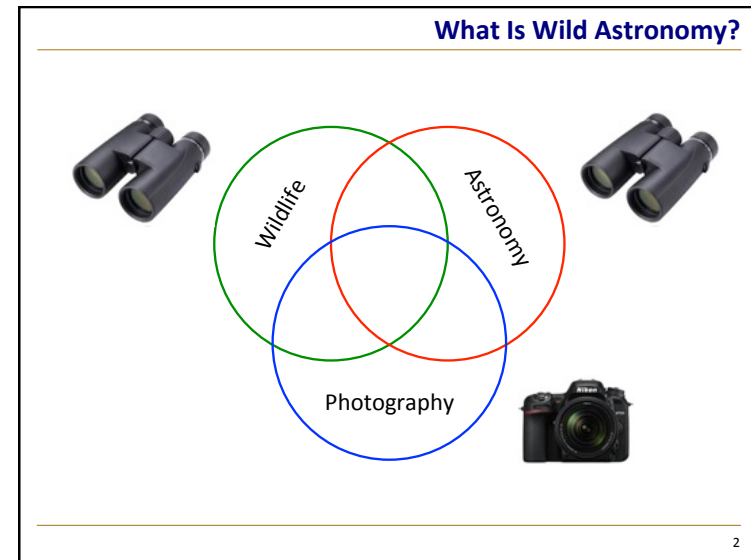


# Wild Astronomy



### What Are We Talking About

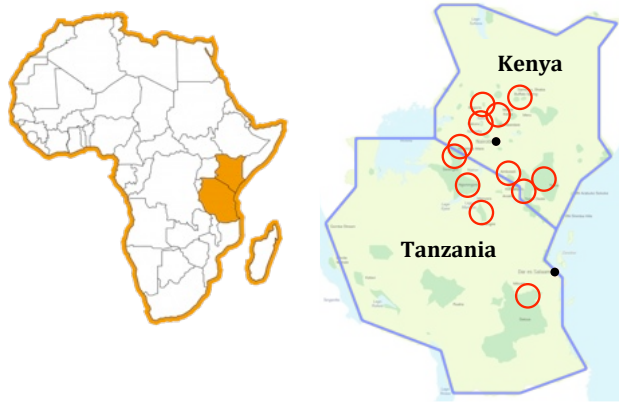
<b>Going on Safari</b>	Where to go, what to take
<b>Lodges and Camps</b>	Where to stay
<b>Game Drives</b>	How to see all the wildlife
<b>Wildlife Photography</b>	Capturing it all
<b>Astrophotography</b>	Under the darkest skies

3



# Wild Astronomy

Kenya and Tanzania



5

Going on Safari



6

Arrival at Nairobi Airport



7

Hitting the Road



8

# Wild Astronomy

## Quintessential Africa



Lots of zebras, elephants and giraffes ...

