

tutorial 8 using available light

Photography's progress may be measured by its increasing mastery of darkness. Once exposures needed several minutes in full sunlight, but now we can work in fractions of a second, even under moonlight. At the same time, digital photography has also improved its handling of wide luminance ranges, both at the sensor and camera processing level and in the digital darkroom.

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fact file

A sensor's sensitivity depends on a number of conflicting factors. If we boost the signal from the sensor, it becomes more sensitive, but noise in the signal is also increased. Modern sensors aim to reduce noise before the signal is boosted. This technique has led to sensors offering ISO speeds as high as ISO 25600, producing acceptable results.

low light levels

Photography in low light is complicated by the widening of difference between what the human eye sees and what the electronic eye of the sensor can detect. While there is a fairly good match between eye and sensor behavior in ample light, the eye's response to low light causes a change in the way that we perceive colors.

human vision | the color of darkness

The human eye adapts to lowering light levels in a wonderfully neat way. The light-sensitive layer of the eye can be said to be made up of two types of sensor—those that work in good light and register different colors, and those that work in low light and can register shapes but see colors only poorly. When the latter set of sensors takes over, there's a shift in the quality of our perception. We don't normally notice this because we take it as natural that we can't see colors well in darkness, simply because there is little light. However, photography can show us the error of that way

👂 Colors are as bright and vivid
in darkness as they were
in full light 👂

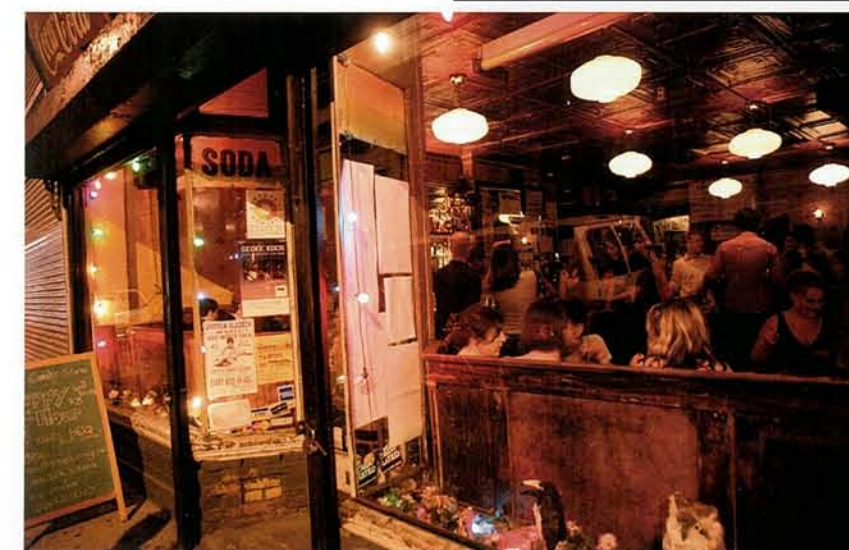
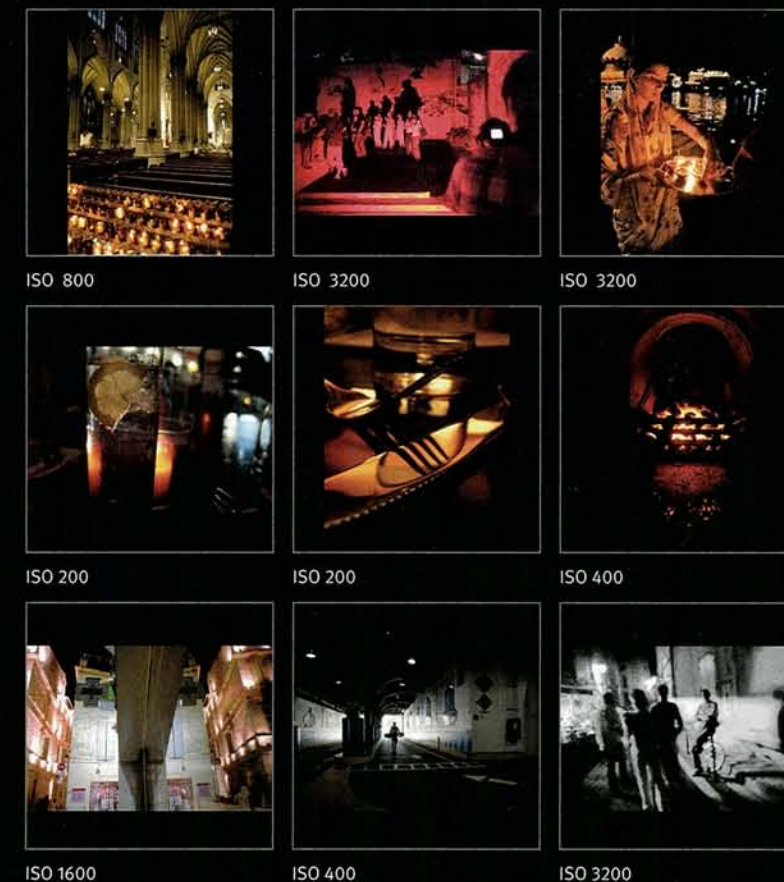
of thinking. In fact, colors are as bright and vivid in darkness as they are in full light—the colors themselves have not changed. To see color in low light we only need a way to accumulate enough light for it to be fully exposed—and that's what a long or high-sensitivity exposure does. The result is always amazing: what we remember as dull darkness becomes richly colored.

