Seeing the Unseen



How to Photograph Landscapes at Night by Alister Benn

PREFACE

Until 2004 my photographic interests were restricted to stalking the bird life of the Malay Peninsula, learning how to take images in the dark of the rain forests. I was as stimulated by the technical challenges of exposure in the dim light conditions of the wet forests as I was of actually finding an interesting bird to photograph. In late September of that year my wife and I were visiting friends in the town of Banff in Canada and I picked up a 17-40mm lens in Calgary to try my hand at some landscapes.



We visited Vermilion Lake that evening and were rewarded with beautiful conditions; the colourful foliage at its peak. We were not alone; perhaps another 50 photographers lined the

shore, playing photographic musical chairs with key compositions. Over dinner that night I pondered this and as I drew the curtains around 11pm, noticed a full moon illuminating the surrounding mountains.

On a spur of the moment, I suggested to my wife we take a drive down to the lake again, and that simple event changed our life. We spent hours there, alone with the night light, Mt Rundle looming over us, mist rolling over the forests, the orange glow of Banff in the distance.

Realising I could make images in the dark set me off on a personal voyage of discovery that has taken me across the world seeking out landscapes by Available Night Light.

This book is the result of nearly a decade of experience, from the savage coasts of Europe to the Himalaya in Nepal and Tibet.

ACKNOWLEDGEMENTS

No man is an island, and we evolve and mature as photographers in a community of peers. Over the years I have been influenced by many people and learned little tips and tricks along the way, in addition to working a lot of it out for myself. I'd like to acknowledge all those photographers out there around the world pioneering Night Photography.

In particular I would like to thank all my friends and colleagues at www.whytake.net - a truly inspiring community of nature photographers.

A special thanks to <u>Guy Tal</u> for writing the foreword.

Copyright © Alister Benn 2012 - All Rights Reserved - This book contains material protected under International and Federal Copyright Laws and Treaties. Any unauthorized reprint or use of this material is prohibited. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system without express written permission from the author.

Seeing the Unseen Community

https://plus.google.com/u/0/communities/116761285030568449325

I'd like to invite everyone to join this community to share their night images, and ask any questions that may arise after reading this ebook.



Deqen, China - week 3 - 81% Nikon D3x 70-300 @ 230mm Single Exposure - LR4 421s @ f7.1 ISO 200

FOREWORD

Alister Benn stood out to me as a gifted night photographer from the first time I saw his work. Here were images that went beyond mere technical wizardry and managed to capture the essence of an experience so familiar to me from countless nights spent outdoors, under a canopy of stars and away from the human hives. I was delighted to learn about this book, and doubly so to have the honour of writing its opening words.

I remember the first time I saw an image captured by the light of the moon, as bright and detailed as if made in the middle of the day, yet with an undeniable air of mystery. It seemed familiar and alien at the same time – a parallel reality where things transpired that I was forbidden from seeing, save for the miracle of photography.

There is magic to the night that goes beyond photography, though. With the sun's blinding blaze tucked below the horizon, the cosmic neighbourhood becomes visible for a few precious hours; nocturnal life awakens, and most humans retire to their homes. Yet, those seeking adventure, romance, and fascination are richly rewarded for staying out, the farther from the lights and bustle of the city, the better. Few things instil a sense of awe and wonder as a night of quiet solitude in a wild place. Whether you reach for the camera or not, just gazing into the unfathomable depths of the universe, listening to distant howls and hoots, the whisper of the ocean, or a breeze in the canopies, has the power to transport and transform the mind.

Nights on Earth, though dark, are not altogether devoid of light. Scarcity of light means that more time and care are needed to gather enough of it to form a visible impression. Night photography is not for the impatient. It is as much a meditative pursuit as a creative one and should be approached with the right state of mind. Visualization – the ability to see in one's "mind's eye" the finished image before making an exposure – becomes a vital skill to be perfected with practice and perseverance. The joy of seeing an image materialize on the screen that is not otherwise visible to the eye is as profound as any you may derive from a photographic experience.

This book will provide you with the tools to produce unique images, sure to impress and captivate your viewers. Still, remember to also take the time to appreciate and revel in the experience of spending a night outdoors. Great images are more than just impressions of light; they are also reflections of the person who created them. The more moving and satisfying your own experience, the more it will come through in your work. Beyond just beautiful images, strive to create beautiful memories. Practice your work in places that are meaningful to you. Also be respectful of those who will follow and wish to have such experiences available to them. Go gentle into that good night.

Guy Tal Utah, USA February 2012

Seeing the Unseen - Table of Contents

Preface	2
Acknowledgements	2
Seeing the Unseen Forum	3
Foreword by Guy Tal	4
Introduction	7
Available Night Light	10
Blue Hour	11
Light Pollution	12
Light Painting	13
The Lunar Month	14
Week 1	15
Week 2	16
Week 3	17
Week 4	18
The Science of Preparation	20
Why Prepare	20
Familiarity	22
The Variables	24
Twilight	25
Moon Phase	26
Weather	27
Seasons	28
Tides	29
Getting Started Scene Evaluation Available Night Light Luminosity High ISO test Shot Final Image - Worked Example Focus at Night The 500 Rule – sharp stars	31 32 33 34 35 36 38
Exposure	40
Metering	40
Night Photographers Guide to Exposure	41
Shutter speed	41
Aperture	42
ISO	44
Noise & Underexposure	44
The Histogram	45
Correct Exposure	46
RAW – The Digital Negative	47
White Balance	48

Dynamic Range	49
Limitations	49
Single vs. Multiple Exposures	50
Single Exposures - Introduction	51
Single Exposures - Lightroom 4	51
Single Exposures – Graduated ND Filters	53
Single Exposures – Magic Glove	56
Single Exposures - Light Painting	57
Multiple Exposures - Introduction	58
Multiple Exposures – Bracketing & Blending	59
Multiple Exposures – Stacking	62
Composition	65
Communication & Expression	66
Visualisation in the dark	67
Practical Considerations	67
Seeing the Unseen	68
Subjects	69
Stars	69
Static of Streaking	69
Direction	71
Finding Polaris	73
The Moon	74
Twiliaht	75
At Night	75
Hyper-focal Distance and Depth of Field	76
In the Field - Introduction	78
Blue Hour Single	70
Blue Hour Multiple	01
Dark Nighta Single	01
Dark Nights - Single	
Durk Nights - Multiple Bright Nights Single	04 05
Bright Nights - Single	80 07
Bright Nights - Multiple	87
Equipment	92
Cameras	92
Batteries	92
Lenses	92
Cable Release/Timer	93
Tripod	94
Torches/Flashlights	94
Blowers or heated gels	94
Survival/Safety	94
	0.5
LINKS	95

Links

INTRODUCTION

A million years ago, a long way away, a pulse of light left an ordinary star on the edge of a nondescript spiral galaxy. It travelled at 299,792,458 metres per second through the vacuum of space; constant, unwavering, eternal.

On a small blue planet, a photographer opens the shutter of their camera on a mountain landscape; a quarter moon shines in the blue black sky studded with pinpoints of light. In the time it takes to make their image, our pulse of light has left its mark among thousands of others, its journey over.

Recorded on that digital sensor, made by modern humans in their own corner of that same nondescript spiral galaxy, is a point of light that has travelled for a million years. Some of the other light may have travelled up to 12 million years from deep space. When we make images at night we are using the most ancient of Available Light.

These are the things I ponder while stood at night making my images; the distances, the vastness, our place in it all. I love weaving this ancient light into my compositions, and feel it allows me to express myself as a photographer and an artist.

This is a book about time: The timescales and distances involved in our available night light, and the real time of our exposures.

With the coming of night, our light slows down, metaphorically. Even on a bright moonlit night we are dealing with exposures of several seconds, and the darker it gets, the longer these images take to make. The frenetic pace of modern life is forced to slow down as we methodically work our way through the problem solving involved in taking images in the dark.

It is a discipline wrapped in as much mystery as the shrouded night scenes themselves. For decades taking quality images at night was the pursuit of professional photographers only, those dedicated to working through the problems of how film would react over numbers of hours.

With the arrival of Digital SLR's and their immediate results, histograms and RAW files, the mastery of night photography is at the fingertips of anyone with the patience to try.

Landscape photography at Night is all about abstraction; hardly a single image taken by available night light can be considered in any way a literal representation of reality. As a species, our night vision is not spectacular compared to Owls for example, but our cameras open up a world of light and detail that is surreal to us.

The pleasure of seeing a night exposure open up before me is a thrill, revealing details in the unseen, a confirmation that my preparation has paid off and I have applied myself with both technique and vision to create something unique from the blackness.

There is no rocket science involved here, just simple, easy to follow techniques that can be learned by anyone.

The aim of this book is to create a comprehensive guide to Landscape Photography at Night, covering state of the art techniques, many of which are very new.

As photographers the world over strive to push beyond the limits and limitations of their gear, new techniques are evolving allowing contemporary landscape photographers to express themselves as never before.

Using many of these techniques for night images is still in its infancy, and everyone who is out there trying, because of books like this, is helping to pioneer the art form. The coming decade will push the boundaries further as DSLR sensor technology and digital processing continues to open new ground. We really are riding on the crest of the wave in this field.

It is time to embrace the challenges of Available Night Light and looking at the nightwreathed landscape with your own unique vision, and your mission of Seeing the Unseen.

> Alister Benn Yunnan, China February 2012





Bali, Indonesia - Blue Hour Nikon D7000 14-24/2.8 @ 21mm 2 images manually blended in Photoshop CS5 Foreground 20s @ f7.1 Sky: 5s @ f7.1 ISO 200

AVAILABLE NIGHT LIGHT

Oddly enough, it is still the sun that is the most significant light source in the night sky; either from its residual effects on the atmosphere, allowing images to be taken well after it has set, the so called **Blue Hour**, or from reflected light off the night skies brightest object, the Moon.

This book is about **Available Night Light**, and we will use the moon and its phases as a framework within which to make our images; either by the available light from the **moon** alone, or by taking advantage of the help given by **light pollution**, **light painting**, or the **twilight** hours after sunset or before dawn.

It is not possible to take images in complete darkness, regardless of how long you keep the shutter open, and night photography relies totally on the Available Night Light.

One of our most important roles as a Night Photographer is to **evaluate** the **intensity** and **quality** of this Night Light and use what we're given to make expressive landscape images.

In this section we will look at the main sources of Available Night Light -

The Sun - Twilight, through Blue Hour to Astronomical Dark and its counterpart before Dawn.

Light Pollution - When the lights of human settlements and Industry are involved.

Light Painting - Intentionally adding man made light to help balance an exposure or for creative effect.

The Moon - Our primary night light, and a source of beautiful conditions.

Between them, these four sources of light offer the adventurous photographer plenty of opportunities for creative thinking and shooting. By learning to evaluate their strength and effectiveness as sources of light, we learn to visualise images when there isn't actually any light to visualise by.

Those who rise to the challenge will be rewarded with images of great beauty, incongruity and mystery.

Blue Hour

Everyone should be familiar with the passing of the seasons; the long days of summer and the shorter winter days. Even on the **Equator** there is some variation in day length, although this effect is more evident as one heads for the **Poles**.

In Arctic Norway in December for example, there is no **Blue Hour**, as the sun does not even rise above the horizon, and in June the same is true but for the opposite reason, the sun never sets.

Most people however, live in more clement latitudes and experience prolonged periods of **Twilight**. After the sun has set until a time known as **Astronomical Twilight**, when it is considered to be **dark** and the sun no longer has influence on the atmosphere. I prefer, and from now on will use the term **Astro Dark**.



Bali, Indonesia Blue Hour Nikon D7000 14-24/2.8 @ 21mm Single Exposure 13s @ f16

The second I see the sun sink over the horizon I consider that I am taking Night Images, and for this book, and the subsequent Case Studies, this is the definition we will use.

During Blue Hour we can encounter landscapes of extreme **Dynamic Range**, where the sky is brighter than the land, and the photographer has to employ various techniques to capture images in these conditions.

Graduated Neutral Density Filters, Bracketed Exposures blended later in Photoshop, or even waving a Dark Cloth in front of the lens; anything to balance the exposure between highlights and shadows. All of these techniques will be explored and explained.

Night has begun, and it's getting dark fast. Between now and **Astronomical Dawn**, when the rising sun starts to have influence on the atmosphere again, we are in the realm of true Night Light - the moon, stars, auroras, lightning or any man made lights from **Light Pollution**, or that we ourselves enter into the scene to give nature a helping hand.

Light Pollution

The vast majority of people live in cities, followed by large towns, villages and finally rural areas. There are few among us who live in a truly wilderness location, far from the lights of mans cities and industry.

Some degree of **Light Pollution** can be expected in most night photography, unless one makes a significant effort to get well away from its sources.

Anyone living in a city only has to look up on a clear night to notice how few stars can be seen from well lit areas. Street lights, factories and offices throw light upwards into the atmosphere where the light is scattered by dust, pollution and the air itself.

This **light pollution** shows itself as an orange glow on the horizons of night images or, in more extreme cases, can make the whole sky a muddy brown colour.

In addition to the colour casts associated with man made lights, a secondary effect is the reduction in the numbers of visible stars. The light of stars we see on dark nights has been coming towards us for millions of years through the vastness of space, and these very dim objects become invisible as the ambient brightness of the sky increases.



Nikon D3x 14-24/2.8 @ 15mm Single Exposure 30s @ f2.8 ISO 640

In the above image I demonstrate that some **light pollution** can actually enhance an images graphic quality, adding meaning by inserting a human element into an otherwise natural scene, or extending the colour palette in a dramatic or incongruous way.

Light Painting

Light Painting is an art form in its own right, The effects can be extreme and colorful, or subtle and delicate, to the extent that it isn't immediately apparent that any artificial light has been added to the scene at all.

Now is a good time to introduce the concept of **Scene Evaluation** as an artistic and technical exercise.

We have limited control over **Light Pollution**, we cannot turn off a city. **Light Painting** however serves two purposes for us.

The first is to **enhance the natural light** - giving nature a helping hand, whereas the second is to add light for artistic effect, most often to highlight the main subject of the image.