... and a watering hole

9

## Flying To Rufiji



Flying by bush aircraft – faster and more expensive than by road

10

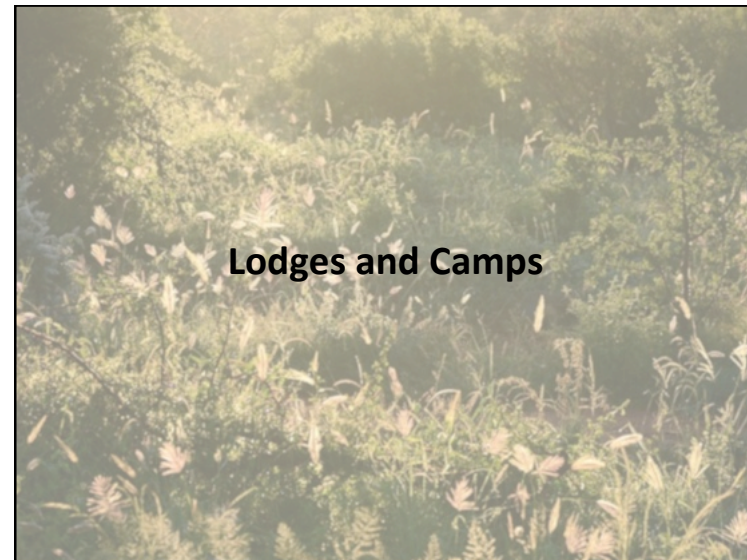
## Rufiji International Airport



Mtemere Airstrip, Rufiji River Camp

11

## Lodges and Camps





# Wild Astronomy

Sunbird Lodge



View from terrace of Sunbird Lodge, Lake Elementaita

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Sunbird Lodge



Inside Sunbird Lodge room, Lake Elementaita

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Mara Serena Lodge



View from terrace of Mara Serena Lodge, Maasai Mara

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Kilaguni Serena Lodge



Terrace of Kilaguni Serena Lodge, Tsavo West National Park

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# Wild Astronomy

Overlooking the Watering Hole



Terrace of Kilaguni Serena Lodge, Tsavo West National Park

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Eland at Sunrise



Watering hole of Kilaguni Serena Lodge, Tsavo West National Park

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Floodlit Watering Hole



Watering hole of Kilaguni Serena Lodge, Tsavo West National Park

19

Star Trails Over Kilaguni



2003 First attempts at astrophotography, Kilaguni Serena Lodge, Tsavo West National Park

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# Wild Astronomy

Rooms On Stilts



Sunrise at Salt Lick Lodge, Taita Hills

21

Crater View



View from Ngorongoro Lodge room, Ngorongoro Crater

22

Keekorok Lodge



Boardwalk in grounds of Keekorok Lodge, Maasai Mara

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Oi Tukai Lodge



Oi Tukai Lodge, Amboseli National Park

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# Wild Astronomy

OI Tukai Lodge



Grounds of OI Tukai Lodge, Amboseli National Park

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OI Tukai Lodge



Electric fence of OI Tukai Lodge, Amboseli National Park

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Star Trails Over OI Tukai



2003 First attempts at astrophotography, OI Tukai Lodge, Amboseli National Park

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Tented Camps



Mara Sarova Game Camp, Maasai Mara

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# Wild Astronomy

Tents by the River



Governors' Camp, Maasai Mara

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Tents by the River



Signs of a nocturnal visitor – maybe astrophotography is not such a good idea

30

Rufiji River Camp



Rufiji River Camp, Selous Game Reserve, Tanzania

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Star Trails Over Rufiji River Camp



Nikon D70 + 18-70mm lens  
Static tripod (no tracking)  
120s exposures

2005 Early attempts at astrophotography, Rufiji River Camp, Selous Game Reserve, Tanzania

32



# Wild Astronomy



## Our Safari 'Team'



The Syzygy Society with David – our driver, guide and friend

34

## Room in the Van



Amboseli National Park

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## Do You Need a Big Telephoto Lens?