minimum noise | fast lenses

So far, we have a win-win situation: not only can photography work into the darkness of night, it can deliver up colors and tonal richness that are impossible for our eyes to perceive. In doing so, photography has quietly overcome the limits to our vision.

And there's more. While high-sensitivity films suffered from very obtrusive grain, poor colors and tonality, and unpleasantly high contrast, modern sensors—particularly large sensors of the CMOS type—can be remarkably free of noise even at sensitivity settings as high as ISO 1600. The latest cameras offer settings up to ISO 25600 with acceptable levels of noise. Furthermore, with image stabilization being increasingly used, it's possible to work hand-held with relatively long exposures.

If you use a dSLR body, it's worth investing in a fast prime lens such as the 50mm f/1.4: these are a full two stops faster than the fastest zoom lenses available. The result is that you will need to rely less and less on using electronic flash for low-light photography.



ISO choices
The ISO is not too high in 1 in order to retain quality, and because there is little movement. 2, 3 are set with the highest available ISO to capture movement. In 4, 5 a mid-range sensitivity is sufficient because the camera is rested on the table. In 6 ISO 400 is sufficient because we plan to under-expose by two stops. In 7 and 9 high ISO is needed for action, while 8 calls for an average ISO to maintain quality.

nightlife
Lighting conditions that used to call for tripod, big lenses, and specialized techniques can now be recorded by point-and-shoot cameras. Those with image stabilization give measurably superior results in low light than those without.

image analysis

The Diwali, or festival of light, celebrations in India present an irresistible photographic opportunity. The candles carried on trays by men, women, and children almost seem to float through the darkness. However, it is nearly nighttime, and the technical fire-power of high sensitivity and fast lenses is needed to capture any images at all from this extremely dark scene.

sensitivity | pros and cons

Earlier digital cameras with small sensors give high-sensitivity settings a bad name. These chips are so packed with circuitry that they are inherently noisy—full of the unwanted background chatter of electrical activity. Pushing up sensitivity is then like turning up the volume of a badly tuned radio—the song is louder but so are the crackles. The latest digital cameras suffer much less from noise. You can set many of these cameras to ISO 1600 and even higher. For some photographers, noise gives the image

a texture akin to film, although the low-light performance of modern digital cameras far surpasses the best fast films. For the best results, record images in RAW format—some modern software can remove noise before the RAW processing, yielding wonderfully clean images from the most testing conditions. If the scene is mostly black, remember that you may need to override the auto-exposure by reducing exposure by half to one stop to ensure that blacks are dark and highlights are not burned out.

in detail

A girl carrying a tray of candles turns around, waiting for her family to catch up with her. That brief pause was essential for capturing the image at all, as the exposure times of around 1/15 sec to 1/30 sec were too long to capture movement.