Our role as Night Photographers is to Evaluate the **Available Night Light** and decide what is required technically and artistically to capture and present that scene to the rest of the world.

The majority of this book will be dedicated to **Scene Evaluation**, the subsequent **Exposure** and **Composition** issues and the technicalities of the capture.

I will not be demonstrating **Light Painting** for artistic effect in this book, where the light itself becomes the subject. Should you wish to explore this style of photography, please follow the appropriate links at the back of the book.



Asturias, Spain - Moon - Week 1 - 1.4% @ 22:06pm Nikon D3x 14-24/2.8 @ 14mm Multiple Exposures + Light Painting 63s, 301s, 601s @ f8 ISO 200

The Lunar Month

Throughout its 28 day orbit of the Earth, the moon displays a variety of shapes and its luminosity is a constant variable. The difference in the visible landscape between nights of **no moon** and **full moon** are massive, and what you can do with a camera on these nights is wildly different too.

A dark, cloudy night can make image-taking seem impossible, whereas on a **bright moonlit night**, it can sometimes feel like there is too much light, and the photographer has to employ more devious methods to control the exposures.

The **lunar month** is a fluid, linear evolution from night to night, but for our purposes, it will be split into four sections each lasting roughly seven days.

Week 1 - New Moon to First Quarter Week 2 - First Quarter to Full Moon Week 3 - Full to Last Quarter Week 4 - Last Quarter to New Moon

There are many variables determining the relative brightness of the moon, such as **Cloud Cover, Humidity, Altitude** and its **Elevation** above the **Horizon**, but there is no simple formula to accurately predict its brightness at a given location at a certain time, or its usefulness as a night light. We can, of course, evaluate the light at the time and shoot accordingly, and this is a book about learning to **Evaluate** possibilities.



Utah, USA Blue Hour Full Moon Rising Canon 20D 100-400 @ 130mm Single Exposure 2s @ f5.6 ISO 200

The Lunar Month - Week 1 New Moon to First Quarter



Week 1 is an ideal time to shoot very long star trails, as the limited illumination allows for longer exposures. Reflective subjects help to balance single exposures, or multiple frame techniques can utilize pre dark twilight to extend the dynamic range of the scene.



Asturias, Spain - Moon - Week 1 - 7.6% @ 03.36am Nikon D3x 14-24/2.8 @ 14mm Single Exposure 3652s @ f4 ISO 125

In this image of the Northern coast of Spain, there was no moonlight. Taken before dawn long after moonset, the ambient light of the sky was enough to expose the surf in 60 minutes. The orange glow to the right is some light pollution from a nearby town, and the brighter light is a lighthouse on a rugged headland. The mixed light sources adding some tonal contrast in an otherwise simple image.

The Lunar Month - Week 2 First Quarter to Full Moon



Week 2 is the start of the bright half of the month, with lots of moonlight. Ideal for shorter exposures with greater depth of field, or using image stacking to create long star trails with greater dynamic range. The best light is in the evening before the moon sets.



Annapurna, Nepal - Moon - Week 2 - 50% @ 03.25am Nikon D3x 14-24/2.8 @ 16mm Multiple Exposures 7 x 120s @ f4 ISO 200

A more complex image that required stacking multiple frames. The bright moon was strongly illuminating the snow, and a single longer exposure would have clipped the whites o the mountainside. Stacking several shorter exposures allowed a more striking image to be produced. Producing longer star trails with a lot of available moonlight usually requires stacking multiple images.

The Lunar Month - Week 3 Full Moon to Last Qaurter



Week 3 has similar light conditions to week two, but the moon is rising much later in the evening, or after midnight. To maximise the use of light, this week is typified with early starts and pre dawn light.



Poon Hill, Nepal - Week 3 - 92.3% @ 05.33am Nikon D3x 24-70/2.8 @ 24mm Single Exposure 25s @ f2.8 ISO 200

This is just a straight shot taken in very bright moonlight, before astronomical dawn in the Himalaya of Nepal. With a bright moon like this, you can take perfect exposures and still retain sharp stars. Moonlight is a wonderful light source, creating mysterious and ethereal landscapes. Many of the harsh shadows of sunlight are avoided, giving images a very delicate feel.

The peak on the right is Dhaulagiri, the 7th highest peak in the world at 8167m (26,795 ft).

The Lunar Month - Week 4 Last Quarter to New Moon



Week 4, and we are again into the dark half of the month, with less and less useful moonlight. Shooting in the evenings will require well-timed sigle exposures, or again shooting in the pre dawn to make use of what moonlight there is.



Alberta, Canada - Moon - Week 4 - 28.3% @ 22.52pm Canon 1Ds2 Sigma 12-24 @ 12mm Single Exposure 81s @ f4.5 ISO 800

On this very dark evening with no moon, the light from the aurora was just enough to provide a good exposure. Again, light pollution from Calgary adds some more colour to the palette.



Annapurna, Nepal - Week 4 - 81.3% @ 21.34pm Nikon D3x 24-70/2.8 @ 60mm Single Exposure - LR4 20s @ f4 ISO 200

THE SCIENCE OF PREPARATION

Why Prepare?

There is an old saying - **Perfect Preparation Prevents Poor Performance**, and while it is a little crude, nevertheless it contains a great deal of truth.

Photographers invest a lot of money in equipment, and over a year, considerably more on travel into the wilderness to take inspiring landscape images. In most regards, Night Photography is no different from daytime photography; being in the right place at the right time greatly improves your chances of taking something meaningful and memorable.

There is no right or wrong way to be a photographer, we all have numerous variables in our lives that dictate when we can get out to make images, but we can split methodology into two camps - **Reactive** and **Proactive**.



Alberta, Canada - Moon - Week 3 - 97.7% @ 00.47am Canon 20D 17-40/4 @ 17mm Single Exposure - My first ever night image, 2 stops underexposed! 30s @ f6.3 ISO 100

Reactive Photography

In the context of this chapter we are not talking about spontaneity or the art of seeing, we are considering people who get in their car, drive out into the countryside for a few hours and then try to make a significant image in complete darkness. They didn't know there was no moon, nor that the forecast was for torrential rain, or the tide was so far in that they couldn't even access the beach they drove to.

The things I have described above, in terms of night photography, are the price one pays for not preparing, or at least being aware of the variables that come to play in your desire to create a great image.

Proactive Photography

I he flip side of the planning coin is preparation, and of course, there are numerous degrees, from a generic understanding of **Available Night Light**, **Weather** and **Tides**, to the micro-planners who scout out new locations on **Google Earth** or know exactly what the moon conditions will be by using tools like **The Photographers Ephemeris**.



Where you are on that scale is up to you, and this book isn't about trying to squeeze you into one shaped mould,. My aim is to express my opinion on why some level of preparation will save you a lot of time, money and disappointment.

In the following chapter we will look at some of the things that can be pre-planned or researched.

Familiarity - Knowing an area well and an understanding of how it will look in various light conditions

Available Night Light - The phases of the moon, sunset and sunrise times and direction.

Weather - Knowing when is good to be out in the field

Seasons - How conditions and Light vary throughout the year

Tides - How to stay alive while shooting night ocean scenes.

Familiarity

This may seem like an odd place to start, but I strongly believe that great photography should start locally. We all like to travel to famous or exotic places, but few of us manage that on a regular basis. With the price of fuel and accommodation, travel has become an expensive activity, and most photographers have a local patch that they shoot regularly, saving their more extended trips for vacations.

Knowing an area well can pay huge dividends in Night Photography; firstly, as you take your first ventures out at night, simply knowing where you are can be a great comfort. Secondly, you may have already found a few compositions that really resonate with you, now you can see how they work at night.



Asturias, Spain - Blue Hour - Week 2 - 76.9% @ 21.01pm Nikon D3x 14-24/2.8 @ 14mm Single Exposure - 76s @ f7.1 ISO 400

Having found this area of beautiful flowers on a previous visit, when the opportunity of a clear, moonlit evening came along, it was an obvious choice for an outing.

This discipline does of course extend further afield, I have a few locations locked away in my brain where I am simply waiting for the perfect conditions of available night light to create a very specific visualised image. Some photographers wait for decades to fulfil these images, but almost without fail, they are incredibly impressive.

Another really useful transferable skill is scouting out an area prior to nightfall.



The image on the left was taken in the afternoon as we were hiking up to the Yak Meadow at 4500m in Yading National Park in Sichuan, China. The moon was going to be nice and bright and I thought the composition would work well as a night image.

I shot the test image, which gave me lots of useful data, like focal length and framing. Later, in the dark, it was very easy to stand in the same place and take the shot on the right.

If however, that night doesn't deliver the conditions, I'll make a note of the co-ordinates on a GPS or iPad and keep it stored away for the next time I am in that area.

It can actually be great to set up your tripod as the sun sets and not move the camera at all; taking a series of exposures from twilight through until darkness. These are excellent sources of images. Reviewing them also gives a great insight into how light changes after sunset through twilight and into darkness. The relationships constantly changing between the foreground and the skies luminosity.

On really dark nights with no moon, these pre darkness images can provide excellent sources of foreground detail that can be blended with a very long star trail, creating a mysterious and incongruous expression of a landscape.

The Variables

The amount and quality of available night light

How big is the moon?

The direction of sunrise, sunset, moonrise & moonset

What time does the sun & moon rise and set?

Weather - Cloud Cover, Humidity, Wind Speed and Direction

Tides - High and Low

Light Pollution - How far is the nearest source of unnatural light?

What type of image are you looking to make?

Already we have quite a list, and all of them can be predetermined to a certain extent. As we all know with the natural world, despite our best laid plans, sometimes things just don't come together.

In this chapter we are going to look at ways we can plan for many of these variables and make sure we are at least out in potentially favourable conditions.

> Today we can know with absolute certainty exactly where the moon will rise on any given day, the heights of the tides and the onset of aurora or meteor showers.

> It is such a waste if we don't use this information to expand the possibilities of our art.

Later in the book however, we will be looking at **Scene Evaluation**, which allows us to examine the scene before our eyes and work out what type of images we can attempt with greater likelihood of success.

In reality, my method of working is to plan and prepare to a certain degree so I know roughly what to expect, but of course I then evaluate the scene when I get there to confirm my expectations and plans are realistic and achievable.

Twilight

It seems ludicrous to even mention the importance of what time it gets dark in a book on night photography, but the period from sunset to **Astronomical Dark** and its twin before sunrise is vital and often overlooked.

Depending on whether you are looking to take **Single Exposures** or blend **Multiple Images** manually, the **Blue Hour** buys you additional light that may be usable in your planned image.

On nights with no moon, or when the moon is rising later in the night as it does in the 3rd and 4th quarters of the month, it can get very dark in the evenings, making it extremely difficult to create more elaborate images.

When the sun sets, the sky gets darker in the east first, often foreground elements pick up lingering light long after the sun has set, which allows great exposures to be taken in that direction well before **Astro Dark**. The opposite is true in the morning, with the western sky remaining dark the longest.

There are many free resources to determine Sunrise/Sunset etc. One of the best of which is http://www.wunderground.com/

Viewing your chosen location, there is an **Astronomy Section** giving lots of great free information for planning night photographers.

Armed with information such as this, it is far easier for photographers to be in the right place at the right time, a fundamental distinction between **reactive** and **proactive** photographers.

Astronomy						
Jan. 27, 20)12	Rise	S	Set		
Actual Time		8:26 AM GMT		4:30 PM GMT		
Civil Twilight		7:42 AM GMT		5:14 PM GMT		
Nautical Tv	vilight	6:54 AM GMT	6:	6:01 PM GMT		
Astronomic	al Twilight	6:09 AM GMT	6:	6:47 PM GMT		
Moon		9:09 AM GMT	10:20 PM GMT			
Length Of Light	Visible	9h 32m				
Length of D	Day	8h 04m Tomorrow will be 4m 5s longer .				
Waxing Crescent, 15% of the Moon is Illuminated						
Today	Jan 31	Feb 7	Feb 14	Feb 21		
Waxing Crescent	First Quarter	Full	Last Quarter	New		
Visit Astronomy						

Very often Professional Photographers hear expressions like "You were so lucky with those conditions."

Yes, it was lucky they checked when the moon was going to set behind that peak and made sure they were there at the right time on the right night.

It was the golfer Arnold Palmer who said - "The more I practice the luckier I get."

For a more complete list of resources for determining twilight and other astronomical timetables, please refer to the links section at the end of the book.

Moon Phase

Every month the moon goes through a predictable and constant rhythm. The role of this light source in night photography is of huge significance, as it often provides us with the majority of the light we need for our exposures.

For the first 2 weeks of the moons phase it is better to shoot in the evenings after sunset, as the moon is rising or is already high in the sky.

For weeks 3 and 4 of its phase, predawn shooting is best, with the moon high in the sky during the early hours or setting after sunrise.

In continental USA and Europe, early morning shooting can be better to avoid the light trails of passing planes. There is usually less air traffic in the early hours of the morning than in late evening,



Moon - Week 2 - 96.9% Asturias, Spain @ 23:40pm Nikon D3x - 14-24 @ 14mm 240s @ f5.6 ISO 100

The 2 images above were taken on a night when the full moon was rising. On the left, much of the foreground is still in shadow, whereas on the right as the moon rose behind me, the rock pool gets a lot more illumination and becomes properly exposed.

The shadow of my camera and tripod can be seen in the right hand image on the left corner. Thankfully, when **stacking multiple images**, the shadow disappears, a fortuitous by-product of the **maximum blending mode** that we will cover later in the book.

Weather

The biggest issue with weather is **cloud cover** - even on a full moon night, if there is heavy cloudy it is super dark, and your **available light** has just been turned off. **Thin cloud** can act like a **giant soft box** and diffuse the moonlight to great effect, softening shadows and is very workable. Even patchy cloud can work, with the moon playing hide and seek, opening opportunities for great available light and dynamic flowing clouds.

Of course, rain can be a mood-killer too and I don't believe I have ever tried to shoot at night in a downpour!

Wild weather may make great landscape images, but at night it creates its fair share of problems. **Longer exposures can be wrecked by a strong wind**, especially if using a longer focal length where the vibrations are magnified. Shooting out to sea on a night with a strong onshore wind will create a salt-crusted lens and a very poor image.

