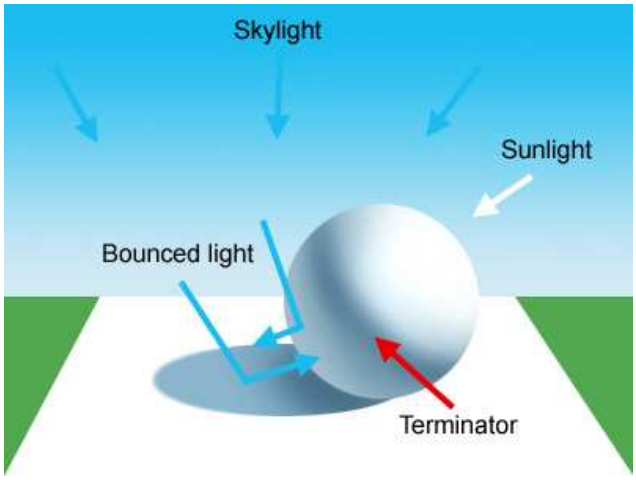
LIGHT

PART 3: Natural light

Natural light comes in a wide range of different flavours, and the difference between them can be enormous. The source of all our natural light is the sun, however it takes on different characteristics at different times of day and in different weather conditions, turning this one source of light into essentially many different ones ranging from hard and warm to soft and cool.

Basic sunshine is essentially described in the diagram in Part 1, this being what most of us would imagine as a normal bright and sunny day.



This image represents sunlight at mid-morning or mid-afternoon, and it probably the most straightforward kind of light the sun gives in terms of colour and character. However there are two major factors that affect the character of sunlight: scattering and cloud cover.

As discussed in part 1, the earth's atmosphere scatters the shorter wavelengths of light which has the effect of creating the blue sky and of reddening the light from the sun itself. The more air that sunlight has to travel through, the more scattering occurs. This means that as the sun gets lower in the sky it has to travel through a thicker layer of atmosphere, thus causing more scattering at the beginning and the end of the day.

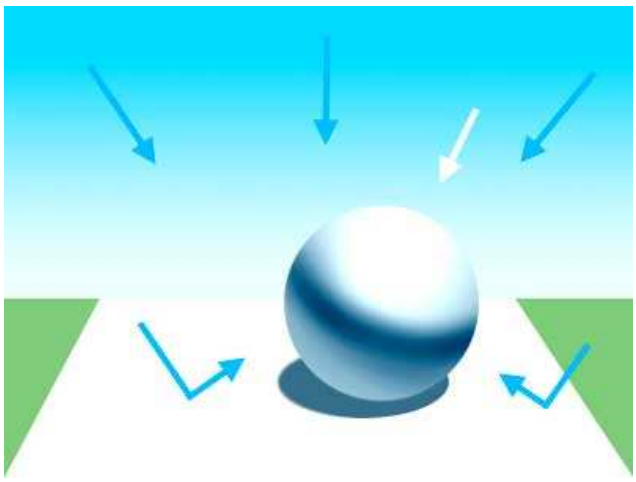
Obviously this means that sunlight has very a different character at different times of day. There are also the special conditions that occur when the sun is below the horizon, when skylight scattered from the sun is the only source of light.

Clouds also have a major impact on both the colour and the character of sunlight. Clouds are translucent, which means that they let light pass through them, but in a diffuse manner. When light travels through a transparent surface such as glass the rays remain parallel, however what happens in a translucent surface is that as the light travels through it is deflected by the substance and the rays bounce around inside it and emerge from it in several directions. This is a similar phenomenon to the scattering of blue light by the atmosphere, except that in clouds it occurs across all wavelengths of light, not just the shorter ones.

The effect that this diffusion has on sunlight is to soften it, turning a small hard light source (the sun) into a large and soft one (the whole sky). Colour is also profoundly affected by cloud cover,

since clouds conceal the blue sky and the light coming from it.

Midday sunshine



When the sun is at its highest point in the sky the light is at its whitest and strongest. Contrast is very high, shadows are very dark, so dark in fact that film emulsions generally render them black - although with the naked eye it can still be possible to see some detail in the shadows. For this kind of lighting to be believably recreated it needs to be very strong and high contrast.