Sensitivity was set to ISO 1600, while the zoom lens was used at its 70mm setting and at a full aperture of $f/2.8$. The image was noisy, which was most disruptive on the girl's face, so it was imperative to reduce noise using specialized software.



noise removal

This close-up shows the importance of noise-removal from areas with smooth tones—noise in mid-tones is very undesirable. It is a price you have to pay for high sensitivity but it does enable you to work in low light.



out-of-focus highlight

The candles are rendered as attractive, smooth blurs thanks to a good quality of blur from the lens. Noise could have disrupted the outlines here, but removing noise also helps smooth out the blur.



eye catchlights

The most important lights in the image are the catchlights in the girl's eyes. It was essential to make sure her eyes were in focus and not moving as, for this picture to really work, it is vital that they are sharp.



candle flare

Detail has been lost because the exposure was aimed at capturing some texture in the shadows, which has left the highlights burned out. This, however, is acceptable, given the darkness of the scene.



hard and high light

Hard, sharp, stark—the words applied to bright light conjure up unease. Indeed, photography's relationship with this type of illumination has long been one of troubled compromise. We love bright light, but working successfully within the range of what the technology permits calls for skill and application.

high contrast | sensor capability

The brightest light that we usually encounter is direct sunlight which is hard and contrasty. The rays of light are essentially parallel to each other—described as collimated—and thus arrive on your subjects from the same angle. One result is that shadows have clean edges. The lack of light scatter means that little light falls into shadow areas, so edges are not softened and the depths of shadows remain relatively dark.

The combination of dark shadows and bright areas exposed to sun results in a high dynamic range—a considerable difference between the luminance of shadows compared to highlights. Cameras with small sensors typically cannot record a wide

dynamic range: a difference of around three or four stops of exposure between light and dark is their limit. Those with larger sensors and more sophisticated image processing can handle much larger ranges, up to around eight stops, while the top-end professional cameras may record as much as 11 stops of luminance range.

However, the effective range seen in digitally enhanced images is somewhat wider than the range visible on the actual captured image.

tonal extremes | manipulation

There are now many digital techniques for extracting detail from shadows, known as “fill,” and obtaining detail from highlights, or “recovery.” The techniques range from using Curves to manipulating Blending Options, using specialist Highlight/Shadow tools, and manipulating RAW files (see pp. 222–25, pp. 184–86). These

blinding light

Light in mountain regions, such as in this shot from Kathmandu, Nepal, can be so bright only photographic images can capture the colors with consistency. But the price of accurate colors in bright areas is almost complete darkness and lack of color in the shadows.



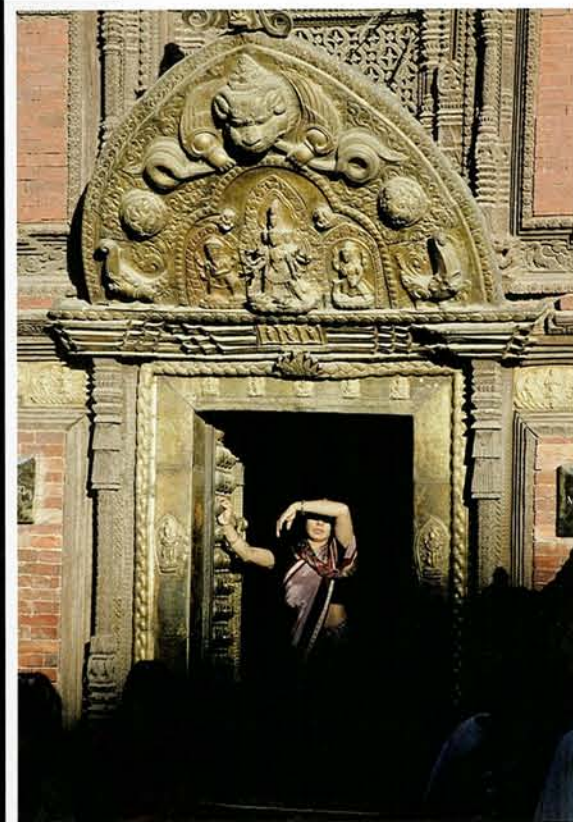
FOREGROUND SHADOW



ZOOM IN



FRAMED BY DOORWAY



techniques all are essentially ways of decompressing the image data that has been compressed at the extremes of the tonal range. This restores otherwise lost details by increasing the density differences between neighboring tones—in other words, improving contrast at tonal extremes.