Sigma 200–500 mm



Nikon 300 mm

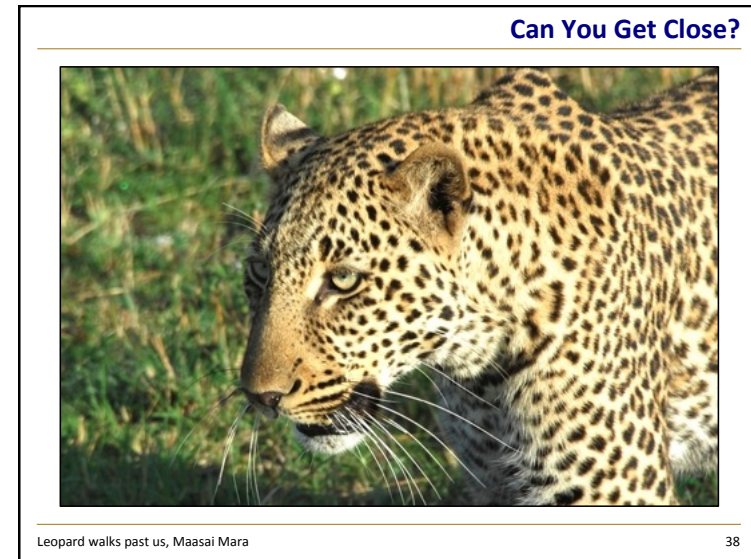
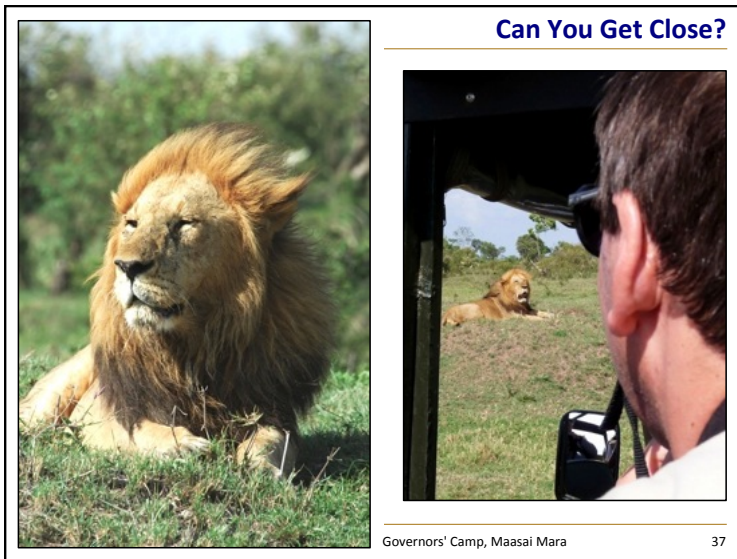


Canon 600 mm

Telephoto lenses up to 300 mm are great for wildlife photography

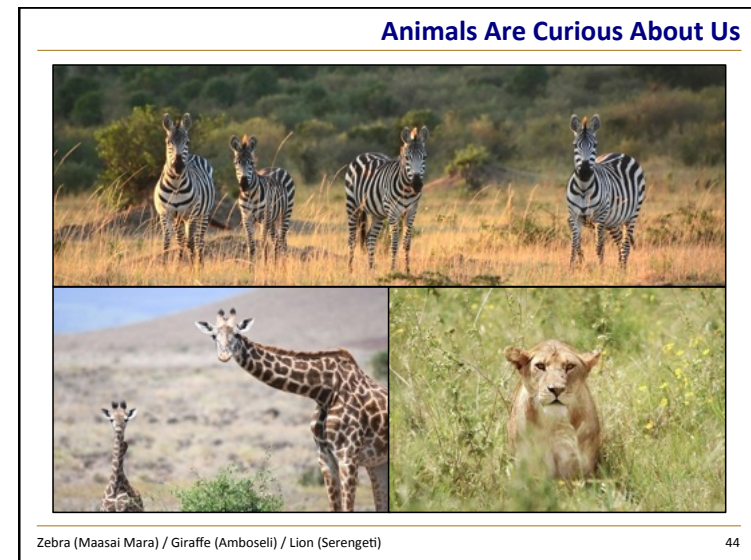
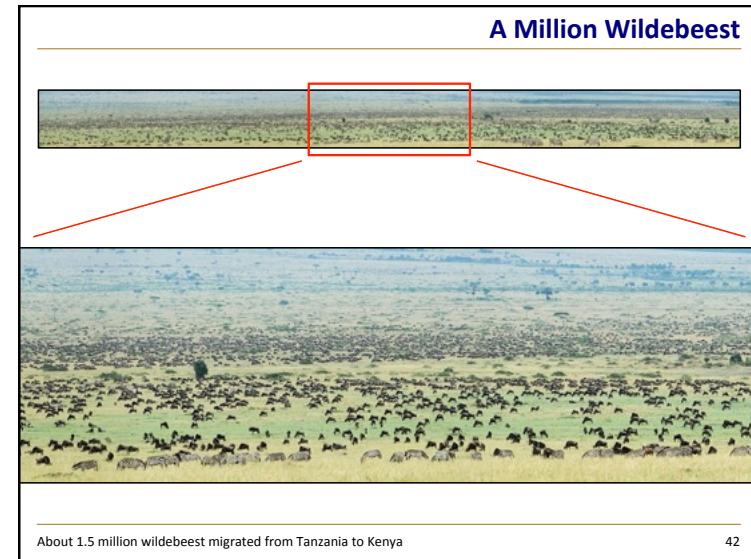
36