The strong light has the effect of bleaching out colours and these appear to be less saturated than at other times of the day. The strong contrast can make it difficult to create appealing images in this sort of light, however in situations where contrast is naturally lower it can work very well. Water for example can really benefit from this strong light, and many images of tropical seas are taken at midday. In other cases the high contrast can be used to creative effect.

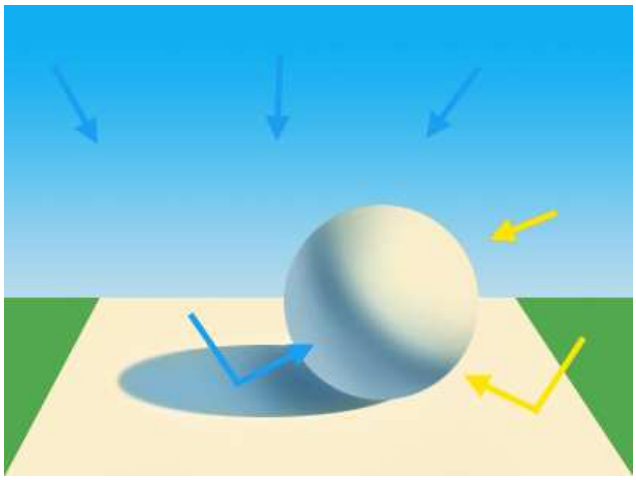
The small shadows and strong light aren't particularly revealing of form, and the low saturation is another drawback. Most photographers avoid using strong midday light, however that doesn't mean these conditions are impossible. As with most things going against conventional wisdom can lead to unusual and creative solutions.

This image is typical of midday lighting, notice how the foreground sand is totally white and the shadow is jet-black. The contrast is too high for the film to be able to reproduce the full range of shades.

Water photographs well at midday because the sunlight is at a good angle to avoid reflecting towards us. Unlike with most other subjects this kind of light brings out the colour in the ocean very effectively.

This photograph makes use of the strong contrast of the midday sun to emphasise the contrast inherent in the scene. Using an infrared filter has heightened this effect further, in colour the image would probably not have been so appealing.

Late afternoon/early evening



As the sun goes down its light gets progressively warmer, so that by the evening sunlight has very obvious yellow cast to it. The colour of the sky also takes on a deeper shade of blue due to the decreasing light levels.

Evening light is generally considered to be very attractive, the warm colours and softer contrast are very easy on the eye. From about an hour before sunset this effect is at its most noticeable - photographers and film makers call this the golden hour because the light takes on very photogenic qualities.

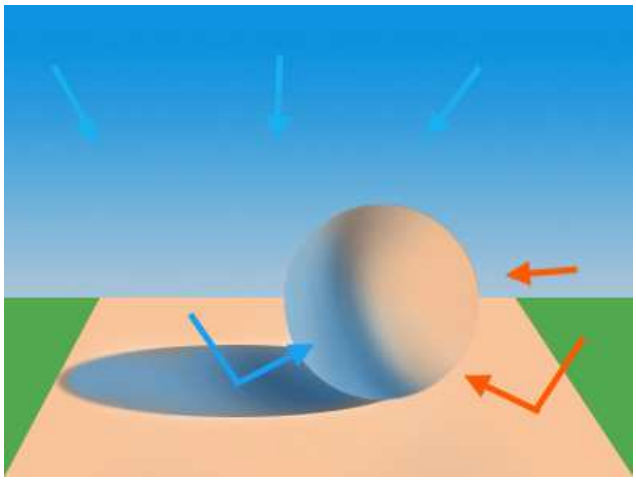
Colour saturation at this time is very high and the colour of the light itself has a huge effect on our perception of the surfaces it touches, lending them a warm and rich appearance. By an aesthetically pleasing coincidence the shadows are near to the complimentary colour of the highlights (yellow against blue), and the main light is a warm yellow while the shadows are a cool blue. These pleasing properties mean that evening light often seen in photographs, films and adverts.