The result is that now, with a digital camera, you can photograph in the brightest, most contrasty situations with the expectation of achieving a good image. If your camera allows you to record in RAW format, select RAW for these demanding lighting conditions.

Whether you record your images in RAW or JPEG, the key to success in very bright light is to ensure that light mid-tones such as fair skin are exposed to mid-tone or light mid-tone; that is, you need to err on the side of under-exposure. This ensures that highlights are not pure white—if they are, it's difficult to recover any color in postproduction.

direction | shift

While the choice of exposure is the foundation for true colors and highlights that don't look too white or washed-out, there is another powerful way to handle hard, high lighting conditions that does not involve image manipulation at all. It is simply to work with the highly directional nature of the light.

Small changes in your position, or subtle shifts in the aim of your camera, can make a big difference to the distribution of light and dark in the image. If you position yourself between your subject and the sun, you will obtain backlit effects and strong outlines; if you turn a little away from the sun, you will find the light rakes the surface of objects, bringing out their textures and revealing undulations.

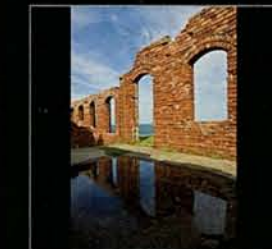
With your back to the sun, shadows diminish and you will obtain flat lighting on vertical surfaces. Such is the beauty of working on location: simply by turning around on one spot, the scene gives you at least four or five different lighting effects, all of which you can work with.

One final refinement may be helpful if you wish to avoid the surface sheen given by bright light on reflective surfaces, which reduces color intensity; a polarizing filter will remove the sheen from most surfaces (but not metal or metallic paints) and give you fully saturated colors.



hard lines

On a brilliantly bright day, sharp shadows interact with the architecture to etch hard boundaries, producing a multiplicity of geometric shapes. You can always work with hard light if you follow the shadows for guidance.



WORK WITH SHADOWS



BACK TO SUN



FRAME WITH SHADE

working with the sun

Top: consciously framing with shadows helps to divide up the image into tonal regions. Middle: these buildings were in full sun, but turning away from the sun helps to flatten contrast. Bottom: shaded parts of the image were used to frame the landscape, thus holding in the image.

direction of light

An experienced photographer remains constantly aware of the light—its strength, its color, its quality, and the direction it's coming from. The direction of light determines not only the form and intensity of shadows, it also governs the tone and contrast in the scene being photographed.

the sun | and technology

Photographers' ability to work in relation to the position of the sun has been determined in part by a specialized area of photographic technology: lens flare suppression. Early photographers couldn't point their lenses toward the sun because stray light entering the lenses was poorly controlled and bounced around, causing chaos in the image. Contrast was badly reduced by veiling glare, internal reflections confused the details and exposure was misread.

As lens coatings, internal baffles, and low-albedo (dark) diffused coatings improved, flare suppression became so successful that photographers could allow a full sun into the image and still be able to capture images. In fact, it's possible to follow the progress of technology in this respect through photographers' increasing confidence when working contre jour (against the light). The result has been a subtle enrichment in our visual vocabulary: essentially our light-source can shine in any direction in our visual field and we can now work with it.

light | shade, and contrast

The more we angle the camera toward the sun, the shorter shadows appear. And when the light-source itself appears in the image, it may cause flare—which you may be able to exploit for its pictorial effect.

At the same time, we tend to see more of the shadowed side of objects. The net effect is to raise contrast—combining sun and shadow in view gives rise to a very extensive subject luminance range. This is the sphere in which we see shapes—and can work with color masses. Determining exposure can be tricky.

working the sun

With fast-moving action, you may need to wait for your subject to orientate itself to the sun for the best lighting. The light on the gardener's hands varied with the angle of the hand: the aim is then to catch the best combination of angle of light and hand position.



