *-42* to the *Blacks* is used and instantly makes the picture more punchy.

5 PRECISE ADJUSTMENTS When used in moderation, the Clarity adjustment can be a wonderful tool to increase contrast in a picture. Although my image had benefited from setting the White and Black points, I felt a small *Clarity* adjustment of *+13* would help finish off the image. Finally I applied a small amount of *Vibrance* – about *+15* – to add some polish to the picture.

6 LENS CORRECTIONS I'm ready to export the image to Photoshop for fixing the dust spots and the wonky horizon. However, something is bugging me about the castle. As it's positioned close to the edge of the frame, lens distortion is causing it to lean over. In *Lens Corrections*, I set *Vertical* to *-21* to correct for this, and clicked *Constrain Crop* to crop the edges. Much better!

ADAM BURTON

RAW CHALLENGE 2: CAROLINE SCHMIDT

THE MORE TIME YOU SPEND EDITING, THE MORE YOUR STYLE EMERGES AND, FOR ME, IT'S A FLAIR FOR THE DRAMATIC

A BROODING LANDSCAPE with striking reflections and tonal detail is crying out for huge contrast adjustments. With a JPEG file, you have to be especially careful in how you go about this so not to introduce quality-degrading noise and artefacts, which is why Raw is such a valuable file format as it provides much wider margins to expand exposure information. Thankfully Adam's exposure is spot-on, so I can concentrate on polishing the colour and contrast. Had the file been under or overexposed, I might not have been able to be so demanding on the data without a detriment to quality.

While Adobe Camera Raw (ACR) and Lightroom are fine places to make all Raw edits, I prefer to use ACR for base adjustments then continue to edit the Raw files in Photoshop for the flexibility of Layers, Layer Masks and Blending Modes.

This challenge will be an interesting experiment in technique and vision. While Jordan and I have often worked on the same photo shoots, it's amazing how different our images can look– especially after we've finished editing the pictures – as our styles are polar. Adding Adam to the mix should yield interesting ideas and results.

"RAW IS SUCH A VALUABLE FILE FORMAT AS IT PROVIDES MUCH WIDER MARGINS TO EXPAND EXPOSURE INFORMATION"

1 OPEN IN ACR In its Raw form this image looks strong, but a click of ***Auto*** neutralises the White Balance, deepens Blacks and brightens Whites. The ***Clarity*** slider should be used carefully to avoid halos but for instances where there's a lot of mid-tone, this feature increases contrast as well as sharpness. The ***Straighten*** tool also corrects the slight skew on the horizon.

2 BE DRAMATIC When the image calls for it, I like extenuating the potential for drama. To enhance tonal definition, I often use Black & White adjustment layer (***Layers>Adjustment Layer>Black&White***) to my colour shots, using the ***Soft Light*** blend mode, to brighten whites and deepen blacks. The effect can be overpowering, so use the ***Opacity*** slider to control the effect.

3 TACKLE IN SECTIONS Global adjustments often do a good job, but occasionally when there's strong interest in different areas of the image, I like to work in sections so not to lose highlight or shadow detail. Tackling the reflection first, I add a ***Curves*** adjustment layer and boost the contrast with a loose S-curve, then use the attached ***Layer Mask*** to hide or reveal the effect (see step 4).

CAROLINE'S FINAL RAW EDIT
The resulting image is high in contrast with neutral tones and a touch of drama – look at that reflection pop!

4 ADJUST THE SKY Repeating the previous step, I correct the sky with another *Curves* adjustment layer and use the *Layer Mask* to hide the effect everywhere else but the sky. As it's easier to reveal the effect than mask it, I *Invert* the Layer Mask then use the *Brush* tool with the *Background color* set to *White* to reveal the sky, varying the brush's opacity to diminish the effect in areas.

5 INTRODUCE COLOUR As any colour cast has been removed and the Black & White adjustment layer has muted the landscape, adding a *Vibrance* adjustment layer reintroduces some tone. Unlike Saturation, Vibrance only targets colours that lack saturation rather than affect all colours regardless of whether they're bold or not, so tends to produce more pleasing results.

6 CLEAN UP THE SHOT As a final step, I zoom in to the image and use the *Clone Stamp* and *Healing Brush* tools to remove sensor dust and marks. A small crop of the image tightens up the composition and a little sharpening using Unsharp Mask (*Filter>Sharpen>Unsharp Mask*) crispens the details. I'm happy with the results – I wonder how it compares to the other two...

ADAM BURTON

RAW CHALLENGE 3: JORDAN BUTTERS

WE GIVE OUR RESIDENT PHOTOSHOP EXPERT FREE REIGN TO SEE WHAT HE CAN COME UP WITH – PURISTS LOOK AWAY NOW!

BEING GRANTED THE privilege of working on someone else's Raw file is a pretty rare occurrence, but an interesting experiment. Photographers are understandably precious about protecting their images – we take a lot of time, care and attention towards making sure our exposures are the best that they can be. With that in mind, I want to do justice to Adam's Raw file, while at the same time explore a more creative approach outside of straightforward editing.

Raw tip

Find your own approach – any one effect can have several different methods of approach, with similar results. Experiment and find one that works for you

I know Adam is an advocate of getting it right in-camera, and his editing style reflects this, so I want to push the boat out (coastal pun fully intended) to create something a bit different. This is the opposite of Adam's purist approach, so it'll be interesting to see how our final images differ!

One blessing is that Adam's Raw file is perfectly exposed for the scene, so no drastic recovery is required in Adobe Camera Raw, meaning I can get straight to work in Photoshop.

"THIS IS THE OPPOSITE OF ADAM'S PURIST APPROACH, SO IT'LL BE INTERESTING TO SEE HOW OUR FINAL IMAGES DIFFER!"

1 BASIC ADJUSTMENTS Thanks to the relatively flat light, there's plenty of scope in the histogram to boost contrast. Opening the file in ACR I try various White Balance settings, however feel that a high-contrast black & white approach will suit the brooding sky best. I use ***Lens Corrections*** to fix distortion and straighten the horizon using the ***Straighten*** tool.

2 FAKE THE REFLECTION The purists may hate this, but I decide to make more of the castle's reflection. In Photoshop, I use the ***Lasso*** tool to select the castle and some sky before copying and pasting it as a new layer. I then use the ***Transform*** command to flip the selection upside-down and add a ***Layer Mask*** with a soft brush at a low opacity to blend the genuine and faux reflections.

3 DODGE & BURN When it comes to fine-tuning areas of an image, my favoured approach is to dodge and burn. To do this without altering pixels, I create a new layer with its ***Blend Mode*** set to ***Soft Light*** and fill it with ***50% Grey***. I then use the ***Dodge*** tool set to ***midtones*** at ***18%*** to brighten where needed. This is repeated for areas that I want to darken using the ***Burn*** tool.

JORDAN'S FINAL RAW EDIT
A high contrast black & white with deep shadows and bright highlights – certainly a transformation from the original!

4 INCREASE CONTRAST There are several ways to boost contrast but I like using a ***Curves*** adjustment layer (***Layers> Adjustment Layers>Curves***) as it allows for fine adjustments. I add an exaggerated S-curve to the ***RGB*** channel, before selecting the ***Blue*** channel and removing blue from the highlights – this adds yellow, as it sits opposite blue on the colour wheel.

5 ADD A GRAD FILTER We're getting there now. I want to over-grad the sky to make the most of those clouds, so I add another ***Curves*** layer. I reduce the exposure from the lower to upper mid-tones, making sure that the shadows and highlights are kept intact so as not to reduce contrast. I then use a gradient layer mask so that only the sky is affected, much like using an ND grad filter.

6 CONVERT TO BLACK & WHITE With the tonal changes made, I convert the image to mono using a Black & White adjustment layer (***Layers> Adjustment Layers>Black & White***). In the Adjustments palette, I decrease the ***Blue*** channel and increase the ***Yellow*** channel – this makes the castle pop. Finally, I go back and tweak Curves to increase contrast a touch more. All done!

RAW CHALLENGE 1: CAROLINE SCHMIDT

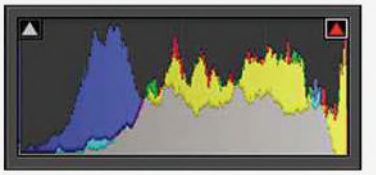
LIGHTROOM IS IDEAL FOR EFFECTIVE, SIMPLE EDITS AND CREATIVE TINTS, WHICH WAS WHAT THIS IMAGE LACKED

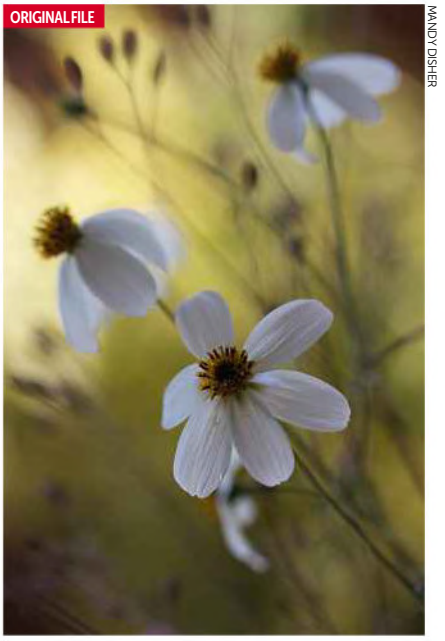
WE'VE SEEN SO many of Mandy Disher's floral images grace the finalists lists of major competitions that we had to find out her secret. We asked her to supply one of her favourite shots and to take us through how she processes her award-winning images, but what wasn't surprising was how beautiful her images are straight out of camera. There's no denying her photographic talent when looking at the quality of her Raw files.

The image Mandy supplied is the perfect floral portrait and holds a lot of potential for enhancement using basic adjustments or more extreme colour manipulation. Personally, I appreciate the natural tones of these backlit blooms and think some simple, subtle colour tweaks could make the image look fresher and softer.

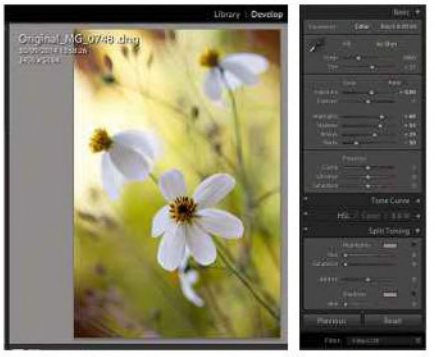
RAW TIP Histogram warnings

If you're ever concerned that you've under-or overexposed your image to the point of losing valuable detail, click the red triangle in the top right of Lightroom's Histogram to turn on the highlights warning and the blue triangle in the left for shadows. Keep them activated so you can see when you've gone too far while editing.





MANDY DISHER



1 CREATE A BASE IMAGE I start by making basic adjustments before moving on to anything creative. I increase the ***Exposure*** slightly, ***Highlights*** and ***Whites*** to brighten the petals and reduce the ***Blacks*** slider to deepen the darker shades. To avoid overexposing the highlights, I only make slight exposure increases and instead open up the shadows using the ***Shadows*** slider.

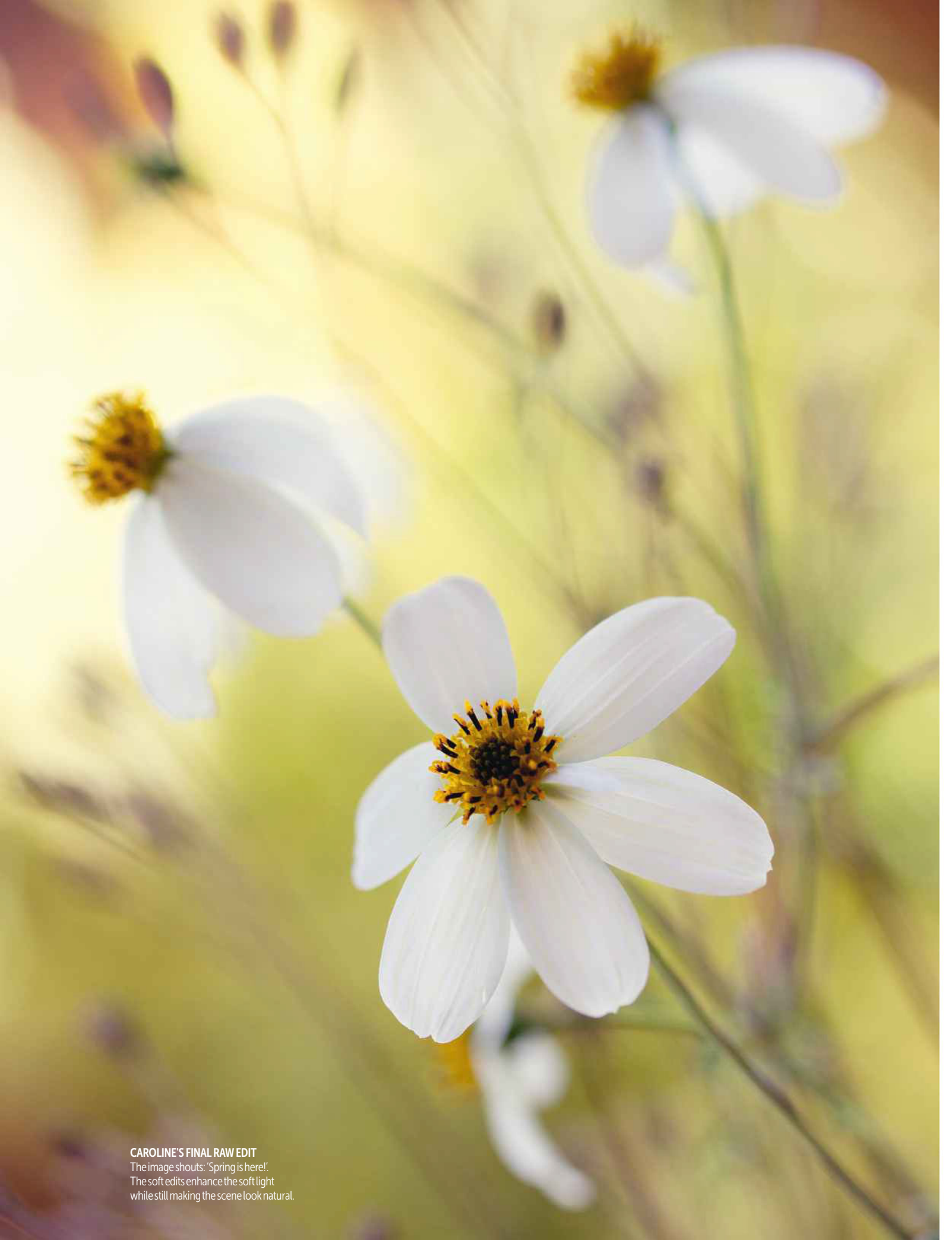
2 ADJUST TONE To brighten the whole image to make it more white-washed and airy, I access the ***Tone Curve*** and move the shadow point of the curve upwards in line with the image's exposure information in the histogram. I then curve the line slightly to increase contrast by placing an anchor in the middle of the line and pulling upwards to create a subtle but smooth contour.

3 ALTER COLOURS I quite like the natural colour of Mandy's image, so I don't plan to do anything too radical. Instead, using ***Split Toning***, I address the highlights and shadows separately. By changing the ***Hue*** to ***60*** I enhance the warmth of the yellows, and shifting the ***Shadows*** to ***288*** adds a pink tinge. I left the ***Saturation*** for both around ***16*** to keep the tones muted and subtle.

4 SELECTIVE ADJUSTMENT In making my Tone Curve adjustment, I lost details in some of the highlights around the second flower. It's an easy fix: I select the ***Adjustment Brush*** and reduce the ***Exposure*** slider, then brush over the area to restore the detail. I click ***New*** to select a new brush, this time to increase ***Contrast*** and reduce ***Clarity*** to soften and brighten the petals.

5 SHARPEN The only area of the image that I want pin-sharp is the stamen of the foreground flower. I select a new ***Adjustment Brush*** and crank up the ***Sharpness*** slider, then carefully brush over this area with a small brush with large ***Feather***, set to ***82%***. I also increase the ***Clarity*** slider slightly to increase the contrast as well as sharpness simultaneously.

6 REMOVE POLLEN As the final act, I zoom into the petals that have yellow pollen spots and select the ***Spot Removal*** tool, set to ***Heal***. I use a brush size that covers the area that I want to hide and a large ***Feather*** to make it blend with the edges. The ***Opacity*** slider adjusts its coverage. Once the area is covered, I click on it again to move or expand the coverage or reapply as I see fit.



CAROLINE'S FINAL RAW EDIT
The image shouts: 'Spring is here!'. The soft edits enhance the soft light while still making the scene look natural.

RAW CHALLENGE 2: MANDY DISHER

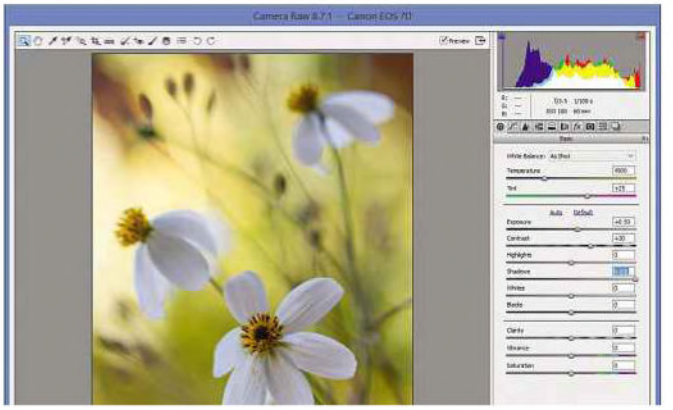
AWARD-WINNING FLORAL PHOTOGRAPHER MANDY DISHER SHARES HER CREATIVE POST-PROCESSING TECHNIQUES

THE TECHNICAL ADVANTAGES of using Raw files make it the only choice for most photographers. If I started with a JPEG there would be little I could do with it post-capture as so much information is discarded by the camera; a Raw file allows me to tailor the pixels to my own preferences. This allows greater scope for creativity.

Most of my images are taken in my garden or home studio so there's always plenty of subject matter waiting for me. I was drawn to these Bidens by their striking yellow centres surrounded by delicate, brilliant-white petals. Each contains detailed structures that are unnoticeable until seen close and their size is perfect too: I find small flowers easier to work with than bigger blooms. During the summer I photographed these pretty flowers many times when light was soft and the flowers backlit, resulting in magical shots.

I'm always careful to compose the image in camera and try to avoid cropping where possible; I don't like to waste valuable pixels. I'd processed lots of pictures of these lovely flowers previously and, as the colour is pleasing straight from the camera, slight contrast adjustments or reduction in saturation is usually all that's needed. But this time I decided to make a colour change. I see endless possibilities with editing and I don't always want to record fact: I want to maximise the potential, enhance a good photo into a great and memorable piece of art. The purist in me left long ago, now editing holds no boundaries and gives me free rein to develop and express my vision.

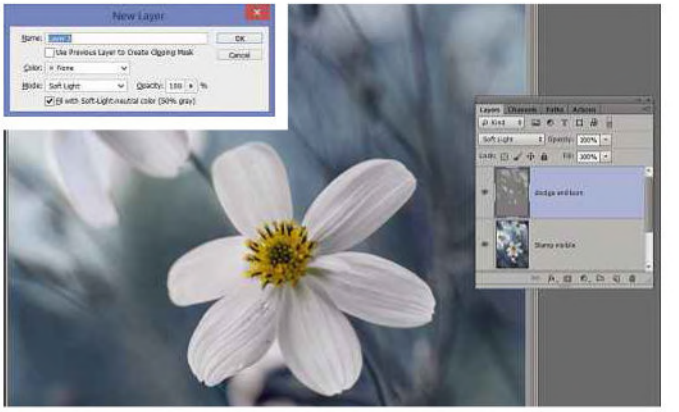
MANDY DISHER



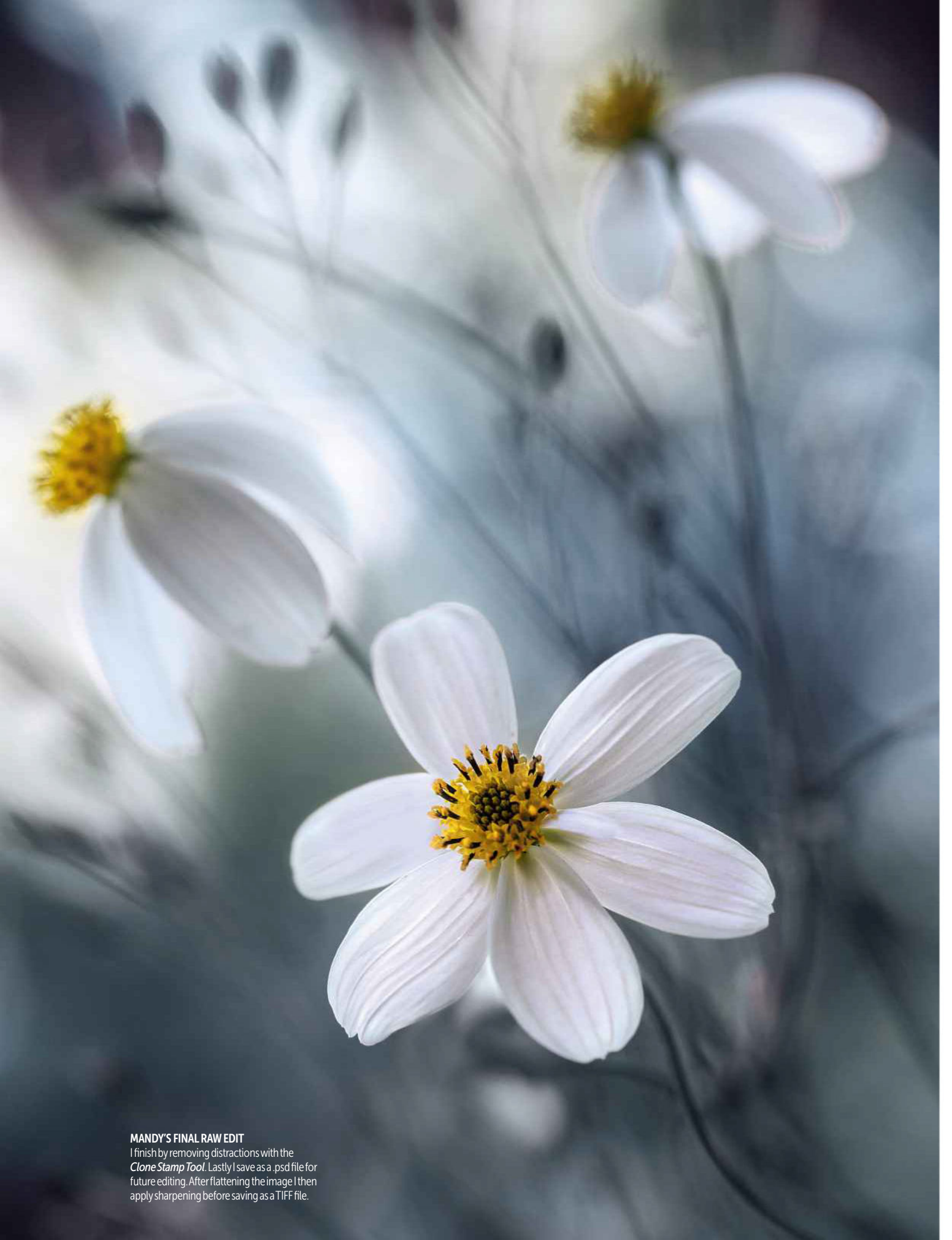
1 BASIC ADJUSTMENT Opening my image in ACR, I apply some basic adjustments: I increase the ***Exposure*** to ***+0.50***, boost ***Contrast*** to ***+0.30*** and lighten the ***Shadows*** by taking the slider to ***+100***. I use ACR to open TIFF files and JPEG too if I want to convert a copy to the Standard RGB colour space for web. For this reason I double check that the colour space is set to Adobe RGB with a 16-bit depth – the same as the camera's Raw file – before I export to Photoshop CS6.

2 ADJUST COLOUR A ***Hue/Saturation*** adjustment layer enables you to change the hue, saturation and lightness of the individual colour ranges as well as the overall colour. By selecting the ***Master*** channel, I experiment with sliders to alter the overall hue and saturation as well as targeting individual colours until the background was a pleasing blue. Utilising the attached Layer Mask, I then use the ***Brush tool*** to reveal some of the yellow tones from the original image.

3 BOOST COLOUR AND TONES I merge all visible layers into a new layer by holding down the ***alt*** key and going to ***Layer>Merge Visible***, before duplicating this layer. To add punch, I apply Gaussian Blur (***Filter>Blur>Gaussian Blur***) at ***180 Pixels***, then set the layer's ***Blend Mode*** to ***Soft Light*** and the ***Fill*** slider to ***35%*** to lower the strength. I then add a ***Photo Filter*** adjustment layer, set to ***Deep Blue***, with the opacity at ***25%***. Again, I use the Layer Mask to reveal areas of yellow.



4 DODGE AND BURN Most of my images benefit from selective exposure adjustments and I use non-destructive dodge and burning to do this. I create a new layer (***Layer>New>Layer***), set the ***Blend Mode*** to ***Soft Light*** and fill it with ***50% grey*** – all of which can be done from the New Layer menu box. I use a soft brush alongside the ***Dodge*** and ***Burn tools*** at about ***10%*** opacity to make the adjustments. It's quick, easy and leaves the original pixels untouched.



MANDY'S FINAL RAW EDIT
I finish by removing distractions with the *Clone Stamp Tool*. Lastly I save as a .psd file for future editing. After flattening the image I then apply sharpening before saving as a TIFF file.

RAW CHALLENGE 3: JORDAN BUTTERS

OUR RESIDENT PHOTOSHOP EXPERT IS LET LOOSE ON MANDY'S FLORAL RAW FILE. WILL HE COME UP SMELLING OF ROSES?

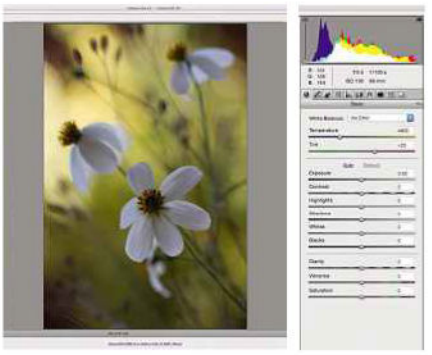
I'M A LONG-TIME FAN of Mandy's ethereal flower photographs. Having tried floral photography myself, I'm fully aware that it's not as easy as you might think, so imagine my surprise when I opened Mandy's Raw file to find a well exposed, near-immaculate image straight out of camera. Hats off to her!

Floral photography is pretty far removed from the types of images that I usually process so this should be an interesting challenge. This is a simple composition, so I'm going to be concentrating my efforts on adjusting the colour, with slight tweaks to exposure through dodging and burning to really make the petals pop! Whilst Mandy has chosen near-immaculate specimens to photograph, there are still a few areas that could be tidied. Here we go...

RAW TIP White Balance

The White Balance presets offered by your camera and ACR are useful, but nothing is more accurate than setting WB from a known neutral area using the WB eyedropper tool in ACR. Ideally, you would use a grey card to establish a neutral tone every time you shoot – in reality this isn't practical, but you can still set the WB by using the eyedropper on any part of your image that you know, or think, to be free from colour cast. Of course WB can be used creatively too – here, there was no known neutral for me, as even the petals might have a tint, however wanting them to be pure white I used the eyedropper to set the White Balance from the nearest petals.

MANDY DISHER

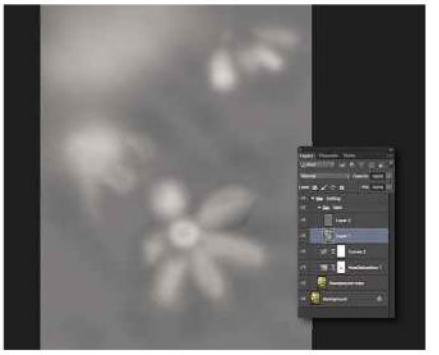


1 CORRECT WHITE BALANCE I start by switching on the highlight and shadow warnings in ACR to make sure that no areas of data are lost, which they aren't. There's a slight blue tint to the petals, which could be correct, but I'd like them to be pure white, so I use the ***White Balance eyedropper*** to set the White Balance from the petals – this adds yellow to the background though.

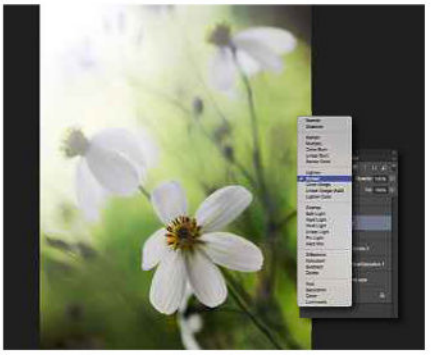
2 TIDYING UP Opening the image in Photoshop CC, I create a duplicate of the background layer by pressing ***cmd + J*** (Mac), or ***ctrl + J*** (PC). I then use the ***Patch tool*** to remove any distractions and blemishes – there are a few specks of pollen on the petals, a glimmer of light on the lower petal and a pink blob at the bottom of the frame, which are easily remedied in minutes.