You can clearly see the strong yellow cast of the evening sun on the chimneys of Battersea Power Station in this photograph.

Here the glossy coat of this dog beautifully reflects the yellow evening light on one side and the blue sky on the other.

Evening light is attractive enough to give a pleasing glow to almost any subject, this photograph would be very boring without the pleasing light.

Sunset



By the time the sun is about to set it has become a deep orange or red colour, and its light has also become much weaker which means that by now contrast is very low. The weaker sunlight also means that skylight takes on a greater importance and shadow areas become a deeper and richer shade of blue. Shadows at sunset are very long, and texture is very apparent.

The sky at sunset can be incredibly colourful if there are any clouds - and unlike the rest of the day the clouds are now lit from below, and take on dramatic red or orange hues. These colours add some complexity to the colour of the skylight and as a result can affect the colour in shadow areas, sometimes turning them purple or pink.

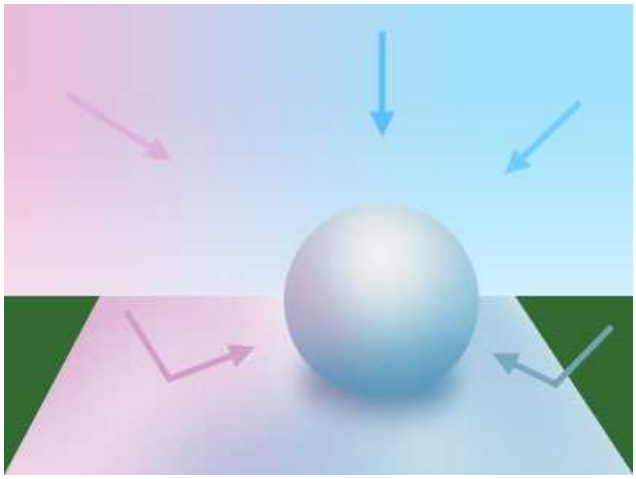
Sunsets are also very varied in terms of colour and atmosphere, a fact that is easily confirmed if you observe several sunsets in succession, no to will be the same.

Here the light of the setting sun is a deep orange, with the shadows turning purple from the mixture of colours in the sky.

Contrast is very low, and here the light of the sun and that of the sky are very close in intensity as they shine on these rocks.

Sunsets are quite short and the light changes very fast, a scene like this will only last for a couple of minutes before the sun disappears below the horizon.

Dusk



Dusk is a very special time of day with unpredictable but often very beautiful lighting. Since the sun is no longer above the horizon the sky itself is the only source of natural light. As a result the light is very soft, with little shadow and contrast and the colours can be very delicate.

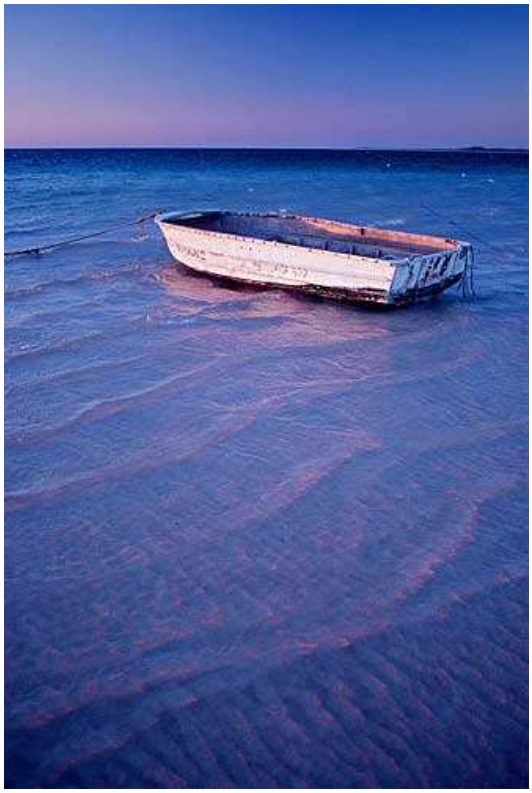
After sunset on a clear day there is often a pink area in the eastern sky, a phenomenon called alpenglow, which occurs very often but can surprise those who aren't used to noticing it. Alpenglow can cast a very noticeable pink light onto surfaces that are reflective, such as white houses, sand or water. This pink light is too faint to affect darker surfaces such as foliage though, so often the land can look very dark at this time.