HANDS TOO SMALL



TOO MUCH SHADOW



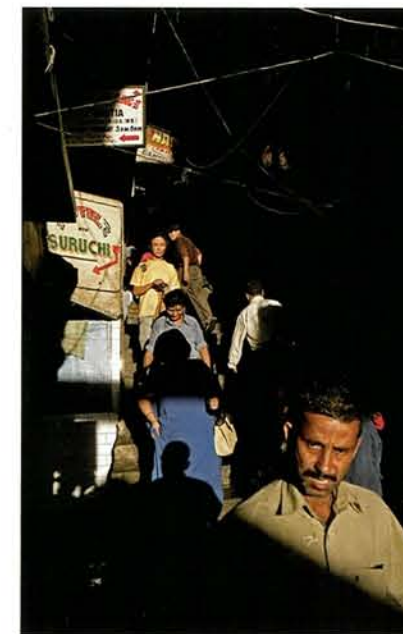
TOO MUCH SUN



We can force under-exposure, so that we work with deep shadows contrasting with intense colors that are created in the resulting mid-tones, or, with static subjects, we can make bracketing exposures in preparation for HDR techniques (see pp. 226–27).

In turning away from the sun, we work with increasingly large areas of shade with the sunlit areas: this is the sphere of textures and form, where capturing subtle tonal transitions dominates the technical requirements. Exposure metering (see pp. 38–39) is generally less technically demanding the further from the sun we turn.

With the sun to our backs, contrast generally drops: the lighting is flatter and we see less shadow. Early and late in the day, you may find your own shadow is sufficiently long to enter the picture, so you may need to hide behind the shadow of another object such as a building or tree. It's difficult to obtain high-contrast effects in all but the brightest lights, but exposure metering is usually not difficult.



front lighting

A brilliant stream of evening sun breaks through closely packed buildings in Gangtok, Sikkim, to illuminate passers-by. The result is an unusual combination of front lighting with intensely dark shadows.



walking around

Exploring a monument is to dance with light. You step around shadows, work to avoid large flat areas without tonal variation, duck down to use a building feature to shade the sun, and control exposure to record as much as possible.



AGAINST THE LIGHT



SUN AT BACK



SHADOWS DOMINATE



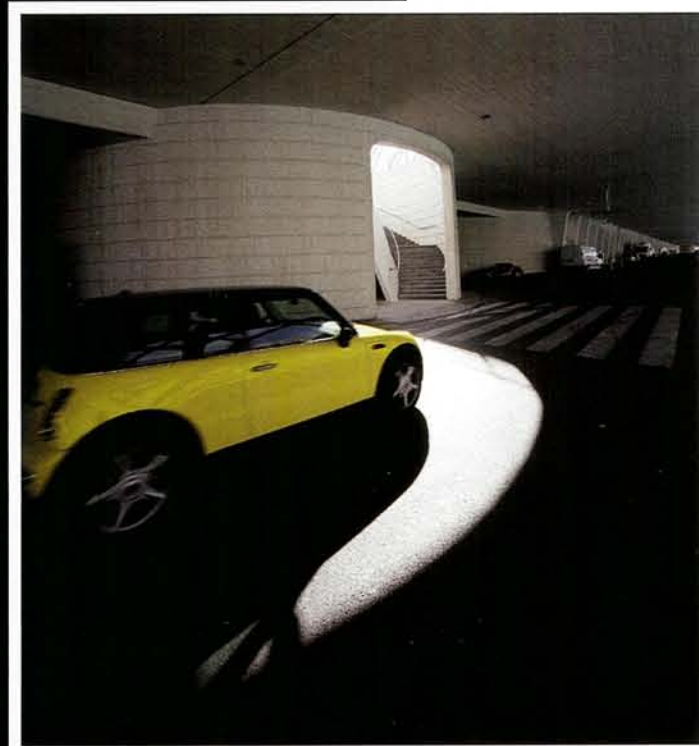
TOO MUCH SHADOW



TOO LITTLE SHADOW

shadow play

In bright light, composition can be regarded as balancing areas of shadow with areas of bright light—the crescent of light in the main image proved the best of the three compositions.

**using shadows**

Photographers generally regard shadows as less interesting than highlights. However, highlights are nothing without shadows to define them.

darkness | and detail

In photography there are some shadows that we are interested in—those that carry detail—and others we are prepared to lose, that is, those that are so dark no useful detail can be seen in them. Much of the tonal underpinning of a photograph depends on the quality of the shadows.