# Wild Astronomy





# Wild Astronomy



# Wild Astronomy

**Animals in the Grass**



Lioness watching over her cubs in the grass, Serengeti National Park, Tanzania

45

**Animals in the Grass**



Elephant in the swamp, Amboseli National Park

46

**Animals in the Grass**



Giraffe in the long grass, Maasai Mara

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**Zebras Grazing**

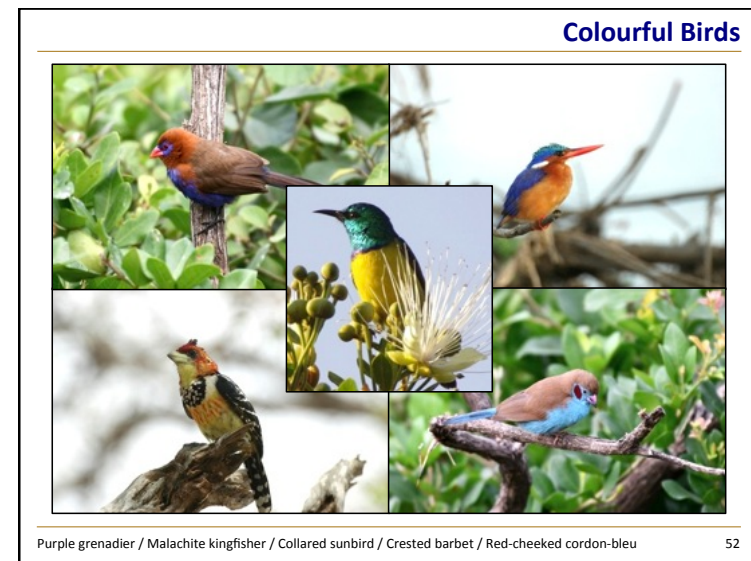
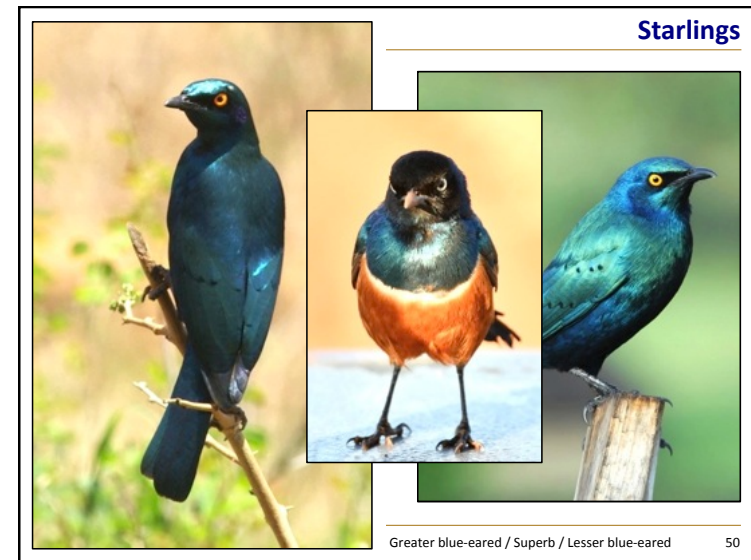
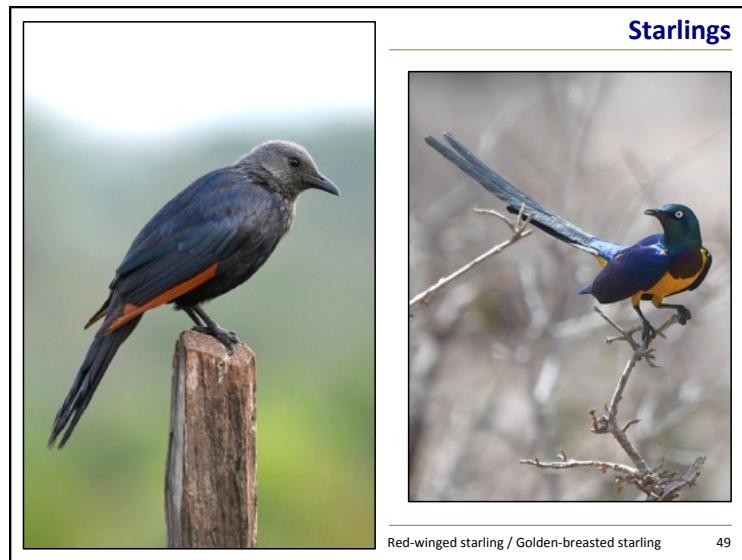