However alpenglow isn't a guaranteed feature of the sky at dusk, at other times the eastern sky is just blue. There is always a yellow or orange glow to the west where the sun is illuminating the sky from below the horizon. The glow from the sun can last for over an hour after sunset, although the colour in the eastern sky is much shorter lived, and changes very fast. It is worth noting that the western sky can also be pink, as well as yellow, orange or red.

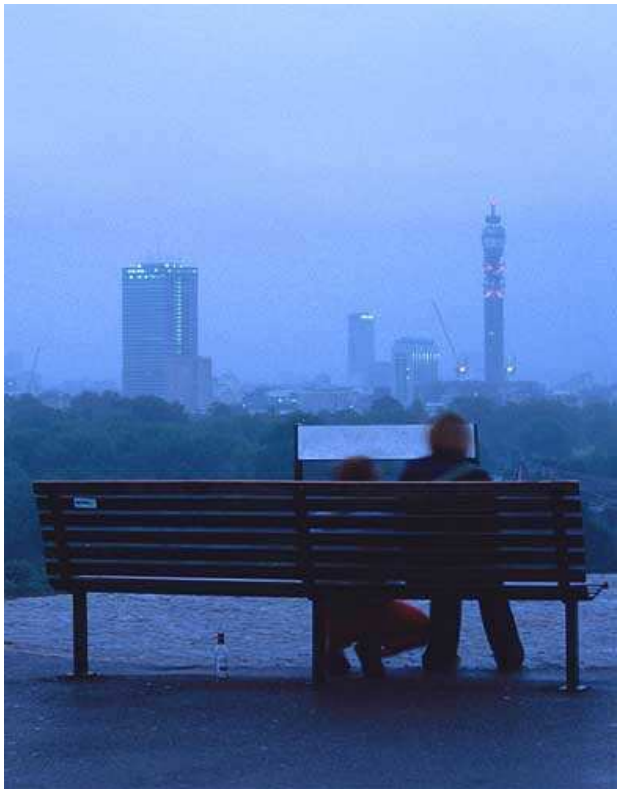
From indoors the sky can look a very deep and vivid blue at dusk, especially as it contrasts with the orange tungsten lighting found in household lamps.

In overcast conditions the skylight is always blue (clear skies are needed for the pink light) and it is generally much darker, with night falling much more quickly.

The pink eastern sky is very obvious in this image - you may not notice it very often but this colour is very common in the sky after sunset. Notice how dark non-reflective surfaces such as foliage become, whereas more reflective surfaces such as the cranes sill look quite light.

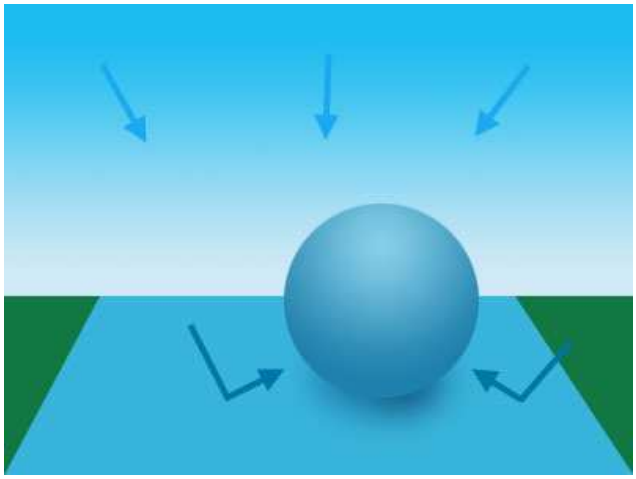


Here the very delicate dusk skylight is reflecting pink and blue from the water and the boat.