On one hand, they need to be dark enough to be convincing: in the majority of pictures you need some area, however small, which appears not just dark but black. On the other, some areas of shadow need sufficient contrast to reveal details—but if too much detail is revealed, or if the colors look too bright, the image starts to look unnatural.

exposure | priorities

Where black-and-white or color negative film is used, photographers need to ensure that exposures are sufficient to capture detail in the shadows – the highlights can be burned in to make them darker.

However, the digital sensor works more like a color transparency film—it's positive-working. This means that tones are recorded as they appear in the subject, so there is no intermediate negative step. The result is that the exposure priorities are reversed: you need to capture the detail in the highlights.

The reason for this is two-fold. Even very low quantities of light can evoke a signal on the sensor: so long as that has some resemblance to the subject, even if the colors and precise tonalities are inaccurate, we will accept that as detail suitable for shadows. Even if the shadows are too dark, you will be able to extract sufficient detail with your image editing software (see pp. 224–25), but it will not be possible to find detail by burning in over-exposed highlights.

The other reason is that we see less detail in shadows than is actually present, because when we look at a subject with tonal contrast we tend to favour seeing detail in bright areas over detail in shadows. The result is that, while highlights seduce our eyes into giving them all the attention, we often fail to notice the fascinating shapes of shadows, the way they run over a surface to define its texture and grain.



PEOPLE SHADOWS

drinks stall

This image combines the stillness of shadows—almost representing people in the negative—with the hurried movement of the passer-by moving energetically through the image. Notice how the shadows carry a blue tint as the light reaching shadows comes from the sky.

color | exposure for saturation

Another reason for shadows being underestimated is the notion that they are dull gray or black. In fact, shadows can be strongly colored. On clear, sunny days, the color of shadows is blue, reflecting the sky, and that blue can be surprisingly intense.

It's perhaps surprising that the colors in shadows can be more saturated than those in full light. This is because shadows receive their light from diffused or reflected sources: the soft light does not create the shiny highlights (reflected images of light sources) that tend to weaken color saturation.

However, you will only obtain these intense colors if you give the full exposure to the shadow area. Where the exposure is correct for the mid-tones, the colors in shadows are under-exposed, which means that they look dark and lack saturation. Don't be tempted to correct this, as high saturation in under-exposed areas would look artificial.



MOVING



CARICATURE



GRAPHIC



MONUMENTAL



MOLDING



TEXTURAL



lightbox

using shadows

In 1 and 2 the shadows cast by people and cat are visually the most important element. In 3 shadows cast by the trees lead the eye toward the light, and define the forest space. 4 uses shadows to compose blocks of light and shade while in 5, shadows are essential for molding the face and in 6, for defining relief in the landscape.

image analysis

Light doesn't reveal things indiscriminately, it's quite selective about what it chooses to reveal. Direct light, in particular, can point out details and highlight shiny areas or shape textures as if it were teaching you how to see. However, light can also cause flare in the lens and reduce contrast in shadows.

light | and shadow

Advice stating that you should avoid photographing directly into bright light can be traced back a long way into the annals of photographic history. Early lenses couldn't cope with veiling glare and ghosting, and photographs would appear as if the camera had been blinded if there was a light source in or near the field of view. Today, however, photographing into the light, or "contre-jour," is not only well within the abilities of any modern lens, it is a very quick way to achieve certain visual effects. The key to success, however, is

to catch the light at just the right time. Usually, the best times to do this are early in the day or late in the afternoon or in the early evening. Light traveling at an oblique angle to the Earth is more likely to enter windows at this time, and will throw long shadows. You have to be careful with exposure as the camera may have a tendency to under-expose. However, the benefit of this is that under-exposure usually helps to retain highlight detail. You can usually retrieve shadow detail in postproduction but, if in doubt, make bracketing exposures.