All these considerations sound like common sense, but for me they have come after thousands of hours our at night trying to create images.

Calm, clear, cool nights with little wind are ideal for beautiful night images, the worse the weather, the tougher it gets to capture that wildness.

Evenings and morning are also quite different in character; it is usually cooler pre dawn, as the heat from the day before has long since radiated off. Water retains its heat longer than land however, and this creates the beautiful misty lakes of dawn, as the water evaporates into the cooler air above.

At night, with exposures times of many minutes, this mist flows like fog and creates ethereal moods.

In the evening, if you are shooting mountains or rocky areas, star trails can appear irregular and distorted; again, this is due to the heat radiating into the atmosphere creating turbulence, bending the light from the stars. Understanding of these phenomena is all part of your preparation.

Finally, temperature and humidity play a huge part in night photography. Warmer temperatures create more evaporation and radiation, possibly resulting in more humidity in the air, or turbulence. However, your DSLR battery will last a lot longer than on a cold night, when the power gets sucked out of them a lot quicker.

Battery life and ways of combating condensation forming on your lens as the night cools are dealt with more fully in the Equipment sections.

Seasons

While at first glance, Season may seem rather similar to Weather, there are sufficient differences to warrant a separate section.

Most of us are accustomed to the 4 main seasons; Winter, Spring, Summer & Autumn (Fall in the USA). In many parts of the world there are also distinct Dry and Wet Seasons, typified by monsoon rains, which bring floods to end droughts.

One of the most significant seasonal variations are the angles at which the moon and sun rise and set - for example, in the Northern Hemisphere, the summer sun rises and sets further in the north than in the winter.

Winters tend to be colder, but when the skies are clear, the clarity can be greater than in the more humid summer months.

There are too many variables to make bold one-size fits all statements, but anyone serious about night photography would do well to understand the variations of season, not only in their local areas, but in any areas they plan to visit for shooting trips.

In places where the monsoon has a massive affect on the weather, like in the Himalaya, the summers are super wet with thick cloud obscuring the peaks on a regular basis. When the rains do stop however, the views are spectacular, with crystal clear air. This makes October-December the peak time to visit Nepal for Mountain Light.

Before the monsoon returns in May, the preceding period, while still being clear, can be plagued with lots of dust and pollution in the air, swept up from the Indian Subcontinent. This dust plays havoc with long-exposures, as shown below.



Nepal Moon Week 4 37.1% @ 04:10am Nikon D3x 24-70/2.8 4442s @ f7.1 ISO 100

Tides

Anyone who shoots by the coast should understand the **ebb** and **flow** of the tides, Safety is of paramount importance, and its bad enough when you can see; in the dark unfamiliarity with the terrain or sea level can be fatal.

Shooting the sea from an elevated point above high tide mark is the safest option, from these locations, I find a rising tide to be most photogenic, as the waves come higher and higher creating a mist on the foreshore.

If I have a lot of available light and I want to get a more traditional seascape image with a good rock pool foreground and maximum depth of field, I will start a little after high tide, meaning the sea will always be receding away from me, leaving me at no risk of getting swamped by incoming waves.

Likewise, if I am accessing an area of coast that can only be reached at a lower tide level, for safety, I always go on a falling tide. Surf shows up brilliantly by moonlight, and along with snow and white sand are the few things that can actually get clipped by over-exposure.



Asturias, Spain - Blue Hour - Week 2 - 56.9% @ 19:50pm Nikon D3x 14-24/2.8 @ 14mm Single Exposure - 76s @ f2.8 ISO 200

On nights with a big swell, an elevated stance can be the safest and most photogenic option.



The Full Moon reflects huge amount of light on a clear night, and landscape images at this time can be very beautiful and very simple. The exposure times are generally short and there is less visualisation involved. The instant feedback of the **histogram** and preview allow for immediate fine-tuning.

It is an ideal time to get started with Night Photography as the problems of focus and exposure are greatly reduced with the abundant light available.

GETTING STARTED

Scene Evaluation

Whether you are in the school of Proactive or Reactive Photographers, we are at the stage where we are out in the field preparing to take some images. If you are from the Proactive Camp, you know already what type of conditions to expect, in terms of the amount of available night light, you may even have a composition in mind.

If your from the reactive camp, you've just stepped out the car and are now in a field somewhere in the pitch dark.

Either way, it is time to evaluate the scene.

For the rest of this chapter and the next, we are concerned with exposure, and as we are trying to determine at this stage what may be possible, we need to evaluate two things.

The Amount of the Available Night Light

and



The Luminosity of the Subjects

Available Night Light

Some things get easier the more light there is, others get harder. If it is truly very dark, look for a strong subject to silhouette against very long star trails. On a super bright night, you can try for images with greater depth of field with nice sharp stars in the sky.

Available Night Light is a flexible and forgiving medium, there is usually something you can achieve regardless of the phase of the moon.

With night photography it is far less about what you would like to shoot, but what the light will **let** you shoot. Don't back yourself into a corner with predetermined ideas. Preparation is great to get an idea of what to expect, but the only way to successfully plan your shot is with accurate scene evaluation at the time.



Asturias, Spain - Week 1 - 28.5% @ 01:47am Nikon D3x 14-24/2.8 @ 15mm Single Exposure - 1552s @ f4 ISO 50

With clouds streaking like this, stacked shots can become very messy, which meant a single exposure was all I could do for this composition. I worked out that around 26 minutes would be enough for a good exposure without risking the brighter areas starting to clip.

Working with the available light will always render the best results.

Luminosity

The amount of available light is obviously very important, but equally, how bright is your subject?

At night, lighter subjects really reflect the light and will expose well; snow, light sand, clouds, surf, waterfalls etc. Things like dark rocks, conifer forests, soil etc hardly reflect any light at all.

The scene evaluation is to fulfil two things, working out what compositions will be possible given the available light, and getting a feel for how long an exposure you're able to do.



From Poon Hill, Nepal - Week 3 - 92.3% @ 04:30am Nikon D3x 70-300 @ 185mm Single Exposure - 25s @ f5 ISO 200

In the above moonlit scene of Machuppuchre in Nepal, the dynamic range is not so great, I was able to capture details in the shadows and retain the highlights. Some thin cloud above me helped to diffuse the moonlight.

But, without an effective way of metering a scene in dim light, how can we effectively assess available night light, luminosity and exposure? We cannot simply employ trial and error, especially in the dark, when it can take over an hour to get a proper exposure.

Thankfully there is a quick and easy solution that solves the majority of our problems in night photography - not just in assessing correct exposure, but checking composition, framing and if the shot is sharp or even level.

The High ISO Test Shot

By far the easiest and quickest way to evaluate a scene is with a High ISO Test Shot - it achieves so many things in such a short time it should be illegal.

This is what to do -

- 1 Put a wide angle lens on your camera.
- 2 Set the Shooting mode to Manual (M)
- 3 Set the aperture to f4 or 2.8 if your lens has that aperture.
- 4 Set Shutter Speed to 30s
- 5 Either use AF and focus on the moon (effectively infinity) or

6 - Have someone hold a flashlight 5m away and focus on that (roughly hyperfocal distance at 24mm f4)

- 7 Place the camera on a tripod and point it in the direction you want to shoot.
- 8 Set the ISO at 1600 (turn OFF long-exposure noise reduction)

Take ONE shot. The 30s exposure will vary hugely depending on two things - The amount of Available Night Light and the Luminosity of your scene.

Examine the histogram and determine if the image has tonality that is workable. If not, repeat with a higher ISO - 3200 for example - one stop brighter. Repeat this until you have a histogram with a good dynamic range being displayed. You can now begin to determine creative issues - For example, do you want sharp stars or star trails?

We will return to evaluating the results of High ISO Test Shots in the Exposure Chapter.



Ama Dablam, Nepal - Week 1 - 31.8% @ 21:05pm Nikon D3x 24-70/2.8 @ 40mm Single Exposure - 30s @ f2.8 ISO 1600

Sometimes, as in the case above, the High ISO test shot produces a beautiful shot in its own right. A definite bonus of investing a small amount of time to Evaluate the Scene.

Final Image - Worked Example

On the previous page we took a High ISO test shot of Ama Dablam in the Himalaya. On this page we'll look at how the information we gathered was interpreted to create the longer exposure shown here.



Ama Dablam, Nepal - Week 1 - 31.8% @ 21:10pm Nikon D3x 24-70/2.8 @ 32mm Single Exposure - 1227s @ f4 ISO 400

The High ISO test Shot was 30s @ f2.8 ISO 1600, and from reviewing the histogram, it was clear I could easily add two stop of exposure and not clip the whites of the moonlit snow.

Secondly, the moon was soon to set behind some mountains and I decided that I could extend the shot for about 5 minutes to increase the length of the star trails.

f2.8 @ ISO 1600	30s
f2.8 to f4 = 1 stop	60s
ISO 1600 to ISO 400 = 2 stops	240s
I added 2 stops	960s
The moon set plus 5 minutes	1227s.

The final histogram shows a good exposure.



High ISO test shot Histogram



Final Image Histogram

Focusing at Night

The Problems

It's dark! - Even cameras with an AF assist beam can rarely function at night. On a very moonlit night with a nice reflective subject with clear edges, the AF system may work, but its best not to bother.

I have read many Night Photography books stating that manual focus is the way to go, either at infinity, or hyperfocally.

I beg to differ, and suggest using your cameras AF system, but provide it something easy to focus on - then turn it off and avoid touching the focus ring. Problem solved.

Here's how - The Solution

The easiest method is to **focus on the moon**, which is effectively at **infinity**, and this works fine if your image is a grand landscape with nothing too close to the front of the lens: In many wide angled images it can work just fine.

- 1 Compose your shot to determine your required focal length.
- 2 With AF ON point the centre sensor at the moon, and focus.
- 3 Turn off AF and recompose your shot.

A more reliable method however, giving the best depth of field is the **AF** - **Hyperfocal method**.

When you do your high ISO test shot, you know how much light you can play with. The variations of **Aperture**, **Shutter Speed and ISO** are creative choices we will look into soon, but for now, let us say for this example, you have decided on an Aperture of f4 @ 24mm

There are many Applications for DOF calculation available for Android, iPad/iPhone etc and they are invaluable in the field.

The Hyperfocal Distance on my D3x at 24mm f4 is 4.8m

If I place a flashlight 4.8m from my camera and focus on it, then everything in my frame from 2.4m to Infinity should be sharp **(assuming the camera is level to the plane of focus.)**

Have a friend hold the light at the required focal distance and focus there and you will have sharp images across the maximum DOF for the given aperture.

This works great for focal lengths from 14-50mm above that your mate is having to head off into the distance quite some way!

NOTE - I would rather sacrifice half a metre of focus at the front and be assured of infinity focus. Adding a metre or two to the hyperfocal distance will achieve that result.
This method starts to break down some more when longer focal lengths are used, especially 200-300mm. For these, I focus on infinity (moon or even Jupiter if you can see it) and then check the focus with a High ISO Test Shot. If there are man made lights visible at a similar distance to your intended subject, focus on those.

Using a High ISO test shot to check **Exposure**, if the shot is **Level**, in **Focus** and a good **Composition**. They are **VITAL** to the success of your images. However, due to noise, exact focus can be difficult to judge at very high ISO.

By the time you invest 2 hours of exposure and perhaps 2 hours for **Long-exposure Noise Reduction**, that is a lot of time to waste if the image isn't even sharp. Even if your test shot is sharp, please be aware that any vibration from wind or even walking too near the tripod can result in shaking and blurred images. If its windy try to set your camera up in a sheltered spot behind some rocks or similar.

Incoming waves can also upset focus, as can the tripod settling into wet sand over time.

Once the exposure is being taken, keeping away from the camera is a good idea to avoid accidentally knocking it or causing unnecessary vibration.



Lijiang, China - Week 1 - 24.1% @ 20:06pm Nikon D3x 300/2.8 @ 300mm Single Exposure - 542s @ f4 ISO 200

A strong wind started and played absolute havoc with the star trails.

The 500 Rule - The Secret of Sharp Stars

The Earth revolves on its axis once every 24 hours, at the equator it is rotating at an absurd 1000mph. This is why the stars appear to move across the sky every night; of course, they're not moving, we are.

The amount of apparent movement is a factor of how long the exposure is.

There is a great guideline for how long you can open the shutter and STILL have sharp stars, that is, before the movement is visible in a final print or web post.

The rule is **500/focal length = EXPOSURE TIME**

EFFECTIVE FOCAL LENGTH (INCLUDING CAMERA CROP)	MAXIMUM SHUTTER SPEED
14mm	35.71 seconds
17mm	29.41 seconds
24mm	20.83 seconds
35mm	14.28 seconds
50mm	10 seconds
100mm	5 seconds
200mm	2.5 seconds
300mm	1.67 seconds
500mm	1 second

These times are just a guideline, because in a small web post you can get away with a little longer because the stars are so small. In a 60" print however, you may want to be even more cautious than these figures. The second consideration is in what direction you are pointing the camera. Around the poles, North and South the stars seem to move less, whereas East and West towards the Celestial Equator the stars will appear to move a lot more.

For small prints or web posts, the 500 Rule guidelines can be relaxed and you can use the 600 Rule. The exact same principle with slightly longer exposure times.



Bali, Indonesia - Week 3 - 50% @ 19:46pm Nikon D7000 14-24/2.8 @ 21mm Single Exposure - LR4 1s @ f3.5 ISO 400

EXPOSURE

For a subject that strikes fear into so many photographers, it is one that fills me with a thrill of discovery and technical challenge. The idea with this element is to make it fun, take pride in getting it right and give yourself a metaphorical pat on the back when you solve the Crime Scene Thriller of unlocking the mystery to what is correct for your scene and intention.

With the absence of extreme highlights to worry about, you usually have quite a lot of latitude to what would be considered a correct exposure. For example, doubling a 30 minute exposure to one hour is only 1 stop, and is unlikely to cause any drastic ill effects to your image.

This chapter is subdivided along an invisible line between **technical considerations** and **creative decisions**.