In overcast weather dusk light is a deep, saturated blue.

Open Shade



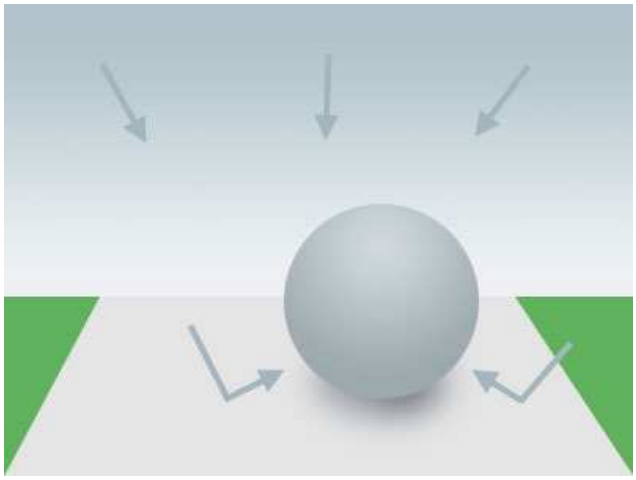
In open shade the sky becomes the main source of illumination, and as a result the light has a strong blue cast. The light from the sky is very diffuse with soft shadows. Without the atmosphere to scatter light there would be no illumination here, if you were to stand in a shady area on the moon for instance it would be pitch black.

Light in open shade can also be reflected from the environment, nearby walls for instance. Foliage and other surfaces can also reflect light into shady areas, with resulting effects on the colour of the light. If you stand in a dense forest where the sky is hidden but leaves are reflecting light then the colour of the light will be green, the same effect can be seen between trees and grass.

The strong blue cast of open shade is clearly visible on these steps. Despite the fact the light is very diffuse you can see it still has a strong direction and is coming mostly from above, the other directions being hidden by walls.

This plant is very obviously in the blue diffuse light that is found in open shade.

Overcast



Overcast light comes in a few varieties, depending on the thickness of the cloud and the time of day. Contrary to popular opinion it can actually be quite beautiful and it does have quite a few attractive qualities. Since the whole sky is acting as one light source the light is soft and diffuse, with very soft shadows. Contrast is low and colour saturation is usually quite high.

Colour is dependent mostly on time of day. I've seen colour temperature charts that claim overcast daylight is blue, and the thicker the cloud the deeper the blue - however my own findings are quite different from this. If the sun is high the light appears to be white or grey to me, and the thicker the cloud the whiter the light. It's only when the sun gets lower in the sky that overcast light becomes bluer, and the lower the sun goes the more obvious this becomes.

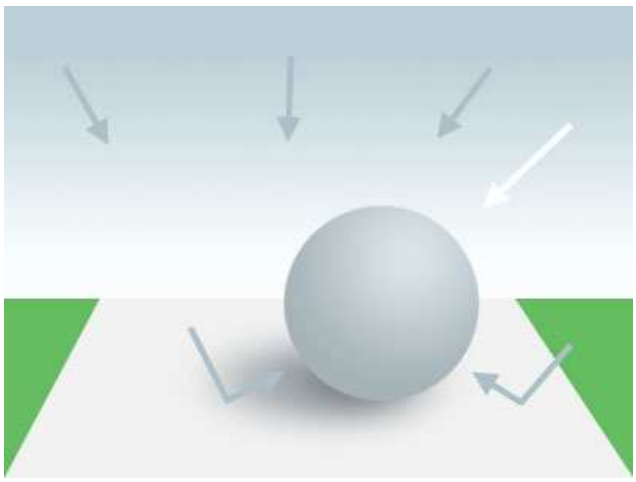
Overcast light is often perceived as being boring, but it can be beautiful too. Because it is very soft it is very flattering, and it can be used to great effect to show colour and texture. Reflective surfaces can also look very appealing in this kind of light as the white sky creates broad and soft reflections of itself, this is most often seen in water but other surfaces such as the metal on cars also exhibit this.