Zebras grazing at sunrise, Maasai Mara

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# Wild Astronomy



# Wild Astronomy

**White-fronted Bee-eaters**



White-fronted bee-eaters, Rufiji River Camp

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**Lilac-breasted Roller**



Lilac-breasted roller, Taita Hills

54

**Big Birds**



Ostrich / Ground hornbill / Saddle-billed stork / Greater egret / Black-headed heron

55

**Odd Birds**



Hammerkop

Secretary birds

Kori bustard

56



# Wild Astronomy

## Raptors



Lappet-faced vulture / Augur buzzard

57

## Raptors



Black-chested snake-eagle / African fish eagle / Pale chanting goshawk / Grey kestrel / African fish eagle

58

## Patience



Tawny eagle, Tsavo West National Park

59

## Bad Hair Day?



Tawny eagle, Tsavo West National Park

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# Wild Astronomy

## Water Birds



Black-winged stilt / Greater painted-snipe / African jacana

61

## Lesser Flamingo



Lesser flamingo, Ol Tukai Lodge, Amboseli National Park

62

## Reflections



Great white pelican / Lesser flamingo / Black-headed heron / Great cormorant / Lesser flamingo

63

## Reflections

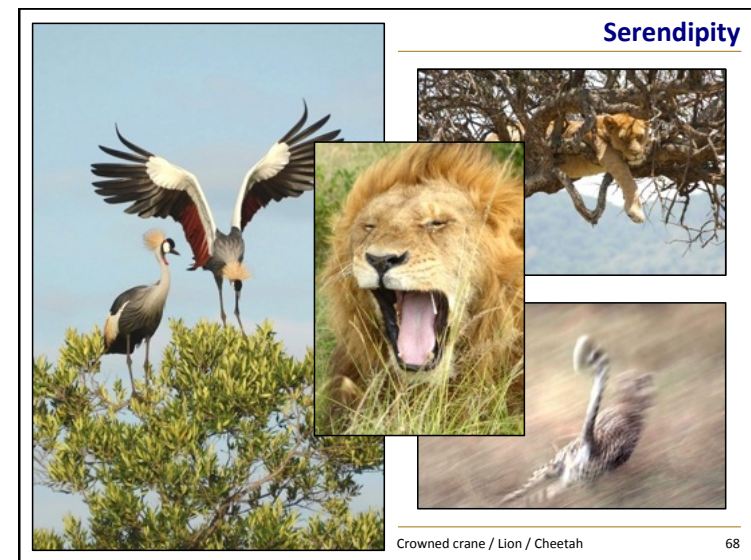
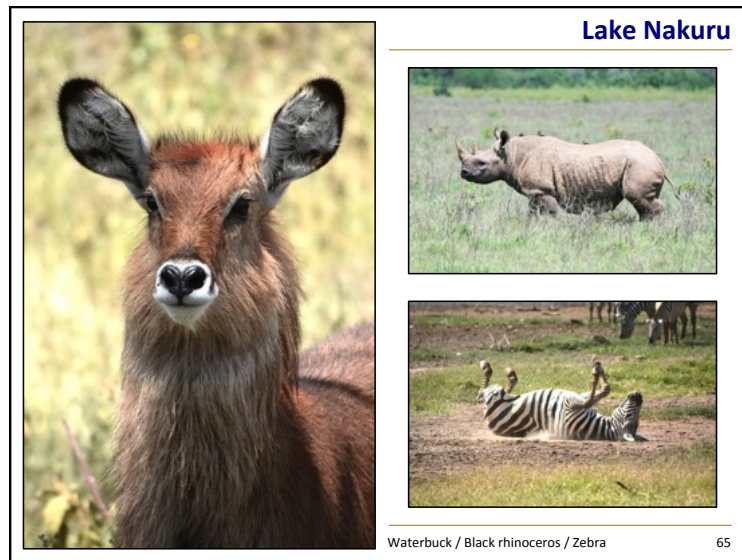