3 ADJUSTING COLOUR A Hue/Saturation Adjustment layer (***Layer>New Adjustment Layer>Hue/Saturation***) is added and I adjust the ***Hue*** in the ***Master*** channel to turn the background green. I desaturate the ***Cyan***, ***Blue*** and ***Magenta*** channels and dial down ***Saturation*** on the ***Red*** and ***Master*** channels. A Layer Mask masks this from affecting the central disk of the flower.

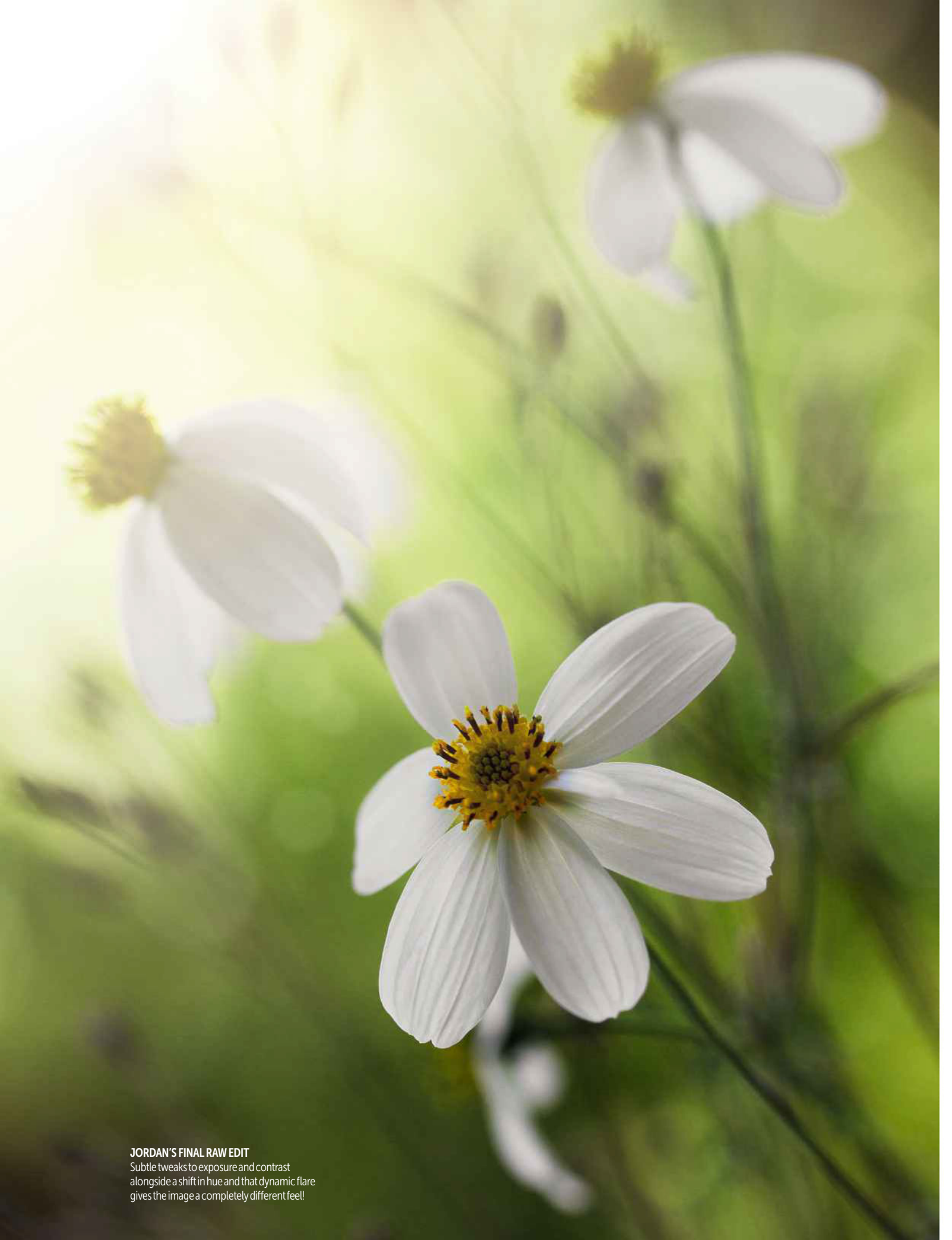
4 ADD CONTRAST I want to boost contrast substantially, but only in the mid-tones so not to risk clipping shadows or highlights. I use a ***Curves*** adjustment layer, adding anchor points to the curve in the highlight and shadow areas, before making an 'S' curve in the mid-tones. This is trial and error and needs to be carefully adjusted to prevent any of the tones looking unnatural.



5 DODGE AND BURN Another way to add selective contrast, and to make your image pop, is dodging and burning. I create two new layers, changing their ***Blend Mode*** to ***Soft Light*** and filling them with 50% grey. I use the ***Dodge tool*** at ***18% Exposure*** to brighten the disk of the flowers, as well as the petals. I then use the ***Burn tool*** to darken the shadow areas in the background.



6 ADD SOME FLARE As a final touch I decide to add some flare. I start by creating a new layer using the ***Screen Blend Mode*** and filling it with ***Black*** – this makes the flare editable, as opposed to applying it to an image layer. I then go to ***Filter>Render>Lens Flare*** and choose my flare position and intensity. The flare is quite cold, so I add a ***Photo Filter*** layer to the flare to add warmth.



JORDAN'S FINAL RAW EDIT
Subtle tweaks to exposure and contrast alongside a shift in hue and that dynamic flare gives the image a completely different feel!

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CANON EOS 5DS R

Boasting the highest resolution of any DSLR to date, Canon's latest launch has raised the bar when it comes to image quality. But is there more to life than megapixels?

TEST: LEE FROST

SPECIFICATIONS

Guide Price (body only): £3,200
Image sensor: Full-frame (24x36mm)
Resolution: 50.6-megapixels
Maximum image resolution: 8688x5792 pixels
AF points: 61 including 41 f/4 cross-type, five dual cross-type at f/2.8 and one cross-type at f/8
ISO range: 100-6400 (expandable to 50-12800)
Shutter speeds: 1/8000sec-30 seconds & Bulb
Continuous frame rate: 5fps
Built-in flash: No
Monitor: 3.2in Clear View II TFT (1,040,000K dots)
Storage: Dual slot Compact Flash Type 1, SD, SDHC, SDXC AND FLU SD. UHS-1 supported
Size: 152x116.4x76.4mm
Weight: 845g (with battery and card)

FLAGSHIP MODEL: Externally, only that distinctive red R badge separates the EOS 5DS and EOS 5DS R.

EVERY NOW AND then, a DSLR is launched that gets everyone talking. Canon did it years ago with the EOS 5D as it was the world's first affordable and reasonably compact full-frame DSLR. Nikon had the forums buzzing when the D800 and D800E appeared, boasting amazing 36-megapixel sensors. Now it's Canon's turn again to set tongues wagging with the 50.6-megapixel EOS 5DS. Never before has a 35mm-type DSLR offered such high resolution. On paper it's a game-changer, taking image quality to a level that has never been seen before in a 24x36mm sensor.

There are two versions of the EOS 5DS – the 5DS and the 5DS R tested here. Both cameras are exactly the same bar one feature – the 5DS R has a low-pass cancelling filter on the sensor. The low-pass filter is there to prevent moiré patterns in your images, which can occur in areas where there are fine repeated patterns, such as the weave in textiles. The low pass filter hides moiré effects by slightly softening the image. By removing it, or cancelling it as the EOS 5DS R does, you get sharper images, but there's an increased risk of moiré patterns, which, when they appear, are very difficult to get rid of. In theory, for most subjects moiré shouldn't be an issue, so for just £200 extra you get the 5DS R and even better image sharpness than the 5DS offers (which retails at £3,000).

In the flesh the EOS 5DS looks just like an EOS 5D Mk III and in practice it handles like one too, so if you already own that camera, the EOS 5DS immediately feels comfortable and familiar. It has the same weatherproof magnesium alloy body (though with a strengthened baseplate and tripod mount so you can clamp it tight to the tripod head to reduce vibrations); it takes the same battery; it has the same shutter speed range, exposure modes and 61-point AF system. The menus and controls are also virtually identical.

The main difference between the EOS 5D Mk III (which is still available) and the EOS 5DS is the leap in resolution, from 22.4-megapixels to 50.6-megapixels – more than double. The EOS 5DS also has dual DIGIC 6 processors to allow a decent shooting and burst rate despite the increased resolution (up to 510 Large JPEGs or 14 Raw files at 5fps with a UDMA CF card installed), whereas the EOS 5D Mk III has one DIGIC 5 processor (managing 6fps).

Closest rivals

- **NIKON D810:** The successor to the superb Nikon D800 and D800E, this is Nikon's best DSLR to date. It offers a full-frame 36.3-megapixel sensor with no low-pass filter.
- **CANON EOS 5D Mk III:** It's a few years old now, but it can still hold its own. The 22.3-megapixel sensor produces superb results and the massive ISO range (expandable to 102400) makes it a brilliant camera for low-light photography.
- **SONY ALPHA 7R MK II:** Boasts the world's first back-illuminated 42.4-megapixel full-frame sensor (with no low-pass filter for increased image sharpness), super-fast 399 point AF, five-axis IS and 4K video.

The metering system of the EOS 5D Mk III is fantastic, but the 5DS goes a step further with its 150,000 pixel, 252-zone RGB+IR metering sensor, plus you can shoot Raw at reduced resolutions of 28- and 12.4-megapixels.

A clever new feature is the option to set a shutter delay when using mirror lock-up, so instead of having to press the shutter release twice – once to lift and lock the mirror and a second to trip the shutter – you press the shutter release once, the mirror lifts and locks, then after the chosen delay period the exposure is made. A cam controls mirror movement and reduces the recoil when you trip the shutter. This slows down the shutter movement, which sounds and feels odd to begin with – but it does make it quieter in use.

In use, the EOS 5DS handles just like a EOS 5D Mk III. It's quite large and feels substantial

▶▶

ULTIMATE DETAIL (LEFT): The level you can zoom in blew me away – tiny objects at a distance can be viewed in detail. **NO MOIRÉ (RIGHT):** The EOS 5DS R doesn't feature a optical low pass filter. Images are sharper, but at the risk of moiré.

Exposure: 1/1300sec at f/8 (ISO 400)

in the hand, but it's not over-heavy and it's very well balanced, whether you're using a compact prime lens such as a featherweight 50mm or a big, heavy telezoom. The control layout is logical and the controls themselves are both a good size and accessible. The rear screen is big, bright and super-sharp and so is the Intelligent Viewfinder II, which shows 100% of the image area. There's an electronic level on the rear screen , which is also visible in the viewfinder so you can check the camera is level as you shoot.

Like all high-end DSLRs, the EOS 5DS has the usual selection of exposure modes – aperture-priority, shutter-priority, program, manual and Bulb, plus a Scene Intelligent Auto mode. Metering patterns are Evaluative, centre-weighted, Partial and Spot. There are Picture Styles that users of this camera are never likely to use, although the in-camera HDR and multiple exposure modes do have their occasional creative uses.

The AF system is fantastic for a camera designed for general use. It offers six AF Area Selection modes from single to 61-point, plus you can customise the focusing to suit your needs using five pages of options in the AF menu section! LiveView is excellent and highly recommended for critical focusing – you can magnify the subject 6x or 16x.

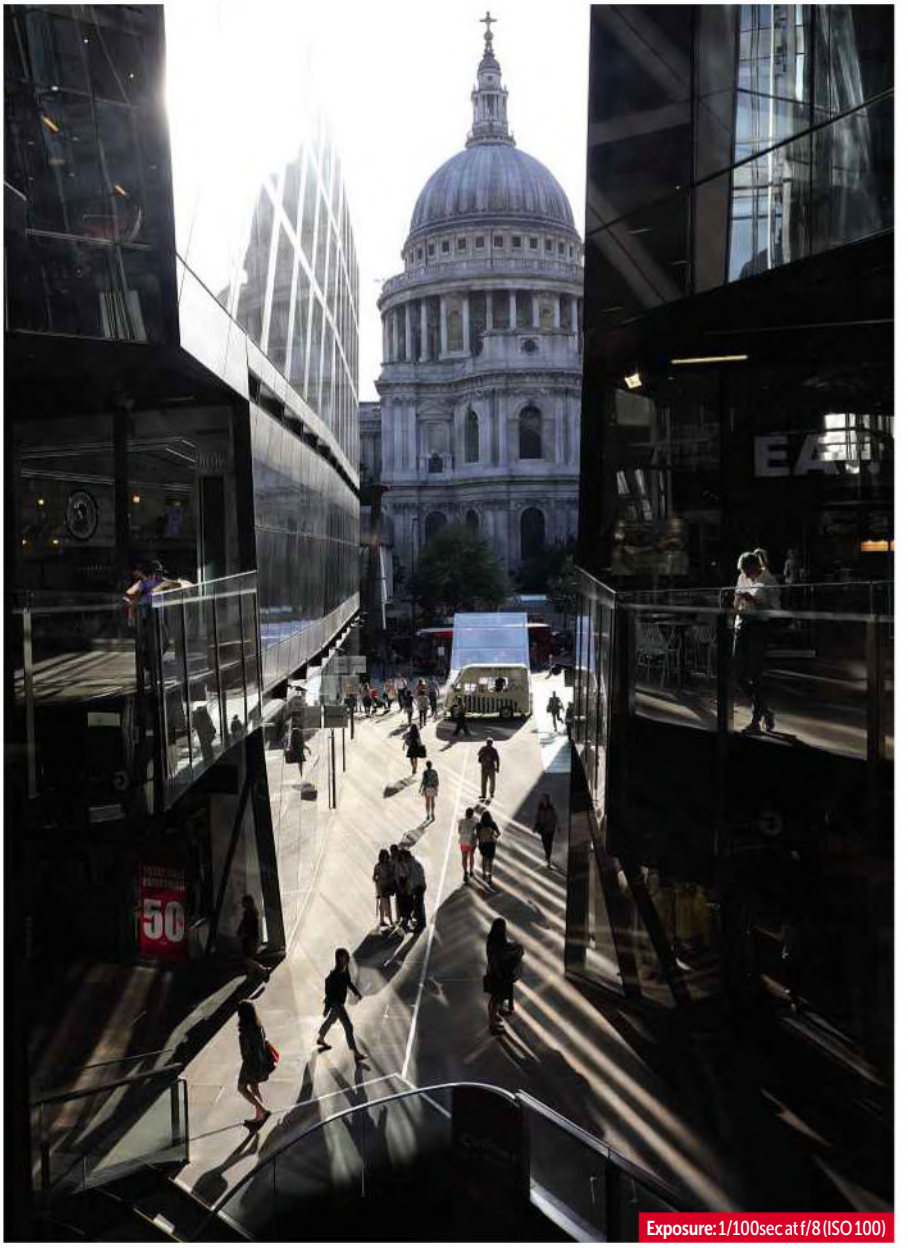
Of course, what you really want to know is does 50.6-megapixels make a difference? Well, I'm pleased to say the answer is a big fat yes! Image quality is stunning. Shoot in Raw, blow-up the images to 100% on your computer screen and you'll be amazed at the detail and sharpness. Images are crisp, punchy and the colours vibrant. Shoot at a wide aperture and the sharp areas look even sharper because the contrast between them and the out-of-focus areas is so great. I've never seen better from a DSLR before and having tested the Pentax 645Z medium-format digital camera, I'd say the EOS 5DS isn't far behind it, despite costing less than half the price. The standard output size of files from the EOS 5DS is almost 75x50cm, which is double the size of files from the EOS 5D Mk III. If you like to print your images big, this is a massive leap forward in quality.

Of course, there are implications to cramming so many pixels onto a sensor measuring only 24x36mm. Those pixels are smaller for a start, so there's a greater risk of increased noise and reduced dynamic range. Thankfully, noise is well controlled and the dynamic range is excellent at up to ISO 3200, matching or beating both the EOS 5D Mk III and the Nikon D810. The ISO range of the EOS 5DS has been capped to help deal with noise – which gets worse as ISO increases. The native ISO range is only 100-6400 (expandable to 50-12800) whereas with the EOS 5D Mk III it's 100-25600 (expandable to 50-102400). In most situations, ISO 6400 is more than enough, and having tested the EOS 5DS at all ISO settings, I'd be happy to use it at any ISO including 12800 when needs must. But the EOS 5D Mk III gives better results at those extreme ISOs (12800+).

IN DETAIL (RIGHT): With good technique comes incredible detail, but any shake is emphasised. **FAMILIAR LAYOUT (BELOW):** The EOS 5DS R is almost identical in layout to the EOS 5D Mk III.

"OF COURSE, WHAT YOU REALLY WANT TO KNOW IS DO THOSE 50.6-MEGAPIXELS MAKE A DIFFERENCE? WELL, I'M PLEASED TO SAY THE ANSWER IS A BIG FAT YES! IMAGE QUALITY IS STUNNING"

ISO COMPARISON: The EOS 5DS R controls noise well, up to a point. A reduced ISO range with useable image quality is more useable than a vast range of unusable ISO values.



Exposure: 1/100sec at f/8 (ISO 100)

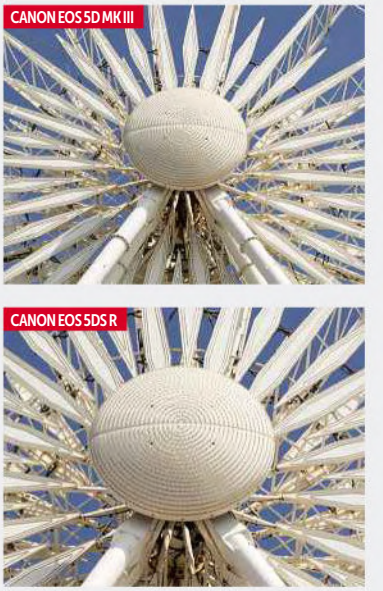
Higher resolution also means bigger files. Raw files range in size from around 50-80Mb (on the EOS 5D Mk III they're under 30Mb), so you get half or less images per memory card. Process those Raw files and the saved 16-bit TIFFs top 300Mb each, compared to 120Mb for EOS 5D Mk III TIFFs. You'll need a computer with both fast processors and plenty of RAM to handle files. I use an Apple Mac Pro with dual six-core 2.4Mhz processors and 24Gb of RAM, but if you've only got a single processor and 4Gb RAM you might need to update your computer!

The two factors that are going to determine whether you get the most out of the EOS 5DS are the lenses you put on it and how carefully you use it. Canon recommend using their own L-series lenses launched in the last four years. I have the 16-35mm f/4 IS, 24-70mm f/4 IS and 70-300mm f/4-5.6 IS and all are capable of handling the resolution of the camera. Prime lenses from the likes of Zeiss will also allow you get the very best out of that 50.6-megapixel sensor.

In terms of how you use it, the crucial thing to remember is that ANY error that could reduce image sharpness will stand out like a sore thumb, so you need to focus critically and make sure the camera is rock solid when the shutter is tripped. If you use it on a tripod, make sure it's clamped down tight, fire the shutter with a remote release and use the mirror lock-up. If you're handholding you must adopt a stable stance and use a shutter speed fast enough to combat any camera shake. This camera is so sharp that the tiniest amount of movement will be visible when you blow up the images. It's totally unforgiving and user-error is perhaps its main limitation. Get everything right, though, and the results will blow your mind. The EOS 5DS is a game-changer and has set a new standard that other manufacturers can only hope to match.

THE EOS 5DS OR EOS 5DS R?

Is it worth spending £200 more to get the 'R' with its low-pass cancelling filter? Personally, I don't think it is. The images produced by the 5DS R are a little sharper than the EOS 5DS, but the EOS 5DS files are fantastically sharp in themselves, and if you feel it's necessary you can sharpen them to match the quality of the EOS 5DS R, whereas the EOS 5DS R files can't be sharpened so easily. With the EOS 5DS R, you also have the increased problem of moiré patterns, and though it shouldn't be a problem for general photography, because the resolution of the camera is so high, some users of the 5DS R are finding they get moiré patterns on any shot where fine repeated patterns are captured. I even heard of a wildlife photographer complaining he got moiré patterns on bird feathers in some images.



IT'S ALL IN THE DETAILS: The same viewpoint shot on two different Canons and zoomed in to 100%. The difference in resolution is astounding.

Verdict

Digital SLR Photography BEST BUY

I liked the EOS 5DS so much that I bought one. Not the EOS 5DS R tested here, but the EOS 5DS (see panel, above). The image quality alone was enough to justify the purchase and I haven't regretted my decision for a second. It's a joy to use and results are stunning. I've never seen such detailed images from a DSLR. Use it with great care and good glass and you'll be amazed by the results. For now, it's the world's best DSLR.

Handling	19/20
Ease of use	19/20
Features	18/20
Performance	20/20
Value	19/20
Overall	**95/100**

Polarising filters

Prices can vary wildly, as can performance, so we've tested a wide selection of screw-in and system polarisers to find the very best buys

TEST: RICHARD HOPKINS

IF YOU ONLY ever buy one filter, make it a polariser. With the right subject and technique, results can be dramatically improved and impossible to mimic in post-processing. Traditionally they're a landscape photographer's favourite for the way they darken blue skies and enrich the colour of foliage by reducing polarised light. Get the angle right, and you can get clear water or glass, and enjoy vibrant leaves and grass. It can also be used when shooting motor sports, for cutting through a shiny windscreen to show the driver or to brighten paintwork. Whatever the subject, to get the best out of a polarising filter you need to know your angles – angle to the sun, angle to the subject, and the degree of rotation. But if in doubt, just give it a twiddle and look through the viewfinder – it's easy to see what's happening.

There are two types of polarising filter: linear and circular, but that refers to their optical characteristics; not to their physical shape. Linear polarisers can upset the metering and AF systems of some cameras, so nowadays they're almost all of the circular type you need.

The polarising filters here range from £30 to a pricey £175. Most of the best value ones are under £100, and the main difference is in the multi-coatings to suppress flare, with dirt-resistant surfaces. In terms of sheer polarising ability, though, they all perform the same.

How we did the test

We used a combination of controlled studio tests and real-world picture taking. In terms of polarising ability – darkening blue skies and reducing reflections – there is no performance difference between any of these filters. And we tried them every which way!

Sharpness is not usually a problem with polarisers, at least not with shorter focal length lenses that are their most likely partners. Longer focal lengths magnify slight imperfections in filters though, so we put them on a 200mm lens and ran comparisons through the Imatest MTF sharpness procedure. There were some small differences. The polarisers vary in density, too – how much the overall exposure has to be increased. The darkest need 1.9 stops extra, and the lighter-toned variety only 1.2 stops. That's a handy difference in some situations.

Flare and ghosting are the biggest threats to image quality with filters: it reduces contrast and makes images look flat when shooting into the light, and ghost images can form when very bright light bounces off the shiny sensor and back again off the rear of the filter. The most significant difference we found was the useful advantage the multi-coated filters showed with reduced ghosting.

We subjected the filters to a variety of abuses, and by far the hardest thing to remove during cleaning was dried-on water marks. The best filters have tough dirt- and water-resistant multi-coatings – rainwater forms into beads and mostly runs off, and dried-on marks are easy to wipe away. The normal multi-coated and non-coated filters all cleaned up eventually, but some needed a fair amount of hard rubbing with a microfibre cloth and optical fluid to get them properly clean.

What to look for..

1) Multi-coating: Reduces the possibility of flare or ghosting
2) Black rim: Stops internal reflections
3) Slim profile: Helps prevent vignetting with wide-angle lenses
4) Index mark: Rotation reference
5) Serrated edge: Grip for rotating
6) Front threads: Allows user to attach a lens cap or second filter

B+W XS-Pro MRC Nano

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £175 (77mm)
Sizes: 49mm to 86mm
www.bpluswfilters.co.uk

Over the years, B+W has built an enviable reputation for uncompromising quality. Made in West Germany with a slim-profile brass mount, the XS-Pro MRC Nano is its top-of-the-range circular polariser, with tough Multi-Resistant Nano Coating. At £175, it's easily the most expensive 77mm filter here. Overall density checked out at 1.6 stops and colour effectively neutral, measuring just 300K cool. Optical quality is top drawer, with zero impact on sharpness. MRC Nano multi-coating is the best in the business with very high resistance to flare and ghosting, and it's also very easy to clean – the worst we could throw at it just wiped off.

Verdict

Superb quality polariser, with excellent MRC Nano multi-coating being perhaps the outstanding feature. Top quality for sure, but a very high price.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪
Overall	✪✪✪✪

Hoya Pro-1 Digital

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £100 (77mm)
Sizes: 55mm to 82mm
www.intro2020.co.uk

Hoya is the world's biggest manufacturer of optical glass and its famous Pro-1 range has always been a standard-setter, even if Hoya now offers an even higher grade with the Revo series. Street price is a competitive £100 or thereabouts for 77mm.

In a slim-profile mount with index marking, optical performance is excellent, with top scores for zero impact on sharpness, good flare-resistance and minimal ghosting. Density measured 1.6 stops and colour showed a just-noticeable 600K cool tint compared to daylight. The multi-coated surfaces cleaned up well, with no permanent marks left by dried-on rain.

Verdict

As expected, high performance all round and good value for money. That's business as usual for the Hoya Pro-1 range.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Hoya Super Pro-1 D Revo

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £120 (77mm)
Sizes: 37mm to 82mm
www.intro2020.co.uk

Recently introduced as top of the Hoya range, the Super Pro-1 Digital Revo is very similar to the Pro-1 D, as the name implies, with even better SMC super multi-coating. The main advantage here is high resistance to water marking, stains and scratches – it just wipes clean. The cost of these useful improvements pushes the price up to £120 in 77mm size fitting. There's an index mark on the slimline mount for easy reference of rotation setting, density measured 1.6 stops, and colour just 550K on the cool side of neutral daylight. There was no measurable impact on sharpness and resistance to flare and ghosting was high.

Verdict

Excellent performance, like the standard Hoya Pro-1 D, plus the Revo's stain and water-resistant multi-coating ticks the final box.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Kood CPL Slim

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £30 (77mm)
Sizes: 37mm to 86mm
www.koodinternational.com

Kood is a UK brand producing a multitude of photographic accessories, all at great value prices. Their filter range is wide, including both square slot-in and screw-mount types. This Chinese-made CPL comes in a good quality slim-profile mount and is of the lighter-toned variety, with a density measuring only 1.2 stops – handy for keeping up shutter speeds. Colour cast was virtually zero – just 50K warm. Sharpness suffered a little in the telephoto test, but there was no measureable effect at shorter focal lengths. Like all uncoated filters, there was some flare and ghosting in difficult conditions.

Verdict

For most users, most of the time, the optical shortcomings will probably pass unnoticed. And it's amazing value at £30 in 77mm.

Build quality	✪✪✪✪✪
Performance	✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪

Kood CPL

SCREW-IN
Street price: £42 (77mm)
Sizes: 27 mm to 86mm
www.koodinternational.com

This is a completely different filter to the Chinese-made Kood CPL Slim, but it also comes at a great value price. Made in Japan, the mount is good quality and slightly deeper and easier to grip, though it may vignette with ultra-wide lenses, causing darkening of the corners. Density checked out at 1.8 stops and colour a slight 750K on the cool side of neutral. Like the Kood CPL Slim, sharpness suffered a little in the tough telephoto test that magnifies any slight imperfections in the glass, though not a problem with wider lenses mostly used for landscapes, while the uncoated surfaces could induce some flare and ghosting when pushed.

Verdict

In truth, optical performance is unlikely to disappoint under normal conditions, and you can't argue with the price. No slim-profile mount though.

Build quality	✪✪✪✪✪
Performance	✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪

Marumi DHG

Digital SLR Photography BEST BUY

SCREW-IN
Street price: £55 (77mm)
Sizes: 37mm to 95mm
www.kenro.co.uk

While not the biggest name in the UK, Marumi has optical roots dating back to 1937 in Japan, and its products are highly rated. The Marumi DHG (Digital High Grade) is exceptional value at £55 in 77mm fitting, with a high-grade spec, including a slim-profile mount. Density measured 1.6 stops, and colour 850K on the cool side. While this is the greatest variance from neutral daylight we tested, in practice it's more noticeable than problematic, and easily corrected for critical work. Sharpness was unaffected, flare resistance high, and dried-on water marks cleaned up with a little effort. High performance at a great price.

Verdict

Not quite the best, and lacking a water-resistant final coating, but it does all the important things very well, and nothing can touch it for £55.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Marumi Super-DHG

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £75 (77mm)
Sizes: 37mm to 95mm
www.kenro.co.uk

Take the Best Buy Marumi DHG, add an extra water and stain resistant coating, and you have the Marumi Super-DHG – for an extra £20 or so in a 77mm slim-profile mount. Whether or not it's actually the same filter underneath is moot, though it's none the worse for that and the modified coating could explain the slight improvement in colour accuracy, recorded at a fairly inconsequential 650K cool. Density was measured the same at 1.6 stops, sharpness was unaffected, flare and ghosting resistance tested high. The easy wipe-clean surfaces are a nice bonus on top. Another all-round high performance from Marumi.