Because of the low contrast and relative neutrality of overcast light colours can appear very saturated. Notice the large soft highlights in the red leaves created by the reflection of the sky. On a sunny day these highlights would be much smaller and harsher.

The diffuse light from the sky shows the form of these grapes but the contrast is soft enough that very little is lost in total shadow. Again the colours are very saturated.

The overcast sky creates beautiful silvery reflections in water. One of the secrets in getting good images on overcast days is to keep the sky itself out of the picture.

Bright overcast



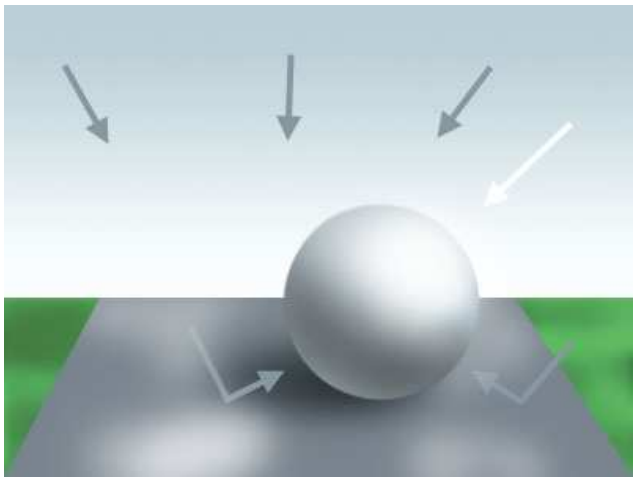
On days with thinner cloud it is possible to get a little directional sunlight coming through, which creates stronger shadows which can still be soft as long as there is cloud in front of the sun. Bright overcast is an almost ideal compromise between the strong contrast of sunshine and the relative dullness of heavy cloud.

On days with thinner cloud cover the sky can have a lot of texture, whereas on days with heavy cloud it tends to look a solid white or grey. Varying cloud thickness or small gaps between clouds can also help to introduce colour into the sky, with blue skylight and yellow sunlight reflecting onto the surface of the clouds. Colours in the sky can vary enormously when cloud is thinner, and the sky can often be very striking with thin or broken cloud. Another factor influencing cloud colour is that distant clouds can appear yellow or even orange because of light scattering, even in the middle of the day.

Bright overcast light has a stronger sense of direction than the more diffuse light from heavy cloud cover, but shadows are still filled in by the surrounding cloud.

Here the stronger light from the sky is bright enough to outline the meerkat but the shadow beneath him is still soft because the sunlight is being diffused by cloud. Notice also how there is no blue in the shadows since there is no blue sky.

Broken cloud, stormy light, dappled light



It is also quite common to come across mixtures of light and shade in natural environments, I have grouped these together although they have quite different characteristics.

With broken cloud you get a different sort of light to pure sunshine or overcast because the blue fill light from the sky is absent yet the sun can shine brightly if there is a gap in the cloud. Clouds will cast visible shadows on the landscape and there will be patches of sunlight in between these shadows. Contrast can be high, and the grey skies are a dramatic backdrop to surfaces in sunshine, with the difference between the bright light and the gloomy background creating interesting juxtapositions.

Again skies in this light can be very colourful, with many factors influencing the colours: time of day, thickness of the cloud, gaps between the clouds, distance etc… Colours can range from many shades of blue through yellows, oranges and greys. Light can change very fast as the clouds move across the sky, with sunlight appearing and disappearing from moment to moment.

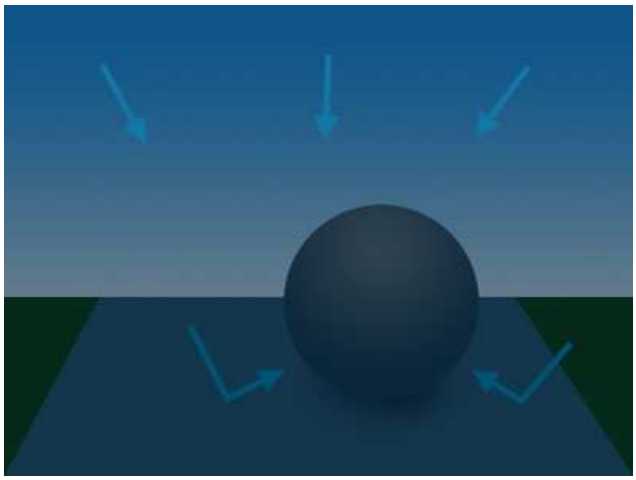
Dappled light, such as that found under trees in sunshine, is another mixture of light and shade commonly found in nature. It is a high contrast light, in full sunlight dappled light can be very bright indeed in contrast to the shade around it. Most cameras will not be able to capture the full range of tones that exist in dappled light, although with the naked eye you may be able to.