Elephant (Amboseli NP) / Impala (Tsavo West NP) / Zebra (Tsavo West NP)

64



# Wild Astronomy



# Wild Astronomy

## Zebra Crossing



Zebras crossing flooded plain, Ol Tukai Lodge, Amboseli National Park

69

## Yawns



Olive baboon / Leopard / Cheetah / Hippopotamus

70

## Astrophotography



## Star Trackers



DIY star tracker 'K2' designed and built by Steve  
Used 2007–2013



iOptron SkyTracker™  
Used since 2013

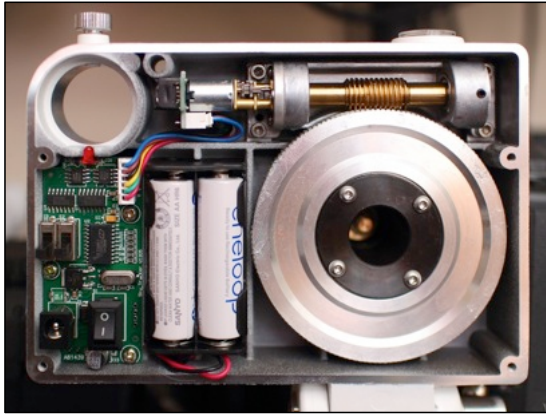
K2 and iOptron star trackers

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# Wild Astronomy

## Inside a Star Tracker



Inside the iOptron SkyTracker™

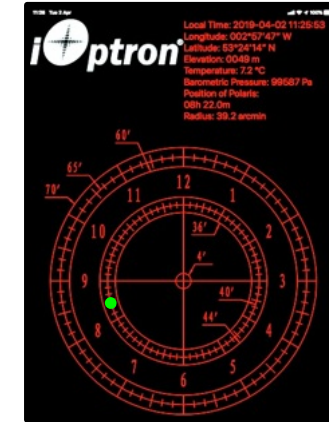
73

## Aligning Using Polaris

With Polaris visible, aligning a star tracker is easy in the UK.



But ...



iOptron SkyTracker™ alignment using Polaris

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## Aligning a Star Tracker

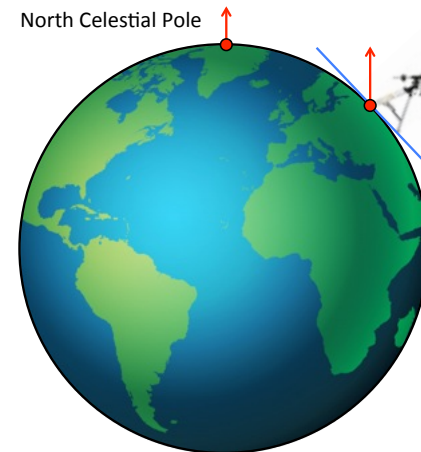
... when in Kenya, on the equator, things are more tricky.