Verdict

The Marumi Super-DHG has a full list of all the best features, and performs to an equally high standard. Very good value at £75 in 77mm size fitting.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Marumi Exus 77mm

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £105 (77mm)
Sizes: 37mm to 82mm
www.kenro.co.uk

Marumi's new Exus range is the flagship, and the key feature here is the lighter-toned polarising material used. Density measured 1.2 stops, which is half a stop less than most others, and handy for subjects like motor sport (a polariser will usually remove reflections from windscreens) when wanting to keep up shutter speeds. Colour cast measured effectively zero at just 50K warm, sharpness was unaffected, flare and ghosting resistance high, and the multi-coated surfaces wipe clean easily. The Exus also comes in a thoughtfully designed oval box that slips into a pocket and opens easily. Other manufacturers could learn from this!

Verdict

With a full set of top-grade features, arguably the best here with its lower 1.2 stops density, and high all-round performance, it's a great buy.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Sigma DG 77mm

Digital SLR Photography HIGHLY RATED

SCREW-IN
Street price: £100 (77mm)
Sizes: 46mm to 105mm
www.sigma-imaging-uk.com

Better known for its lenses, Sigma filters are also high quality. Physical appearance of the Sigma DG is very similar to the Marumi DHG, and performance too. In the much larger 105mm fitting, the Sigma also makes an interesting alternative for Lee and Hitech filter system users. Specification is high, with a slim-profile mount. Density tested at 1.6 stops, with no effect on sharpness, good resistance to flare and ghosting, and a fractionally blue 750K colour cast. We've had trouble cleaning dried-on water marks from Sigma filters in the past, but after a little careful rubbing this Sigma DG filter came up sparkling.

Verdict

High all-round performance at a reasonable cost, though much the same can be had for less from the Marumi range.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪
Overall	✪✪✪✪½

Cokin P-164

Digital SLR Photography HIGHLY RATED

SYSTEM FILTER
Street price: £72 (P-System)
Sizes: P-System slot-in
www.intro2020.co.uk

The original Cokin square filter system is still going strong, and while the slot-in mount is great for grads, it's more difficult with polarising filters that need to be rotated. Sliding the filter in is easy enough, though turning it is not so simple and the edges are very sharp. Getting it out again is just plain awkward. The P-164 is made of glass, not resin like most other Cokin filters, and density measured 1.9 stops with colour just a hint cool at 750K blue. Sharpness was unaffected with this polariser, but like all uncoated filters it could be prone to ghosting in some situations and cleaning dried-on water marks took a fair bit of effort.

Verdict

For P-System users, there's not a great deal of choice with polarising filters, but the Cokin P-164 does a decent job at a pretty fair price.

Build quality	✪✪✪✪
Performance	✪✪✪✪
Value	✪✪✪✪
Overall	✪✪✪✪

Cokin Z-164

SYSTEM FILTER
Street price: £250 (Z-System)
Sizes: Z-System slot-in
www.intro2020.co.uk

Cokin's Z-System is basically a scaled-up version of the P-System. While it takes 100mm square slot-in filters like Hitech and Lee that can be interchanged between brands, the Z-164 polariser will only rotate in a Z-System holder. Fitting is improved over the P-System though, with retractable retaining pins to make things easier. Unsurprisingly, the Z-164 polariser appears to be identical to the smaller P-164 – made of glass, 1.9 stops density with a hint of 800K cool blue cast, and the same comments on sharpness, ghosting and cleaning apply. The biggest difference is the price, that jumps up to an eye-watering £250.

Verdict

The Z-164 is a good, basic polarising filter, and easy to use in the Z-System holder. The cost is hard to justify, but Z-System users don't have many options.

Build quality	✪✪✪✪
Performance	✪✪✪✪
Value	✪✪
Overall	**✪✪✪**

Hitech CPL

SYSTEM FILTER
Street price: £150 (105mm)
Sizes: 77mm, 95mm and 105mm screw mount
www.formatt-hitech.com

The 105mm Hitech CPL is designed to fit Formatt-Hitech's 100mm slot-in system, and needs a front adaptor ring on the holder for mounting, at a relatively modest extra cost of £16. It's a good system, more similar to Lee than Cokin, and is well designed and made, with smooth and easy operation. The Hitech CPL is of the lighter-toned polarising variety. The glass is uncoated with a density measured at 1.3 stops. Colour is effectively neutral at only 250K cool. There is a problem though, and that is a tendency to flare in contrasty conditions. Other filters tested side by side were not affected in the same way.

Verdict

Nicely made with smooth rotation and an attractive price for 100mm slot-in system users. It's just let down by poor flare resistance unfortunately.

Build quality	✪✪✪✪✪
Performance	✪✪
Value	✪✪✪
Overall	**✪✪✪**

Lee Filters CPL

Digital SLR Photography BEST BUY

SYSTEM FILTER
Street price: £215 (105mm)
Sizes: 105mm screw mount and 100mm square
www.leefilters.com

Lee is the master of square slot-in filters, renowned for its range of high-quality resin filters, hand-made in the UK. The Lee CPL is glass, made under license in Japan, and it screws into an additional ring at the front of the adaptor. It's not cheap, but works very well. Density measured 1.7 stops and colour 700K on the cool side of neutral. Optical quality is high and sharpness completely unaffected, though being uncoated, a little flare and some ghosting is visible under provocation. Unfortunately, adding anti-reflection multi-coating to reduce this would push the price even higher for such a large filter.

Verdict

This is the best polarising filter for square slot-in systems. It's expensive, but given the size, good value. A cheaper 100mm square version is available.

Build quality	✪✪✪✪✪
Performance	✪✪✪✪
Value	✪✪✪✪
Overall	**✪✪✪✪**

Conclusion

If you want the best, then the B+W XS-Pro, Hoya Revo and Marumi Exus are it. They're all Highly Rated, optically excellent and feature the best dirt-resistant multi-coatings. They're also among the more costly options though. For less money, the Marumi DHG is almost as good, lacking only the easy-clean aspect of the most expensive filters. At £55 in 77mm size, it takes the Best Buy award. Several other filters can equal its performance and come Highly Rated. If you shop around you may be able to better the prices we've quoted and grab a bargain. For slot-in system filter users, the Lee Filters CPL is the Best Buy. Watch out for cheap fakes. There are a few around and they're very hard to tell from the real thing. The only way to be sure of getting a genuine product is to buy from a retailer supplied by the official importer.

ND GRADUATED FILTER SYSTEMS

GRADS ARE THE LANDSCAPER'S FAVOURITES – RECTANGULAR FILTERS USED WITH A SLOT-IN HOLDER TO PUT LIFE AND DRAMA INTO DULL SKIES. WE BRING YOU THE LEADING TRIO FROM OUR TEST OF FIVE TOP BRANDS

Top trio

Our original test of five top brands included the Cokin and SRB P-systems. Both are good value and scored well (four stars overall) but our round-up here concentrates on the three systems that scored highest on quality and value.

TEST: RICHARD HOPKINS

GRADS ARE ABOUT controlling dynamic range – the range of tones from darkest black to brightest white that the sensor can record. Graduated Neutral Density filters, to give them their full name, are dark at the top and gradually fade to clear through the middle and bottom. Their main purpose is for darkening skies in landscapes that would otherwise be too bright – or even completely overexposed and blown to white because they've exceeded the dynamic range of the sensor.

Grads are available in a range of densities, commonly from one to three stops, and also in two transition options where the change from dark to clear is either very gradual (soft-cut grads) or more abrupt (hard-cut). As well as neutral grey, they can come in different colours too.

There are one or two circular screw-fit grads on the market, but the best and most popular type are rectangular, used with a slotted holder. The big advantage is the filter can be slid up and down to adjust position of the transition line. The holder attaches to the lens via an adapter ring and these are usually quickly detachable so one holder can be used on other lenses with different filter sizes. If you've several lenses, buying different adapter rings is much cheaper than spending out on several filters. There are also wide-angle holders available with less filter slots so they don't protrude so far, or wide-angle adapter rings that allow the holder to sit closer to the lens, reducing the possibility of it encroaching into the image.

The two most popular rectangular filters systems are known as P-type using 84mm wide filters, and the larger 100mm-type, sometimes called Z-system. Most manufacturers cover both sizes and as a rule different brands of filter and holder can be used interchangeably. Some manufacturers also make smaller filters for CSC users, and at the other extreme, expensive jumbo-sized versions for big ultra-wide lenses.

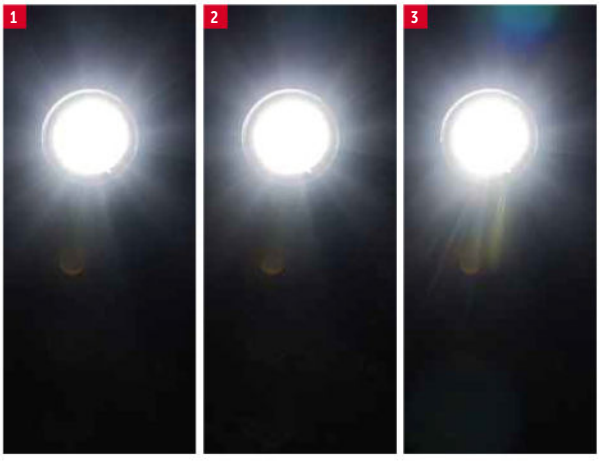
The filters themselves are not glass, but made of dyed resin – a somewhat unpredictable process that can vary from batch to batch. The filters don't have any anti-reflection coatings, making them slightly more prone to scratching and also to flare and ghosting. That's not often a problem, more something to be aware of and worked around with slight reframing of the shot if needs be.

HOW WE DID THE TESTS

- **DENSITY:** Measured at the darkest point, with results given in f/stops. Filters can also be marked with density expressed as a filter factor, or in optical density. So a one-stop filter could be marked as x2 or 0.3ND; two-stops as x4 or 0.6ND; three-stops as x8 or 0.9ND; and so on.
- **COLOUR:** All these filters have a very slight colour cast. Compared to neutral daylight at 5500K, an 'excellent' rating equates to a shift from neutral of under 200K – that's virtually undetectable in practice. 'Very good' is under 400K shift, difficult to see without a side-by-side comparison and suitable for very high quality work. 'Good' is up to 600K and that is noticeable, but often acceptable. 'Fair' is a shift of over 600K and needs adjustment in post-processing for best results.
- **SHARPNESS:** Not usually an issue with filters, unless used with longer focal lengths that magnify optical imperfections. Fortunately, grads are never used with long lenses as the graduated effect reduces dramatically, becoming almost invisible above 100mm or so. Using a 50mm lens and Imatest's MTF lens testing procedure, the worst result was a totally insignificant 1.5% drop in sharpness.
- **FLARE:** Flare can be a problem with all filters, especially those without anti-reflection coatings – like all of these ND grads. Most noticeable is a tendency for blown highlights to spread out when very bright light sources are in the frame or just outside it, such as a sunset. Also, coloured flare spots can appear in the same situation. On the whole though, all these filters performed to a high standard and were all very similar, regardless of price.

Flare resistance

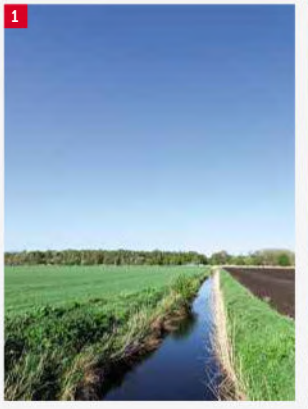
To simulate a typical sunset, a desk-lamp was pointed towards the camera, placed in the corner of the frame. Shooting first without a filter (1), then with a high-quality multi-coated Hoya Pro-1 UV filter (2) for comparison, and then with each ND grad, positioned to shoot through the clear area. The uncoated grads all performed almost identically to the Lee shown here (3), introducing coloured spots and slight flaring around the edge of the lamp.

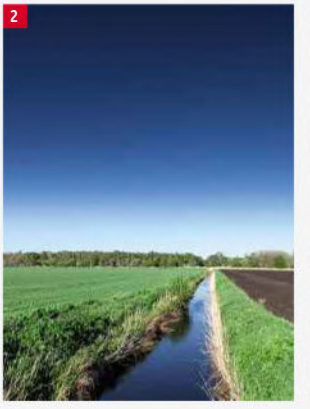


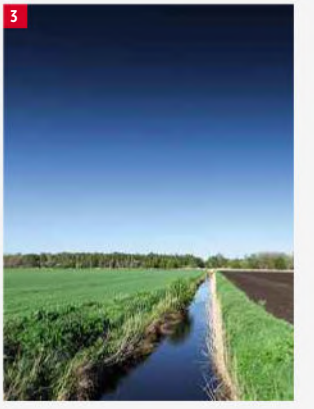
Density & transition

Graduated filters are available in different strengths, and also with a hard-cut transition line, or soft-cut. In addition, the focal length of the lens has a big impact on how strongly the effect appears, with wide-angles showing most darkening (as illustrated), reducing significantly as focal length is increased. With telephoto lenses, the graduated effect becomes almost invisible. Lens aperture can make a difference too, with higher f/numbers showing more strongly. Use the lens stop-down button (if your camera has one) to preview the effect.

1) No filter. **2)** Two-stops hard-cut. **3)** Three-stops soft-cut. These are Lee filters and the nature of the cut can vary slightly between brands.







Formatt Hitech system (100mm)

Tested: 0.9ND soft-cut and 0.6ND hard-cut
Filter: £45 / **Holder:** £60 / **77mm lens adapter ring:** £23
Contact: www.formatt-hitech.com

IF YOU'RE LOOKING for 100mm filters, but at a lower cost than Lee, Hitech is a popular option. Both brands have their devotees, some preferring the Hitech holder, as well as the prices. Hitechs come in an extensive range of sizes: 67mm, 85mm and 100mm (as here), 150mm and the Lucroit (165mm) system – for ultra-wide zooms like the Nikon 12-24mm that cannot use regular filters because of the bulbous front element.

The holder has a solid aluminium mounting plate, rather than the plastic used by others. There is no practical advantage to that, and it's slightly heavier, but it certainly conveys a nice impression of quality. On the front, there's a stacking system that allows the holder to be customised from one, two or three filter slots and a kit of brass screws is supplied for that very easy task. On the back, the lens adapter ring drops in, retained by a brass locking screw (as opposed to Lee's spring-loaded catch) that some feel is easier and more secure. It's a subjective choice really, though if you have a preference, as a rule all 100mm filters fit any 100mm holder. For ultra-wide lenses, a wide-angle adapter (illustrated) is available for £32.

The three-stop soft-cut ND grad measured exactly three-stops density, and the two-stop hard-cut came in at 2.1 stops. That's pretty much a perfect performance and while the exact density does not usually matter too much in practice, within reason, it's a good sign. Colour neutrality was more variable, with the hard two-stopper rating 'excellent' with almost exact neutrality, but the soft three-stop ND grad scored only 'fair' with a noticeable magenta cast. Sharpness was unaffected, and flare resistance was good – very much in line with others.

Verdict

A mixed performance from Hitech, with one filter bang on target specification and the other significantly off. The aluminium holder is a nice item, and Hitechs are great value.

Build quality	✪✪✪✪✪
Performance	✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪

Kood P-system (84mm)

Tested: 0.6ND and 0.9ND soft-cut
Filter: £12 / **Holder:** £6 / **77mm lens adapter ring:** £5
Contact: www.koodinternational.com

KOOD HAS BEEN struggling to keep up with demand, awaiting a new batch of hard-cut grads and only able to supply P-type soft-cut filters for this review. No problem though, that's enough to get a good impression of what's on offer and the shortages will be quickly rectified. The full Kood range includes smaller A-types and the larger 100mm-type, all British-made and at very competitive prices. For example, the Kood 100mm-type holder sells for £25, lens rings are £9, and the 100mm grads are just £20 each. That's way less than rivals, and the savings add up to a substantial amount by the time you've collected a few. The filters come in retail packaging of a clear plastic envelope lined with thin cardboard. Kood suggests to keep this as protective storage – functional perhaps, just about, but hardly ideal. Good and easily accessible storage is important with grads as by their nature it's hard not to leave finger marks that can get smeared across the surface when you put them away, almost guaranteeing flare problems.

The Kood holders are very like Cokin, made of precision-moulded plastic with the lens adapter ring clipping into the back, and out again, in the same way. In fact, the Kood and Cokin P filters, holders and adapter rings are interchangeable. The Kood holder illustrated is the wide-angle version with one filter slot, and it's slim enough to clear a 17mm lens (full-frame).

The three-stop soft filter measured 3.2 stops, and the two-stop soft 2.3 stops – both acceptably close to spec. Some cheaper grads have a reputation for poor colour neutrality, yet the three-stops filter rated 'very good' and the two-stops version scored 'excellent'. Sharpness was unaffected and resistance to flare is as good as any.

Verdict

Keen prices have always been Kood's ace card, and that certainly still applies. Yet the current Kood range is also high quality, competing with the best on this showing.

Build quality	✪✪✪
Performance	✪✪✪✪✪
Value	✪✪✪✪✪
Overall	✪✪✪✪✪

Lee Filters (100mm)

Tested: 0.9ND soft-cut and 0.6ND hard-cut
Filter: £80-100 / **Holder:** £59 / **77mm lens adapter ring:** £19
Contact: www.leefilters.com

ASK ALMOST ANY keen landscape photographer, and they'll say the best filters are made by Lee. They might also add the most expensive, though that's because they're not just high quality, but consistently high quality. Lee's reputation is about both meticulous manufacture and also tight quality control. This ensures the filters you buy today are exactly the same as those a few years old that are a bit worse for wear.

Lee filters come in three sizes – the ever-popular 100mm-type illustrated, the smaller Seven5 range that is 75mm wide, and the giant 150mm wide SW150 range for ultra-wide zooms. Lee 100mm-type filters are 2.1mm thick, about 0.5mm more than the others, to help maintain surface flatness.

The Lee filter holder is one of the system highlights, made from high quality plastic with brass fittings, and thoughtfully designed with a lens ring released by a spring-loaded catch. The advantage here is the holder can be popped on and off very quickly and easily, without needing to remove the filter. Another feature, also shared with some other brands, is the filter slots can be customised to take either one, two or more filters. A wide-angle lens adapter ring (illustrated) is also an option at £37. Everything comes very well packaged in tough padded wallets with Velcro'd closures and an identification window.

The three-stops soft-cut grad measured at 2.8 stops actual density, and the two-stopper exactly two stops. The colour was very neutral too, with both the three-stops soft-cut filter and the two-stops hard-cut rating 'excellent' – Lee Filters is the only brand on test here to score an illusive double. Sharpness was unaffected and resistance to flare was good too.

Verdict

True to form, Lee scores highest on everything – except value! What you're paying for is not just the high quality, but also the consistency from filter to filter, and from batch to batch.

Build quality	★★★★★
Performance	★★★★★
Value	★★★★½
Overall	★★★★★

Test conclusion

Kood P-system (84mm)

Lee Filters (100mm)

WE HAVE TWO winners, one each in P-type and 100mm-type, and at both extremes of the price range. There are some very good filters here, and you don't need to spend a fortune to get high quality. As a caveat though, it has to be said that the manufacturing process for grads is a tricky one, and is achieved mostly by hand-dipping the filters in dye, so some slight batch variation is inevitable.

Lee Filters is our Best Buy in the larger 100mm format, with first class colour neutrality and general image quality. The Lee Filters holder is another highlight with its spring-loaded release catch and customisable slots. You can't really go wrong with Lee, but at considerable cost.

Kood is our Best Buy P-type. On this showing, Kood competes well for accurate colour and overall image quality, at bargain value prices, and it's only the plastic holder and budget storage provision that lowers the score for build quality. Not that there's anything wrong with cheap plastic holders, nothing at all, just that they're not as nice to use as the more expensive aluminium ones.

In our original five-way test, all the other brands had mixed fortunes, usually with one filter scoring well, but the other letting the side down with a wayward colour cast. This can be corrected in post-processing, but it's an extra task that shouldn't be necessary. It's well worth looking out for starter kits offered by some manufacturers, with a handy cost saving. They include a filter holder and lens adapter ring, plus a small selection of popular grads.

BIG SHOTS

Benro C3570F vs Giotto's Silk Road YTL 8213

Size and weight are two of the most important factors to consider when choosing the right tripod. But while picking a lightweight option that folds down small makes sense most of the time, if you use long lenses and heavier loads, bigger is often better

TEST: RICHARD HOPKINS

THESE ARE TWO high-quality carbon-fibre tripods of classic design – but bigger. They have three-section legs with adjustable angles, sliding centre-columns and fast lever leg-locks – basically larger versions of popular medium-sized Benro and Giotto's models. Here they've been beefed up to handle longer lenses and heavier loads, and they also stand usefully taller too. They weigh a bit more and cost that bit extra too, but they're not massively expensive for carbon-fibre and that magical material helps keep the weight down. The Benro weighs just under 1.9kg, and the Giotto's is actually impressively light indeed for a tripod of this size, at just over 1.6kg.

The legs are fatter as well as being longer. The top sections measure a meaty 32mm diameter and the 28mm middle-sections are basically the same as the top sections of the next model down. Bigger means more rigid with less flex and the leg-locks are larger too. The extra length means both tripods stand roughly 12cm higher than their smaller siblings, bringing the Benro up to 153cm before extending the centre-column, and the Giotto's to 162cm. This is substantially above the typical 130-135cm (plus head) needed to put the camera at a comfortable shoulder level for the average person.

The extra size brings several advantages. In normal use when you don't need the height, it allows a few inches of leg to be slid back inside the upper section and this stiffens up the joints for a really solid support. Or if you're working on a slope, there's the option to extend one or two legs and maintain a level platform. Then when you want the full height, it's there – when shooting groups for example, to give a better view and a more interesting angle. Wedding photographers go armed with short stepladders for this. With architecture, a raised viewpoint reduces converging verticals.

The Giotto's is unusually tall, especially with the centre-column extended. At full stretch in a normal room, your head will literally be bumping against the ceiling. It's the largest model in the Giotto's range, though Benro offers one size bigger, the 4570. These tripods can take a heavy load, and while the claimed figures should be taken with a pinch of salt, there's not much they can't handle – like a super-telephoto 500mm f/4 prime on a gimbal head.

In terms of build quality, both tripods are very well finished and smooth operating. They both have leg-locks adjustable for wear, though the Benro clamps more firmly and the Giotto's benefits more from the slide-some-leg-back-up trick, potentially reducing its height advantage. The Giotto's centre-column also feels slightly less solid when fully extended, though the fluted profile helps it to slide nice and easy.

The Giotto's features the new slimmed-down Silk Road design for a more compact folded size, and that's most welcome, but the extra leverage-loads imposed by a taller tripod can push the strength of some components more than usual.

BENRO C3570F
Street price: £250
Leg sections: Three
Leg angles: Three
Height: 153cm
Centre-column up: 180cm
Min height: 38cm
Length closed: 71cm
Weight: 1.86kg
Load rating: 18kg
Carry bag: Included
Warranty: Five years
Website: www.kenro.co.uk

GIOTTO'S SILK ROAD YTL 8213
Street price: £220
Leg sections: Three
Leg angles: Three
Height: 162cm
Centre-column up: 193cm
Min height: 45cm (14cm with adapter)
Length closed: 68cm
Weight: 1.63kg
Load rating: 10kg
Carry bag: £25 extra
Warranty: Five years
Website: www.giottos-tripods.co.uk

Verdict Benro C3570F

A good, big, firm tripod. Fairly light but well engineered to handle heavier loads, plus extra height when needed. A lot of performance for not too much money.

Build quality	★★★★½
Features	★★★★
Performance	★★★★½
Value	★★★★
Overall	**★★★★½**

Verdict Giotto's YTL 8213

Exceptionally tall and very light – nothing can touch it on that score. Works very well at normal heights, but at full stretch the joints could be beefier. Great value.

Build quality	★★★★
Features	★★★★½
Performance	★★★★½
Value	★★★★★
Overall	**★★★★½**

The Benro is a great tripod that can take heavier loads than the Giotto's. However, overall we'd opt for the Giotto's as it offers a height and weight advantage and costs slightly less. In truth though, there's little to choose between these two.

Giotto's

The thick foam pads on the legs are a very welcome addition when carrying the tripod in cold conditions.

Benro

Solid build and all-round performance for a very fair price. Its load capacity means it will support pretty much any outfit.

Giotto's

The YTL 8213 is very tall, especially with the centre-column extended, yet is lighter than many smaller tripods.

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Digital SLR Photography BEST BUY

CHILLBLAST FUSION PHOTO OC LITE

Over-clocked Intel i7 quad-core chip / High-speed performance / Optimised for photo editing / Built-in RAID-1 backup

TEST: RICHARD HOPKINS

SPECIFICATION

Guide price: £1,099
Intel i7 quad-core chip
Over-clocked to 4.4GHz
Liquid-cooled processor
16GB RAM
128GB solid-state drive
Twin 1TB hard drives
RAID-1 configured for back-up
Blu-ray rewriter
www.chillblast.com

IS THIS THE best photo editing computer that you can buy? Well, no actually. But that's considering Chillblast's top model costs a jaw-dropping £13,000. But for a tenth of that price, £1,099 to be exact, the Chillblast Fusion Photo OC Lite is probably the best package out there for high performance at an affordable price.

Chillblast is a specialist builder of custom PCs, winner of many industry awards, and is particularly well known for over-clocked processing chips to extract maximum performance, with warranty-backed reliability. Chillblast's other skill is building PCs with carefully matched components, selected according to task, such as gaming, music production or photo editing. Gamers for example, need stacks of expensive graphics power but are not so demanding in other areas, whereas photographers are almost the opposite. With Photoshop and Lightroom, there's less pressure on the graphics side but high demand for sheer processing speed using lots of RAM, and with high megapixel cameras some quite normal editing actions build up to generate heavy workloads. Photographers also create lots of image data that needs big capacity storage and secure back-up.

At the heart of the Photo OC Lite is Intel's fastest i7 quad-core chip, over-clocked by 10% to 4.4GHz and liquid-cooled for safety. There's 16GB of RAM and a 128GB solid-state drive to further speed things along, plus twinned 1TB hard drives in RAID-1 configuration. RAID-1 is a key feature for photographers, with the two hard drives mirroring each other, duplicating everything as you go and creating an instant back-up. If disaster strikes, it has the major advantage of automatic recovery, so you can continue working using the undamaged hard drive. With memory so cheap these days, all photo editing PCs should have RAID-1.

In addition, there's a built-in multi-card reader, Blu-ray rewriter, and more USB ports than you can shake a memory stick at. In a nutshell, performance outpaces the highest spec Apple iMac, that some might say sets the gold standard, yet a system based around the Photo OC Lite is way cheaper – hundreds of pounds less.

All PCs are built to order and Chillblast offers a wide range of upgraded components to suit personal needs, from additional RAM and more powerful graphics cards, to bigger hard drives and whisper-quiet cases. Chillblast welcomes customers to call and discuss modifications too. All machines are tested at full load for 24hrs, and have a warranty – two years on everything plus three more labour-only.

Verdict

The key to Apple iMac-beating speed and price is carefully matched components, expertly chosen to put power where it's needed for optimum photo-editing performance. The Chillblast Fusion Photo OC Lite is specified to perfection and promises excellent reliability, with extensive warranty.

Build quality	★★★★½
Features	★★★★½
Performance	★★★★★
Value	★★★★
Overall	**★★★★½**

Which lens?

WHETHER YOU'RE SHOOTING WILDLIFE, NATURE OR LANDSCAPES, OUR PICK OF THE BEST OPTICS FROM *DIGITAL SLR PHOTOGRAPHY*'S AUTHORITATIVE LENS TESTS ENSURES YOU MAKE THE RIGHT CHOICE

IMAGE: ADAM BURTON

How we test the lenses

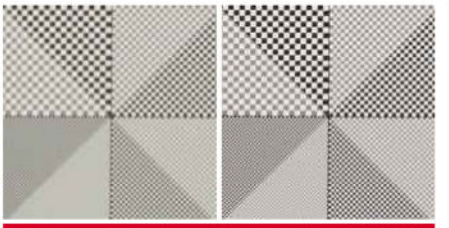
OUR TESTS LOOK at the key factors influencing image quality – sharpness, distortion, chromatic aberration and vignetting. We also test performance of the AF and image stabiliser (IS) systems.
For IS, we use an oscillating platform custom-made to mimic handholding the lens. The platform's great virtue is that it's an absolutely standard test, so all lenses are evaluated in exactly the same way for accurate comparisons.

Sharpness: What we call sharpness is a combination of resolution (the fineness of details) and image contrast (how clearly those details are shown). Resolution and contrast are directly linked and when one goes up, the other goes down. We use Modulation Transfer Function (MTF) analysis to measure sharpness, as do lens manufacturers. Results are shown as % MTF at 24 lines-per-mm for full-frame lenses and at 36 lines-per-mm for APS-C to adjust for the crop factor, so sharpness is generally slightly lower than full-frame, in line with actual use. Multiple readings are taken and averaged, and edge readings are taken from points 1-2mm from the sensor edge. Peak resolution shows maximum lpmm at 20% MTF, which is the lowest level where light and dark tones can be reliably measured, though the difference is faint.