The highlights in dappled light are very bright, turning to pure white in parts of this photo.

Here again the camera can barely handle the range of contrast this lighting provides.

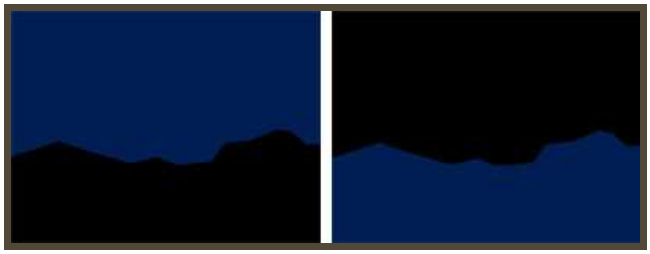
Sunlight against a dark cloudy backdrop provides a dramatic mood.

Night



Although the sun is no longer in the sky at night, the sky itself generally still has some light in it. This light might come from sunlight being scattered through the atmosphere, or moonlight. Stars are too faint to cast any noticeable light.

The key point to remember about lighting a night scene is that the sky will always be lighter than the land - unless of course there is artificial light on the landscape. Take a look at the images below, the one on the left is the correct one, the one on the right is a physical impossibility because the light on the landscape would be coming from nowhere:



If the moon is visible then remember that moonlight is really just reflected sunlight and obeys the same rules that sunlight does. When the moon is near the horizon it has a red or yellow colour, but as gets higher in the sky it becomes whiter. The surface of the moon is practically colourless, being shades of grey - if you like at photographs of the moon landings they could look as if they were taken in black and white until you see colour on the astronauts.

Light from the sky is obviously diffuse and soft, however if there is any moonlight it will be hard, just like the sun. The main difference with sunlight is that it is obviously much fainter, so the ratio between the hard moonlight and the soft skylight will be different than in daylight. Another thing you should be aware of is that the moon is quite small when you look at it with the naked eye, it can often be tempting to make it much larger than it appears in real life.

In terms of colour, our eyes have very little colour sense in the dark so our perception of night is colourless. However film emulsions are still sensitive to colour at night, in fact you can expose a photo at night that will look like it was taken in the daytime if you leave the shutter open for long enough. Even short exposures at night have a lot of colour in them (far more than the naked eye can perceive).

In film making the classic way of shooting night time scenes is to shoot in daylight but underexpose and use a strong blue filter on the camera lens to create the illusion of night.

Another factor to consider with night scenes is light pollution. In England no matter where you are (even in the countryside miles away from any town) you can always see city lights glowing in the sky somewhere or reflecting back down off clouds with an unmistakable orange glow. You have to go to some very remote places to avoid this in the modern world.

Where there is no artificial light the landscape elements are very dark compared to the sky. Notice too how the roofs in the foreground are still reflecting skylight, despite the darkness.

Notice the lightness and colour in the sky, in photographs the colour is stronger than it looks to the naked eye.

Here the moon has a slight red or brown cast because it was low in the sky when the picture was taken. At its zenith the moon is white and grey.

Colour in the sky

The sky is often very colourful, if you look at it every day it can produce amazing and complex ranges of different colours. Many factors will influence the colours you see in the sky or in clouds. As well as time of day and cloud cover, the thickness of the clouds is important as well as the space between them. If the cloud is of uneven thickness, of if there are small gaps in between closely spaced clouds you will get variation in the amount, colour and quality of the light in the sky. This creates texture and a great deal of unpredictable variation.