Two images taken side by side with the same exposure histogram can have very different looks depending on whether you are looking at a **short shutter speed** and a **wide aperture**, or a **longer shutter speed** and stopped down to a **smaller aperture**.

As the high ISO test shot demonstrates, 30s @ f2.8 ISO 3200 equates to exactly the same exposure as 3840s @ f5.6 ISO 100.

Both these shots will have very similar Histograms, but will look very different indeed, as the stars can appear to move a long way in 64 minutes.

All you have to do is determine how you want your shot to look and the calculate a suitable Shutter Speed, Aperture and ISO to create the desire effect. And we will come to these three variables very shortly.

Metering

Most photographers rely very heavily on their in camera meter. Centre-weighted average, spot, evaluative, or a handheld light meter and grey cards!

Let's make this easy - FORGET IT.

Light meters do not work at night - not long after sunset they start getting it wrong, and in the dark they just freak out.

From this point in the book onwards you are in the realm of **Manual Exposures**, and honestly, it makes life a whole lot easier.

Night Photographers Guide to Exposure

The problem starts when people try to define what exposure is - all I am going to say is that you have to "expose" your sensor to the available night light for a period of time to record some light.

And there are only THREE things to consider when it comes to Night Exposures.

SHUTTER SPEED | APERTURE | ISO

Any shot you are ever going to take is a combination of those three things, and the way we use them to create our final exposures is as much a **Creative Decision** as a **Technical Challenge.**

All three of them can adjust the amount of light that reaches the sensor, and as we've already demonstrated various combinations of them can create **Histograms/Exposures** that have identical properties, but the images **look** completely different.

This is what Night Photography is all about, exposing the frame long enough to **Harvest** the **Light** and using a combination of the only three variables there are to determine how the image looks.

Shutter Speed

In most modern DSLR cameras the range is between 1/8000th of a second to 30 seconds - for the majority of Night Photography, you can forget about the fractions.

When you use **BULB** mode, the shutter will stay open as long as you tell it to, from minutes to hours. The actual time you keep the shutter open is a factor of whether you want to have sharp stars or more static clouds, or big swirling star trails and/or streaking movement of cloud, mist or water.

Use Shutter Speed to determine MOTION.

A raging ocean turns to mist in this exposure long after sunset. By cranking the ISO extremely high, I could have rendered some detail in the waves, but chose this combination of the three variables for precise artistic expression.

In this case f4.8 was the minimum aperture of the lens I was using, and 400 ISO is one that I know renders low noise images if exposed correctly.



Asturias, Spain Week 4 - 4% @ 20:02pm Nikon D3x 70-300 101s @ f4.8 ISO 400

Aperture

The Aperture is the hole in the lens through which the light makes its way to the sensor. Usually referred to as a range of f-stops with small numbers like 1.4, 2.8 representing big holes, and larger numbers like f16, or f22 meaning very small holes.

The smaller numbers let in a lot more light and are most commonly used in night photography, but there are of course exceptions.

The second function of Aperture is to control Depth of Field - the amount of the image that is acceptably sharp. As the aperture hole gets smaller, the depth of field increases.

Use Apertures to mostly control DEPTH

We will cover the **Depth of Field** calculations and implications in the **Composition Chapter**.

However, another substantial factor to consider when choosing your aperture is how many stars you want to be visible in your final image.

Shooting at f2.8 for 30 seconds @ 800 ISO will reveal very high numbers of stars, whereas by the time you have stopped down to f8 for example, the number of stars will be significantly reduced.

This can actually be a good thing, as star trail images at large apertures can look extremely busy as every star is producing a trail, creating a crazy mess. Stopping down reduces the number visible and gives the individual trails more space.

The High ISO Test shot on the right showed good numbers of stars, but I wanted to reduce that number for the final image, producing a more spacious effect, rather than very busy trails. I actually used a 2stop ND Filter to seriously reduce the stars numbers in this bright moonlit image.

The image on the next page shows the results of that aperture and ND adjustment.

Sichuan, China Week 1 - 41.6% @ 20:01pm Nikon D700 24-70/2.8 @ 40mm 15s @ f2.8 ISO 2500





Sichuan, China Week 1 - 41.6% @ 20:10pm Nikon D700 24-70/2.8 @ 40mm 2702s @ f5.6 ISO 100

It is well worth remembering that Aperture has this impact on the number of visible stars in any given exposure, it becomes increasingly important when we consider **stars as subjects** in our compositions. By dialing in a smaller aperture you have creative control of the number of stars that will be visible in your finished images.

ISO

This is the digital equivalent of film speed, and for me it is a creative variable. I rarely make an **Exposure judgement** based on ISO, I use it to fine-tune the creative combination of **Motion** and **Depth** that I came to with my **Shutter Speed** and **Aperture** choices.

If 30 seconds at f5.6 is 2 stops too dark at ISO 200, I will take the image at ISO 800 to add the 2 stops of exposure back into my image.

Thinking that ISO 200 is less noisy than ISO 800 is nonsense, as the final shot will be better exposed at 800 than if I try to get those two stops back later by brightening a RAW file shot at 200.

ISO is the magic switch to add or subtract exposure brightness when your creative choice has already been made with your selections of Shutter Speed and Aperture.

Noise & Underexposure

These two walk hand in hand - one of the most common mistakes that people new to night photography make is underexposing their images, which they then try to rectify in processing. This rarely produces a satisfactory result.

Bringing back details from an underexposed shadow is the surest way to bring excessive noise into your images.

Sure, ISO comes into play in this too, with your cameras native ISO being the best to shoot at. For my Nikon D3x it performs best at 200 ISO, but I can shoot up to 1600 ISO quite often with very usable results, as long as I expose the frames correctly.

With the D700 I was able to shoot up to ISO 2500, and with the newer super capable cameras, the sky is clearly not just the limit.

As camera sensor technology advances in the coming years, fresh avenues of creativity are opening up to the adventurous night photographer. Getting supper sharp images by moonlight in 10 seconds will be marvellous; for now, all of us have to accept there are some limitations to what our cameras are capable of, regardless of how much they cost.

On the plus side, Adobe Lightroom 4, Adobe Camera Raw and many third party plug-ins like Noise Ninja, or Nik are excellent at dealing with noise, and images can be corrected very nicely in processing. But the key, I believe, is a **well-exposed** starting point.

The Histogram

This wonderful graph that is displayed on the back of your camera is the best present you are ever going to get and the surest way to making better images NOW.

Warning - Never believe the Preview Screen when evaluating your night exposure.

You're in the dark, your pupils are wide open trying to make the most of the dim night light and you are looking at an illuminated display in glorious color. Of course it looks bright and well-exposed!

Use the Histogram, it does not lie and is the ONLY true gauge you have of the actual exposure you have just taken.

In the sample Histogram shown below, we have a graph with two axis - the vertical axis is an expression of quantity, with higher numbers of values reaching higher into the graph.

The horizontal axis shows luminosity values, with 100% Black, represented with the RGB Value of 0,0,0 on the far left, and Pure White, represented by 255,255,255 on the far right.

The overall graph shows the image expressed as the total distribution of pixel values by luminosity.



Histograms can also be viewed in the three Primary Colours, Red, Green and Blue, which can give a more detailed expression of the colour distribution of the image, and if a colour cast exists.

Good Exposures

How can the Histogram help, and what does it tell us?

Firstly, we have to split the definition of exposure; in one we need to talk about the traditional definition of exposure and the histogram values - **the Capture**.

In the second, we are talking about the final image that is being viewed online or in print, the presentation - **the Output**.

When we are out in the field and evaluating the scene, quantifying the Available Night Light and the relative luminosity of our subjects, I believe we should be aiming to capture a **good exposure**. By that I mean a histogram that contains values that we can work with later to create an expressive output.



If we split the Histogram into quarters, a night image that has the majority of its tonal values in the first quarter on the left would be considered UNDEREXPOSED.

One should be aiming for a Histogram that contains the majority of its tonal values in the 2nd and 3rd quarter, essentially the mid tones. The stars themselves will be in the 4th Quarter, as they are highlights, and it matters not if they get clipped.

The Histogram is the only true guide to the exposure that the camera has recorded. It is better to record a brighter exposure as we can darken it in RAW Processing, but it is almost impossible to brighten an underexposed image without bringing serious noise into the shot.

Darkening a well-exposed capture for final Output is infinitely preferable to lightening an underexposed one.

Underexposure is far more of an issue at night than overexposure, unless you are shooting waterfalls, snow, surf or coral sand under a completely full moon.

Soon, we will be examining **Dynamic Range** and what the implications are of this in our night images. Some of you will embrace the prospect of shooting multiple frames to represent the scene as you would like, while others will stick with single frame techniques and the inherent limitations they represent.

The RAW Format

am not going to write long on this topic; anyone who is serious about taking quality Night Images should already be shooting in RAW - The Digital Negative.

RAW files contain a range of potential values for each pixel, rather than carving the values for colour and luminosity in stone, as a jpeg does. Shooting RAW allows us to **process** the file prior to working with it in more detail in Photoshop or similar. As one works with a RAW file in Adobe Lightroom 4, Adobe Camera Raw, or any of the proprietary software that comes with your DSLR, you can make many adjustments to the file "prior" to converting it to a TIFF.

This is called **Non Destructive Editing**. Most of the Processing Techniques we will look at in this book rely totally on having a RAW file as the starting point.

Ideally, RAW files should have quite low contrast and saturation. We are looking to capture a **good exposure**, useful tonal information that we can work with to create our final expressive image. Getting it right in camera is not necessarily the right approach in **digital night photography**.



Asturias, Spain Week 1 - 7.6% @ 03.36am Nikon D3x 14-24/2.8 @ 14mm Single Exposure 3652s @ f4 ISO 125

In the dark, this is not what I saw - all night photographs are an emotional representation of an experience, and cannot in any way be considered literal renditions of reality.



White Balance

This is a wonderful topic and the range of creative options here are huge, assuming of course you are shooting in RAW. If not, what your camera decided to be correct when you took the image is what you are stuck with.



In the two images shown above we can see how white balance affects the **mood** and **expression** of our images. The very warm colours on the left are quite attractive, although certainly more extreme than I was experiencing at the time.

The colour corrected image on the right creates a more neutral, natural scene, but may in fact be too cold.

The point of this section is to realise that creative control lies in **your** hands, not in the cameras silicon brain. Shooting in RAW allows you to change the white balance settings later in processing, even making multiple conversions of the same raw file to blend manually. It is very common with **Light Painting** to have a different White Balance caused by an LED or similar. This multiple conversion method is the best way to balance these anomalies.

In scenes with mixed lighting it is rare that the white balance out the camera is the one you will use in your final presentation.

Its always good in photography to remember who has the brain and what is the tool.

Dynamic Range - Limitations

This is a term most photographers have read plenty about; it represents the range of tonal values present in any given scene. In night photography it is rare for us to have to deal with the extremes of sunset, but issues still exist, especially during early **Blue Hour**, and to be effective Night Photographers we have to learn ways of dealing with these **dynamic range challenges**.

There are only two factors that need to be considered. The first is the dynamic range capabilities of your camera, which vary quite a bit, and the second is the dynamic range actually present in the scene, which is equally variable.

At night there are some types of images that you **CANNOT** take with single frame techniques. Even using diverse and devious means to control the dynamic range, some scenes are not possible: Long star trails during full moon for example.

In this section, we'll look at ways to extend the dynamic range capabilities of **Single Frames** as well as **Multiple Frame Techniques**.



Blue Hour scenes similar to the one shown above are all too familiar to Landscape Photographers where a dynamic range exists that is beyond the capabilities of a single exposure to capture. The **problem** - expose for the sky and the foreground shadows fall into clipped black, expose for the shadows and the sky explodes in clipped whites.

Human eyes are remarkable, and for us to recreate landscapes as we experience them requires us to extend the dynamic range our cameras can record. Shooting lower dynamic range scenes to avoid these challenges seems very negative. Thankfully there are many ways we can extend the range of our single and multiple image captures.

Single vs Multiple Frame Techniques

And here the ethical debate starts and from now on we will split our examples in to Images that can be created using Single Frame Techniques only, versus images that require Multiple Images to be taken and somehow combined later to create a finished image.

I believe Landscape Photography is an expressive medium and our images should, first and foremost, communicate something of how it was to be there. We are not bound by the literal or firm boundaries of reality as photojournalists are, we are bound by our own self-regulating code.

Until the camera comes along to capture the dynamic ranges of naturally occurring scenes as our eyes see them we will have to **compromise**, by either not recording the real scene accurately, extending the dynamic range of our cameras capture in processing, controlling the exposure during capture techniques or making multiple exposures to **Harvest the Available Light** and blend them ourselves to express the landscape as we saw it and felt it.

Before the end of this page you have to accept some basic facts that are true in contemporary Night Landscape Photography.

- 1. The Dynamic Range in some scenes you may want to capture cannot be contained in a single exposure
- 2. Noise that becomes an issue with longer exposures can be mitigated or eliminated in shorter exposures.
- 3. On bright moonlit nights, long star trails cannot be achieved due to the over exposure of the foreground (and the sky).

Due to one, or all of the above reasons, it is becoming more common practice to use multiple exposures in all night images, but there are numerous occasions where single exposures work very well, and many of my favourite night images are in fact single shots.

We'll look at both, which essentially opens the door for you to be able to handle any situation on any night of the year, in any light.

And this is what this book is all about, **preparing you for anything**. If you choose, for whatever your reason to not pursue multiple image techniques that is your choice, and your expression is being limited by your own freewill, and that is your right as a photographer and an artist.

Single Exposures

Every make and model of camera exhibits different characteristics in terms of the usable **dynamic range** it can capture in a **single exposure** and how it handles **digital noise**. All I can suggest is that you take some time to evaluate your cameras capabilities and develop a workflow that works to its strengths.

This is the problem with any instructional material that attempts to generalise **ISO settings**, **Exposures**, **Shutter Speeds** and **Apertures** for Night Photography. I have shot at night with many different camera models and lens combinations, and they all behave differently.

Just as variable as the equipment are the users holding them, with varying degrees of tolerance to **Noise** & **Sharpness**. I would however suggest setting the bar relatively high for these as there is no excuse for sloppy technique.