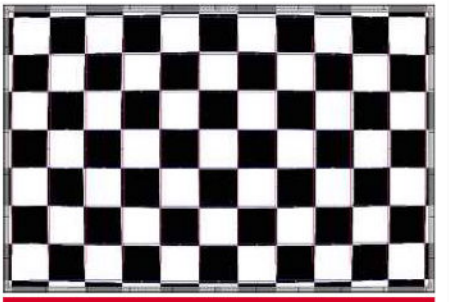
Unlike most lens test procedures that use a relatively small test target that often has to be shot at very close range, eg wide-angles, we use multiple individual targets of different sizes to keep distances realistic. A focusing wedge ensures absolute accuracy and automatically adjusts for field curvature and focus shifts that can skew other methods. A Nikon V1 is used when possible (all Canon and Nikon lenses) with a precision custom adaptor to position any area of the test image over the centre of the sensor. This provides both a level playing field and also an extremely high resolution (equivalent to 74 megapixels on full-frame) to ensure the camera is never the limiting factor.

Distortion: Distortion makes straight lines towards the frame edges appear curved. It changes with focal length and is less noticeable on APS-C. Barrel distortion lines curve outwards (indicated as a positive percentage value, eg +1.5%); pincushion distortion curves inwards (indicated as a negative value, eg -0.5%). The lower the stated figure, the better: 1% or less is good, 2% or more being increasingly noticeable.

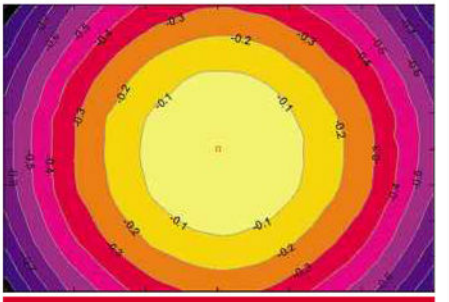
Vignetting: Vignetting is darkening towards the corners. It changes with focal length and is also less prominent on APS-C. Vignetting reduces quickly as the aperture is closed down. It's easily removed in post-processing, but when it's strong this results in greater noise. Vignetting is measured in Exposure Values (1EV equals one stop). -1EV is usually not a problem.



Sharpness: How well fine detail is resolved



Distortion: Straight lines have a slight curve



Vignetting: A darkening at the image corners

Chromatic aberration: Also known as CA or colour fringing, it is usually only slightly reduced at higher f/numbers, and is more noticeable on APS-C format due to the crop factor. Distortion, vignetting and CA can all be substantially reduced or eliminated with post-processing software.

Autofocus: Autofocus speed and accuracy is a game of two halves – half camera, half lens. On the lens side of things, most of the differences relate to the mechanics and build quality, and this is commented on in the reviews.

Image stabilisation: We use an oscillating platform, custom-made to hold a DSLR body in place and mimic handholding characteristics, and in our testing it has proved very realistic. The platform's great virtue is that it's an absolutely standard test.

Lens terminology

AF motors
Micro-motors are the older and more conventional type of system used to focus lenses and remain a fast and reliable option. Better still are motors using 'sonic waves' to rotate the lens, which are faster and quieter. Most brands offer lenses that boast sonic motors, including: Canon Ultrasonic (USM), Nikon Silent Wave Motor (SWM), Sigma Hypersonic (HSM), Sony Super Sonic Motor (SSM) and Tamron Ultrasonic Silent Drive (USD).

Aspherical lens element
High-quality elements designed to improve performance, particularly towards frame edges. Aspherical lens elements are usually made from glass, but there are also many moulded glass/plastic hybrid elements, too.

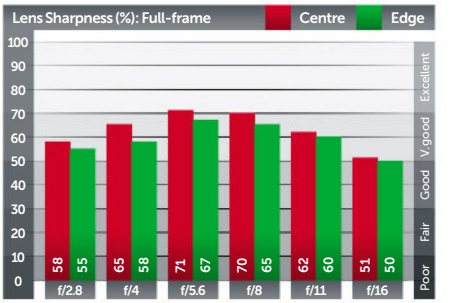
Image stabilisation
Many lenses have a 'floating' element linked to sensors that move it to counteract movements when handholding. Most brands offer lenses with lens-based stabilisers, although with some it's camera-based. They include: Canon Image Stabiliser (IS), Nikon Vibration Reduction (VR), Sigma Optical Stabiliser (OS) and Tamron Vibration Compensation (VC).

Internal Focusing (IF)
Also called inner focusing, this system rotates elements within the lens during AF so that the front of the lens doesn't rotate. This is useful when using filters as you don't have to adjust the filters following focus.

Premium glass elements
High-quality elements ensure the best possible image quality, delivering maximum sharpness, superior colour reproduction and contrast, and minimal chromatic aberration. Common types include: Canon Fluorite & Ultra Low Dispersion (UD), Nikon ED (Extra-low Dispersion), Sigma Extraordinary Low Dispersion (ELD) & Special Low Dispersion (SLD), Tamron Extra Refractive (XR).

How to read the lens sharpness graphs

Our bar graphs provide you with a visual representation of lens sharpness. Each graph shows the centre and edge performance of the lens at full f/stops from maximum aperture to f/16 at different focal lengths of the zoom. Centre sharpness is shown in red; edge in green. The higher the bar, the better the sharpness, with ratings as follows:
Below 10: Poor; 10-29: Fair; 30-49: Good; 50-69: Very good; Over 70: Excellent.
All our lens test analysis was performed using Imatest software.



Canon EF-S 10-22mm f/3.5-4.5 USM £420

HANDLING: A compact and very lightweight zoom with smooth focusing rings and sweet handling. Top-quality build.

FEATURES: Focal length range is broad and versatile. Good overlap with a standard range zoom means less lens changing. Maximum apertures are modest though.

AUTOFOCUS: Canon's Ultrasonic Motor (USM) focusing is fast, positive and quiet and offers full-time manual override.

PERFORMANCE: Sharpness is high, especially in the centre, where it kicks off well into the 'excellent' zone and this is maintained at all focal lengths, only dipping under at f/11. Edge sharpness is notably lower, but still consistently around the 'very good' level and, unlike some, there's no drop-off at the longer end. Peak resolution is the highest here at 129 lines-per-mm. Aberrations control is the usual mixed bag with ultra-wides. Barrel distortion at 10mm is +2.4%, which rates as 'poor', though others are worse and it quickly gets much better at longer focal lengths. Vignetting is relatively high, but never much of a problem even wide open, and chromatic aberration (CA) is about average.

VERDICT: Versatile zoom range, great AF, and a high standard of sharpness – very high in the centre – is maintained at all focal lengths and apertures. It comes in a very light and compact package with excellent build quality, and best of all the price has been reduced recently, making it great value.

DISTORTION: Strong barrel +2.4% at 10mm. Overall rating: Very good

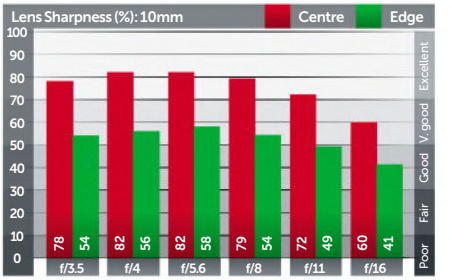
VIGNETTING: Moderate 1.4EV at 10mm f/3.5. Overall rating: Excellent

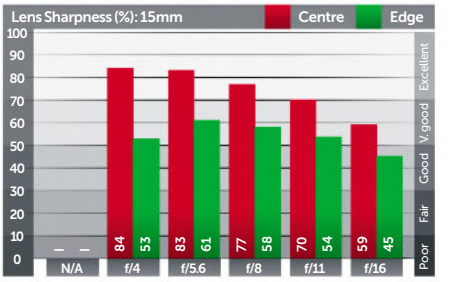
CHROMATIC ABERRATION: Reduces at 22mm. Overall rating: Fair

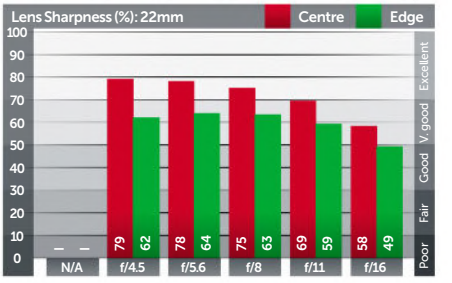
PEAK RESOLUTION: 129 lines-per-mm at MTF 20%, 15mm f/4 centre

HANDLING	18/20
FEATURES	18/20
PERFORMANCE	37/40
VALUE FOR MONEY	18/20
OVERALL	91/100

Canon EF-S 10-22mm f/3.5-4.5 USM







Canon EF 17-40mm f/4L USM £550

HANDLING: Light, compact and with a solid feel. Focus and zoom controls are smooth and nicely weighted – excellent, as you'd expect from a Canon L-grade lens.

FEATURES: USM focusing, weatherproofed construction, and 12 elements in nine groups (including exotic glass and aspherical surfaces), take care of the imaging. Good lens hood and robustly made. It's unusually large – good for shading, but takes up more space in the camera bag. Filter size is 77mm, in common with many pro-spec lenses.

AUTOFOCUS: Canon's USM rarely disappoints – always fast, smooth, quiet and accurate.

PERFORMANCE: On full-frame this lens meets our very good rating at f/4, then jumps into the excellent zone from f/5.6 and holds on to it, only starting to dip slightly with the inevitable effects of diffraction at f/16. The same pattern is reflected on APS-C, only with the higher resolution demands of the smaller format pushing numbers down. The standard is very high at most commonly used apertures.

VERDICT: Reassuringly solid, a good lens that does well across the range. Distortion and chromatic aberration at the higher end, but these things can be either substantially improved or eliminated in post-processing, or even in-camera these days, so the reality is not too bad at all, all things considered.

DISTORTION (Full-frame): Poor
DISTORTION (APS-C): Poor

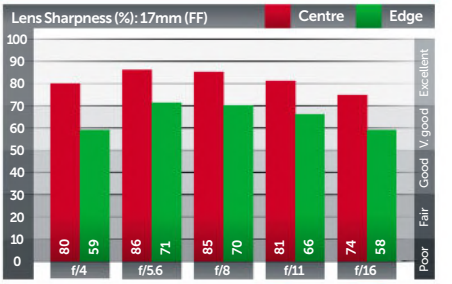
VIGNETTING (Full-frame): Fair
VIGNETTING (APS-C): Excellent

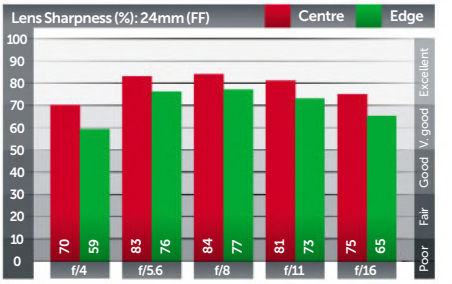
CHROMATIC AB (Full-frame): Good
CHROMATIC AB (APS-C): Fair

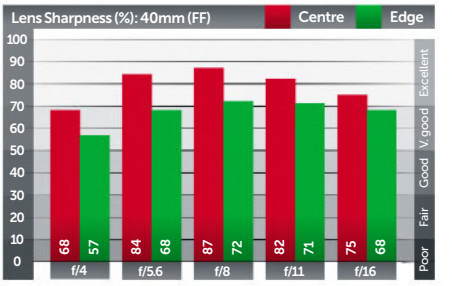
PEAK RESOLUTION: 110 lines-per-mm at MTF 20%, 40mm f/8 centre

HANDLING	20/20
FEATURES	18/20
PERFORMANCE	34/40
VALUE FOR MONEY	20/20
OVERALL	92/100

Canon EF 17-40mm f/4L USM (full-frame)







NIKKOR AF-S 18-35mm f/3.5-4.5G ED £520

HANDLING: Manufactured in China, it weighs very little thanks to an extensive use of plastics. That doesn't reflect on quality though. There is a tiny bit of play in the manual focusing ring.

FEATURES: 12 elements in eight groups, with ED glass and aspherical elements. The maximum aperture varies with focal length, and f/3.5 at the 18mm end is one-third of a stop faster than f/4, and f/4.5 at 35mm is one-third of a stop slower. AF uses the Silent Wave Motor with full-time manual override.

AUTOFOCUS: SWM focusing works quietly and efficiently. It's not quite the fastest mover, though we're talking fractions of a second.

PERFORMANCE: For sharp imaging, this lens excels. On full-frame, the centre starts well into the excellent zone and never goes below, while the edges only dip just under it at the highest f/ numbers. On APS-C, the higher resolution demands of the smaller format naturally depress the MTF figures, as expected. Peaked at 103 lines-per-mm in the MTF 20% test – slightly lower than rivals, though even the Nikon D800 can 'only' resolve a theoretical maximum of 102 lines-per-mm. Distortion, vignetting and CA are plentiful, but no more so than is typical.

VERDICT: Build is high-end consumer grade rather than pro-spec, though optically this lens is top drawer. Dropping more than £100 since launch means value matches performance.

APS-C / FULL-FRAME

DISTORTION (Full-frame): Poor
DISTORTION (APS-C): Poor

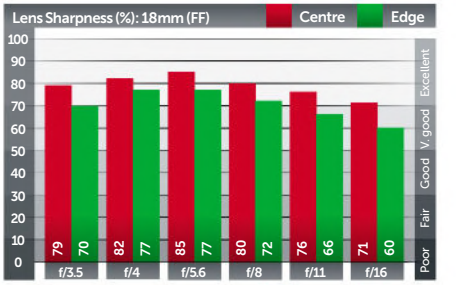
VIGNETTING (Full-frame): Good
VIGNETTING (APS-C): Excellent

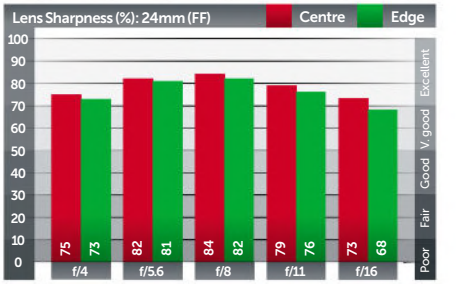
CHROMATIC AB (Full-frame): Very good
CHROMATIC AB (APS-C): Good

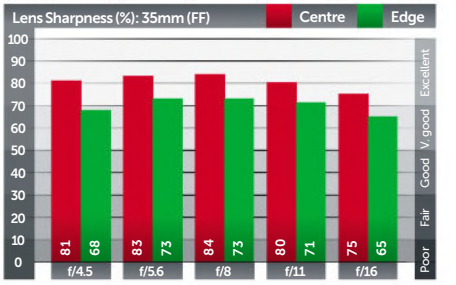
PEAK RESOLUTION: 103 lines-per-mm at MTF 20%, 18mm f/5.6 centre

HANDLING	19/20
FEATURES	16/20
PERFORMANCE	36/40
VALUE FOR MONEY	16/20
OVERALL	87/100

NIKKOR AF-S 18-35mm f/3.5-4.5 (full-frame)







NIKKOR AF-S 16-35mm f/4G ED VR £830

HANDLING: Considerably larger than the 18-35mm and almost double the weight. Handles beautifully and is extremely well made. Zoom and focus rings are one-finger light, but there's a bit of play in the manual focusing ring.

FEATURES: VR image stabilisation is a first for a lens of this type and is at least partly responsible for the extra weight of 17 elements in 12 groups, with premium glass and aspherical surfaces. Aperture is a constant f/4 and the wider focal length at 16mm adds a useful 7° more coverage. It's also weatherproofed.

AUTOFOCUS AND VR: Nikon's SWM AF is so fast and quiet. The VR has a claimed four-stops effectiveness and it's certainly possible to handhold at crazy-long shutter speeds.

PERFORMANCE: Very sharp, recording the highest peaks here. On full-frame at 16mm and 24mm, the centre is nudging 90% at f/4 with edges also well into the excellent zone. Sharpness drops a little at 35mm, particularly at the edges, though it's still very high. Resolution peaked at an impressive 120 lines-per-mm at MTF 20%. Distortion is the weak point, though it's much reduced at longer focal lengths, and vignetting almost goes away at mid-apertures.

VERDICT: Nikon has done a fine job incorporating VR into a high-grade optical package, even if the benefits diminish as focal length is reduced, and this is one very wide lens.

APS-C / FULL-FRAME

DISTORTION (Full-frame): Poor
DISTORTION (APS-C): Poor

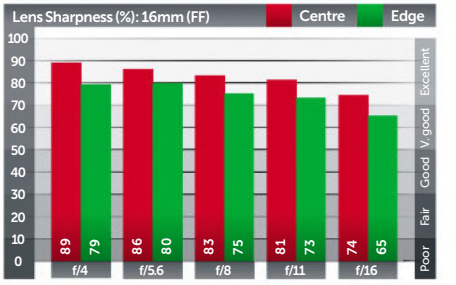
VIGNETTING (Full-frame): Good
VIGNETTING (APS-C): Excellent

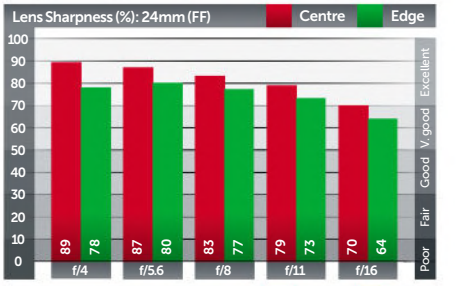
CHROMATIC AB (Full-frame): Very good
CHROMATIC AB (APS-C): Good

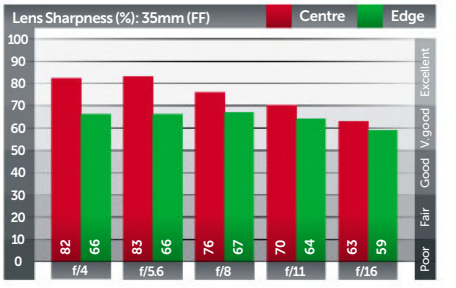
PEAK RESOLUTION: 120 lines-per-mm at MTF 20%, 16mm f/4 centre

HANDLING	18/20
FEATURES	20/20
PERFORMANCE	38/40
VALUE FOR MONEY	18/20
OVERALL	94/100

NIKKOR AF-S 16-35mm f/4 ED VR (full-frame)







NIKKOR AF-S 10-24mm f/3.5-4.5G DX ED £640

HANDLING: Compact, light with smooth and well-weighted controls. Good quality build – made in Nikon's China plant.

FEATURES: Best zoom range in the super-wide class for great versatility, though maximum apertures are average. Has a rain-seal mount gasket, and comes with a lens hood.

AUTOFOCUS: Silent Wave Motor is excellent as usual, with full-time manual override.

PERFORMANCE: 'Excellent' levels of sharpness in the centre at all focal lengths, from f/3.5-4.5 and dipping down to 'very good' around f/8 as diffraction begins to bite. Edge sharpness is lower, though comfortably within the 'very good' band at all times, apart from at the longer 24mm end that doesn't really get going until f/8. Peak resolution is a little lower than other comparative lenses we've tested, at 111 lines-per-mm. Distortion is high at 10mm with a hefty +3.9%, though it improves dramatically at longer focal lengths and is close to zero through most of the mid range. Vignetting is low, rating 'excellent' overall, and chromatic aberration control is typical of most ultra wide-angles, in other words always present and rating 'fair'.

VERDICT: Sharp, compact and light, great AF, same maximum apertures and even more useful focal length range. Edge sharpness at 24mm is the only weak spot, and the peak resolution figure is slightly lower. It is quite expensive compared to others though.

DISTORTION: Severe barrel +3.9% at 10mm. Overall rating: Good

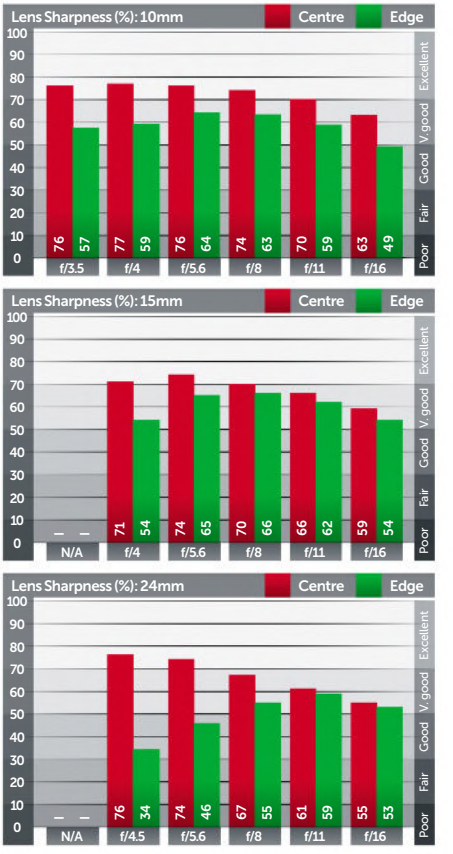
VIGNETTING: Mild 0.9EV at 10mm f/3.5. Overall rating: Excellent

CHROMATIC ABERRATION: Reduces at 24mm. Overall rating: Fair

PEAK RESOLUTION: 111 lines-per-mm at MTF 20%, 10mm f/5.6 centre

HANDLING	18/20
FEATURES	18/20
PERFORMANCE	36/40
VALUE FOR MONEY	17/20
OVERALL	89/100

NIKKOR AF-S10-24mm f/3.5-4.5G DX ED



Sigma 12-24mm f/4.5-5.6 II DG HSM £600

HANDLING: This is a well-made lens. It's moderately heavy, and both focus and zoom rings are well weighted and silky smooth.

FEATURES: This lens's standout feature is the mega-wide zoom, which goes down to an incredible 12mm. At 122°, the field-of-view is a whopping 15° more than the second widest lens on test here: the NIKKOR 16-35mm. The flipside is the focal length at the longer end only extends to 24mm, which almost makes this a specialist lens. Another downside is the bulbous front element that protrudes out and prevents the use of normal filters.

AUTOFOCUS: With so much depth-of-field, the Hypersonic AF system doesn't have much to do, but works very quietly and efficiently.

PERFORMANCE: Performance is better than you might expect, standing shoulder to shoulder with the best, despite its relatively low cost. The lens is very sharp, hitting the excellent standard right across a full-frame image from maximum aperture. Only the edges lag a little at the tele end, which is common. There's plenty of distortion, vignetting and chromatic aberration, as with any ultra-wide. Peak resolution is a high 118 lines-per-mm, recorded at 17mm f/5.6 in the centre. Watch out for flare.

VERDICT: An amazing lens. It is sharp, built to a very high quality, has a smooth operation and reasonably priced. Well worth consideration.

DISTORTION (Full-frame): Poor
DISTORTION (APS-C): Fair

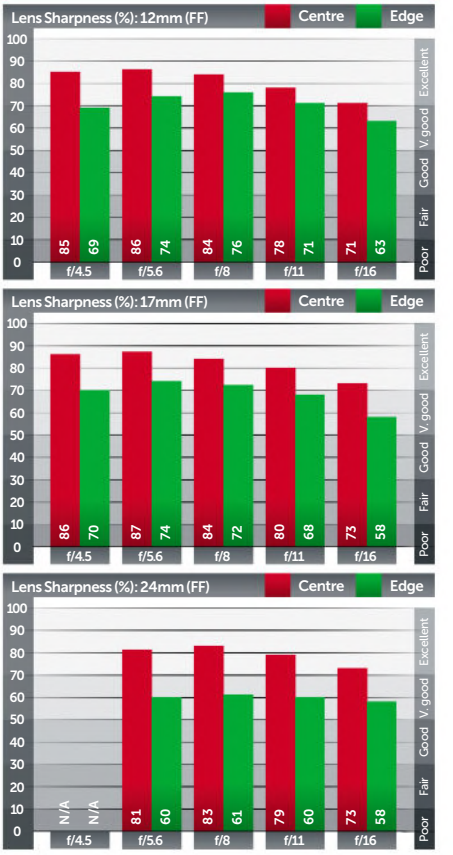
VIGNETTING (Full-frame): Fair
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame): Good
CHROMATIC B (APS-C): Fair

PEAK RESOLUTION: 118 lines-per-mm at MTF 20%, 17mm f/5.6 centre

HANDLING	20/20
FEATURES	16/20
PERFORMANCE	36/40
VALUE FOR MONEY	18/20
OVERALL	90/100

Sigma DG12-24mm f/4.5-5.6 II (full-frame)



Sigma 10-20mm f/4-5.6 EX DC HSM £300

HANDLING: High build quality and finger-light, super-smooth controls. Excellent, but Sigma's velvet-matt finish can show scuff marks.

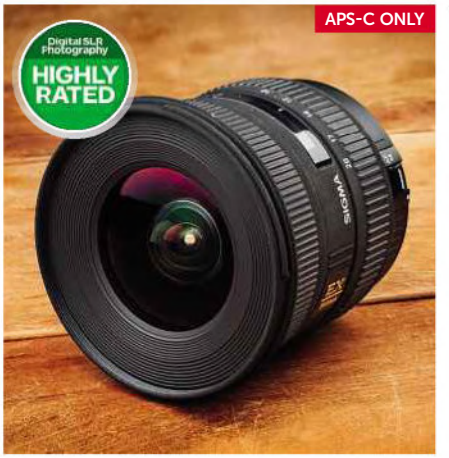
FEATURES: 10mm is as wide as they come, but 20mm is a bit less than average. Maximum aperture f/4-5.6 is also modest. Lens hood and case supplied.

AUTOFOCUS: Sigma's excellent Hypersonic Motor (HSM) autofocus drive is as good as any, and there is full-time manual override, too.

PERFORMANCE: Sharpness in the centre is always high, well into the 'excellent' zone up to f/11 before diffraction takes hold. As always, edge sharpness is lower, though never less than 'very good' with the exception of 10mm at f/4, which stands out as being a bit disappointing. However, it improves very quickly and by f/5.6 it's 'very good' and from there onwards sharpness is uniformly high across the frame.

Peak resolution hits 121 lines-per-mm. Barrel distortion is a high +3.5% at 10mm, but falls quickly and turns to -0.6% mild pincushion at mid-range and longer focal lengths. Vignetting is a little higher than average, but still 'very good' overall, while CA control is a little better than some, rating 'good'.

VERDICT: No prizes for low-light performance, but from f/5.6 to f/11 – probably the most useful range for an ultra-wide – sharpness is very high at all focal lengths. At only £300, the price is even sharper.



DISTORTION: Severe barrel +3.5% at 10mm. Overall rating: Good

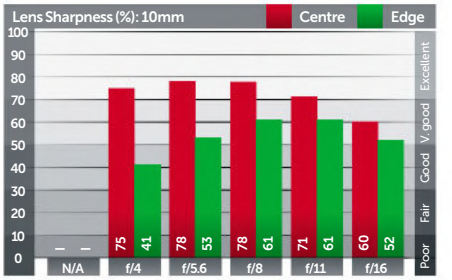
VIGNETTING: Moderate 1.3EV at 10mm f/4. Overall rating: Very Good

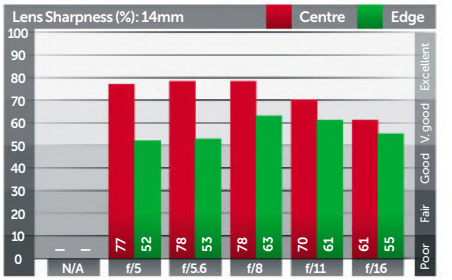
CHROMATIC ABERRATION: Highest at 10mm. Overall rating: Good

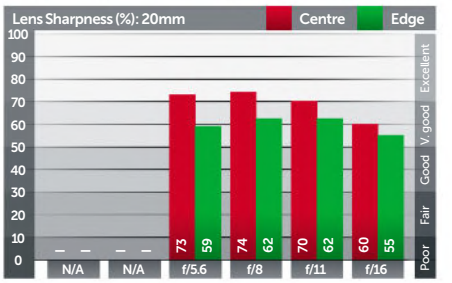
PEAK RESOLUTION: 121 lines-per-mm at MTF 20%, 10mm f/5.6 centre

HANDLING	18/20
FEATURES	16/20
PERFORMANCE	35/40
VALUE FOR MONEY	20/20
OVERALL	89/100

Sigma 10-20mm f/4-5.6 EX DC HSM







Tokina AT-X 12-28mm f/4 Pro DX £530

HANDLING: Slightly larger and heavier than most, the build quality is obvious. Styling is very Nikon-esque. Switching from AF to manual focus is by pulling the clutch-ring, though this usually moves the exact distance slightly.

FEATURES: It's a fairly new lens, sitting alongside the acclaimed Tokina 11-16mm f/2.8, trading constant f/4 maximum aperture for much greater 12-28mm zoom range. Lens hood included.

AUTOFOCUS: Tokina's SD-M Silent Drive-Module works quickly and quietly. Top marks.

PERFORMANCE: Tokina has a reputation for high- image quality, so no surprises here. In the centre, sharpness is well into the 'excellent' zone at all focal lengths up to f/11. Edge sharpness is lower, but never less than 'very good'. Performance is consistent at all settings – no peaks, and no nasty surprises either. Peak resolution measured a high 123 lines-per-mm. Barrel distortion is +3.2% at 12mm, rating 'poor', though it quickly drops to +0.4% at 18mm ('excellent') and hovers around zero to 28mm. Vignetting is effectively insignificant throughout; CA is a little higher than expected, rating 'fair' overall.