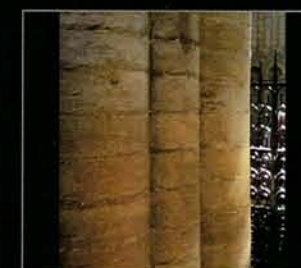
in detail

What caught my eye here was the set of whorls in the ironwork of the gate that were picked out by the light. The sinuous shapes are echoed in the shadows cast on the stone floor, and are repeated with numerous details scattered throughout the image. The main technical hurdle to overcome was to ensure that the camera meter was not unduly influenced by the very bright light from the windows and the reflection of the sun from the stone floor. However, the pale stones reflected back much of the ambient light so more details were revealed in the shadow areas of the image than were visible to the eye at the time.



aberrations

There is evidence of color fringing at the edges of the image. This is a combination of lateral chromatic aberration from the lens and errors in image processing, which are caused by high levels of light causing overload of the sensor photosites.



accurate verticals

With an extreme wide-angle view, it is essential to hold the camera precisely aligned to the vertical. Even the slightest error will be greatly magnified by the wide-angle view, which would disturb the dignified tone of the composition.



recovering highlights

The sun is shining on the floor as well as being reflected into the camera. It is virtually impossible to retain detail in these highlights. A polarizing filter may have reduced the reflection, but attempts to retrieve detail are likely to make the shadows too dark.

Assignment: light and shadow

One of the very first photographs ever created – Henry Fox Talbot's picture of a broom leaning against a door, which dates from 1844—features a distorted shadow whose strong lines almost steal the show. While all photographs are, by definition, a record of light and shadow, photographers ever since Fox Talbot's day have sought to exploit these intrinsic components of photography as subjects in their own right. In this sense, to photograph light and shadow is to aim for the most abstract kind of image.

thebrief

Photograph the interplay of the built environment with lighting effects from natural or artificial sources or a combination of both, indoors or outdoors. Look for close detail, an unusual angle, an intriguing composition, or a combination of colors for their own sake.

Points to remember

- use high-contrast and high saturation if it is available on your camera
- keeping your zoom lens at one focal length will help you to concentrate on composition
- a low ISO setting will ensure the best color quality and clean blacks
- keep the camera square on to the subject to eliminate converging parallels—unless you particularly want them
- for minimal distortion, the middle of a zoom range is usually advisable
- use apertures in the middle of the range for the best image quality

must-see masters

Ray Metzker (1931–)

Metzker is one of the most inventive observers of the environment, his innovative work exploring every formal possibility of the monochrome image. He has been an unacknowledged influence on generations of photographers.

Alex Webb (1952–)

Although his concern is not primarily with the formal qualities of light and shade, Webb's humanistically motivated photography—much of it created in the

harshest tropical light—displays a virtuoso command of highlight, shadow, and color.

László Moholy-Nagy (1895–1946)

Perhaps the most brilliant of a generation of brilliant artists and photographers, Moholy-Nagy was an innovative polymath. He was a versatile artist, but it's his photography that has left a lasting influence—one that's far out of proportion in relation to his comparatively small output.



ISO 200 Focal length 100mm 1/400 sec at f/9



ISO 100 Focal length 32mm 1/250 sec at f/8



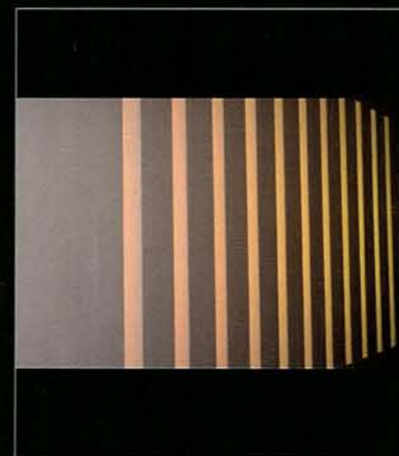
ISO 500 Focal length 20mm 1/25 sec at f/5.6



ISO 100 Focal length 32mm 1/250 sec at f/8



ISO 160 Focal length 46mm 1/720 sec at f/8



ISO 200 Focal length 7.2mm 1/60 sec at f/4



ISO 200 Focal length 7.2mm 1/400 sec at f/4



ISO 250 Focal length 24mm 1/25 sec at f/2.8



ISO 200 Focal length 7.2mm 1/400 sec at f/4

1 2 3
4 5 6
7 8 9

lightbox

toptips

1 2 shadows | constant change
One of the challenges of daylight shadows is that they move with the sun. Their quality also varies considerably according to latitude and atmospheric conditions, so you need to watch and follow.