Adobe Lightroom 5

As has already been mentioned, RAW files contain a lot more usable data than appears when you first look at them on the computer. The jpeg that is rendered by the preview screen on your camera is just a **best guess** and is not in fact anything near the final image you can produce when you import the file into the flagship RAW conversion software, **Lightroom 5**. (Released 2014)

The majority of tools and adjustments possible with this tool are now very much geared towards getting the most usable dynamic range from a single RAW file as possible.

Take the Blue Hour image shown below as an example. Apart from levelling and a crop, the image shown is the way it came out of the camera, with no adjustments.





The yellow triangle on the top left shows that there is a small amount of shadow clipping, but otherwise the dynamic range has been contained within the histogram. This image should be a good candidate for extending the visible dynamic range displayed without having to resort to Photoshop or more advanced techniques. The image below is the same file after making a series of quick adjustments in Lightroom 5 in less than 2 minutes. The majority of the work was done to extend the dynamic range in the shadow areas and a little on global contrast. I think that with another 5-10 minutes I could make some more significant changes, but wanted to go for a really quick fix in this first example.



Comparing the Histograms shows that the spike of darker shadow detail has been moved to the right, revealing detail in the hillside and waterfall. In fact, quite a striking improvement for a couple of minutes work.



Less than 5 years ago to achieve the same result would have required a technique known as **multiple RAW file processing**, where you make multiple conversions of the same RAW file and blend them together in Photoshop. **Lightroom 5** has come a huge step forward to allow all this in a far more affordable package, and quickly.

There are of course limits to what Lightroom can achieve, if **highlights are seriously clipped** and contain no information in the Red, Green and Blue channels, there is nothing you can do. Likewise with **completely clipped black shadows**.

This type of technique works brilliantly in cases where the dynamic range is completely captured, or only slightly clipped at either end. For a huge number of Night Scenarios, this is the only tool you would ever need to achieve excellent results.

Take the time to capture a **good exposure** using a **High ISO test shot**, translate that into your desired creative exposure and you should have a usable file.

Single Frame Techniques - Graduated Neutral Density Filters

This is a well-known technique for extending the dynamic range of single frames. It has been around for a long time and works great in Blue Hour and even into full night photography, especially on nights with more moon.

It does however have some **serious limitations** that we will look at shortly, but in certain situations can work very well.

The Principle

Graduated Neutral Density Filters (GND's), are made from glass or resin and are darker at one end than the other. The graduation comes is two varieties, **hard** or **soft**. With the hard edge, the line between the dark and clear areas of the filter is quite abrupt, while on the soft options there is a gentle gradient, making the transition softer and more natural looking.

They tend to come in three strengths - 1, 2 & 3 Stops, usually written as 0.3, 0.6 & 0.9.

The best brands like **Lee** and **Singh Ray** are quite expensive, and having a specialised holder and the three strengths in both hard and soft options will run into many hundreds of dollars. (We cover the free option in the next section!).



The above images show the effects of a 0.6 Stop Soft GND, bringing down the exposure of the sky by 2 stops and creating a more balanced and natural looking image. In images like this with a flat, level horizon GND's work extremely well. We will see on the next page however one of the serious flaws of using them on images where the horizon is not a nice straight line.

Please remember that the **sky should never be darker than its reflection**, this is a sure sign that too strong a filter was used to control the sky.

In the unworked RAW file shown here, a GND was used to control the difference in this Blue Hour Sky and the foreground. The beautiful sea stack is completely dark as it

is now 3 stops darker than it should be. Any image where something crosses the area where the GND will be placed will look like this; unnaturally dark.

Once you know what to look for, you will see hundreds of examples of this slip-up with landscape images.

To my mind it is one of the strongest arguments for using multiple bracketed exposures to capture more natural looking scenes. That technique however requires some fairly advanced Photoshop Processing Skills.

If your skills are not yet up to it, or you don't own Photoshop, it can make excellent sense to get into the habit of capturing the full dynamic range of scenes you witness to future proof your images for when your skills or budget allow you to work them better.



This is the basis of my **Harvesting Light** Principle, bracketing images to capture the full dynamic range of your landscape experiences.

GND's at Night

As Blue Hour comes to an end and the moon takes over as the dominant light source, the dynamics of scenes tend to change. A time comes on the edge of night where the luminosity of the sky and the land balance out and your dynamic range problems mostly disappear.

At night, the majority of circumstances where GND's are of use are not to control the exposure of the sky, but the land. During extended exposures to capture long star trails, some bright foregrounds can actually get over exposed. Not to the point of being clipped, unless it is snow or coral sand, but just unnaturally bright relative to the sky.

Using a GND upside down can reduce the exposure of the foreground by up to 3 stops. Of course, with Lightroom 4 you can do this **after** with a greater degree of control. But, in cases where you do need to control that exposure at the time, a GND can come in very handy. This relative luminosity between the sky and foreground will be immediately evident in your High ISO test shot, allowing you to take the necessary precautions.

GND's in Low Light Conditions

One case where GND's not only don't work, but create another problem is when there is not enough moonlight to expose your foreground well and still keep sharp stars in the sky. In the example shown below, the 500 Rule dictated that at 400 ISO I could only expose this image for 15 seconds @ f2.8 to retain sharp stars without streaking.

If I was to use a GND to place over the sky and snowy peaks, and allowing the foreground to expose for another 2 or 3 stops, then the stars are still being exposed and would show in the frame as pale streaks instead of sharp, bright points.



Ama Dablam, Nepal - Week 2 - 85.4% @ 22:45pm Nikon D3x 24-70/2.8 @ 32mm Single Exposure 13s @ f2.8 ISO 400

The second problem at night is you really cannot see what you are doing. It is very hard to place a GND accurately. It is however possible by trial and error with a series of High ISO test shots to place the GND with enough accuracy to make it a worthwhile technique in the correct circumstances.

Thankfully, there is a way to overcome some of these issues, and even better, its free.

The Magic Glove Technique

Using the above example again, we know that we are limited to only 15 seconds before the stars will begin to streak, but the foreground needs a good couple of minutes longer to show proper details in there and to balance the exposure.

The magic glove technique is so simple, but with a little practice can deliver excellent results.

- 1. Set the Camera in BULB mode and open the shutter with a cable release.
- 2. Count out the required sky exposure, or check a watch to measure the time, and once that time is over, use your hand (wearing a dark glove) to cover the top of the lens in the area where the sky is.
- 3. It is vital to keep the hand moving in small increments, half an inch or so, with a gentle up and down motion. The idea is to blur the line between the obscured area and the exposed area, much the same as in a GND.
- 4. Continue this motion for as long as you need to expose the foreground sufficiently.



Asturias, Spain Week 1 - 3.3% @ 05.39am Nikon D3x 14-24/2.8 @ 14mm Single Exposure 47s @ f4 ISO 100

The sky was exposed for a very short time, perhaps a second or two. I used a dark glove to cover the top of the lens for the reminder of the exposure.

I have found through experience that much more than a couple of minutes and this technique can get a little tiring, as you have to keep your arm raised horizontal to the lens and then move your hand up and down.

A dark lens cloth works well also, and I use that wrapped around my hand on occasions.

Do NOT use a coloured cloth or glove, it will create a colour cast on the fringes of the edge that can be almost impossible to remove.

Light Painting

On nights with less moonlight it may be necessary to enhance the available night light by adding some of your own. The technique can be used with both single and multiple frame techniques, although, with single, one has to be quite sure about how the effect is going to be applied as it is not at all an exact science.

For short exposures of less than a minute, or even more importantly, ones that apply to the 500 Rule, you are not investing too much time in the shots. Taking the image and painting at the same time can be checked quickly.

For a longer exposure intended to create longer star trails, I would elect to wait until you have completed the star trail and then take a separate image for a painted element. Investing a couple of hours into a long star trail only to ruin it with unpredictable painting seems a shameful waste of time and effort.

DifferentLights - DifferentTemperatures

The most intimidating aspect of light painting isn't the actual light painting, but variable results based on using different types of flashlights. Various bulbs have different temperatures, and your camera may show the light as quite blue of quite warm depending on those temperatures.

In the image shown below I used my flash unit off camera with a warm gel over the light. Flashed multiple times to illuminate the sea stack. I would always suggest with light painting to test a few frames first to see how the light will be rendered in camera before committing to the final image.

I used a warming gel to match the colour of the flash with the generally warm tones of the environment. Personally, I always strive to make the light painting blend with the rest of the image. It is also quite easy to do a couple of RAW conversions with different white balances and blend those together in Photoshop.



Asturias, Spain Week 1 - 1.4% @ 22:54pm Nikon D3x 14-24/2.8 @ 14mm Single Exposure 48s @ f4 ISO 640

Multiple Exposures

The heart of all multiple exposure techniques is the concept of combining more than one exposure to either **extend** the **dynamic range** available from a single exposure, or taking a **series** of **identical exposures** and then **stacking** them together to create **star trails.**

Taking a number of **bracketed exposures** and combining them in software to create HDR images has become incredibly popular - doing this process **manually** is gathering speed among photographers striving for the most natural looking dynamic range images currently possible.

The technique of combining multiple exposures in extreme dynamic range situations has become quite common, and the same principles work equally well through **Blue Hour** and into true **Night Photography**.



Asturias, Spain, Week 4 3.5% @ 21:45pm Nikon D3x 14-24/2.8 @ 22mm Multiple Exposure Sky - 15s @ f14 ISO 200 Foreground - 106s @ f14 ISO 200

The majority of **Manual Blending** requires the use of Photoshop to combine the different exposures. However, Lightroom and some third party plug-ins are getting better all the time at creating images with extended dynamic range from multiple exposures, without having to venture in to the whole HDR software arena, which does not deal well with low light images.

Bracketing & Blending

Most DSLR cameras have the capability to Bracket Exposures; usually between 3, 5, 7 or 9 frames in the pro models and in 1/3, 1/2, 1 or 2 stop increments. Each camera model has its own settings, but the ones above cover the full range available.

The idea is that you can compose an image and take a series of exposures that cover a much larger dynamic range.



0EV

-1EV

+1EV

0EV represents the exposure that you set in camera, -1EV is 1 stop darker than your dialed in exposure, and +1EV is 1 stop brighter. My Nikon camera can only bracket one stop apart as a maximum, which for my needs in more extreme dynamic range situations isn't really enough. Most Canon cameras will bracket +/- 2 Stops.

Cameras Bracket by changing Shutter Speed **NOT** Aperture.

Consequently, I favour manual bracketing, where I adjust the shutter speed on the camera manually and tend to bracket in 2 stop increments.

Whichever way you bracket, the important thing is to keep the camera steady on its tripod. Any movement between frames causes alignment problems, although the latest Photoshop CS5 has a remarkable **Align Images** feature that does a stunning job at correcting movement.

I also tend to use **MLU** - **Mirror Lock Up**, as the shutter slapping up and down between frames can also adversely affect the sharpness of the images.

Blending the three images above in some HDR software, like **Photomatix Pro** or **Nik HDR**, would produce an HDR image, but this is not what I am wanting to do - but of course you can try it out and see for yourself.

At night the principles are the same, we take one exposure to get a good foreground exposure and we blend that manually with another exposure intended to get the best creative sky available. Either a long star trail or tack sharp stars. We have already discussed the difficulties in getting good foreground exposures in the limited time available as per the **500 Rule** to keep our stars as points. Let's look at an example on the next page.



Bali, Indonesia, Week 2 - 100% @ 04:35am Nikon D3x 14-24/2.8 @ 18mm Multiple Exposure Sky - 30s @ f4 ISO 200 Foreground - 241s @ f4 ISO 200

In the image shown above, two images were used to capture the dynamic range in a scene where the full moon was setting behind some clouds. Any shot I took to get a nice exposure in the foreground had very blown out clouds, and likewise, any shot to expose the sky invariably underexposed the foreground.

Analysis of Alternatives - I could have used a 0.9 GND Filter and achieved a balanced exposure, BUT the clouds would have moved a lot more in 4 minutes than they did in 30 seconds. I wanted to retain some structure to them.

I could have used the **Magic Glove Technique** too, but again, the results are a little more hit and miss, and with the rapidly changing light I wanted to make sure I **Harvested Light** fast and efficiently. But, in many cases single frame techniques can achieve similar results as multiple frames. It would appear there are two reasons for taking **Multiple Exposures**; the first, which we have just looked at, is **Dynamic Range** and the second is **Creative Control**. In some cases there is more than one way to achieve control of dynamic range, but creative control is a more demanding challenge, and we should be free to make these choices based on our expressive desire, **NOT** the technical limitations of a single frame based on some arbitrary algorithms.

As can be seen, there is clearly a lot of freewill involved here and each photographer is urged to make their own choices on these matters.

There is however a **third scenario** that **demands** multiple exposures, and to date I have not come up with a satisfactory single frame alternative.



Switzerland, Week 1 - 30.5% @ 21:46pm Nikon D3x 14-24/2.8 @ 14mm Multiple Exposure 24 x 300s @ f5.6 ISO 320

Multiple Exposures - Stacking Star Trails

On the previous page there is an image that typifies the technique of **Stacking Star Trails**; 24 images, each of 5 minutes, combined in Photoshop to create a continuous sequence of star trails, but **retaining the luminosity** of a single 5 minute exposure.

It is obvious from the above paragraph that had I attempted to take a single exposure of 120 minutes at the same ISO and Aperture, the entire shot would have been wildly overexposed.

We discovered early in this chapter that all exposures are a product of only three variables

Shutter Speed | Aperture | ISO

We became aware that we could use a smaller Aperture or a lower ISO to compensate for these long exposures, but there are limits to any equation.

Stacking multiple identical exposures to create star trails is the only way to achieve shots like these when the moon is in the bright half of the month, or when dealing with highly reflective subjects.

There are actually some pretty convincing arguments to suggest that all star trail images should be taken using this method, although there are exceptions.

- 1. Shorter exposures suffer less noise than longer images
- 2. You don't need Long Exposure Noise Reduction
- 3. Amp Glow is less likely in short exposures
- 4. You get more exposures on a full battery
- 5. Start and end times are more flexible, as frames can be discarded
- 6. Plane trails can easily be cloned out of the frames in which they occur

These six points warrant some further explanation, as I have introduced a number of new terms we have not looked at yet.