VERDICT: A fine lens. It feels good and works great, with consistently high image quality at all settings. The extra focal length at 28mm is useful, but at the expense of a couple of mms less at the wide end. The price has dropped a little since launch, too.

DISTORTION: Severe barrel +3.2% at 12mm. Overall rating: Good

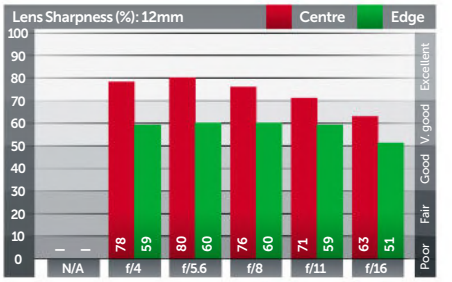
VIGNETTING: Mild 0.8EV at 12mm f/4. Overall rating: Excellent

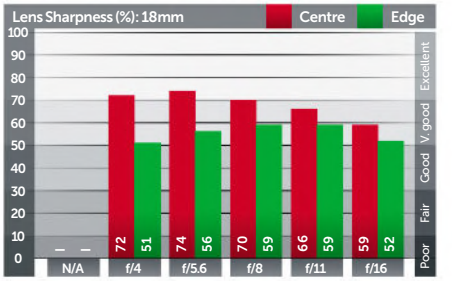
CHROMATIC ABERRATION: Reduces at 28mm. Overall rating: Fair

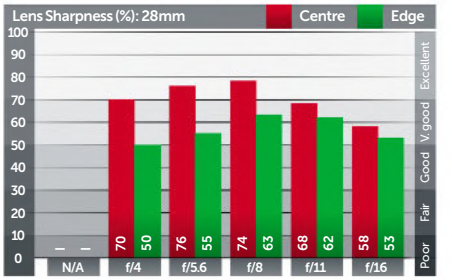
PEAK RESOLUTION: 123 lines-per-mm at MTF 20%, 12mm f/5.6 centre

HANDLING	18/20
FEATURES	18/20
PERFORMANCE	37/40
VALUE FOR MONEY	18/20
OVERALL	91/100

Tokina AT-X 12-28mm f/4 Pro DX







CANON EF 11-24MM F/4L USM

Canon's new record-breaking zoom is causing quite a stir. On a recent trip to Cuba, Lee Frost took one out for a comprehensive field test

TEST: LEE FROST

WIDE-ANGLES ARE BY far my favourite lenses. Always have been, always will be. Over the years I've owned them in all shapes and sizes, from ultra-wide zooms to full-frame and circular fisheyes. I just love the way they bend and stretch the world and allow me to squeeze so much into the frame.

For years, Nikon reigned supreme when it came to producing the sharpest ultra wide-angle zoom in the world, in the form of the NIKKOR AF-S 14-24mm f/2.8G ED. I often wondered why there was no Canon equivalent and despite being a devoted Canon user, I did have a brief flirtation with the Nikon 14-24mm, adapting it for my EOS 5D Mk III. The romance was short-lived – using it was too much like hard work due to the lack of electronic contacts. I then tried the Sigma 12-24mm, which at the time was the widest corrected zoom on the planet. A great lens for the money, but not the sharpest tool in the shed.

But now, after years of waiting, Canon has finally trumped everyone in a way even I never dreamed of. Their latest optical offering, the EF 11-24mm f/4L USM, is the widest zoom lens ever made. Ever.

I'd been itching to get my hands on it from the day Canon announced it, and finally took delivery of one a few days before flying out to Havana. It's a shame it didn't come attached to an EOS 5DS, but beggars can't be choosers I suppose!

The first surprise came when I opened the box and took the lens out. Man, it's big. Seriously. The front end looks like half a crystal ball and as I gazed into it, I could see a very exciting future!

Achieving such an incredible focal length range takes some serious optical engineering and that's partly why the front end of the 11-24mm is so big, and also why the lens is so heavy, tipping the scales at over 1kg. It boasts 16 glass elements in 11 groups. The first three (the biggest three) and the last one are aspherical. If that weren't enough, it also has a Super UD (Ultra low Dispersion) glass element and a UD glass element to increase sharpness and further reduce colour fringing.

The second surprise came when I peered through the viewfinder and zoomed back to 11mm. Man, it's wide. Seriously. If you have problems with balance, have consumed alcohol or suffer from a dodgy ticker, I suggest sitting down to do this, otherwise you might just fall over. The field-of-view is enormous. Some might even say greedy. I let my wife have a quick look through the viewfinder and her legs turned to jelly. "Wow, that's incredible," she says. "You should buy one". I mention the price. "Okay, probably best not rush into these things".

Fast forward 48 hours and I'm exploring the streets of Havana at dawn, slightly jet-lagged, slightly sweaty in the 35° heat but eager to start filling memory cards. I round a corner and stumble upon an old American car. Not exactly difficult in Cuba – there are thousands of 'em – but I decide to shoot it anyway and see what Big Bertha is capable of.

I pop it on my EOS 5D Mk III, lock that onto my Gitzo tripod, take a deep breath and zoom back to 11mm. The car looks like a Matchbox toy, even though I'm only 2m away. I move in closer. Still too small. Closer still. Nope, going to have to do better than that. By the time the composition is starting to look half decent, I'm so close to the car that I feel like I've climbed inside the headlamp. Which highlights an important factor – 11mm is very, very wide. Too wide? I'll let you be the judge of that.

I take a shot and check the preview screen. The composition looks good but the sky's completely blown out. Better fit a trusty ND grad. Which highlights another important factor. Thanks to that bulbous front end, you can't fit filters at the front, only gels cut to size for a rear slot – which doesn't solve the problem. With any luck, Lee Filters or Hitech will soon launch an adaptor for their SW150 and Lucroit systems so grads and ND filters can be used on the front of the 11-24mm. But that's another few hundred quid added to the cost of the lens. Kidney anyone?

Obviously, you don't have to use ND grads – in this case I shoot a series of exposures that I can blend once back home using HDR Efex Pro – but I'm old fashioned and ➤➤


Exposure: Multiple brackets at f/16 (ISO 400)

SPECIFICATIONS

Price: £2,800
Sensor format: Full-frame & APS-C
Construction: 16 elements in 11 groups
Maximum aperture: f/4
Minimum aperture: f/22
Minimum focus: 28cm at 24mm; 32cm at 11mm
Filter thread: n/a (rear slot-in)
Image stabilisation: No
Focusing: AF and Manual
Angle of view: 126-84° diagonal; 117-74° horizontal; 95-53° vertical (full-frame)
Number of diaphragm blades: Nine
Dimensions: 108x132mm
Weight: 1,180g
Supplied accessories: Lens hood, front & rear caps
Website: www.canon.co.uk

Above: Merging exposures using HDR software overcomes the difficulty of using filters with the bulbous 11-24mm.
Right: The resulting image quality is superb, with virtually no fall-off of sharpness at any aperture, even wide open!

Exposure: 1/60sec at f/5 (ISO 1600)

Exposure: 1/400sec at f/8 (ISO 100)

prefer to get my shots as close to finished in-camera as I can. It saves time at the computer if nothing else.

Later that day I head to an old building I've photographed before, to see how the 11-24mm copes with interiors. As expected, it's in its element. The super-wide capability allows me to compose shots that I've never managed to take before, simply because my widest lens (16-35mm) isn't wide enough.

I turn the camera on its side and set to 11mm I can capture the floor and the ceiling in the same frame. Better still, with the camera carefully levelled, there's no distortion. Vertical lines remain vertical – at 11mm! I also love the dramatic perspective, which emphasises the lines and curves beautifully. For architecture this is one heck of a lens. More versatile than the Canon 17mm tilt-shift? Quite possibly.

I even used it at 11mm to shoot sequences of images that were subsequently stitched into panoramas using Photomerge in Photoshop. There were a few false starts as the software got to grips with the wideness of the images, but I found that if I used the Spherical layout option it handled them fine. Imagine that – panoramas shot at 11mm full-frame! It only takes half a dozen frames to cover 360° – and that's with a generous overlap.

As the days roll by and I become more accustomed, the lens starts to feel familiar. It's really well put together and is nicely balanced on my EOS 5D Mk III. In some situations I'm forced to handhold, but despite the size, weight and lack of IS, I confidently shoot at shutter speeds down to 1/60sec and they're tack-sharp.

Speaking of which, optically, this lens is amazing. It's quite possibly the sharpest lens I've ever used, which is saying a lot given that it's an ultra-wide zoom. It doesn't matter which aperture you shoot at – from f/4 to f/22, corner-to-corner sharpness is superb. At the wider end of the focal length range depth-of-field is also enormous so you'll never need to stop down below f/5.6 or f/8 to record everything in sharp focus from the near foreground to infinity. At 11mm and f/8, the hyperfocal distance is roughly 0.5m. Focus the lens on 0.5m and depth-of-field will extend from 25cm to infinity! Not only that, fall-off at the corners is non-existent at all apertures except f/4, where it's too slight to worry about – almost unheard of in an ultra-wide zoom.

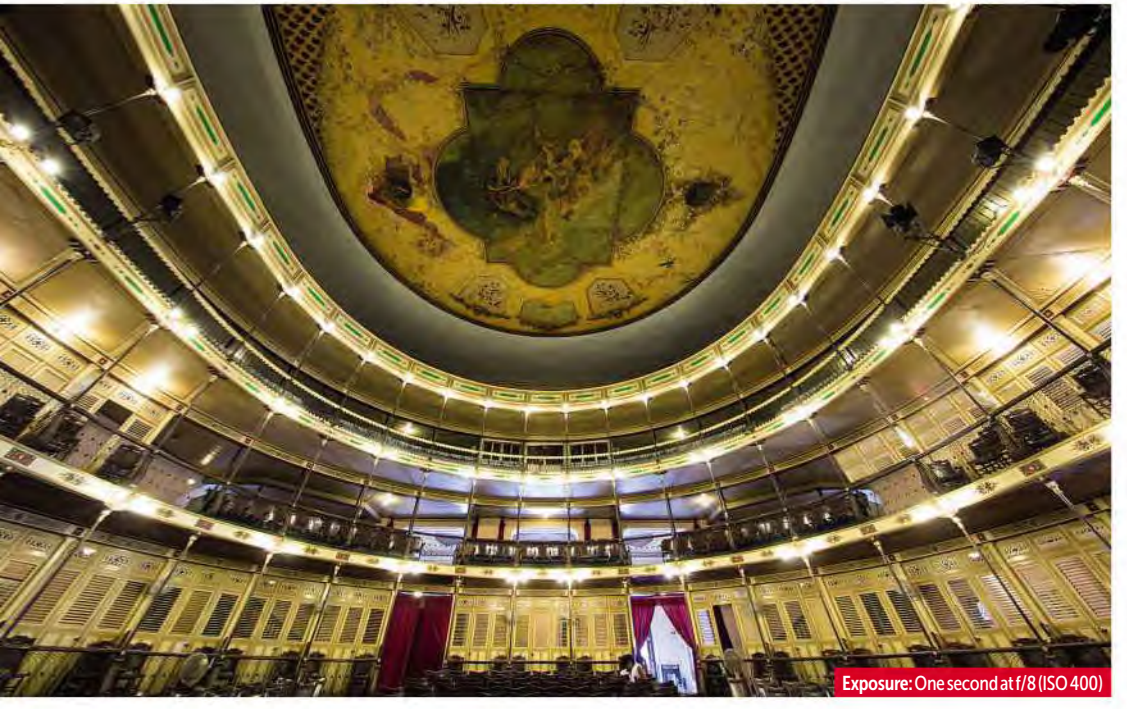
Distortion is minimal too – far less than in my Canon EF 16-35mm f/4L IS, and I thought that was good! There is a little distortion at 11mm, but we can forgive that, and it's easy enough to correct using the Lens Distortion Filter in Photoshop, though I didn't bother. Can you tell? Exactly. At the time of testing, Adobe hadn't upgraded ACR to include a profile for the 11-24mm, but to be honest, I don't think the images need it as they're so good. It's almost as if Canon have stumbled upon some magic optical formula by accident and used it in the creation of this lens. Once you see the results, the £2,800 price tag starts to seem reasonable. Just.

Above: Stitching a sequence of shots produces amazing panoramas that cover a huge field-of-view.
Right: The ultra-wide focal length offered by the Canon EF 11-24mm is perfect for shooting architecture and interiors.

I apologise if I come across as a little over-enthusiastic, but it's rare that I get so excited about a lens. The last time was when Zeiss launched the 21mm f/2.8 Distagon. But this is way better. Canon has created a lens that has no rival. A lens that will allow you to take photographs no other lens can.

I'd say it's too wide at 11mm for landscape photography – you'd struggle to find scenes where such a massive field-of-view works. But for architecture and interiors it's completely at home, and for general creative photography it will open doors that until now have been firmly closed.

"CANON HAS CREATED A LENS THAT HAS NO RIVAL. A LENS THAT WILL ALLOW YOU TO TAKE PHOTOGRAPHS NO OTHER LENS CAN"



Exposure: One second at f/8 (ISO 400)

Verdict

Wow, this lens is insane! It's the sharpest wide-angle zoom ever made, the widest wide-angle zoom ever made. It's virtually distortion-free and suffers from minimal fall-off. There really isn't anything bad to say.

Okay, at £2,800 it's expensive. But given the incredible 11mm minimum focal length, Canon has achieved almost the impossible and that's going to cost. It's a unique lens that can do things no other lens can. Top quality lenses are also a long-term investment – there's no reason why you won't still be using it in 20 years, whereas it's highly unlikely you'll keep your next DSLR for five. So instead of upgrading your EOS 5D Mk II or Mk III to the new 5DS (which costs a similar amount), why not buy this awesome lens instead? Or better still, why not buy both!

Build quality	★★★★
Features	★★★★★
Performance	★★★★★
Value	★★★★
Overall	★★★★½

Canon EF 24-70mm f/4L IS USM £700

HANDLING: With a maximum aperture of f/4, it looks and feels just like a smaller version of the all-conquering Canon EF 24-70mm f/2.8L Mk II, and it weighs a significant 25% less at 600g. Build quality is up to Canon's L-grade standard of excellence, including weatherproofing. Focus and zoom controls work as they should.

FEATURES: Image stabilisation claims four stops of camera-shake reduction, a feature shared only with the Tamron in this class. The benefit of IS is reduced at shorter focal lengths, though there's no question it can be extremely useful and this lens can be handheld at some crazy-long shutter speeds. The downside is if the subject is moving, IS can do nothing to prevent motion blur. There's also a 'macro' mode; filter size is the more popular 77mm; lens hood and soft pouch provided.

AUTOFOCUS AND IS: AF is ring-type USM ultrasonic with full-time manual override. It's very fast, recording an average of under 0.4 seconds in the near-to-far speed test, and is almost totally silent.

The macro mode is engaged by pushing a switch and zooming past the 70mm mark. Don't expect true macro lens performance, though it's undoubtedly very handy and takes the maximum magnification ratio down to an impressive 1:1.4. It's fine for things like flower portraits, but at its maximum setting it gets very close, just 3cm from the front of the lens, and that's actually inside the lens hood!

Image stabilisation is very impressive, and we achieved 100% sharp images at three stops below the unaided handholding limit, and 70% at four stops.

PERFORMANCE: On full-frame, sharpness in the centre is comfortably into the 'excellent' sector at f/4, improving slightly at f/5.6, then declining gradually in line with diffraction, only dipping just below 'excellent' at f/16. Edge sharpness is never less than 'very good' and improves to 'excellent' at f/8 where it matches the centre. Unusually, it's actually strongest at longer focal lengths.

On the higher APS-C standard, sharpness in the centre is reduced mostly to the 'very good' zone, though at 70mm it holds on well, rating 'excellent' in the main. At the edges, sharpness is always 'very good' with a noticeable lift when stopped down to around f/5.6-8.

The more modest f/4 maximum aperture helps achieve slightly better than average scores on aberrations control.

VERDICT: While the Canon EF 24-70mm f/2.8L Mk II rules on ultimate performance, this f/4L IS version offers a strong challenge. Sharpness is high, well on par with other rivals, the price is very competitive (it recently dropped by £400), plus it has excellent image stabilisation, fast AF, weatherproofing and a handy macro feature. On size and weight, it easily beats everything.

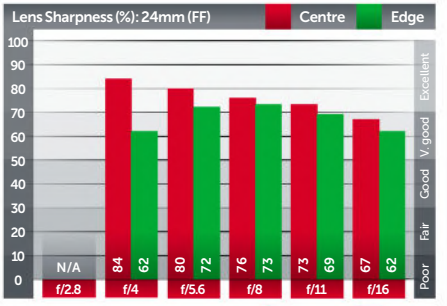
HANDLING	19/20
FEATURES	18/20
PERFORMANCE	36/40
VALUE FOR MONEY	18/20
OVERALL	91/100

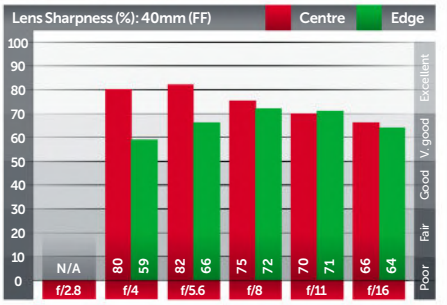
DISTORTION (Full-frame) Very Good

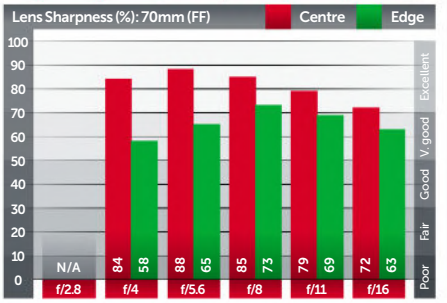
VIGNETTING (Full-frame) Very Good

CHROMATIC AB (Full-frame) Good

Canon EF 24-70mm f/4L IS USM (full-frame)





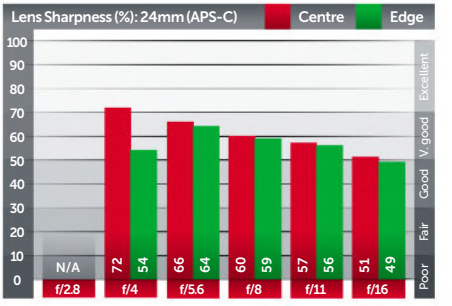


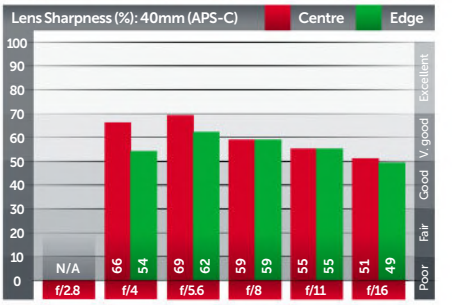
DISTORTION (APS-C) Very Good

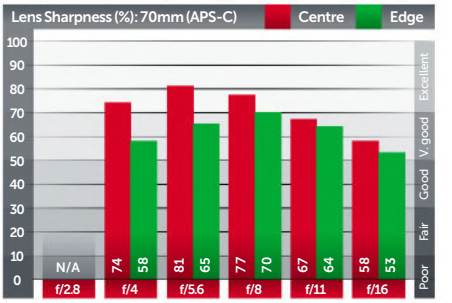
VIGNETTING (APS-C) Excellent

CHROMATIC AB (APS-C) Good

Canon EF 24-70mm f/4L IS USM (APS-C)







Canon EF 24-70mm f/2.8L II USM £1,400

HANDLING: Canon has knocked a handy 145g off the weight of the older Mk I version, and at 805g this Mk II is in line with the lighter Sigma and Tamron offerings. Mechanical design has also been revised, and it's no longer like the Nikon with that cunning 'zooming' lens hood feature (see Nikon review over the page) – the Mk II now has a more conventionally extending front section. It's weather-sealed and feels as solid and smooth as you'd expect for a lens costing almost £1,500, with control rings nicely weighted.

FEATURES: There's no image stabilisation, surprising perhaps for such a recent redesign, and instead Canon has opted to concentrate on sheer optical excellence. To that end, there are 19 glass elements, more than any other, arranged in 13 groups, and including plenty of exotic glasses and aspherical lens surfaces. The filter size goes up to 82mm. Lens hood and soft pouch supplied.

AUTOFOCUS: AF is ring-type USM ultrasonic, with full-time manual override. It's lightning fast, effectively instant, recording just 0.35 secs average in the near-to-far speed test. If you listen very carefully, you might just hear it working, but no-one else will. Closest focus is 38cm, giving a maximum magnification ratio of 1:4.8 at 70mm – typical of the other lenses in this class.

PERFORMANCE: Canon has put all of that expensive optical glass to very good use and this zoom's performance is outstanding. Most significantly, sharpness in the centre at f/2.8 is very high indeed, getting on for 90% MTF on full-frame straight out of the trap – very impressive! There's an ever-so-slight increase at f/4, but it's diffraction limited from then on out, meaning that sharpness cannot improve with stopping down, but the centre is never less than 'excellent' on full-frame, at any focal length or aperture, and on APS-C it only dips below the 'excellent' line at f/16. Edge sharpness is close behind, on both formats, again mostly in the 'excellent' zone, just dipping down to 'very good' on APS-C at either end of the aperture range. Aberrations reduction is also to a high standard, and CA control is better than most.

VERDICT: If you want the best, and you are a Canon user with very deep pockets, then here it is. Very few lenses can match its standard of sharpness, and no other 24-70mm for sure. What sets the Canon Mk II apart is fabulous performance at f/2.8, at both centre and edges, on full-frame and APS-C. And also the consistently high quality at all focal lengths, with no weak spots. Mechanical performance, and the weather-resistant build quality is top drawer, too. But, and unfortunately there's always a but, you can't ignore the high asking price. Start saving now!

HANDLING	18/20
FEATURES	18/20
PERFORMANCE	38/40
VALUE FOR MONEY	15/20
OVERALL	89/100

DISTORTION (Full-frame): Good

VIGNETTING (Full-frame): Good

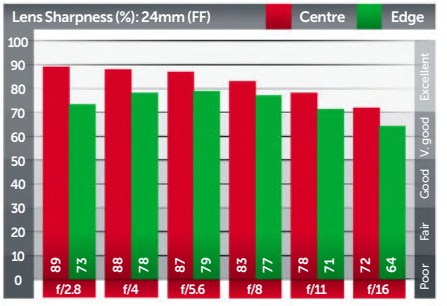
CHROMATIC AB (Full-frame): Very Good

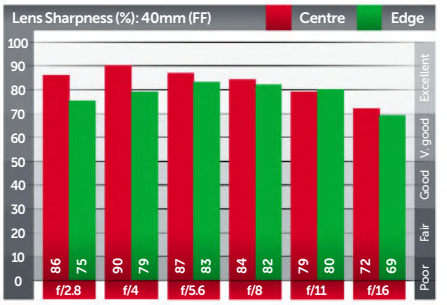
DISTORTION (APS-C): Very Good

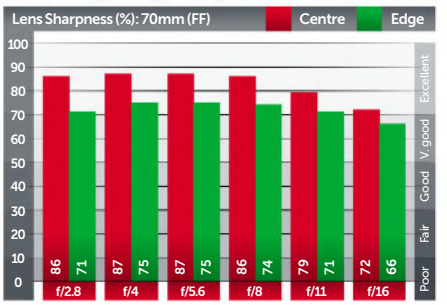
VIGNETTING (APS-C): Excellent

CHROMATIC AB (APS-C): Very Good

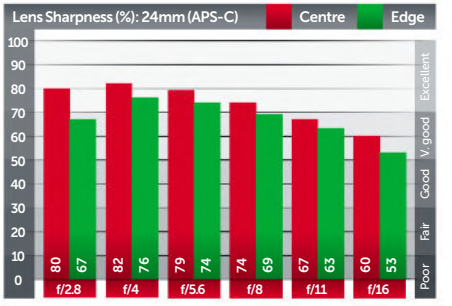
Canon 24-70mm f/2.8L II USM (full-frame)

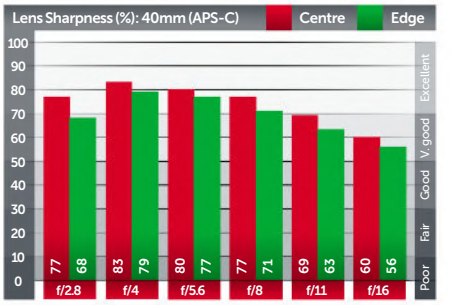


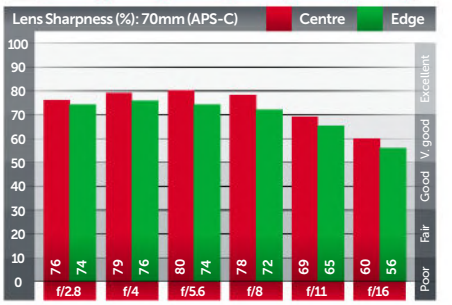




Canon EF 24-70mm f/2.8L II USM (APS-C)







Nikon AF-S 24-70mm f/2.8G ED £1,200

HANDLING: The Nikon is slightly bigger and heavier than other 24-70mm lenses, and features a reverse internal zoom mechanism where it's longest at 24mm, and gets shorter with increased focal length. Nikon uses this to improve shading efficiency of the lens hood, attached to the fixed outer barrel so the front of the lens moves independently inside. The result is effectively a 'zooming' lens hood that maintains maximum shading from 24mm to 50mm, and close to maximum at 70mm. This is unique (now that the similar Canon Mk I is discontinued) and on all other zooms the hood can only provide optimum shading at the widest focal length, or it would encroach into the image area.

Build quality is superb, weather-sealed, with finger-light and silky smooth control rings, as you'd expect from Nikon.

FEATURES: Optical construction is 15 elements in 11 groups, including a liberal sprinkling of exotic glasses. Filter size is the popular 77mm, hood and case supplied.

AUTOFOCUS: Nikon's AF is SWM ring-type ultrasonic with full-time manual override. It's super-fast, recording 0.38 seconds in the near-to-far speed test, and is effectively silent. Focusing goes down to 38cm, measured from the sensor, for a maximum magnification ratio of 1:3.8 at 70mm – similar to other 24-70mms.

PERFORMANCE: Optical performance is very high, though in the battle of the brands, the newer design of the Canon Mk II just takes the win. On full-frame, sharpness rates 'excellent' in the centre at f/2.8, rises even higher at f/4, then declines gradually, but never drops out of the 'excellent' zone. Edge sharpness follows a similar pattern at a lower level, but not much lower and is also mostly well above the 'excellent' line.

On APS-C the pattern is repeated, with the higher standard required pushing the numbers down. Sharpness in the centre remains 'excellent' throughout the mid-range apertures though, and towards the edges it is never less than 'very good'.

Aberrations control is typical of the class, with quite strong barrel distortion at the wide end, turning to mild pincushion at mid and longer focal lengths. Vignetting is noticeable at f/2.8 on full-frame, particularly at 24mm, but quickly clears at higher f/numbers and is negligible in any case on APS-C. There's some CA too, but all of these aberrations are easily corrected in post-processing.

VERDICT: The Nikon 24-70mm f/2.8G may be a little bigger and heavier than rivals, but the build quality is peerless and there's the bonus of that clever 'zooming' lens hood trick. Sharpness is very high, and while it's technically not quite as sharp as the Canon Mk II lens at f/2.8, that's to debate slightly differing levels of excellence.