3 texture | and contrasts
Man-made objects present very hard shadows and clean-cut textures, but to ensure that they stand out from the background, use a large aperture so that distractions are minimized. Here, even the second ring of the gear teeth is soft and the background is heavily blurred.

4 5 light | and water
The key to photographing the effect of light with water is to use the shortest possible exposure times to cut movement blur to a minimum. In 4 there is perhaps too much blur compared with the clean lines of 5.

6 indoor | lighting effects
Many possibilities are offered by domestic lamps and shades. The lighting effect may not be obvious unless you deliberately under-expose the image by half a stop or more.

7 perspective | in shadows
A prosaic subject, such as the shadow of this lantern against a blind, can be turned into a haunting abstract by exaggerated perspective.

8 shadows | oblique meanings
Shadows are a sign of a presence, so, while they can be used for their abstract qualities in a composition, they also carry some meaning, no matter how oblique that meaning may be.

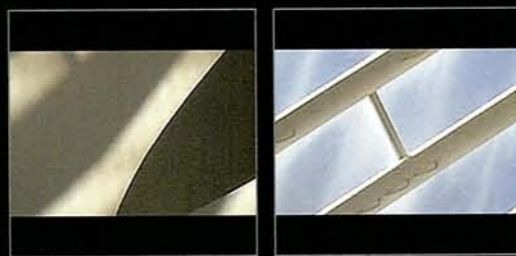
9 depth | of seeing
Where the thrust of an image is abstract, out-of-focus blur is often a hindrance. For images with receding patterns, it's important that depth of field extends to the very end.

▶ see results

central lightwell

Michael McCauslin

"Just about every time I visit the San Francisco Museum of Modern Artspace, I take a shot looking up toward the skylight."



▲ Sony DSC P200 ISO 100 Focal length 7.9mm f/5.

thecritique

As a subject for photography, the interplay of light and the built environment is almost a given, if only because architecture from as far back as Mayan times has exploited the relationship between light and blocks of stone. But the accidental can also be a rich subject, particularly where light has a focused quality that causes shadows to be sharply defined. This is one reason photography in the Mediterranean or Australasia is so rewarding: shadows show extremely clean edges with good density, thus contrasting with neighboring areas of flat tone or color.

central lightwell

Persistence paid off for Michael, who says he photographed the central lightwell at the San Francisco Museum of Modern Art on many occasions. He found he would either have glare from the sun causing blown-out areas in the image or distracting elements such as signage, lights and "a less-than-exciting compositional interplay of the shadows and architectural geometries." As he says, the day he made this shot, he "found a nice combination of 'good' parts and a relative lack of the 'bad' ones." His image also demonstrates that a good composition can make up for lack of a wide-angle lens.

homely fence

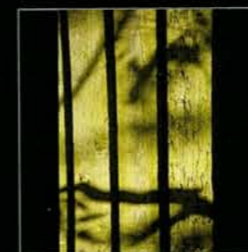
The key to this kind of image is simply observation: you can pass a scene a hundred times but if you aren't paying attention, you will miss even the most elegant calligraphy of shadows. Also, of course, Nick had his camera with him.

Beijing

The geometric elementalism of this image is admirable. Note that, even if you cannot frame this kind of shot square-on to the wall, it's important to square up the sides to avoid sloping lines.

homely fence

Nick Jones



"I'd passed this fence every day for years but this was the first time I noticed the lovely shadows—almost like calligraphy!"

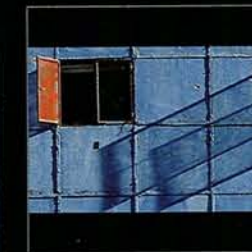
▲ Canon EOS 5D ISO 100 Focal length 48mm 1/125 sec at f/5.0

**Beijing**

Bogdan Grosu



▲ Canon Powershot A40 Focal length 16.2mm 1/400 sec at f/4.8



"Some photos are strongly anchored in the moment, with a strong sense of place, others could have been taken anywhere."