1: DSLR Sensors are designed to capture light in daylight or in studios, where the majority of photography takes place. They are increasingly being engineered to deal with low light, but again, they are targeting situations like sports indoors, or in dull daylight. These advances are benefiting Night Photographers too, but there are also serious technical limits as to what DSLR sensors can do in the dark.

The longer you try to leave the shutter open, the more noise will creep into the image.

2: Many cameras come with **Long Exposure Noise Reduction** capability, designed to combat the phenomena of more noise in longer exposures. After you have taken your long exposure, the camera takes a **Black Frame** of **equal duration** to the original exposure and subtracts the noise in the second frame from the first frame, therefore cancelling, or reducing the noise.

This is a neat idea, but as with everything in a DSLR, it requires battery power, and you have to leave enough juice in the battery to complete the dark frame. This effectively halves the amount of time you can expose for, and your camera is out of use while this noise reduction is completed. Something to do on the drive home I suppose.

3: **Amp Glow** is a funny thing, in most sensors it shows up as blotches of reddish/magenta colour cast at the edges of the frame, and it is caused by the circuitry heating up during longer exposures. Cooler temperatures help, but it will often come into most long exposures.

4: As explained in point 2 above, when you stack you are doing multiple shorter exposures and therefore you do not have **Long Exposure Noise Reduction** on (In fact you must not). This way, you can start your sequence with a full battery, and keep taking shots until the camera battery is finally depleted. In many modern DSLR cameras this can now extend into many hours.

5: With a single exposure it is risky to start before it is truly dark - Astro Dark. The lingering effects of twilight are hard to judge with the naked eye and there is huge variability with **Latitude**, **Humidity** and **Pollution**. With stacked exposures, you can start before Astro Dark, or continue after Astro Dawn, capturing useful foreground detail in the twilight and blend these exposures with the true star trails later producing unique and stunning images.

6: Plane trails and satellites are a fact of life for most night photographers - when you stack images it is quite easy to clone out these trails and produce a final image that is devoid of these inconveniences.



Asturias, Spain - Blue Hour Nikon D3x 24-70/2.8 @ 24mm Single Exposure - LR4 13s @ f5.6 ISO 200

COMPOSITION

Composition and Exposure really walk hand in hand, and the decision to cover Exposure first was based on the fact we introduced and explained a lot of terminology in that chapter that we can now expand upon in this one.

In real life situations the photographer tends to spot a composition first; then spends some time working around the subject to evaluate how the elements relate to each other. At the same time, they are considering the exposure situation, what problems that may entail and the best way to go about harvesting the light.

Technical decisions at this stage can also include whether the need for **exposure** or **focus stacking** is required, or indeed, if there is a better time to come back to this scene in better, or more mysterious light.

At night however, especially so on darker nights, it can be necessary to evaluate the Available Night Light with a High ISO Test shot **first**, before considering what compositions may even be possible.

I would however like to take this moment to stress that as with traditional daylight photography, composition is a huge part of the process. There is a common misconception that any subject taken at night with a backdrop of spiralling star trails is immediately interesting and worth looking at.

Wrong - At night we have amazing

light, stars lighting the sky, moonlight, mists, moods and metaphors. Those skilled in communication can combine these elements into intriguing and captivating images far from normality and everyday experience. This is the challenge we should be rising to, not just pointing our cameras at the nearest subject and blindly producing images.

The key here is flexibility, evaluating the light and identifying intriguing and interesting compositions is the complete essence of night photography.



Spain, Week 3 - 99.4% @ 07:05am Nikon D3x 14-24/2.8 @ 15mm Multiple Exposure 1/60 + 1/15 @ f11 ISO 200

Communication & Expression

Why do you take Photographs? I've asked this question many times to colleagues, friends, on forums, online communities and polls on my website. The answers are as varied as the people who took the time to answer, but the majority said it was artistic expression - in other words, to communicate a feeling, a meaning, an emotion or a mood to another person.

Photography is a visual language, we use light interacting with various subjects to communicate. At night we have all the ingredients to create powerful and meaningful images. With a blue sky during the day it is easy to forget we live on a planet flying through space at an absurd 30 kilometres per second. At night we have the stars around us to make us consider our place in the Universe.



Tibet, Week 1 - 12.6% @ 21:55pm Nikon D3x 14-24/2.8 @ 24mm Single Exposure 1800s @ f4 ISO 400

Mount Kailash, pictured above is considered to be one of the holiest mountains in the world, a place of pilgrimage and worship for at least four major religions. Taking this shot from our camp at over 17500 feet was a wonderful experience.

Regardless of ones personal faith or philosophy, taking images in remote places at night can be hugely rewarding on both personal and artistic grounds. It is unusual for night images not to resonate with their viewers on some level, even if it is just awe.

Visualisation in the Dark

Practical Considerations

We have already seen that the lunar month is split into a **Dark Half** and a **Light Half**, weeks 1 and 4 are darker, weeks 2 & 3 offer the most available night light to shoot by. On all but the brightest nights it can be quite tough with the naked eye to see what you are trying to photograph, let alone visualise some final image from it.

Once again, the High ISO Test shot comes to the rescue. A quick 30 second exposure can give you a good indication of your final composition. The key things to really look out for at this stage are.

1. Is it Level?

2. Watch the Edges

3. Give your Subject Space

Is it Level?

It can be very hard to level a camera in the dark. There are two very good reliable methods. The first is to use your cameras built in leveller if it has that feature. The second is to use a **Bubble Level**, a small, cheap device that slides into your **flash hot shoe**. The High ISO test shot is the final confirmation that you have a level composition.

Watch the Edges

It is natural when we are composing an image to focus our attention on the centre of the frame and the primary subjects. Our eyes ignore the clutter and distracting elements on the sides of the frame, which are invariably the first things to catch the eye of an observer.

Give Your Subject Space

No pun intended! There will be "space" in all your night images.

On the next page we are going to look at **Seeing the Unseen**, and part of this is considering the significance of all the elements in the frame and how they relate to each other. A big swirling star trail is a significant subject in its own right, if you try to counterpoint that against another complex foreground subject, the eye can soon become confused and overwhelmed.

If you spend some time to study the work of your favourite landscape photographers, you may be surprised to find how many of the images that resonate with you are actually quite simple compositions. There is certainly no need to fill the frame with action.

Seeing the Unseen

This is the real **Art of Visualisation at Night**, seeing the unseen, having to imagine how the final shot will look after ten minutes, or even one or two hours of exposure.

The way the stars will move through the frame in the exposure, if **Polaris**, the north star is in the frame, where is it centred, how high in the sky is it, how does that swirling star trail counterpoint to the foreground elements, is it balanced?

All these things need careful thought and the ability to visualise the final image does take time and experience to master.

With shots containing moving water, it is fair to say that any exposures of more than a minute will render the water completely smooth and misty creating a very ethereal look.



Asturias, Spain, Week 1 - 37.4% @ 20:54pm Nikon D3x 70-300 @ 116mm Single Exposure 331s @ f5 ISO 200

The night this image was taken the Atlantic Ocean was pounding these sea stacks with huge waves. In the time it took to record this exposure the sea had been rendered to a smooth mystical glow. The light from quite a small moon was enough to expose the cliffs well, but still retaining some shadows to add depth and that half light feel.

Subjects

Every photography ever taken is a photograph of something, a "what" - a subject. It would be fair to say the majority of night images feature the stars, but anything you choose to shoot in daylight can be a subject at night also, given sufficient Available Light. It is true that we are using more prolonged exposures and using **time** as an **abstracting** element, but our images are only limited by our own imaginations - its time to stretch that creative muscle.

Stars as Subjects

There are people who specialise in Astro Photography, which is the discipline of shooting star fields, constellations and other celestial bodies. For this book we are only looking at **Stars as Subjects** in the context of a Landscape, but there are many considerations, important for compositions and expression.

Static or Streaking

Whether you are aiming for a composition with the stars as static points or one in which the stars are creating trails is down to your own intention and available light. Static Stars require less careful consideration as they are less significant in the frame than the foreground, or so one would assume.

In this image on the right, the leading line of the river and the snowy mountain in the distance carry the eye through the frame - the sharp stars add an element of incongruity to this well-lit night scene.

Had I taken this as a stacked star trail image and filled the sky with swirling circles, would the composition remain balanced, would it be too much?

Deciding on when to have trails and when to have static stars is an important point in the personal development of each photographer. First and foremost, our compositions should make visual sense.

Sichuan, China, Week 1 - 50% @ 21:05pm Nikon D3x 24-70/2.8 @ 29mm Single Exposure 30s @ f4 ISO 2000





Once you decide to commit to a longer exposure and **star trails** your mind must begin to work on a **visualisation** process of how the trails are going to interact with the other elements in the frame, and the frame itself.

Failure to do so will result in impressive images that will usually fail to more prolonged scrutiny. There are many factors to consider in **placement** of the star trails, and we will study these in the next few pages.

In the image above, which is the most dominant subject, the mountains or the concentric star trails?

Direction

In this section we have so many factors that dictate **what**, **when** and **how** we can shoot that its importance in the book as a whole cannot be understated. The information covered on the next couple of pages lays down so many variables for the thoughtful Night Photographer to consider.

As we all know, the Earth is an oblate ellipsoid, a squashed circle rather than a perfect sphere. Its axis is also not straight up and down, the axial tilt varies between 22.1° and 24.5°. It was actually the meteoric collision that broke off our moon that caused this misalignment, and this wobble contributes greatly to our seasons and turbulent weather.

The night sky looks quite different from where on the surface you are observing it from and in what direction you are looking. The axis roughly points towards **Polaris**, the **North Star**, and we'll cover how to find that shortly, but for now, we need to consider how the stars will appear to move during our exposures depending on the direction we are shooting, and our latitude.

What is Latitude?

If you are standing on the Equator, your Latitude is **0**° and if you are on the **North Pole** it is **90**°**N**. Every point in between is measured by the same definition, for example, here in SW Yunnan, China, I live at 28°N.

Every point on Earth can be defined by its Latitude, which is either North (N) or South (S) of the Equator, and Longitude, either East (E) or West (W) of Greenwich Meridian in London, UK.

For Night Photography, our Longitude is of little importance, but our Latitude has a great amount of influence on our compositions.



Every degree of Latitude will create different compositions of Star Trails even if taken facing the same direction and this is due to the elevation of the North Star in the sky and your point relative to the **Celestial Equator**.

On the next few pages we will be looking at how the stars will appear to trail from various points of Earth looking in various directions; North, South, East and West. It is clear there is more to think about when composing star trails than is immediately apparent. But, this attention to details should help to elevate your work to a far higher standard.

North

Because the earth's axis roughly points towards the North Star, Polaris, shots taken in this direction are typified by concentric star trails radiating out from a static point in the sky. Stars close to Polaris appear to hardly move at all in a given exposure, while the further out you get, the more they rotate.

From the North Pole, Polaris is directly above you, 90° vertical. Conversely, when you are at the Equator, Polaris lies on the horizon. As you move north, Polaris gets higher in the sky. In fact the altitude of Polaris in the sky can be used to determine your Latitude. If you are at 55N, then Polaris will be located 55° up in the sky.



POLARIS AS YOU MOVE NORTH

In these two over simplified illustrations, as you move north from the Equator, Polaris will appear higher and higher in the sky in accordance with your latitude.

South

There is no Southern Hemisphere equivalent of Polaris, but the stars still appear to rotate about a virtual pole. Exactly the same phenomenon is viewable from south of the Equator; the virtual Pole will rise in the sky as you head south.
East & West

This is where it gets fun! And best illustrated by the image on page 61, which was taken in Switzerland looking east. As the earth rotates, the stars appear to rotate around **Both Poles**, not just the north. In this image you can see the stars curving in both directions, because we are facing the **Celestial Equator** and are therefore seeing the rotation around both poles.

On the Equator, when looking East or West, the stars will appear to rotate equally around both poles and fall almost vertically toward the horizon in the middle. Again, as you move to the poles, the rotation will appear to be dominant in that hemisphere, but none the less, you will still witness this dual rotation, until you reach the North or South Pole and then you cannot see the other hemispheres influence any more.

From a compositional consideration, it should be clear that the virtual paths of the stars should be estimated **before** final arrangement of the elements has occurred,

Finding Polaris

The easiest way is to find the Constellation **Ursa Major** (The Big Dipper) and align the North Star that way as illustrated on the right. This is a reliable method assuming the Big Dipper is actually visible in the night sky. I have been out often when it is below the horizon, and you have to fall back on a couple of other methods.

With a Compass

If you're out in the wild it's a good idea to carry a map and compass with you anyway, and knowing which way is north certainly is a start in your search for the North Star.

If Ursa Major is not visible, I start by finding north on the compass. Then, set up the camera on a tripod and a wide lens to get a lot of the sky in URSA MINOR

the frame. Focus at infinity on the moon and take a 2 minute exposure @ f4 ISO 400 (If it is Astro Dark). The rotation of the stars will be visible in this time, and you can usually find which star is Polaris simply because all the others appear to be rotating around it. Sadly, it's not an exact science, but with experience you get better at finding it.

The Moon

In addition to providing the night photographer with the majority of their night light, the moon makes an excellent subject in its own right, both isolated and in landscape compositions.

In both scenarios however, it does present some challenges, but with the application of good technique, great images can be achieved fairly easily.



Ama Dablam, Nepal, Week 2 - 100% @ 19:16pm Nikon D3x 70-300 @ 145mm Single Exposure 1/30 @ f5.6 ISO 100

Shooting the Moon

Taking any image of the moon where it is big enough in the frame to view any detail requires a lot of focal length, using a 500 or 600mm lens, usually with a 1.4 or even 2x convertor, and often both!

A sturdy **tripod**, **mirror lock up** and a **cable release** to reduce vibrations to a minimum. The moon is moving all the time, and you need a faster shutter speed to freeze its motion. At least 1/60 or even 1/125 - 1/250 if possible. But for this book, I want to focus on getting images of the moon in the context of a landscape, and really, that is more of a challenge.