HANDLING	18/20
FEATURES	18/20
PERFORMANCE	36/40
VALUE FOR MONEY	17/20
OVERALL	89/100

DISTORTION (Full-frame): Good

VIGNETTING (Full-frame): Good

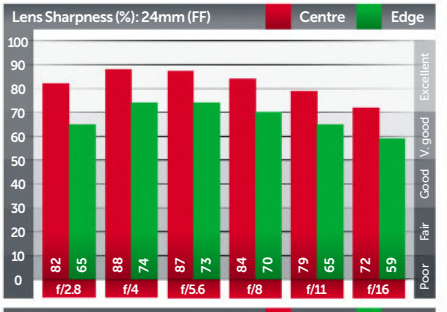
CHROMATIC AB (Full-frame): Good

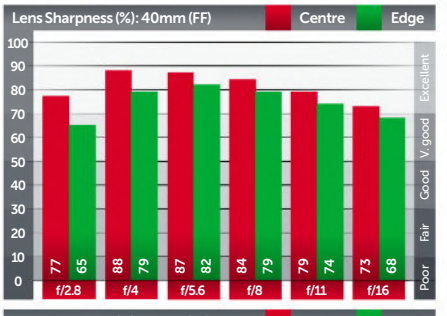
DISTORTION (APS-C): Very Good

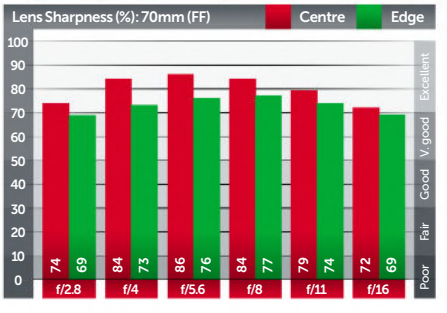
VIGNETTING (APS-C): Excellent

CHROMATIC AB (APS-C): Good

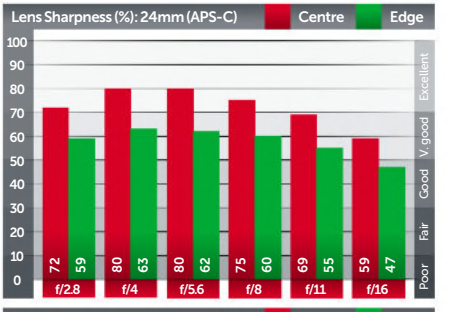
Nikon AF-S 24-70mm f/2.8G ED (full-frame)

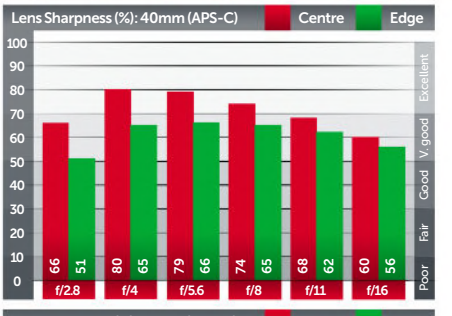


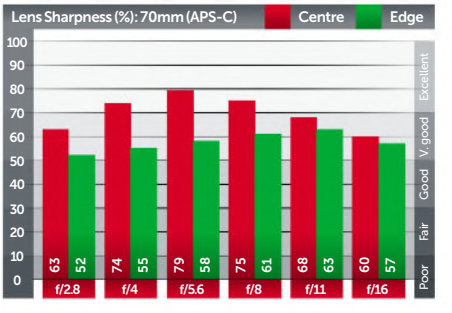




Nikon AF-S 24-70mm f/2.8G ED (APS-C)







Tamron SP 24-70mm f/2.8 Di USD VC £740

HANDLING: Very nicely made with solid, weather-resistant build. It's smooth operating too, with a finger-light focusing ring and isn't too heavy at 825g. There's a zoom-lock, but it's not really needed. No complaints at all.

FEATURES: The headline is VC (Vibration Compensation) stabilisation, a feature shared only with the Canon 24-70mm f/4 IS, and claiming four stops of camera-shake reduction. Optical design is 17 elements in 12 groups, and Tamron hasn't held back on the exotic stuff with three LD glass elements, two XR and four aspherical. Filter thread is the larger 82mm size; lens hood provided.

AUTOFOCUS AND IS: Autofocus drive is Tamron's USD ring-type ultrasonic, with full-time manual override. It's not quite as ultra-rapid as some, recording 0.5 seconds in the near-to-far speed test, but in practice a tenth of a second makes no difference, and it's very quiet. Closest focus is 38cm with a reproduction ratio of 1:5 at 70mm – very similar to rivals.

Tamron's Vibration Compensation stabilising system usually impresses and no change here, scoring 90% sharp images at three stops below the handholding limit, and 70% at four stops. Excellent.

PERFORMANCE: Tamron's designers faced a tough challenge here, with the need for high sharpness at a fast f/2.8 maximum aperture, plus the image stabilisation system, and all at a competitive price. They've done really rather well, all things considered.

It's not quite the sharpest 24-70mm f/2.8, that accolade goes to Canon, but the Nikon runs it close and this Tamron is very much in the same ball-park. Sharpness in the centre on full-frame starts well into the 'excellent' zone at f/2.8, at all focal lengths, and stays there right through to f/11. The edges rate 'very good' at f/2.8, then bounce up to 'excellent' from f/4.

On APS-C, sharpness is inevitably reduced, though in the centre it breaks above the 'excellent' line at mid-range apertures. At the edges, sharpness holds on well, also reaching the 'excellent' line or close to it through the mid-range, and never less than 'very good'.

Good aberrations control is not easy on fast, wide-angle zooms like these, though the Tamron is on par. That is to say not particularly good but with no nasty surprises and nothing that can't be easily fixed later during post-processing.

VERDICT: Even if you're indifferent to the value of image stabilisation in this class, the combination of a fast f/2.8 aperture, with fine optical performance and high build quality, is enough to press the 'buy it now' button for only £740. But if you do value image stabilisation, and there's no denying the benefits in some situations, then it's almost a no-brainer.

HANDLING	18/20
FEATURES	20/20
PERFORMANCE	38/40
VALUE FOR MONEY	19/20
OVERALL	95/100

DISTORTION (Full-frame): Good

VIGNETTING (Full-frame): Good

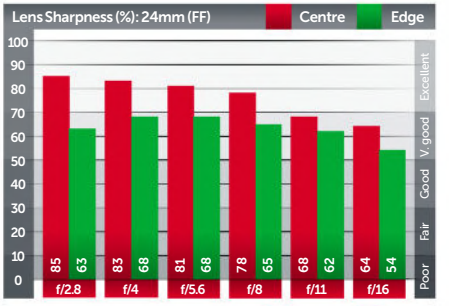
CHROMATIC AB (Full-frame): Good

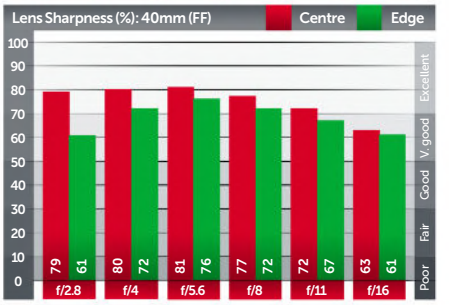
DISTORTION (APS-C): Very Good

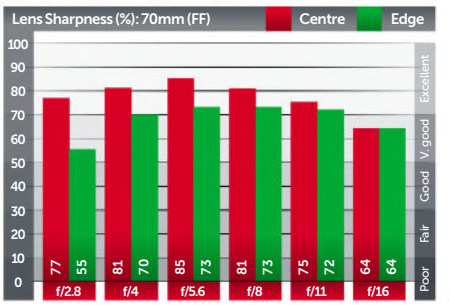
VIGNETTING (APS-C): Excellent

CHROMATIC AB (APS-C): Good

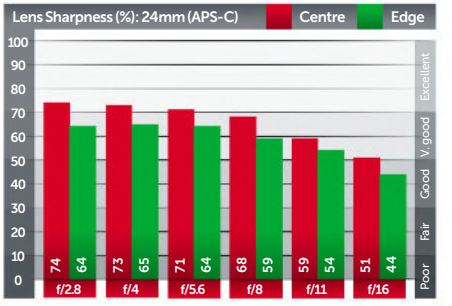
Tamron SP 24-70mm f/2.8 Di (full-frame)

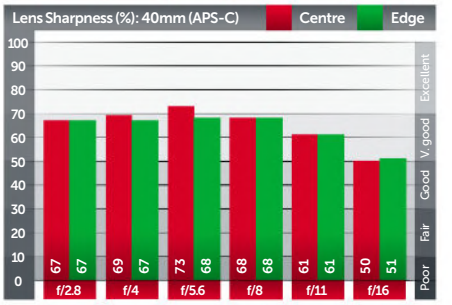


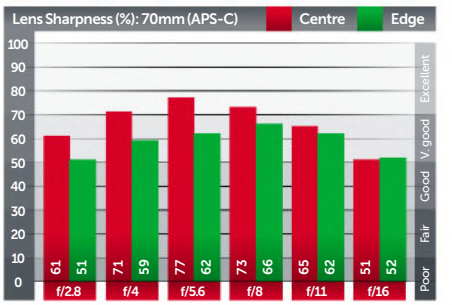




Tamron SP 24-70mm f/2.8 Di (APS-C)







Canon EF 70-200mm f/2.8L II USM IS £1,500

HANDLING: Big, fat and superbly constructed. Chunky zoom and focus rings are one-finger light and smooth. It's slightly heavier than rivals, but once it's on the camera that disappears. Great to use.

FEATURES: Everything you would expect of the most expensive 70-200mm f/2.8 zoom, including ultrasonic focusing, image stabilisation, weather-resistant build, detachable tripod collar and an excellent flock-lined hood. The best bits are inside – 23 elements in 19 groups, including five of UD glass and one fluorite. Fluorite is Canon's magic dust, and while other manufacturers claim glass with similar properties, this is the real thing produced in a dedicated factory.

One advantage is the Canon's closer focusing, down to a magnification ratio of 1:4.8 at 200mm, compared to rivals' 1:8. Basically focal length is measured at infinity focus, and at closer range this often reduces – so-called 'focus-breathing' – and at minimum distance a marked 200mm may be more like an actual 150mm. This lens from Canon suffers much less with this.

AUTOFOCUS AND IS: Autofocus is smooth and quiet, and lightning fast. In the near-to-far speed test, the Canon averaged 0.45 seconds – the fastest of all the lenses here. It focuses quicker than you can think. There's full-time manual override, too, of course.

Image stabilisation claims four stops shake reduction compared to the normal handholding rule of thumb, with dual modes for normal and panning use. This checked out with a 60% success rate at four stops under, rising to 90% at three stops, which is very much the standard for the best image stabilisation systems these days.

PERFORMANCE: The MTF graphs say it all. On full-frame, sharpness never drops below the 70% 'excellent' line, at any focal length or aperture, centre or edges. It's mostly running between 80% and 90% through mid-range apertures from f/4 to f/8 – remarkable performance. On the higher APS-C standard, it's not far behind either, never less than 'very good' and mostly well into the 'excellent' zone. Aberrations control is not a problem, with distortion, vignetting and CA all scoring either 'very good' or 'excellent'. Peak resolution measured a high 117 lines-per-mm at 20% MTF, recorded in the centre at 70mm f/4.

VERDICT: For Canon users that want the best, and can afford it, look no further. This is a wonderful lens, bitingly sharp and delivering excellence on every aspect of performance. Even when looking hard for any weakness, the worst we could come up with was its slighter heavier weight compared to the others. A recent £350 price drop makes it an even more appealing option.

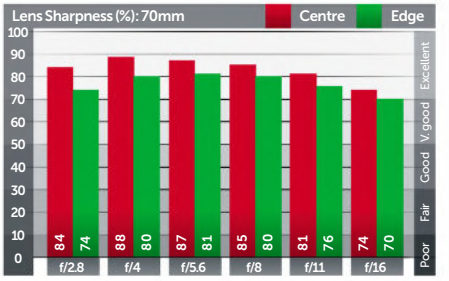
HANDLING	20/20
FEATURES	20/20
PERFORMANCE	40/40
VALUE FOR MONEY	16/20
OVERALL	96/100

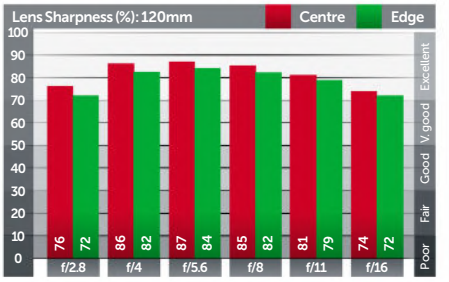
DISTORTION (Full-frame) Very good

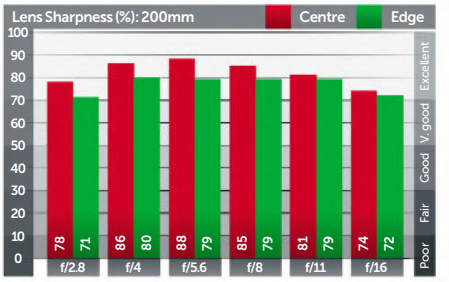
VIGNETTING (Full-frame) Excellent

CHROMATIC AB (Full-frame) Very good

Canon EF 70-200mm f/2.8L II IS (full-frame)





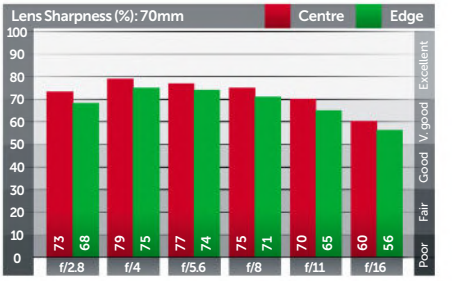


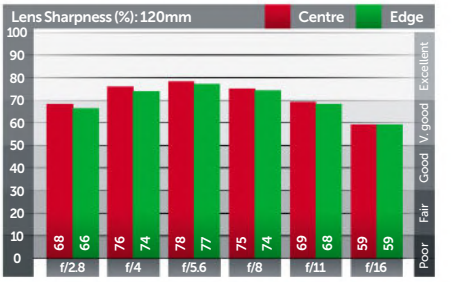
DISTORTION (APS-C) Excellent

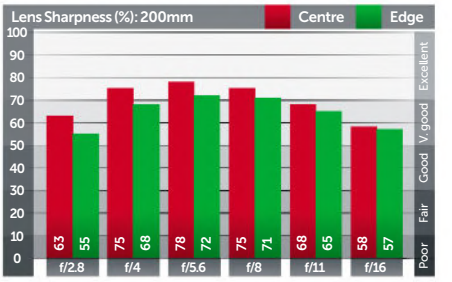
VIGNETTING (APS-C) Excellent

CHROMATIC AB (APS-C) Very good

Canon EF 70-200mm f/2.8L II IS (APS-C)







Nikon AF-S 70-200mm f/2.8G ED VR II £1,580

HANDLING: Like all high-end NIKKOR lenses, this lens just feels right – a proper professional tool. Smooth, finger-light controls, rugged build, perfect. It's everything we look for.

The rotating tripod collar is fixed, though the foot slides off with a screw-locking clip. A small point, but the lens hood is not as deep as it should be, and it's not squared off so won't stand on end.

FEATURES: It's all here – Silent Wave Motor focusing with full-time manual override, Vibration Reduction, weatherproofing, tripod collar, hood and case. Optical construction is 21 elements in 16 groups, including seven ED glass elements.

All these lenses suffer from focus-breathing, the Canon least and the Nikon most (Sigma and Tamron are actually very similar). This reduces focal length at close range and at a marked 200mm the Nikon is more like 140mm when focused at 1.4m. The maximum magnification ratio of 1:8 means you can fill a full-frame image with an A4 magazine page, but nothing smaller.

AUTOFOCUS AND IS: Nikon's Silent Wave Motor autofocus is very quiet and efficient. Not quite as fast as the Canon in side-by-side comparison, averaging 0.6 seconds in the near-to-far test, but there's barely a tenth in it. More importantly, when it came to the servo-tracking test it performed immaculately.

VR image stabilisation claims four-stops of camera shake reduction against the handholding rule, and we scored 60% success at four stops under, rising to 90% at three stops. This is an excellent performance for the Nikon, and par for the course with modern top-grade lenses like these.

PERFORMANCE: If only by the smallest margin, overall the Nikon is the sharpest 70-200mm f/2.8 lens you can buy. The clues to best high resolution performance are in the fractionally better figures on APS-C, and also the peak resolution figure of 121 lines-per-mm that is just a whisker ahead of the others, recorded at 200mm f/4. In practice, the Nikon's advantage is barely visible, though at the long end it bodes well for use with a teleconverter. Like the Canon, sharpness on full-frame never dips below the 70% 'excellent' line at any time, and on APS-C it's mostly in the 'excellent' zone, too.

Aberrations control is to the usual high standard, though -1.8% pincushion distortion at 200mm is a little higher than some.

VERDICT: This is a very fine lens. Apart from minor issues like the close-up focus-breathing, it's almost faultless. It's wonderfully sharp, with excellent mechanical performance and superb build quality. On the other hand, £1,600 is asking a lot and we think it's erring on the expensive side.

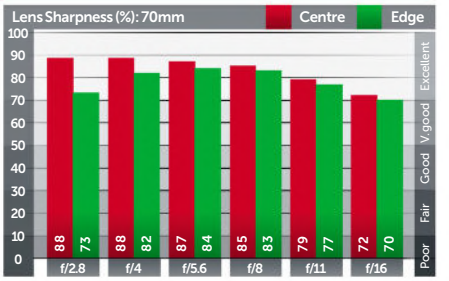
HANDLING	20/20
FEATURES	20/20
PERFORMANCE	40/40
VALUE FOR MONEY	15/20
OVERALL	95/100

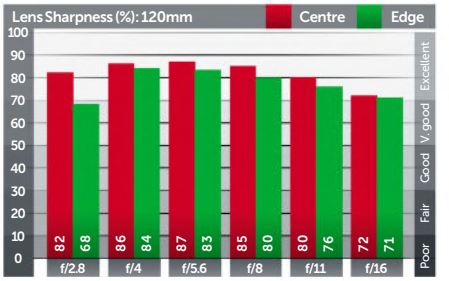
DISTORTION (Full-frame) Good

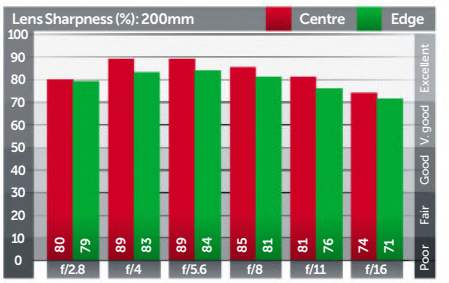
VIGNETTING (Full-frame) Excellent

CHROMATIC AB (Full-frame) Very good

Nikon AF-S 70-200mm f/2.8 II (full-frame)





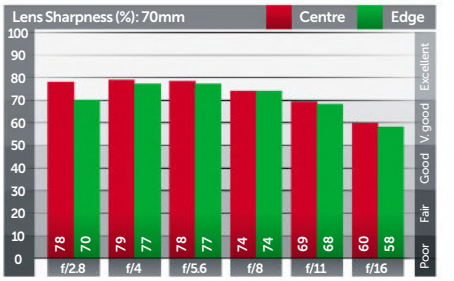


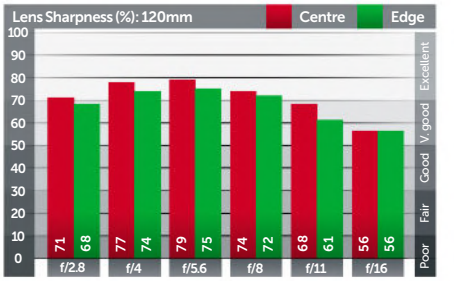
DISTORTION (APS-C) Excellent

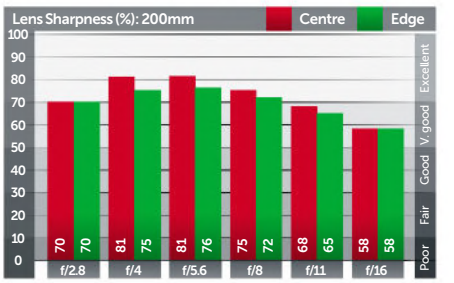
VIGNETTING (APS-C) Excellent

CHROMATIC AB (APS-C) Very good

Nikon AF-S 70-200mm f/2.8 II (APS-C)







Sigma 70-200mm f/2.8 EX DG APO HSM OS £800

HANDLING: Although the lightest lens of the group, it's still heavy. Zoom and focus rings are light and smooth, though, both turning in the same direction as Canon. They're positioned differently, with the focus ring nearest the camera, reflecting the arrangement of focus and zoom lens groups inside. Finish is Sigma's newer smooth matt.

FEATURES: There's a full features set with Hypersonic AF, full-time manual focus override, and two-stage image stabilisation. No weatherproofing though – a sign of Sigma cutting back on costs. It comes with a detachable tripod collar and lens hood with an APS-C extension.

Optical construction is 22 elements in 17 groups, including two of FLD glass and three SLD. The modest maximum reproduction ratio of 1:8 is clear evidence of the usual focus-breathing that reduces focal length when shooting at close distance.

AUTOFOCUS AND IS: The mechanical components perform well. While Sigma's HSM was slowest of the group, averaging 0.65 secs in the near-to-far test, that's still very swift. More importantly, it was plenty fast enough to deal with the tough AF-tracking test outlined on the opening page.

Sigma's OS (Optical Stabilisation) claims four stops of camera-shake reduction and we achieved a 90% success rate at three stops, and 60% at four stops. Excellent performance, on a par with the others.

PERFORMANCE: The big question is, can a £800 lens be as sharp as one costing twice as much? And the answer is yes. Almost. The one exception is edge sharpness at 200mm, where below f/8 it's considerably softer than at any other point.

This doesn't appear to be 'bad copy' syndrome, but a characteristic of the design that affects performance on both full-frame and APS-C formats. Sharpness jumps up with stopping down, and it's also quite likely that subjects towards the edges of the frame at longer focal lengths will be out of focus anyway, but the problem is there.

Apart from that, all other aspects of performance are in line with the other lenses here. There's maybe a touch of distortion apparent, but then it's no more than the Nikon. Peak resolution at 20% MTF measured a respectable 112 lines-per-mm, in the centre at 200mm f/4.

VERDICT: The Sigma looks the part, and does the business. It's sharp, very sharp, giving nothing away to more expensive rivals, apart from the edges at the long end. AF and image stabilisation perform very well, too, but weatherproofing is absent. Its best feature, though, is the unbeatable price – you can't quibble at that.

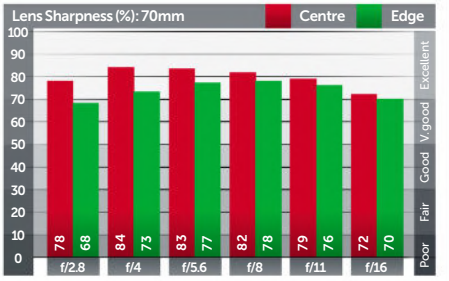
HANDLING	20/20
FEATURES	19/20
PERFORMANCE	36/40
VALUE FOR MONEY	20/20
OVERALL	95/100

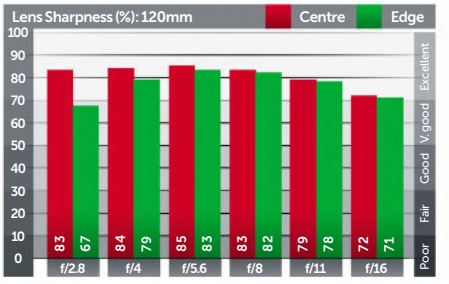
DISTORTION (Full-frame) Good

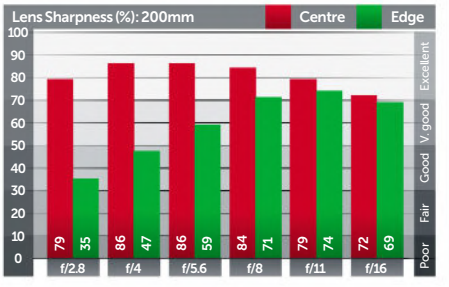
VIGNETTING (Full-frame) Excellent

CHROMATIC AB (Full-frame) Very good

Sigma 70-200mm f/2.8 HSM OS (full-frame)





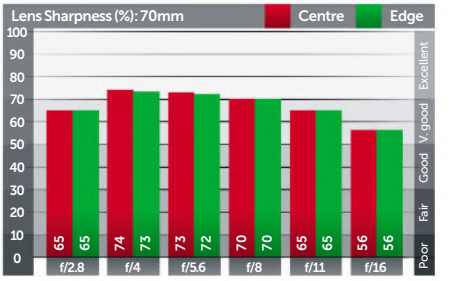


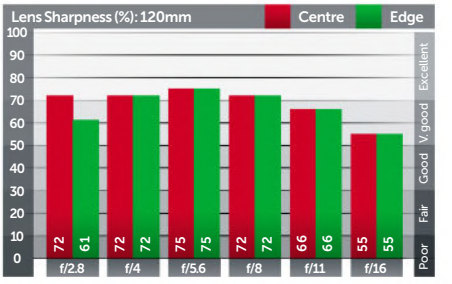
DISTORTION (APS-C) Excellent

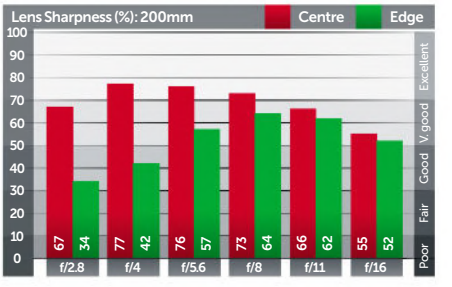
VIGNETTING (APS-C) Excellent

CHROMATIC AB (APS-C) Very good

Sigma 70-200mm f/2.8 EX HSM OS (APS-C)







Tamron SP 70-200mm f/2.8 Di VC USD £1,000

HANDLING: Tamron claims the smallest lens in class (just!), though it's still a meaty beast. Solidly made and well finished, the smooth-operating build gives nothing away to marque rivals. Note for Nikon users is zoom and focus rings that turn in the same direction.

FEATURES: This new lens is in a completely different class to the older Tamron version, adding Ultrasonic Silent Drive focusing, image stabilisation and weatherproofing.

It's sharper, too, with 23 elements in 19 groups, including five of UD glass and one of XLD with fluorite-like qualities. There's some focus-breathing going on, reducing the maximum reproduction ratio to 1:8 (unlike the older lens's 1:3).

AUTOFOCUS AND IS: Tamron's USD focusing is a transformation, zipping though the near-to-far speed test in a very rapid 0.55 seconds, narrowly beating the Nikon. Excellent performance by this lens.

VC (Vibration Compensation) has unique three-axis correction. It can control both left/right and up/down directions simultaneously and detect persistent panning movement, switching out that plane automatically without needing a second mode.

VC works very well, despite our best efforts to fox it. Tamron claims four stops improvement against the normal handholding shutter speed yardstick and we achieved 70% success at four stops under, and 90% at three stops. That's as good as it gets.

PERFORMANCE: With all those elements and exotic glass, we were expecting this lens to be sharp, and so it proved. In the centre on full-frame, sharpness soars well above the 'excellent' line at all times, and the edges are not far behind, also rating 'excellent' for the most part.

On APS-C, the higher resolution demands inevitably push the numbers down, but here again sharpness in the centre is generally 'excellent' and the edges comfortably within the 'very good' zone.

Distortion, vignetting and CA are all contained to a very high standard, rating either 'very good' or 'excellent'. Peak resolution at 20% MTF scored the second highest of the group at 119 lines-per-mm, measured in the centre at 120mm f/4.

VERDICT: Tamron has done a great job with its new flagship 70-200mm f/2.8. Only at the edges towards the longer end of the zoom range does sharpness lag a little, but that's being very critical and you'd be hard pressed to notice it in practice. USD focusing and VC stabilisation performance are first-rate without doubt, and the weather-resistant quality build promises durability. It makes a perfect partner to Tamron's also excellent 24-70mm f/2.8 VC standard range zoom.

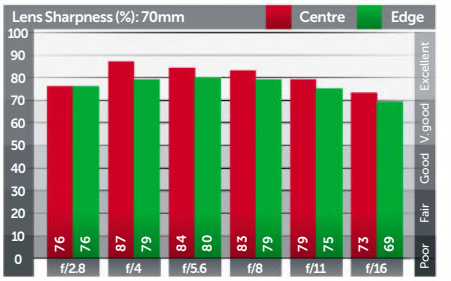
HANDLING	20/20
FEATURES	20/20
PERFORMANCE	38/40
VALUE FOR MONEY	17/20
OVERALL	95/100

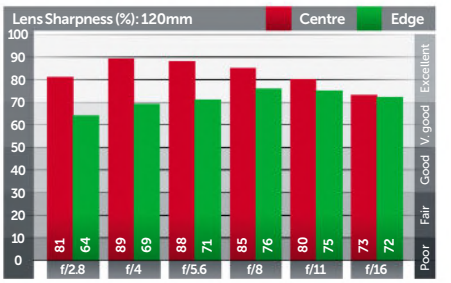
DISTORTION (Full-frame) Very good

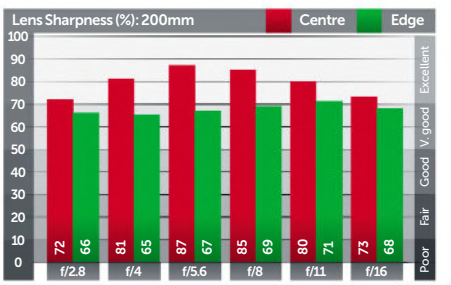
VIGNETTING (Full-frame) Excellent

CHROMATIC AB (Full-frame) Very good

Tamron SP 70-200mm f/2.8 VC (full-frame)





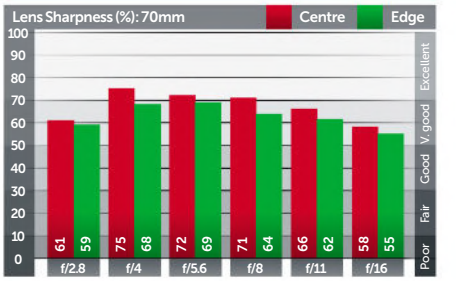


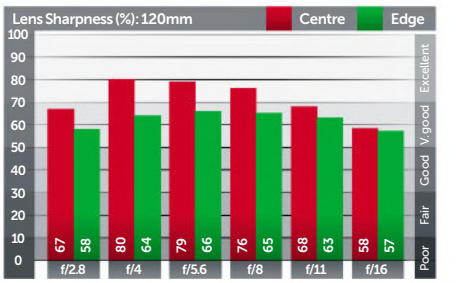
DISTORTION (APS-C) Excellent

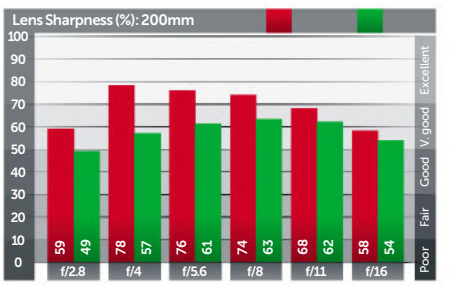
VIGNETTING (APS-C) Excellent

CHROMATIC AB (APS-C) Very good

Tamron SP 70-200mm f/2.8 VC (APS-C)







NIKKOR AF-S 70-300mm f/4.5-5.6 G ED SWM VR £420

HANDLING: As 70-300mm telezooms go, the Nikon is bigger and heavier. Layout is spot-on, and controls are nicely weighted for fast and smooth working. Solid build quality.