Natural light, and the sky in particular, almost always has some colour, even on the bleakest day. And the sky is a constant diffuse light source during the day, no matter how bright or dim the sun is.

I've no idea what's caused the distant rain to look pink, it could be because the evening sun is behind it. The sky is always changing and unpredictable.

Volume

Light also interacts with our atmosphere if there are any particles suspended within that reflect or scatter light. Particles of dust, water or pollutants catch light and give a sense of volume, creating sunrays, haze or fog.

Haze is almost always present in the air, and it is what causes the perception of aerial perspective. Things that are further away from us are obscured by haze and look fainter, bluer and lower in contrast because the light reflecting from them has been slightly diffused by haze.

Fog is very similar to haze, only thicker. It diffuses light a great deal and if you find yourself in thick fog the light becomes so scattered that it has equal strength from all directions. When taking photos in thick fog a camera meter can give the exact same reading whether you point it up, down or to one side.

Haze is generally white or light blue, depending on the weather: usually it is blue in sunshine (because it's reflecting the sky) and white if it's cloudy. Fog is white (like clouds) but can also take on any colours that might be shining on it from the sky or the sun, so in practice it can look blue or even yellow or orange.

Sunbeams coming through clouds like this are caused by particles in the atmosphere catching the light.

This ground fog is a deep blue because it is reflecting the blue sky above it. The trees are shading it from the sun's glow otherwise it might be yellow or orange.

This snow scene is shrouded in heavy fog and this creates very diffuse lighting, there isn't any shadow whatsoever beneath the trees.

Water

Water also plays a big part in how natural light interacts with the world around us, being a common feature of the landscape in the form of rain and dew, or lakes, rivers and the sea.

Water changes surfaces that are wet because unlike most natural substances it is highly reflective and causes strong directional highlights. Dew in grass for instance can cause thousands of little highlights as it catches the morning sun, with each drop acting as a lens. Specular reflections are comparatively rare in nature unless water is present and so we can instantly recognise when surfaces are wet. Like volume in the air, water can be very atmospheric.

Another major effect of water on light is that it reflects light back up into the landscape, if you are by the sea you will have a lot more light reflecting on you because of this.

Finally water is also the cause of many atmospheric effects, from rainbows to haloes and ice rings.

Small drops of water will cause a multitude of specular highlights on a surface, even in overcast light such as this. Note that the drops are reflecting the white sky.

The strong mirror-like reflections on the pavement here tell us that it is wet.

The sticky liquid on these berries give the surface strong highlights that accentuate the texture of the skin. We know this surface is wet because this kind of reflection is not normally found in nature.

Final thoughts

Natural light is a complex and constantly changing phenomenon, it does follow some patterns and obey the rules of physics but it is too complicated to completely explain in an article of this length. What I hope to give is some guidelines that can help to understand it in different conditions, and hopefully arouse your curiosity enough to observe it for yourself. By making your own observations and applying them to your own work you can steer clear not only of obvious mistakes but also of cliché. Finally, reality is only a starting point and there is always room for interpretation and exaggeration.

One thing I am wary of is common wisdom or rules that are passed down unthinkingly, an example of this would be that warm light should have cool fills. This can be true in natural light, with yellow sunlight and blue shadows for instance, but there is a physical cause for this and it is not a rule to be followed blindly. In other circumstances it might not be true, broken cloud would be one such situation.

The same applies to the theory that shadows should be in a complimentary colour to the main light. This can indeed be a common perception as our brain can fill in the shadow with the complimentary even if it's not really there (something a photograph should be able to establish

easily). The point is to only apply this if you have observed it yourself, or you want that particular effect - not because it's a rule.

The best artist to study if you want to get a better understanding of natural light in all its many facets is Claude Monet, most of his work deals exclusively with light. Although his painting style is quite rough and loose his depiction of light is incredibly accurate. He made several series of paintings that deal specifically with changing light, such as his Haystacks series or the Rouen Cathedral paintings.

Go to part 4: Artificial and indoor light

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