The Moon in Landscapes

Let's get one thing clear, there are many composite shots of full moons in landscape images out there. They create an entirely false impression that it is very easy to get the full moon juxtaposed with an impressive foreground - it's not.

Once you get used to seeing them, they are easy to spot. For the moon to be any size in the frame needs at least a medium zoom of over 200mm, and most of the composite images are taken with wider angled lenses than that.

You can of course stack an exposure of the moon with a landscape to balance the exposure, but mixing focal lengths or adding moons that were not there distorts reality.

At Twilight

The visible moon is always relative to sunrise and sunset times. **New Moons** always **rise** around **sunrise**, and **Full Moons** always **rise** around **sunset** and **set** around **sunrise**. The image on the previous page was taken at sunset, which provided enough lingering light to balance the exposure with the rising moon, and give some nice purple tones to the sky.

There is really only one day a month when it is possible to see a full moon rising or setting in the landscape with enough light from the rising or setting sun to balance a good exposure. The day of full moon is the one you want to be out on.

On other days of the month, the moon will still be in the sky at various times of the day and night and in various phases, and many of them allowing for good images to be made.

At Night

Having the moon in the frame at night opens up some excellent opportunities, either on crystal clear nights, or when scattered clouds sweep across the sky. Even a small amount of moonlight will backlight clouds to great effect. As we've said before, night light is diverse and offers massive opportunities to those who venture out.

There are no practical difficulties to be concerned about, the moon will blow out completely in anything over a fraction of a second exposure, but rendering it small in the frame with a wide angled lens makes that point a minor one.

Any shot showing the moon with any detail at night in the context of a landscape is a composite.

With a wide-angled lens it is also possible to shoot the moon rising or setting creating a super bright trail. These too can be very impressive.

Shootiing images with the moon in the frame has the benefit of showing the light source, which can add a lot of depth to your night images.

Hyperfocal Distance & Depth of Field

This is one of the most important elements of landscape photography and has huge implications in our night photography too. It is one of our most reliable methods of focus and the way in which we control how much of our image will be sharp.

As with all forms of photography, there is no right or wrong, especially if you make a signature style out of it, but to my mind, nothing is worse than out of focus stars or worse still, out of focus star trails.

The stars are effectively at **Infinity Focus**, they are, after all, a long way away! But, due to the limited available light, shooting at very small apertures of f22 or so, is mostly impractical. More normal apertures for night photography would be f2.8-f5.6.

At wide angles, you can still have very large depth of field, even with large apertures, but one must be mindful of how close the nearest elements in the frame are to the camera.

What is Hyperfocal Distance

Firstly, Hyperfocal Distance is not a fixed point, it is not constant and it changes between camera models, focal lengths of the lens used and the chosen aperture. You need access to a **DOF Calculator**, either online http://www.dofmaster.com/dofjs.html or one of the many applications available for iPad, iPhone or Android.

The most simple definition is this - Hyperfocal Distance is the focal distance that allows **everything** from **half** that distance to **infinity** to be **in focus**.

For example - Nikon D3x - 24mm lens at f4 - Hyperfocal Distance = 4.8m

If I focus this Camera/Lens/Aperture combination at 4.8m (even at night) - I know that everything in the frame from 2.4m in front of the lens all the way to infinity should be in sharp focus.

In Theory!

The world is rarely flat and regular - I prefer to buy myself a couple of metres of flexibility and in the above case would rather focus at 6m and loose a little foreground in the frame (only 60cm less) - and be assured of infinity focus.

The stars really have to be sharp, and in many cases **Infinity Focus** on the moon works extremely well. This really is a matter of personal choice, **hyperfocal** or **infinity focus**. At wide angles on full frame sensors I find the difference in DOF marginal. As you move up in focal length, the challenges of sharp foregrounds increase. Infinity focus however, always creates sharp stars, whereas trying to gauge a 50m hyperfocal distance @ 70mm can prove troublesome.

Choosing your compositions with depth of field in mind though will enhance your shooting experiences and can open up quite dramatic scenarios.



Asturias, Spain, Week 2 - 21% @ 21.21pm Nikon D3x 24-70/2.8 @ 28mm Single Exposure - moon in frame 121s @ f5 ISO 80

IN THE FIELD

Introduction

Reading theory is all well and good, but it is outside in the field where we make our images, using our study time wisely to make the most of the Available Night Light that nature provides for us.

We've already learned that every night is different, with moon phases, cloud cover, humidity, temperature, light pollution, altitude and a multitude of other variables. To write a section that is a definitive guide to all situations would be a thankless task, and to be honest could even take a lot of the fun of discovery and exploration out of the process for the readers.

I will use this chapter to lay out some guidelines of some of the things that are possible under a range of light conditions. Its not definitive, but is a starting point for those of you less familiar with Manual Exposures at night or with limited time to practice.

Of course, any image taken should start with a thorough **Scene Evaluation**, as the variables of **Available Light** and **Subject Luminosity** will always make any **pre-decided** Settings or Aperture, Shutter Speed and ISO unreliable.

We mentioned already the fact that some images are more achievable in certain conditions than others, and in the case studies that follow we'll be looking at the easier things to achieve rather than the more technically challenging. Night Photography is definitely a Progressive Learning Curve and as you gain your own experience and knowledge you can branch out into the more adventurous or technically demanding aspects of the discipline.

We'll break the case studies down into three shooting scenarios and look at single frame and multiple frame opportunities.

Blue Hour - Single Blue Hour - Multiple Dark Nights - Single Dark Nights - Multiple Bright Nights - Single Bright Nights - Multiple

79

Blue Hour - Single Exposures

At the very beginning of the book we began by discussing Available Night Light, whether from the moon, light pollution, intentional light painting, or the residual light after the sun has set, or before dawn. Blue Hour is the time on the edge of night, when the mood is often subdued, or mysterious in the half light.

There is no single case scenario for Blue Hour, the conditions immediately after sunset are still quite bright, whereas shortly before Astro Dark it is effectively dark. The transition point happens when the luminosity of the sky more or less matches the ground, and the effects of any available moonlight begins to become evident.

No Filters

In order to take a single frame during Blue Hour there has to be a scene with a dynamic range limited enough to be captured in a single exposure.

As we learned earlier, **Lightroom 4** is exceptional at extending the dynamic range of single frames with the use of their Shadows/Highlights, Whites and Blacks sliders.

The image on the right was taken in Indonesia when the dynamic range between the sky and foreground was balanced enough for a single exposure.

I knew that a shutter speed of 0.8s was about right to keep some texture in the water and just had to adjust the aperture to get the correct exposure.

In this case it was still bright enough to meter, so I used Spot Metering on the brighter area of the sky and added 1/3 of a stop. Spot metering wants to render whites as mid tone grey, so adding some exposure helps to brighten them.

The same is true for shadows, when you spot meter a shadow, you can reduce the exposure by up to a stop to render them darker.

Bali, Indonesia, Week 4 - 50% @ 18:25pm Nikon D7000 14-24/2.8 @ 21mm Single Exposure - Processed in Lightroom 4 0.8s @ f14 ISO 200



Filters or Magic Glove

As soon as the dynamic range is greater than a single exposure can handle, you have to control the cameras inability to record the scene as you experience it. For single exposures that means using **GND's** or the **Magic Glove Technique** covered earlier in the book.

We discussed already the limitations of these techniques, in that both of them do not take into consideration any elements that cross the transitional zone, such as trees, sea stacks or mountains. It is my opinion that unless the transition lends itself to more or less a straight line, then multiple exposures and manual blending should be employed for best results.



Astrurias, Spain, Week 1 - 28.5% @ 05:12pm Nikon D3x 24-70/2.8 @ 66mm Single Exposure - Processed in Lightroom 4 15s @ f9 ISO 50

In the above image I used the **magic glove technique**. A longer exposure helps with blurring the water, and give time to briefly expose the sky for a second and then cover it for the rest of the exposure. Keep the hand moving to avoid an obvious transition line. Still, the very top of the dark rocks on the right are darker than they should be, but this is quite a good example of how good this technique can be.

Another advantage of the **Magic Glove Technique** is that it comes in more varieties than 0.3 0.6 & 0.9

Blue Hour - Multiple Exposures

The Multiple Exposures technique of manual bracketing images is my preferred method of shooting these days. I expose various areas within the scene as I want them with as many exposures as are required to cover the dynamic range. I believe this gives me the maximum opportunity to process an image that accurately reflected my experience and I know I have Harvested the Available Light, which I will be able to keep for years.



Astrurias, Spain, Week 2 - 81.4% @ 22:08pm Nikon D3x 24-70/2.8 @ 24mm 5 Multiple Exposure Processed in LR4 & Photoshop CS5 1/30, 1/8, 0.5, 2s & 8s @ f10 ISO 200

For this example, the scene exhibits extreme dynamic range and would not be possible with conventional single frame techniques due to the irregular distribution of shadows and highlight. While this image may be no more than a technical exercise, it shows the power of manually blending images in terms of delivering high dynamic range scenes, very close to how it was experienced at the time. Our eyes are so good at discerning details in shadows and highlights, we sometimes forget at how limited a single frame of a DSLR can be.

Processing images like this is quite complex, and is beyond the scope of this book. Please visit www.harvestinglight.net for frequent free tutorials.

Dark Night - Single Exposures

For the purpose of these exercises, we will define **Dark Nights** as those with less than half a moon - weeks 1 and 4 in our Lunar Month. Even so, there is quite some difference between a night with a new moon and nights with half. Still, it makes sense to refer to these two weeks as the **Dark Half** of the month.

With Single frames, it is a good time to do long exposures, as the limited moonlight prevents any overexposure issues of the foreground, or washed out skies caused by too much moonlight.

For any Single Night Exposure, a **High ISO Test Shot** really is the first step. Evaluate the **Available Night Light** and **Subject Luminosity** and work your long exposure times from there.



Asturias, Spain Week 1 - 7.6% @ 03.36am Nikon D3x 14-24/2.8 @ 14mm Single Exposure 3652s @ f4 ISO 125

A full hour, with no moon in the sky, and still enough available night light to get a great exposure. The **High ISO Test shot** looked very similar in terms of its luminosity. Placing the Pole Star in the upper left of the frame helps to balance the heavier sea stacks of the lower right. A little **light pollution** from a nearby town adds a glow to the horizon, not unlike the first rays of dawn.

As the moonlight allows in the second half of week 1, or in the first half of week 4, other opportunities open themselves up. **High ISO Test shots** can become presentable images in their own right. The key here is to be mindful of the **500 Rule** and limit the shutter speed to within the parameters set by this guideline.

A shot with slightly streaking stars is not too attractive and implies sloppy technique, rather than a well thought out and technically proficient image.



Asturias, Spain Week 2 - 51% @ 19:30pm Nikon D700 24-70/2.8 @ 28mm Single Exposure - LR4 30s @ f4 ISO 800

The above image was actually taken on day one of week 2, but I am sure a day didn't make too much difference. The statistics are slightly out of the 500 rule though, and there is a tiny amount of streaking available at 100%. Each person has their own tolerance to this, and in future I could reduce the Aperture to f2.8, or stay at f4 and raise the ISO to 1600 to eliminate the streaking, while retaining the same exposure.

Dark Night - Multiple Exposures

As soon as you are not constrained by the limitations of a single exposure, creative opportunities open up before you. Even on the darkest nights with no moon, you can take an exposure during the last moments of **Blue Hour**, providing a foreground exposure that can then be blended with either a short duration star image to create sharp stars, or a longer, extended exposure to create long star trails. Even if you only use the Blue Hour exposure to paint in some foreground details in Photoshop you are massively extending the dynamic range.

Again, we are not concerning ourselves with the authenticity or morality of such images, we are only trying to create a final image that is an artistic expression of nightfall and our particular subjects.

Even with a relatively small moon, I was able to capture a good exposure in only 2 minutes at f4. I was able to start before **Astro Dark**, and a couple of the images caught a little of the post sunset glow off to the far left.

There were many plane trails in the sky and boats on the ocean, but they were all cloned out on the frames in which they occurred. There is no noise in the image.

Some of the foreground details no doubt came from there images before the last light from the sun was gone.

Stacking is an incredible tool for night photography, and we will cover exactly how to create these images in the next chapter.

Note too the compositional importance of the Pole Star. It compliments the cliff face and balances the scene.



Basque, Spain Week 1 - 27.3% @ 21:00pm Nikon D3x 14-24/2.8 @ 28mm Multiple Exposure - LR4 + CS5 35 x 120s @ f4 ISO 200

Bright Nights - Single Exposures

Once again, we will define **Bright Nights** as those occurring in **Weeks 2** and **3** of the lunar month; from **Half Moon**, through **Full** and back to **Half**. It is an excellent time to shoot night images, and for people starting out, it can be a lot easier too. Everything from focus, to scene evaluation, composition and finding your way is just so much easier.

On very bright clear nights it is a truly wonderful time to be in woods, when the dappled light filters through the trees to the forest floor. The scope for creative, expressive images is simply staggering, the world truly is your shellfish.



Annapurna, Nepal Week 3 - 97.4% @ 06:00am Nikon D3x 24-70/2.8 @ 62mm Single Exposure - LR4 15s @ f2.8 ISO 200

At full moon, the amount of available night light is staggering, especially reflected off luminous snowy mountains. This technique is rightly called **Night as Day**, and its only the stars in the blue sky that give away it is a night image at all. The white balance too is slightly cooler than one would expect during the day.

Again, **Lightroom 4** does an incredible job of bringing out details in the shadows and controlling the highlights. There was no need to call on any specialised Photoshop tools to make this one look any better.



Sichuan, China Week 2 - 51% @ 19:53pm Nikon D700 70-300 @ 78mm Single Exposure - LR4 597s @ f5.6 ISO 100

On bright nights you can still achieve single frame star trails by using a longer focal length. In this image of only 10 minutes, the trails are long enough to let it be known it is a night image. Infinity focus on the moon is the way to ensure sharp stars and subject. In this case, I could have easily made the exposure a lot longer by dropping the ISO to 50 and the aperture to f8. There would be slightly fewer stars in the frame, but the trails would be 4 times longer because of the extra 2 stops. Obviously too, a less luminous subject would allow for a longer exposure as well. Its all about **Scene Evaluation**.