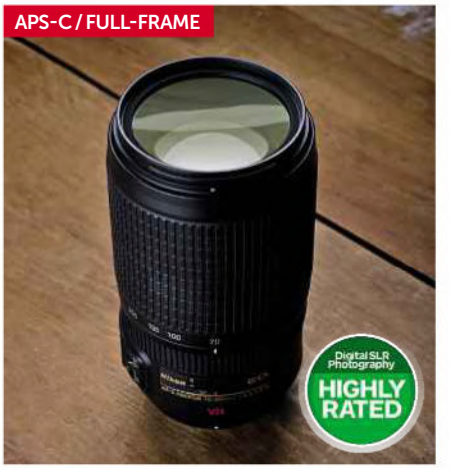
FEATURES: A full set of features including SWM AF, and top-grade VR-II image stabilisation with dual modes: Normal and Active. Optical design comprises 17 elements with two of ED glass, arranged in 12 groups, and the aperture diaphragm has nine rounded blades.

AUTOFOCUS AND IS: SWM AF drive (AF-S) is virtually silent, fast and positive. VR-II image stabilisation claims a four-stops reduction in camera shake; we achieved 80% success at three stops, and 40% at four stops. With both AF and image stabilisation, the Nikon proved close to the best available.

PERFORMANCE: A fine sharp lens, particularly at 300mm. On full-frame, centre sharpness is way above 'excellent' at all times, and on APS-C, it only dips into the 'very good' zone at f/11. Edge sharpness is weaker, but still no lower than most. Aberrations control is par for the course, with barrel distortion at 70mm turning to pincushion at mid-range and longer focal lengths. Significant CA at the long end, though vignetting is never really troublesome.

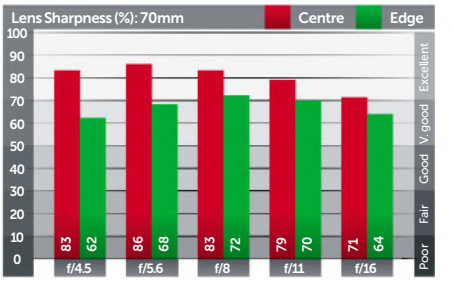
VERDICT: The best lens in this class, but a higher price tag. Sharpness is high throughout, it's well made and has excellent AF and VR image stabilisation.

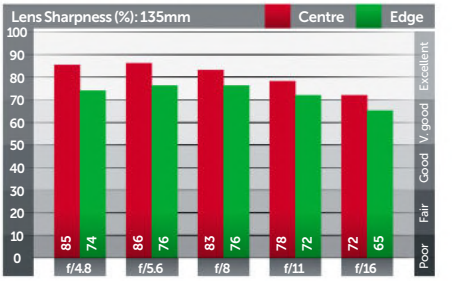
APS-C / FULL-FRAME

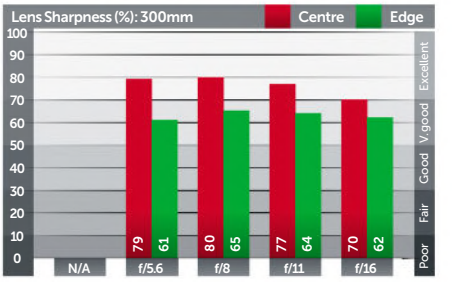


DISTORTION (Full-frame): Good	
DISTORTION (APS-C): Very Good	
VIGNETTING (Full-frame): Excellent	
VIGNETTING (APS-C): Excellent	
CHROMATIC AB (Full-frame edge): Good	
CHROMATIC AB (APS-C edge): Fair	
HANDLING	20/20
FEATURES	20/20
PERFORMANCE	38/40
VALUE FOR MONEY	17/20
OVERALL	95/100

NIKKOR AF-S 70-300mm f/4.5-5.6 (full-frame)







Sigma 70-300mm f/4-5.6 DG Macro £100

HANDLING: Medium weight and well finished, with metal mount. Slight barrel wobble at 300mm, though it doesn't affect performance. Manual focusing is very good. Extend the zoom and push the macro/normal switch to allow much closer focusing to under 1m.

FEATURES: No IS and Micro-Motor AF rather than Ultrasonic, but focusing goes down to 1:2 magnification ratio at the longest focal length. On APS-C, that fills the frame with a subject just 45-50mm long and at a generous 69cm MWD. The barrel rotates when focusing, revealing a handy magnification ratios scale as it extends. Optical construction is 14 elements (one SLD) in ten groups. Lens hood is provided.

AUTOFOCUS: Fairly quiet and fast, averaging 0.5 seconds in the near-to-far speed test, though it slows a little at 300mm and in lower light. Manual focus is via an AF/M switch.

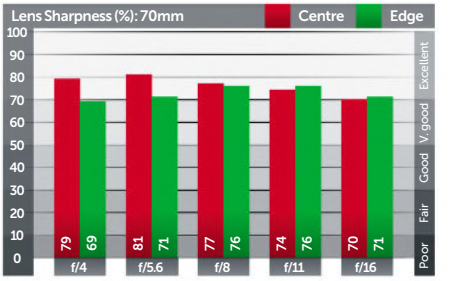
PERFORMANCE: Sharpness is remarkable for a £100 lens, performing close to much more expensive telezooms. Aberrations control is typical of most telezooms. Vignetting is not really a problem, almost unnoticeable on APS-C. There's some CA, more so at the longer focal lengths.

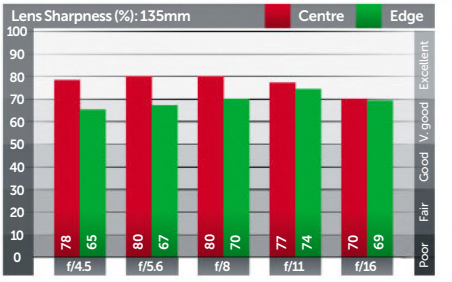
VERDICT: Though light on luxuries, this lens has a couple of strong features: the price and that extra-close focusing ability. Overall, optical performance can hold its own against much more expensive telezooms.

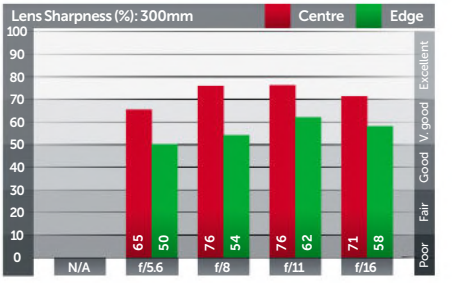
APS-C / FULL-FRAME

DISTORTION (Full-frame): Fair	
DISTORTION (APS-C): Fair	
VIGNETTING (Full-frame): Excellent	
VIGNETTING (APS-C): Excellent	
CHROMATIC AB (Full-frame edge): Fair	
CHROMATIC AB (APS-C edge): Fair	
HANDLING	18/20
FEATURES	18/20
PERFORMANCE	32/40
VALUE FOR MONEY	20/20
OVERALL	88/100

Sigma 70-300mm f/4-5.6 DG (full-frame)







Sigma 70-300mm f/4-5.6 DG APO £150

HANDLING: Physically, the Sigma 70-300mm DG APO Macro is identical to the non-APO version. It's quite light at 550g. As expected, there's some movement in the barrel when extended to 300mm, but nothing too worrying. Manual focusing is particularly good.

FEATURES: APO is short for apochromatic, and refers to three lens elements of SLD glass, as opposed to just one in the non-APO version. Costing an extra £50 than the other Sigma 70-300mm on test, SLD glass focuses all colours of light more accurately, for lower CA and improved sharpness.

AUTOFOCUS: Impressively fast at an average of 0.5 seconds in the near-to-far speed test, slowing a little at the longest focal length. It's audible, but not intrusive.

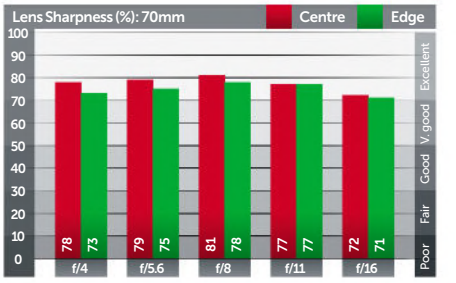
PERFORMANCE: On full-frame, sharpness in the centre is 'excellent' from 70mm to 135mm at all apertures, and from f/8 at 300mm. Edge sharpness lags a little, which is typical of most telezooms. Performance is the same for APS-C, but the edge sharpness holds up better. Basically, it's the same as the non-APO version, though with fractionally sharper images and a little less chromatic aberration.

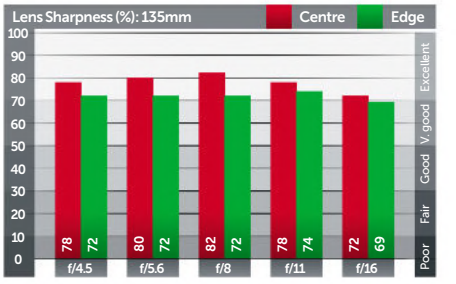
VERDICT: Optical performance is good overall, and while still great value, it's not significantly better than the bargain Sigma non-APO. Nice to use with good controls and fast AF. The extra close-up mode is a bit fiddly, but very useful.

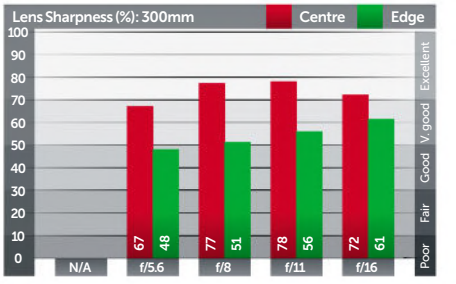
APS-C / FULL-FRAME

DISTORTION (Full-frame): Fair	
DISTORTION (APS-C): Fair	
VIGNETTING (Full-frame): Excellent	
VIGNETTING (APS-C): Excellent	
CHROMATIC AB (Full-frame edge): Good	
CHROMATIC AB (APS-C edge): Good	
HANDLING	18/20
FEATURES	18/20
PERFORMANCE	32/40
VALUE FOR MONEY	18/20
OVERALL	86/100

Sigma 70-300mm f/4-5.6 APO (Full-frame)







Tamron SP 70-300mm f/4-5.6 Di USD VC £250

HANDLING: A smart-looking lens, it feels meaty, marginally the heaviest of this group, and similar to the NIKKOR 70-300mm VR.

FEATURES: Includes Tamron's USD ring-type Ultrasonic AF, with full-time manual override, and VC stabilisation claiming four stops of camera-shake reduction. Optical design has 17 elements in 12 groups, with one LD and one XLD glass. Minimum focusing distance is 1.5m from the sensor and that translates to an MWD of 119cm from the lens front, giving a magnification ratio of 1:4 at 300mm.

AUTOFOCUS AND IS: USD Ultrasonic AF is very quiet and locks on positively. It's not the most rapid, though only a tenth or so behind most rivals. Tamron's Vibration Compensation is smart and has auto-sensing of panning movement so doesn't need a dual mode switch. Performance is excellent.

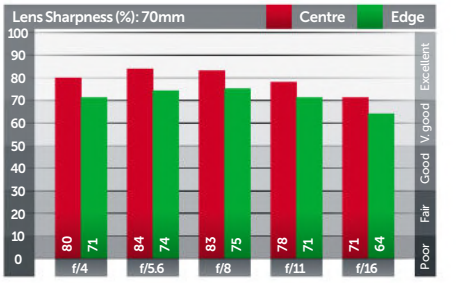
PERFORMANCE: Sharpness is high, excellent on full-frame, just dipping at f/16. A noticeable drop at 300mm f/5.6 and centre sharpness is 'excellent' again at f/8. Same for APS-C, just at a slightly lower level. Limited aberrations.

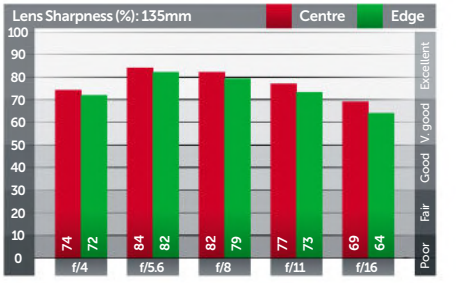
VERDICT: There are hardly any downsides. The upsides are good AF and IS, high sharpness at all focal lengths, beating everything except the more expensive NIKKOR 70-300mm VR at the long end, and the Canon 55-250mm STM. The Tamron offers terrific value at £250.

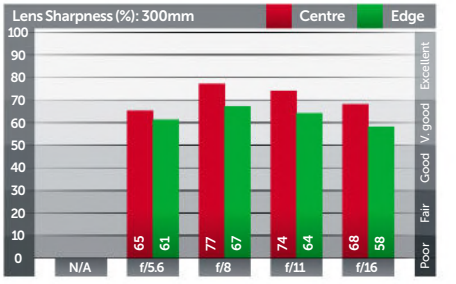
APS-C / FULL-FRAME

DISTORTION (Full-frame): Good	
DISTORTION (APS-C): Very Good	
VIGNETTING (Full-frame): Excellent	
VIGNETTING (APS-C): Excellent	
CHROMATIC AB (Full-frame edge): Good	
CHROMATIC AB (APS-C edge): Fair	
HANDLING	20/20
FEATURES	20/20
PERFORMANCE	36/40
VALUE FOR MONEY	20/20
OVERALL	96/100

Tamron SP 70-300mm (Full-frame)







Sigma 150-600mm f/5-6.3 DG OS HSM/S

If you're looking for a lens with real pulling power, then this beautiful beast from Sigma could be what you need

TEST: DANIEL LEZANO

SPECIFICATIONS

Guide Price: £1,600 / **Street Price:** £1,500
Lens construction: 24 elements in 16 groups
Premium optics: Two FLD ('F' Low Dispersion) & three SLD (Special Low dispersion) glass elements
Number of diaphragm blades: Nine (rounded)
Minimum aperture: f/22
Minimum focusing distance: 2.6m
Maximum magnification: 1:5
Filter Size: 105mm
Dimensions: 121x290.2mm
Weight: 2,860g
AF Fittings: Canon, Nikon & Sigma
Supplied accessories: Tripod mount, lens hood, lens hood cover, carry case
Compatible teleconverters: Sigma 1.4x & 2x APO EX DG
Website: sigma-imaging-uk.com

WHILE THE MOST popular focal lengths of telezoom are 70-200mm and 70-300mm, there are specialist fields of photography, in particular sports and wildlife, that require even more power at the top end. There are a number of zooms covering decent 80/100/135-400mm from marques and independents and a few zooms touching 500mm too, but when even that's not enough, there are a handful of super-telezooms offering a very versatile range of 150-600mm. We tested Tamron's 150-600mm a year or so ago and it delivered an excellent performance on both full-frame and APS-C.

Recently, Sigma released two lenses with the same focal length, the £1,200 C-series (Contemporary) lens and this, the £1,600 S-series (Sports) lens. As well as the optics, the main difference between the two is the size, with the C-series lens being more compact and lightweight.

If you've never used a lens of this type before, its sheer length and weight may initially take you a little by surprise. Weighing a little under 3kg, it's not the sort of zoom that you want to be using handheld for too long. Those shooting sports and action will mostly use this on a monopod, while wildlife shooters will no doubt have the Sigma perched atop a decent head on a sturdy tripod.

In terms of finish, this Sigma is absolutely stunning with an all black barrel and premium build. Don't think just because it's not a marque lens that it's second best for build – as well as looking fantastic, this zoom is dust- and splash-proof and made to the highest standard. To ensure it can be used in poor conditions, even the optics have been treated, with a water- and oil-repellent coating allowing the surface to be quickly and easily wiped clean.

The barrel design is excellent – the wide rubberised ring at the front controls the zoom, while the manual focus ring sits further back, next to the large focus distance window. Several controls are located on the left of the barrel, allowing you to change settings while keeping the right hand on the shutter button. The zoom lock prevents focal lengths being accidentally changed, while four other switches control focusing and optical stabilisation (see panel, right).

Our lens was used mounted on a Manfrotto 055CXPRO4 tripod using a Manfrotto gimbal head, which gave a secure support as well as making it relatively easy to shift position. We left the deep hood fitted at all times to minimise the risk of flare, with the stabiliser off while mounted.

The zoom ring has a smooth action and looking through the viewfinder, seeing the large shift in focal length is impressive. The latter can also be said for the autofocus, which is very positive and quiet. While we weren't able to test its tracking of fast moving subjects, it performed very well at locking on to static objects and following slow-paced subjects. Filter users will be pleased to know that the Sigma uses internal focusing.

Where the Sigma scores most highly is with image quality, with very high performance throughout the range of focal lengths. Even at maximum aperture, image sharpness is very impressive across the frame. It's easily the sharpest zoom of its type that we've tested. The optical stabiliser does a good job too – we noted around a 2.5-3-stop benefit when handholding the lens – although this is not something you'll want to do too often in truth, but it's a great back-up benefit to have available if needed.

The superb optics mean that chromatic aberrations aren't an issue, with the Sigma being practically devoid of this problem. Some light fall-off (darkening at the frame edges/corners) is evident when wide open but stop down a stop or two and it is avoided. As for diffraction, that's only an issue at the minimum aperture of f/22 and even then it's not too bad.

Finally, it's worth praising the supplied case – as well as being of decent quality, it offers a shoulder strap, to make lugging this premium chunk of glass that little bit easier

Overall, this lens is nothing short of an incredible accomplishment from Sigma.

Lens controls

Four switches control key features, as follows:

- **FOCUS:** Along with AF and manual focus is Manual Override, allowing you to alter the AF point using the manual focus ring following AF.
- **FOCUS LIMITER:** Reduce AF hunting by setting the distance range the AF will cover.
- **OS:** Set the Optical Stabiliser to 1 (standard), 2 (when panning moving objects) or off.
- **CUSTOM:** Use along with Sigma's USB Dock (supplied separately) to create customised settings of factors like AF speed or OS.

Verdict

Digital SLR Photography BEST BUY

Any photographers looking for a far-reaching super-telephoto zoom has to put the Sigma at the top of the list. It delivers top quality in every area and covers a range marques have yet to reach. It's a big and heavy lump of glass and expensive too, but for versatility and performance, there is nothing else close.

Build quality	★★★★★
Features	★★★★★
Performance	★★★★★
Value	★★★★☆
Overall	★★★★★

IMAGE DETAIL: The Sigma's pulling power lets you fill the frame with the subject and capture it in incredible detail.

NIKON AF-S 300MM F/4E PF ED VR LENS

Nikon's new Phase Fresnel telephoto lens has wildlife and sports shooters talking, but is it any good? We put it to the test to see what all the fuss is about

TEST: JORDAN BUTTERS

SPECIFICATIONS

Guide price: £1,640 / **Street Price:** £1,640
Lens construction: 16 elements in ten groups
Premium optics: One ED (Extra-low dispersion) and one Fresnel element
Number of diaphragm blades: Nine (rounded)
Minimum aperture: f/32
Maximum magnification: 0.24x
Filter size: 77mm
Dimensions: 89x147.5mm
Weight: 755g
Supplied accessories: Lens caps, lens hood, case
Website: www.nikon.co.uk

WHEN IT COMES to Nikon's newest 300mm lens, forget the mantra that bigger is better. The NIKKOR AF-S 300mm f/4E PF ED VR is the smallest and lightest 300mm prime autofocus lens on the market today, by a long shot. Weighing in at just 755g and measuring under 15cm long, it's roughly the same size as Nikon's AF-S 24-70mm f/2.8G, but 145g lighter! When compared to the alternatives, the new lens is half the weight and around 7cm shorter than the old Nikon 300mm f/4D and a third of the weight and half the length of the 300mm f/2.8G – that's a big difference.

This huge reduction in its bulk is down to the unfamiliar letters that are littered throughout the lens's full title. Nikon has utilised a Phase Fresnel lens element, much like the kind used to focus light in lighthouses. Typically, several lens elements work in harmony to reduce chromatic aberration, however a Fresnel element eliminates the need for this, thus keeping the overall size and weight of the lens down. This optical design is very similar to that of Canon's DO range of optics in this regard. There's also fluorine coating on the front element to repel dirt and moisture, and the lens is weather-sealed. The VR system is very good, offering an impressive 4.5 stops of shake control – useful at this focal length.

In hand, the lens feels impossibly compact – this is the first time that I've been able to comfortably fit a 300mm f/4 lens in my camera bag whilst still attached to my D800. I took the lens on a recent job overseas and was able to fit it in my carry-on backpack alongside two bodies, a fast 70-200mm and 24mm and 35mm primes and other paraphernalia. I can even hang it around my neck all day without pre-booking a chiropractor's appointment!

The lens is perfectly matched to a full-frame body such as the D750 or D800, and the weight feels just right. This is the first

300mm lens that I can comfortably prop up with just two fingers underneath – one-handed shooting is entirely possible too! Autofocus is fast and accurate, with the lens only hunting occasionally in tricky lighting or low-contrast situations. There's full manual focus override too, so it only takes a quick twiddle of the focus ring to get it back on track. When mounted to a smaller APS-C body, the 300mm f/4E offers an equivalent 450mm reach, but that's when its compact size and weight start to work against it. Handholding at 450mm becomes tricky with the lighter body and, as there's no tripod collar available, it can be challenging to obtain sharp shots when approaching the reciprocal shutter speed rule. Having said that – it's a fantastic reach to have from something so small and light.

Image quality can't be faulted. Even wide open the AF-S 300mm f/4E PF is pin-sharp from corner to corner with no distortion. The bokeh looks incredible too, with backgrounds falling away to blur almost instantly. Fresnel lens elements tend to struggle when pointed directly at a strong light source, and this lens is no different – rings of flare can be seen, which would be very difficult to remove in post processing, although Nikon claims this can be done using a 'PF Flare Control' feature in its Capture NX-D software.

And then we come to the price – the AF-S 300mm f/4E PF ED VR weighs in at a pretty reasonable £1,640. This may seem like a large chunk of money, but considering that this is a high quality professional telephoto prime with a fast fixed aperture and VR, I don't think that's too bad, certainly compared to the £4,000 you'll pay for the huge AF-S 300mm f/2.8G II ED VR.

Verdict

A lightweight and very compact 300mm f/4 prime for a snip over £1,600. There's little to knock it for – Nikon may just have found the magic formula with this one.

Digital SLR Photography BEST BUY

Build quality	★★★★★
Features	★★★★★
Performance	★★★★½
Value	★★★★☆
Overall	★★★★½

IN ACTION: The NIKKOR AF-S 300mm f/4E PF ED VR had no problem tracking fast action. When mated to an APS-C body, the 450mm reach and fast maximum aperture make it the perfect compact lens for shooting motor sport or wildlife.

Abbreviation alleviation

Confused by Nikon's lens abbreviations? Here's what all those letters actually mean...

- **E: Electromagnetic diaphragm** – There's no mechanical diaphragm control, which results in more consistent exposures, especially when shooting at high burst rates.
- **PF: Phase Fresnel** – A lens element, originally designed for use in lighthouses. The single PF element reduces chromatic aberration, doing the job of several typical lens elements.
- **ED: Extra-low Dispersion** – A special lens element that further helps to reduce chromatic aberration and colour fringing.
- **VR: Vibration Reduction** – Reduces blur by actively compensating for camera movement.

SIGMA 50MM F/1.4 DG HSM/A

Premium standard lens / Hypersonic focusing / high-performance optics / For full-frame & APS-C sensors

TEST: DANIEL LEZANO & RICHARD HOPKINS

Guide price: £850 / **Street price:** £700
Lens construction: 13 elements in eight groups
Filter thread: 77mm
Minimum focus: 40cm
Maximum magnification: 1:5.6
Diaphragm: Nine blades
Size: 85.4x99.9mm
Weight: 815g
Supplied accessories: Padded case, hood & caps
Fittings: Canon, Nikon, Sigma & Sony
Contact: www.sigma-imaging-uk.com

FOR MANY PHOTOGRAPHERS, the thought of substituting their standard zoom for a 50mm lens seems a backward step, with the thought of swapping the versatility of a zoom for a fixed focal length seemingly illogical.

Of course, you and I know better. Using a 50mm is nothing short of a joy, with the fast maximum aperture and sharp optics more than making up for the loss of a zoom facility. There are currently two main types of 50mm – the most common is the f/1.8, with the faster f/1.4 also proving popular.

The latter type boasts better optics and a higher price tag and is a favourite with professionals and enthusiasts alike. We're in no doubt that Sigma's latest prime, the 50mm f/1.4 | Art lens, is the one that every dedicated 50mm user will want to own. Quite simply, it's the sharpest 50mm on the scene, bar none. Our lab tests confirm what the images captured using the Sigma already told us – this 50mm delivers incredible sharpness, excellent contrast and minimal distortion. It's benchmark stuff in this regard.

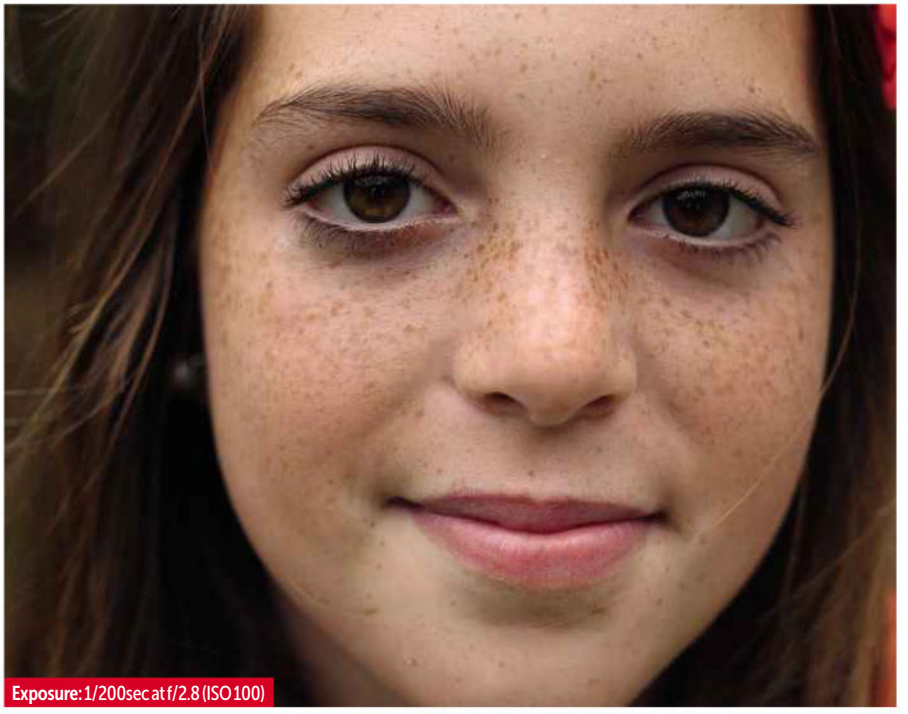
That's little surprise when you take into account its make-up – Hypersonic AF provides very accurate and fast (as well as near-silent) focusing, that locks swiftly onto static subjects as well as doing a fine job following moving targets, too. The optical set-up includes one aspherical and three SLD (Special Low Dispersion) elements to produce images that will blow you away. It's incredibly sharp at f/1.4 and gets better as you close down the lens – f/5.6 to f/8 gives optimum results, with diffraction reducing sharpness as you close down to f/16.

There is a downside to all this glass, but one we're sure users don't mind, and that is that the Sigma is bigger and heavier than any other 50mm f/1.4 – in fact it's not too far off the size and weight of a 24-70mm f/2.8. It's also expensive in comparison to other 50mm f/1.4s, too, but what do you expect?!

While around £700 is a lot to pay for a 50mm, you'll know where your money went as soon as you first try the lens. The design is stunning, the metal barrel with wide rubberised ring handles beautifully and the AF performance is excellent. It's the image quality that grabs the headlines – whether used on full-frame or with APS-C, you won't be disappointed. Sharpness is very high – our test shows it leaves rivals in its wake.

On a more artistic level, the image fall-off and bokeh when used wide open is stunning, but take care – depth-of-field is so shallow your focusing needs to be precise.

Overall, we'd have no hesitation recommending this lens. It's simply the best.


Exposure: 1/200sec at f/2.8 (ISO100)

AN OPTICAL BENCHMARK (above): Sigma 's latest standard lens is one of the finest optics we've ever tested.
PORTRAITS (below): We can't fail to rave about the quality of images – incredible sharpness and lovely depth-of-field.