Bright Nights - Multiple Exposures

It was clearly demonstrated over the last few pages that on bright nights, the length of the shutter speed has to be moderated due to so much available light. But what if you feel you still want to do some long star trails? This is the realm of **Stacking**, allowing many short exposures to be blended together to produce a constant trail without blowing out every highlight in the image.

In this fully worked example we'll examine the **technical side** of capturing the images, and the **processing** in **Lightroom 4** and **Photoshop CS5**. There are other ways to stack star trails, especially in **Windows** with software called Startrails.exe but on a Mac, this is how I do it.

Preparation - The scene is on the north coast of Spain, around 12 km from where we used to live. I had visited the location many times and as soon as I saw it knew I wanted to do a long star trail. Two things I knew, I wanted to be there when there was quite a lot of moon and on a falling tide, as the caves get filled with water at high tide. Not somewhere I wanted to get trapped at all.

I also needed a clear night I was looking for star trails, not sweeping clouds. On the night of the night of 15th May 2011, the conditions were right and we went out with a moon of 96.9% in a clear sky.

Scene Evaluation - I wanted exposures from before it was dark to help illuminate the inside of the cave and I took some frames shortly after sunset around 10pm. The dynamic range is huge, and I bracketed a number of exposures to build up a bank of Harvested Light covering the inside of the cave and the foreshore. As Astro Dark approached, I did a high ISO test shot to evaluate the way the light was interacting with the surf, and decided upon an exposure of 180s @f4 ISO 200. The surf was not clipping in the moonlight and the rocks outside the cave were well lit. Inside the cave was of course pitch black on the ceiling, but the floor was picking up some ambient light.

Shooting a Stack - The idea is to take a series of identical frames, and for this you need a timer cable release. (Covered in Equipment Chapter) - I dialed in the exposure time of 3 minutes, set the interval to 1 second and the frames to constant. On the camera, In BULB mode I set Aperture f4. Make sure Mirror Lock up is OFF, otherwise you have a 30s gap in your star trails. Long Exposure Noise Reduction is OFF.

Focus had already been established before sunset, so there was no need to move the camera or recompose. If you can close the viewfinder at the back do so, or cover it with a cloth. The Canon 5D2 has a red light that shines when it is exposing (why?) and that can reflect off your clothing or face and enter the back of the camera and affect the sensor.

Click **start** on the Timer and the camera will take exposures until you tell it to stop, or the battery in the timer release or camera die.

In this case I took 33 exposures, giving a total time of 99 minutes

Light Painting - For the last exposure, the 34th, I painted the inside of the cave with my head torch. I obviously couldn't stand in front of the lens, so I was a little limited with the reach of the light, but I was able to illuminate the inside of the cave quite well in the 3 minutes I had available to me.

Lightroom 4 - One of the stacked images directly from the camera is shown below, and below that after it has been worked in Lightroom 4.



Not too much work done, opened up the shadows a little and levelled the ocean horizon. Once this is done, SYNCH all the files, to apply the same corrections to every frame. At this stage, I select all the files and **Export** them to a folder at 300 dpi resolution, Pro RGB colour space and 16bit TIFF.

On the next page we'll look at what happens next in Photoshop.

Stacking in Photoshop - To stack your images in Photoshop you need to open Statistics. This is located in **FILE/SCRIPTS/STATISTICS**

A dialogue box opens, as shown on the right. Use the Browse button to navigate to the folder containing your exported images. Please note I used jpegs for this example, but for a full print image I would be using 16 bit Tiff files.

Once the files have been loaded, you will notice the drop down box at the top called - **Choose Stack Mode**.

There are a number of options, for stacking star trails we use **Maximum**.

This creates a stacked Smart Object

Image Statistics					
Sourc Choos Choos opera	e Stack Mode: e Files se two or more tion on.	Maximum files to comp	ute the	• statistics	OK Cancel
Use:	Files		٣		
	_DSC0765.jpg _DSC0766.jpg _DSC0767.jpg _DSC0768.jpg _DSC0769.jpg _DSC0770.jpg _DSC0771.jpg _DSC0771.jpg _DSC0772.jpg		1 1	Browse Remove Add Open Files	

in Photoshop and blends the images based on the brightest value for each and every pixel. It makes sense if the exposure is essentially identical for all the foregrounds, the only real change is in the sky, and a star will always be the brightest pixel in a darker sky. As the stars move, each image pastes a new star position into the stack.

Really smart, really ingenious and helps night photographers immensely.

Warning - Each 16bit Tiff file from a typical DSLR is in the 50-75Mb region. You can imagine what opening 20-50 of them at the same time is going to do to Photoshop and your RAM. I recommend leaving the **Attempt to Automatically Align Source Images** box **Unchecked**, otherwise you may as well head out for the day and leave the computer to it.

The processing of stacking is very memory intensive for your computer. I try to start a stack before dinner, or even if I am heading out for an hour or so. Obviously high powered computers help with this, but even so - now is not the time for multitasking.

The basic stack is shown on the right, the star trails clearly visible outside the cave mouth. The cave of the floor is currently as bright as the brightest frame of the stack, the one or two before complete Astro Dark.



Photoshop opens the stack as a **Smart Object**, and is shown in the layers palette as a single frame. If you double click on this layer, it opens a warning box telling you that you can edit the layers individually and then click **FILE / SAVE** to save the file and update the Stack.

The implications of this are pretty huge. You can **edit** any of the **single layers** of the stack individually to remove unwanted lights that may come into a night exposure - Plane Trails, Boats on the Ocean, Cars driving along a road, satellites, or even someone walking through your frame wearing a head torch (this happens).

Once you have removed all these unwanted elements (I use masks on each layer rather than destroying the original pixels) - click **File/Save** and the stack updates itself and all your plane trails have gone.

The image on the right shows layer masks on a stacked star trail image. The **white mask** means **Reveal**, showing everything on that layer in the stack. If you paint out a plane trail in Black on the white mask, that part of the images will be hidden, and will not show up in the stack.

Smart, neat and tidy.



In our worked example, there were no plane trails, but

there were a couple of fishing boats that had moved through the frame and I removed those using this method.

Flatten & Save - At the moment the file is in the Photoshop PSD file format. Once you have finished your editing you can Flatten all layers and save the file as a Tiff or PSD.

Adding the Light Painting - This is another element of stacking that is so flexible, we have already seen that you can delete any layer you want from a stack while editing the layers. Exposures from too long before **Astro Dark** may add too much luminosity to the sky. Either mask them out, or delete the layer.

When we want to add our light painting we did in the very last frame, that too is a simple and flexible process. I intentionally didn't add that image to the original stack, but instead opened it with the flattened stack later.

Again, using masks, it is possible to paint in details from the painting as you like.

I am not going to illustrate the full processing, that is something I can cover in free online articles. But, the final image is shown on the next page. Of course, it is a stylised representation of star trails seen from a double cave on a remote section of Spanish coast, but it demonstrates well the power of these techniques to create unique images.



Landscape Photography at night is a fascinating and endless opportunity to create unique images in mysterious light conditions. Whether you limit yourself to the naturally Available Night Light only, or use the lingering light of twilight, light pollution from nearby towns or add some light yourself, the process of Harvesting Light at Night is just the beginning.

Preparation - Know when to be out and what light to expect

Scene Evaluation - A High ISO Test shot clearly shows what Available Night Light there is and the Luminosity of the Subjects in your Frame. Are there Dynamic Range Limitations, will a single exposure work, or do you need to stack?

Exposure and Composition - Focus, Exposure and Composition, make your creative choices from Aperture | Shutter Speed & ISO combinations.

Seeing the Unseen - Visualise a final image in all its glory - use the Harvested Light to create your expressive vision.

Processing - Releasing the vision from the Harvested Light.

EQUIPMENT

Night Photography requires very little specialised equipment, if you are already invested in gear for landscape photography chances are you have everything already, or else need a small investment to get yourself started at night.

Its been said a million times and once more wont help - cameras do not take great images, great photographers do. Investing time in your technique, learning, visualisation and planning will pay greater dividends than spending a load of money on a new camera.

Having said that, photography is a gear-oriented pursuit, and certain equipment is necessary, but the minimum requirements are already in the camera bags of millions of photographers worldwide.

Cameras - To achieve any technique described in this book, the only requirements your camera need are the ability to shoot in **BULB** mode and accept an **external cable release**. We all know that some cameras have more megapixels in their sensors or deal with noise in different ways, but it is up to you to evaluate those characteristics and take images that play to the strengths of your equipment.

A third capability that I would consider to be essential is the ability for the camera to record images in the **RAW** file format. Jpegs will get you only so far, but your creativity will be very limited if you can only shoot jpeg. If that is your situation, then of course, you have to deal with that too. You must pay particular attention to your exposure to make sure you are not underexposing your images. Jpegs do not easily forgive underexposure.

Long Exposure Noise Reduction is useful for longer single exposures and of no value to stacking shorter exposures. I rarely use it now, but If you wanted to do a single exposure of one hour, I would use it. Remember it does half the usable battery life, as you need to leave enough power to complete the dark frame.

Batteries - Very variable in their usable time limits, and also affected by temperature and humidity. On a cold night they will drain faster and on warm nights will last considerably longer. If you are looking for maximum duration, always start with a full warm battery.

Cameras that accept battery grips containing two batteries are ideal for night photography and a worthwhile investment for those looking for very long star trails.

Lenses - Most modern lenses in common use have a minimum aperture of between f2.8 and f5.6 - This is perfectly acceptable for night photography. When doing your **High ISO** test Shots use your **minimum aperture** whatever it may be.

Wide-angled lenses are most forgiving for Night Photography, allowing greater Depth of Field and nearer Hyperfocal Distances.

When calculating your 500 Rule you must include the crop of the sensor in your calculations, or you will be very wrong. 14mm on a Canon camera with a 1.6x crop is actually 22.4mm.

Lenses continued - If the lens comes with a lens hood, use it. Stray light entering the side of the frame can seriously affect longer exposures. They also help to reduce the effects of fogging condensation that can build up on lenses (especially lenses with bulbous front ends).

Cable Release/Remote Timer - This little piece of equipment is essential for night photography. Most brands make them for their DSLR's and there are now numerous third party ones that work very well for a fraction of the price.

The Canon and Nikon ones are shown here on the right, both sharing identical functionality.

The large button on the front, when depressed, will keep the shutter open for as long as you hold it down, or it can slide forward to lock it.

The most important function of these however, is to allow multiple exposures to be programmed, and then will open the shutter at predetermined intervals for the duration of your shot.



There are 4 programmable parameters - Delay, Interval, Long and Frames.

Delay - If you want your sequence to start in 30 minutes time, enter that time. This has limited use to night photographers unless for some reason you need to leave your camera in a place that you cannot personally keep an eye on it all night.

Interval - This is the time between the frames, use 1 second, which is the minimum that can be set. Any longer and there will be a pronounced gap between star trails, effectively ruining the shot.

Long - This is the length of the exposure. If you have calculated that you need 2 minutes at f4, 200 ISO, then dial in the 2 minutes on the timer.

Frames - Finally, you can specify a number of frames. You can set 30 frames (@ 2 minutes this gives you a one hour sequence). Otherwise you can set the counter to the (-) symbol, which means the timer will keep shooting frames until you press stop.

Once you have set the camera going, keep away from it and leave it alone until you want to stop. Any vibration can affect the alignment and sharpness of your images.

Tripods - The make and model of your tripod is not important, the only requirement is that it can support your camera and lens for long exposures. If it is windy then weighting down your tripod with some rocks in a bag can massively improve its stability. If possible try and keep it out the wind in the shelter of a cliff, boulder or tree.

Flashlights/Head torch - Before embarking into the wilds, safety and survival should be paramount considerations. Having a light source with you is always a good idea. Make sure you have spare batteries for it too. I usually carry at least two with me, one of which is solar powered and lives strapped to the top of my backpack.

These light sources are great for your survival and getting you back to the car in the dark, but also for Light Painting if you want to use that technique.

Please be mindful about using it to set up your camera though. Your eyes become accustomed to the dark quite fast, and you will find you can use most of the functions of your camera by feel. Shining a head torch in a colleagues face will ruin their night vision for quite a while. Get used to the available night light and try and set yourself up without a torch.

Lens Blower/Heated Gels - Condensation can form quite easily on lenses and can ruin your shot. Gently blowing air over the front element can reduce this build up. The other option are the heated hand warmer gels that can be purchased. Strapping a couple of these to the lens will also stop the condensations build up. Make sure not to place them on the focus ring and check focus before you commit to the shot.

Safety/Survival Gear - As with a light source, any trip into the wilderness should be accompanied with suitable outdoor survival gear and supplies. The following list is not definitive, but worth considering.

GPS, map, compass, warm clothes, food & hot drinks , some company, a book, music, ground mat and sleeping bag, spare batteries for camera, torches, timer release & GPS.

It can get very cold at night even in the desert, a ground map to sit on, a sleeping bag to wrap yourself up in and a mate to chat to while you watch the stars and drink hot chocolate is a great way to make the process more comfortable.

> Respect the wilderness, take your trash home. Leave only footprints, take only images.



LEARN with Alister Benn



Each year Alister Benn and Juanli Sun lead a small number of Photo Tours to Iceland, Spain, Scotland & Tibet.

Dates available all year.

Maximum Goup Size: 2-6

CHECK AVAILABILITY HERE

USEFUL LINKS

Websites

<u>Available Light Images</u> Personal Tuition, Photo Tours & Workshops with Alister Benn

Seeing the Unseen G+ Community

Q&A for the eBook plus Image Critique Forums - Free Registration

<u>Whytake.net</u> The Global Community of Nature Photographers inspire | Connect | Explore

Software

The Photographers Ephemeris - The premier sun/moon prediction software.

Google Earth - An incredible tool for planning locations with astronomical awareness.

<u>Adobe Lightroom</u> - For maximising your RAW file workflow - incredibly powerful processing tools.

LR Enfuse - An excellent plugin for Lightroom that allows bracketed images to be blended within Lightroom. Also works to Stack Star Trails

Startrails - A well-known Windows-based piece of software for Stacking Star Trails.