Verdict

Wedding and portrait pros, along with more affluent enthusiasts, will want to get their hands on this remarkable lens. It may be as large and as heavy as a premium zoom, but it sets a new benchmark in optical quality and is the sharpest 50mm we've ever tested.

Digital SLR Photography BEST BUY

Build quality	★★★★★
Features	★★★★★
Performance	★★★★★
Value	★★★★☆
Overall	★★★★★

Canon EF 50mm f/1.4 USM £240

HANDLING: Average size and weight for a 50mm f/1.4, and nicely made – a big jump up in build quality from the older Canon 50mm f/1.8. Manual focus ring is very light.

FEATURES: Ultrasonic USM focusing has full-time manual override, and the focusing scale has depth-of-field marks at f/22, to help with hyperfocal distance setting. Optical construction is seven elements in six groups. A lens hood is extra – Canon only supplies hoods with premium L-grade lenses. Poor show really.

AUTOFOCUS: USM autofocus is fast, and though not as quiet as some, that's nit-picking. Closest focus is a typical 45cm from the sensor, or 35cm from the front of the lens.

PERFORMANCE: Sharpness is very high, getting off to a great start with strong central performance from f/1.4. Edge sharpness is noticeably less good at maximum aperture, but catches up very quickly on stopping down. Overall sharpness reaches excellent levels on both full-frame and APS-C formats as early as f/2.8, and that is held to f/11. Distortion and vignetting is only fair on full-frame, recording +1.6% barrel and -2.5EV respectively, though that is countered by above average CA control. Since these aberrations are easily reduced or eliminated in post-processing, we don't mark them down too harshly. Sharpness at a glance – overall average MTF level from f/2 to f/11 measured 74%. Peak resolution was 114 lines-per-mm at f/5.6 (MTF 20%).

VERDICT: Canon's 50mm f/1.4 is a fine lens. Its great strength is overall performance, with particularly good sharpness wide open, certainly in the centre, making it very usable at all apertures. From f/2.8, global sharpness is excellent, by which time the vignetting is reduced to very low levels. At £240, it's good value, even without a lens hood.

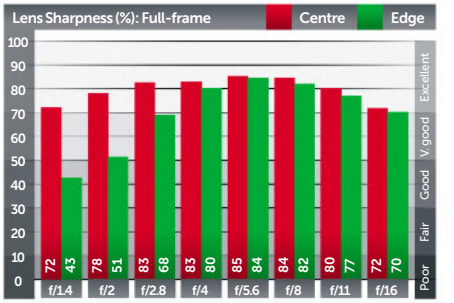
HANDLING	18/20
FEATURES	18/20
PERFORMANCE	38/40
VALUE FOR MONEY	18/20
OVERALL	92/100

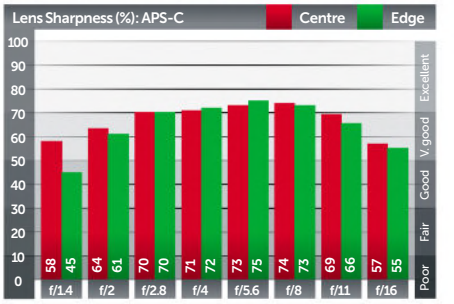
DISTORTION (Full-frame): +1.6% (Fair)
DISTORTION (APS-C): +1.2% (Good)

VIGNETTING (Full-frame): Fair
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame edge): Very good
CHROMATIC AB (APS-C edge): Very good

Canon EF 50mm f/1.4 USM





Nikon AF-S 50mm f/1.8G £140

HANDLING: Not as heavy as it looks – at 185g it's more than the 50mm f/1.8 D, though one-third less than the f/1.4 G version. Manual focusing is smooth and one-finger light.

FEATURES: It focuses down to 45cm from the sensor, or 32cm from the front of the lens, with full-time manual override. There's a token depth-of-field scale with marks at f/22 for hyperfocal distance setting. Construction is mainly plastic, but the mount is metal and fitted with a weather-sealing gasket. Comes with a good quality hood and soft pouch. These little things add up.

AUTOFOCUS: Silent Wave Motor is smooth, quiet and swift. It's actually a bit faster than the much more expensive f/1.4 G version, possibly because the actual glass it has to shift is lighter.

PERFORMANCE: Optical specification is high for such a modestly priced lens, with seven elements in six groups, including one aspherical surface. This is reflected in very good sharpness, that beats the f/1.4 G at equivalent apertures. Right from the start it hits excellent levels in the centre on both full-frame and APS-C. By f/2.8, the edges have also reached the excellent standard. Sharpness at a glance – overall average MTF level from f/2 to f/11 measured 74%. Peak resolution was 110 lines-per-mm at f/4 (MTF 20%). Aberrations control – distortion, vignetting (corner shading) and chromatic aberration (CA) is about average for this class.

VERDICT: Nikon users are rather spoilt for choice in the 50mm sector, but this 50mm f/1.8 G-series is the cherry. It's barely half the price of its sister f/1.4 G, but overall it's better at most apertures, and produces very good to excellent edge-to-edge sharpness throughout the range. With excellent Silent Wave Motor autofocusing, too, it's a great buy.

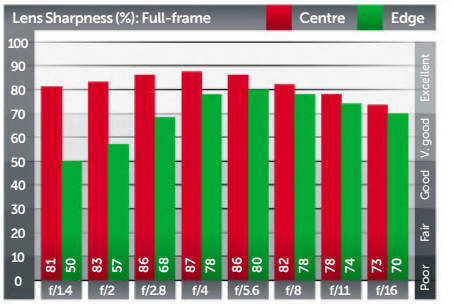
HANDLING	18/20
FEATURES	18/20
PERFORMANCE	38/40
VALUE FOR MONEY	20/20
OVERALL	94/100

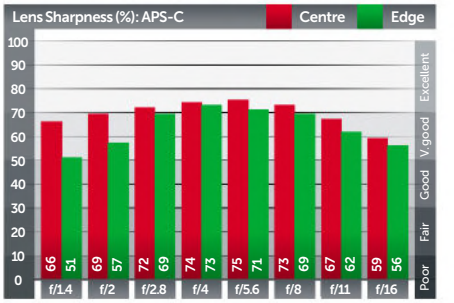
DISTORTION (Full-frame): +1.3% (Good)
DISTORTION (APS-C): +1.0% (Very good)

VIGNETTING (Full-frame): Good
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame edge): Very good
CHROMATIC AB (APS-C edge): Good

Nikon AF-S 50mm f/1.8 G





Nikon AF-S 105mm f/2.8 G IF ED VR £620

HANDLING: The first thing you notice is the size and weight. It's a bit fatter and heavier than most, but in use these things melt away and it's actually a wonderful lens to use – chunky, easy to hold, superbly smooth.

FEATURES: Boasts Vibration Reduction claiming four-stops benefit, Silent-Wave AF and a generous lens hood. Optical construction is 14 elements in 12 groups, including one ED glass. Nikon doesn't claim weather-sealing, though the mount has a rubber gasket.

AUTOFOCUS: Silent-Wave AF is excellent – fast, quiet, positive – as good as it gets, plus full-time manual override.

PERFORMANCE: Sharpness is very high, and you'd expect no less, though being picky, the peak resolution measured 99 lines-per-mm – just missing out on the top grade. It's not easy to see this in practice, and sharpness reached excellent levels on both full-frame and APS-C, only scoring a little lower at f/2.8 and at highest f/numbers. As usual, distortion, vignetting and CA are all very well controlled, and MWD is par for the course at 14cm. The VR measured a handy 1.6-stops benefit at 1:1. One notable difference is the way Nikon reports apertures compared to Canon. When focus gets very close, the effective f/number rises, eg from f/2.8 to f/4.8 at 1:1. All macros do this, but Nikon chooses to report it, while Canon stays at f/2.8. TTL metering compensates automatically for this so it makes no difference in practice.

VERDICT: This was the first lens to bring the benefits of stabilisation to macro photography. Since then, other brands have caught up and even edged ahead on the optical front, with AF and stabilisation systems to match. Though the performance differences are marginal, where Nikon still scores is in build quality and a solid, reassuring feel that Nikon users will relish.

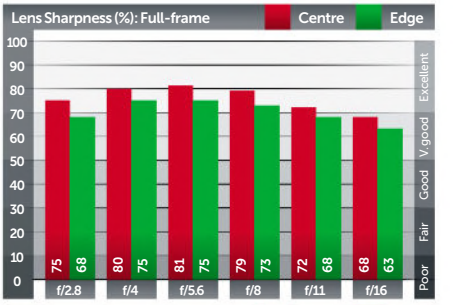
HANDLING	18/20
FEATURES	20/20
PERFORMANCE	38/40
VALUE FOR MONEY	16/20
OVERALL	92/100

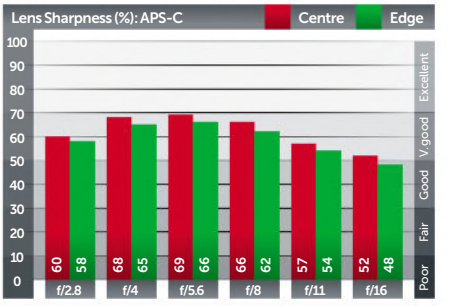
DISTORTION (Full-frame): +0.3% (Excellent)
DISTORTION (APS-C): +0.5% (Excellent)

VIGNETTING (Full-frame): Very good
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame edge): Good
CHROMATIC AB (APS-C edge): Good

Nikon AF-S 105mm f/2.8G IF-ED VR





Canon EF 100mm f/2.8L Macro IS USM £640

HANDLING: One of the sweetest handling macros. Everything is just right – size, weight, focusing and controls. Engineering-grade plastics on the external barrel help keep weight down and are warmer to the touch in the cold.

FEATURES: Headline story is the Hybrid Image Stabilisation claiming four-stops benefit at normal distance, reducing to two stops at 1:1. Optics are top-drawer with 15 elements in 12 groups, including UD glass. Build of the weather-sealed barrel is excellent, and it comes with a particularly good and deep lens hood, lined with black flocking.

AUTOFOCUS: Ultrasonic AF is silent and swift, with full-time manual override. Macros tend to be slower focusing because of their longer range mechanisms, but you'd not know it here.

PERFORMANCE: All macros are very sharp, but this is the sharpest here (just!) and recorded the highest maximum resolution figure at 110 lines-per-mm. Excellent performance from f/2.8, peaking at f/4, and sharp right across the frame. On APS-C, diffraction hits earlier and harder than full-frame and performance just starts to dip from f/8. Distortion is negligible, CA well controlled, vignetting minimal at f/2.8 and gone by f/4. Minimum Working Distance is a smidge less than some at 13cm. The Hybrid IS also corrects lateral movement – up-down as well as angular pivoting – which is more noticeable with macro. It works very well, and tested at exactly two-stops benefit at 1:1.

VERDICT: In all key areas, this lens wins – if only by a short head. It's extremely sharp, handles beautifully and has the best IS and AF. As you'd expect from Canon, the build quality is excellent and it's optically brilliant. It's around a third more costly than rivals that run it very close for image quality at mid-range apertures. But if you want the best and use Canon, this is it.

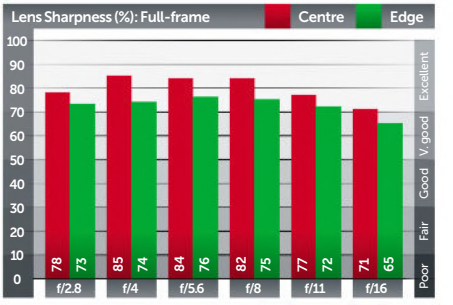
HANDLING	18/20
FEATURES	20/20
PERFORMANCE	39/40
VALUE FOR MONEY	15/20
OVERALL	92/100

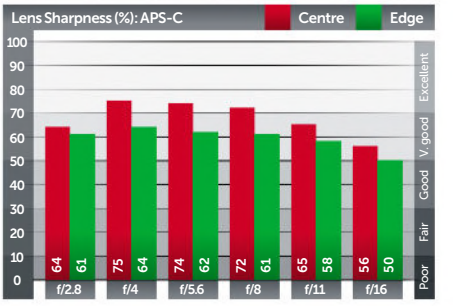
DISTORTION (Full-frame): -0.1% (Excellent)
DISTORTION (APS-C): +0.4% (Excellent)

VIGNETTING (Full-frame): Very good
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame edge): Good
CHROMATIC AB (APS-C edge): Good

Canon EF 100mm f/2.8L Macro IS USM





Sigma 105mm f/2.8EX DG OS HSM Macro £380

HANDLING: A little longer and heavier than some, but not by much. Switches are easy, and the full-time manual override focusing is particularly positive and well weighted.

FEATURES: Sigma has been catching a few headlines with some very high-spec lenses, and this macro is one of them. It has 16 elements in 11 groups, more than any other here, including two of Sigma's SLD glass. Optical Stabilisation claims four-stops benefit, and focusing is Hypersonic. The lens hood is unique in having an extension for use with APS-C cameras.

AUTOFOCUS: The Hypersonic Motor certainly moves fast, but can be a tad noisier and juddery around the focused point. Normally not much of a criticism, but both standards and prices are high here. AF has a three-stage limiter.

PERFORMANCE: All that glass certainly works! Sharpness is very high, matching the Canon 100mm L's MTF peak at 83% and only just falling short on maximum resolution at 108 lines-per-mm. Edge sharpness isn't quite so spectacular at f/2.8, but still very good indeed. Distortion, vignetting and CA are minimal. Optical Stabilisation works well and we measured an improvement of 1.6 stops at 1:1. Though this is a lot less than the four stops you might expect at normal shooting distance, it is still very welcome with macro where there is often pressure to achieve sufficiently high shutter speeds. Minimum Working Distance checked out at 14cm, very much in line for this class.

VERDICT: No excuses at this level, not that Sigma really needs any. Optical performance is right up there, almost class-leading, and so too is image stabilisation and overall build quality. Only the HSM focusing, to be very critical, can be occasionally hesitant as it seeks perfect focus. All round, the Sigma makes a strong case and has the edge on price over marque optics.

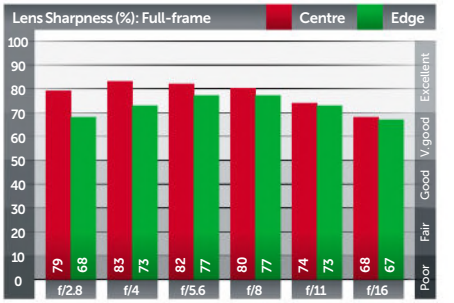
HANDLING	17/20
FEATURES	20/20
PERFORMANCE	36/40
VALUE FOR MONEY	17/20
OVERALL	90/100

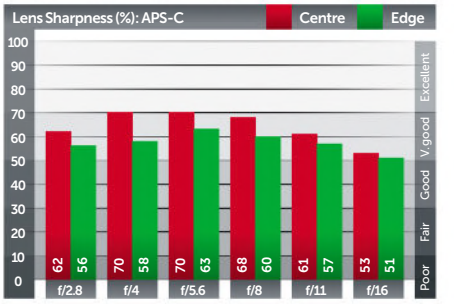
DISTORTION (Full-frame): +0.2% (Excellent)
DISTORTION (APS-C): +0.4% (Excellent)

VIGNETTING (Full-frame): Very good
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame): Excellent
CHROMATIC AB (APS-C): Excellent

Sigma 105mm f/2.8 EX DG OS HSM Macro





Tamron SP 90mm f/2.8 Di VC USD Macro £380

HANDLING: Slightly lighter than you might expect and generally well made, though there was some very fractional play in the manual focusing ring on our test sample. Nothing at all serious, except that, at this price level, every detail is worth mentioning.

FEATURES: The specification wants for nothing, with ultrasonic AF, four stops of Vibration Compensation and weather sealing (or at least a gasket around the mount). On the optical front, there are 14 elements in 11 groups, including one of LD glass and two XLD.

AUTOFOCUS: Ultrasonic Silent Drive is very good – fast, smooth, quiet and positive – plus there is full-time manual override.

PERFORMANCE: Sharpness is excellent, though Tamron seems to have taken a slightly different tack here. While not quite reaching the very highest levels of some others in the centre, it's a very close call and Tamron hits back with edge performance that is so amazingly close to the centre it's almost overlapping. So while the peaks may be slightly lower, overall image quality is exceptional even across the whole frame and at all apertures. Maximum resolution of 91 lines-per-mm at f/5.6 doesn't truly represent how good its total performance is, including excellent control of distortion, vignetting and CA. Tamron's tri-axial Vibration Compensation is impressive at 1.6 stops at 1:1. Minimum Working Distance checked out at a handy 14cm from the front of the lens.

VERDICT: This lens performs extremely well right across the board. And that's its key strength, with sharpness evenly spread at a very high level across all areas of the frame, at all apertures (inevitably bar the highest f/numbers). AF and VC are both excellent. A big price drop (this Tamron was priced at £569 not too long ago) means this lens is very good value.

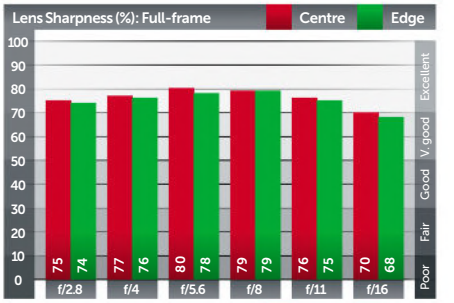
HANDLING	17/20
FEATURES	20/20
PERFORMANCE	36/40
VALUE FOR MONEY	16/20
OVERALL	89/100

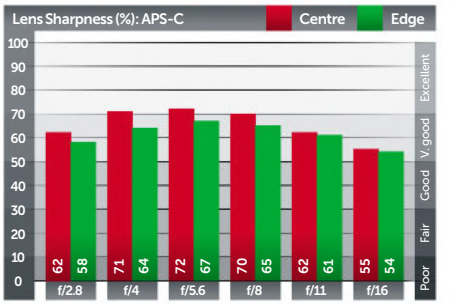
DISTORTION (Full-frame): -0.1% (Excellent)
DISTORTION (APS-C): +0.3% (Excellent)

VIGNETTING (Full-frame): Very good
VIGNETTING (APS-C): Excellent

CHROMATIC AB (Full-frame edge): Very good
CHROMATIC AB (APS-C): Excellent

Tamron SP 90mm f/2.8 Di VC USD Macro





Sigma 180mm f/2.8 EX DG OS HSM APO £1,200

HANDLING: It's big and heavy, actually weighing more than some 70-200mm f/2.8 zooms. Superbly made, it feels solid as a rock yet works smooth as butter. Absolutely top-grade build, only lacking weatherproofing – but none of the longer macros have that.

FEATURES: Everything you might expect for £1,300. Optical design is 19 elements in 14 groups, and significantly, three elements are of costly FLD glass with fluorite-like qualities. AF is Hypersonic, and Sigma's OS image stabilisation is another highlight. Hood and case supplied.

AUTOFOCUS AND IS: AF has Sigma's quiet and efficient HSM drive, with a limiter set at 67cm, plus full-time manual override. It's fast, recording 0.4 seconds in the near-to-far speed test (1.5m to infinity). MWD is 22cm at 1:1, measured from the front of the lens, a couple of centimetres less than rivals. Sigma's OS image stabilisation recorded 80% sharp images at three stops below the unaided handholding limit, and 50% at four stops. Even at macro range, we got a two-stops upside.

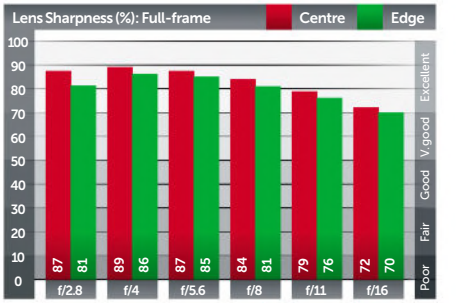
PERFORMANCE: Very few lenses, of any design or price, are as sharp as this one. On full-frame sensors at f/2.8, both centre and edges soar high above the 'excellent' line, nudging 90% MTF at f/4, only then reducing in line with diffraction. Even at the higher standard demanded on APS-C sensors, sharpness is hardly dented, and still remains comfortably above 'excellent' to f/11.

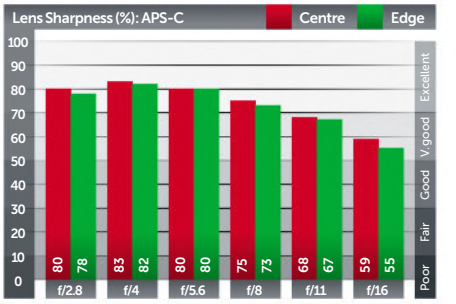
VERDICT: The mighty Sigma 180mm f/2.8 presents a conundrum. For sheer performance - from the stunning sharpness, to first class AF and OS operation, to superb build quality - this is clearly the best long macro lens available, bar none. But in practical terms, it's one big lump of a lens to manhandle on a macro safari, with an equally heavy price.

HANDLING	17/20
FEATURES	20/20
PERFORMANCE	40/40
VALUE FOR MONEY	16/20
OVERALL	93/100

DISTORTION (Full-frame): Excellent
DISTORTION (APS-C): Excellent
VIGNETTING (Full-frame): Excellent
VIGNETTING (APS-C): Excellent
CHROMATIC AB. (Full-frame edge): Good
CHROMATIC AB. (APS-C edge): Good

Sigma 180mm f/2.8 EX DG OS HSM APO





Sigma 150mm f/2.8 EX DG OS HSM APO £670

HANDLING: A physically short lens consider its focal length, although not the lightest. It looks and feels like a scaled-down version of the 180mm Sigma, and shares the same high build quality. Top marks.

FEATURES: A full house, including Hypersonic AF with full-time manual override and dual-mode image stabilisation. Optical construction is 19 elements in 14 groups, with three SLD elements (compared to the 180mm Sigma's three FLD elements). Tripod collar, hood and case are standard.

AUTOFOCUS AND IS: Hypersonic AF is near-silent and fast, scoring an average of 0.4 seconds in the near-to-far speed test (1.5m to infinity). Minimum working distance (MWD) is 18cm from the front of the lens at 1:1, roughly 5cm less than the 180mm macros, though usefully longer than 100mm macros that average around 14cm. OS image stabilisation scored 90% success at three stops below the handholding limit, and 60% at four stops. That's about as good as it gets.

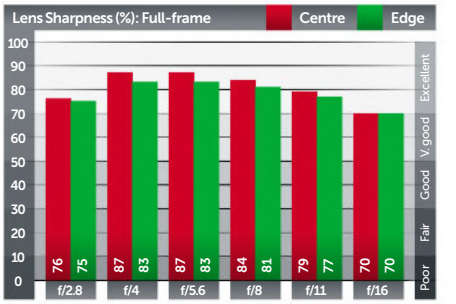
PERFORMANCE: Another very sharp lens from Sigma, and notable for how closely edge sharpness tracks the centre. On full-frame, sharpness is already 'excellent' across the frame at f/2.8, it gets a useful leg up at f/4, and stays above the 'excellent' line to f/16. First-rate performance, and the pattern is repeated on APS-C at a slightly lower level, but still 'excellent' through the mid-range apertures.

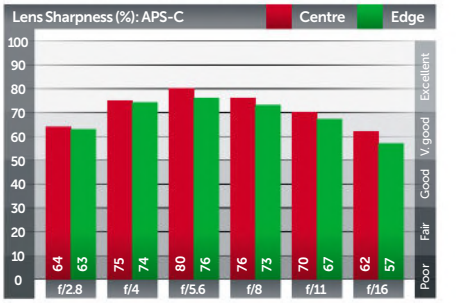
VERDICT: Only the Sigma 180mm is sharper than this, though apart from at f/2.8 there's really nothing in it. Mechanical performance of AF and OS is excellent. Very impressive stuff again from Sigma, though inevitably the MWD is less than 180mm macros, and that could be a drawback for some users. Just one more thing to note – it's a real bargain at under £700.

HANDLING	19/20
FEATURES	18/20
PERFORMANCE	37/40
VALUE FOR MONEY	20/20
OVERALL	94/100

DISTORTION (Full-frame): Excellent
DISTORTION (APS-C): Excellent
VIGNETTING (Full-frame): Excellent
VIGNETTING (APS-C): Excellent
CHROMATIC AB (Full-frame edge): Excellent
CHROMATIC AB (APS-C edge): Excellent

Sigma 150mm f/2.8 EX DG OS HSM APO





Metered to perfection!
Scenes with bright skies can lead to exposure error. Use a grey card and you should have no problems.

TOP TIP
Be sure to bracket!
Whether you use the grey card or not, in tricky lighting conditions, bracket your exposure by +/-1 stops using your camera's exposure compensation or AEB functions to ensure you get the shot

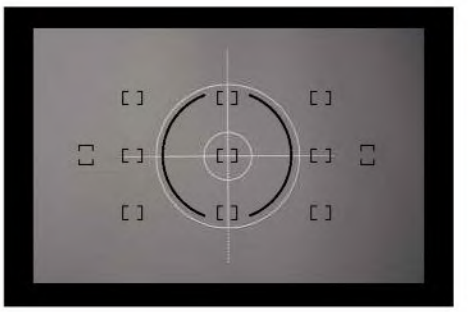
ADAM BURTON

How to use your metering & White Balance cards

The 18% grey card can be used to ensure perfect exposures when shooting in tricky lighting conditions. Both reference cards can also be used to set a custom White Balance. Depending on the camera you use, you need to take a White Balance reading from the grey or the white card (your camera's instructions will show you how)

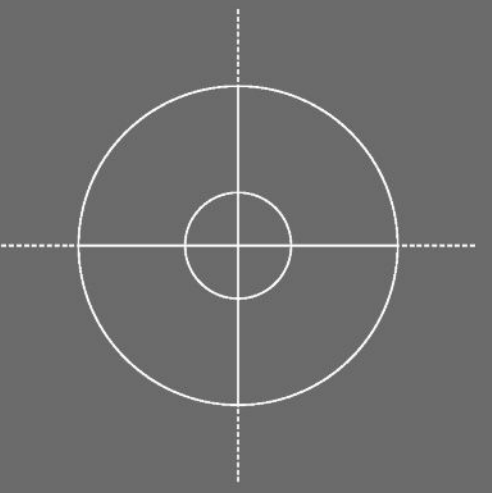
DIGITAL SLRS USE SOPHISTICATED exposure systems and all work using the same assumption that the average of the scene that is being metered from is a mid-tone, or 18% grey to be exact; the average of all dark, light and mid-tones mixed together is 18% grey. It's the basis of all metering patterns and works surprisingly well, but while it's fine for the majority of shooting situations, it can lead to incorrect exposures when the scene or subject is considerably lighter or darker in tone than 18% grey. For example, very dark areas can fool the metering system into overexposure. Similarly, very light subjects, such as a snow scene, can fool the camera into underexposing them – making them appear darker than they are – as the light meter will take a reading designed to render them as a mid-tone. As a camera is trying to render an image 'grey', it's your job to ensure you compensate to keep the tones true to life. You can do this by using one of your DSLR's exposure override facilities, such as exposure compensation or the AE-Lock button, or by metering from an area of the scene that has a mid-tone. And that's where our grey card comes in. Using it is very simple as our step-by-step guide below illustrates. Remember that you need to place the grey card in similar lighting to your scene for instance, don't place it in a shaded area if your scene is bathed in sunlight. Also make sure that the card fills the metering area – we recommend that you use spot metering as the card won't need to fill the entire image area, but any is suitable. You can either lock the exposure using your camera's AE-Lock facility or note the aperture and shutter speed, and then switch to manual mode and set these (although this method isn't suitable to days where lighting is variable). The card has AF reference lines to help your camera's autofocus lock on to it. However, you don't necessarily need it to be in focus to work correctly. The grey card (as well as the white card) can also be used to take a custom White Balance reading from, too.

1 Getting started Place your grey card on the ground angled towards you and ensure it's located in a spot that is bathed in the same light as the majority of the scene you plan to shoot.



2 Take a meter reading Ensure that the entire metering area is filled by the grey card (in this instance we're using multi-zone metering) and lock the exposure with the AE-Lock button.

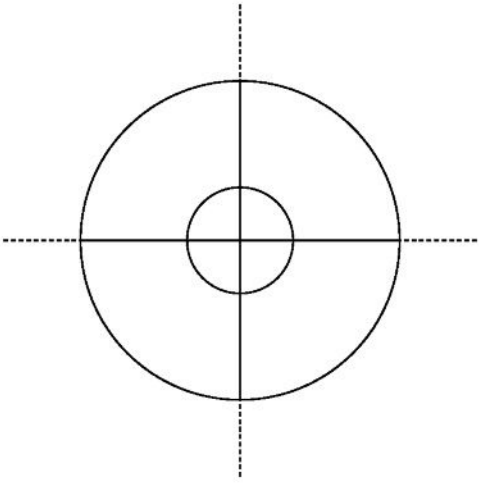
3 Compose & shoot With this exposure locked, you can compose your scene and take your shots. When you check it on your LCD monitor, the exposure should be perfect.



GREY CARD

Digital SLR Photography

CUT ALONG LINE



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Digital SLR Photography

CUT ALONG LINE

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