Kenya straddles the equator

75

## Aligning a Star Tracker



In East Africa the NCP and Polaris are very close to the horizon, and hence are hidden behind distant hills or elephants.

Aligning a star tracker near the equator

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# Wild Astronomy

## Alternative Ways To Align

To align a tracker with the North Celestial Pole, even if you can't see it, you can use a compass to find North and a spirit level to set the tracker's axis to the correct altitude (= your latitude on the Earth's surface).



But beware ...

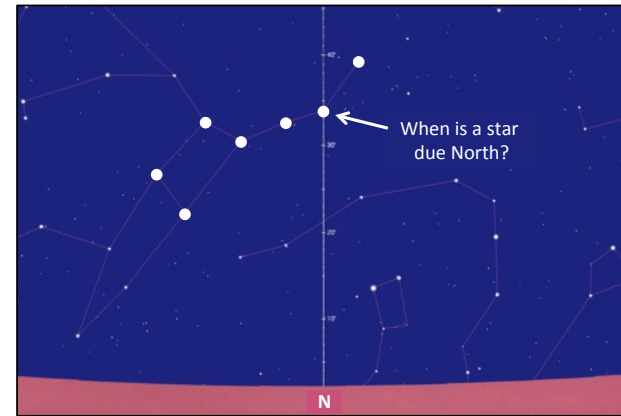
Magnetic North is not the same as True North, and a compass needle can be affected by nearby metal and motors found in, for instance, a motorised star tracker!



Aligning a star tracker using magnetic North and the latitude

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## Alternative Ways To Align



Aligning a star tracker using star transit times

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## Milky Way



Taken by Rob / Nikon D7500 / 50mm lens @ f/2 / single 20s

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## Large Magellanic Cloud



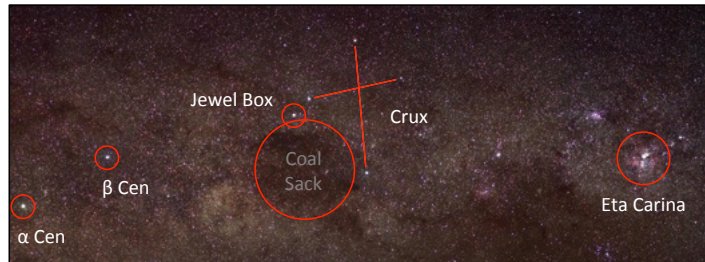
Taken by Steve / Nikon D7100 / 85mm lens / 30 x 60s

80



# Wild Astronomy

Centaurus–Crux–Carina



Taken by Steve / Nikon D7100 / 35mm lens / 30 x 60s

81

Milky Way



Taken by Steve / Nikon D7500 / 35mm lens / 10 x 120s

82

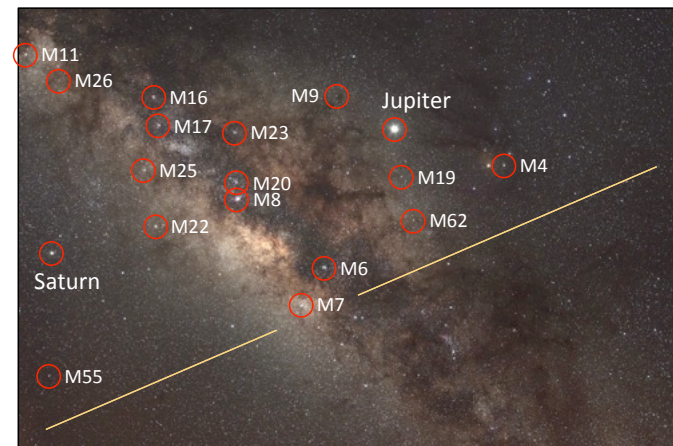
Milky Way



Taken by Steve / Nikon D7500 / 35mm lens / 10 x 120s

83

Milky Way

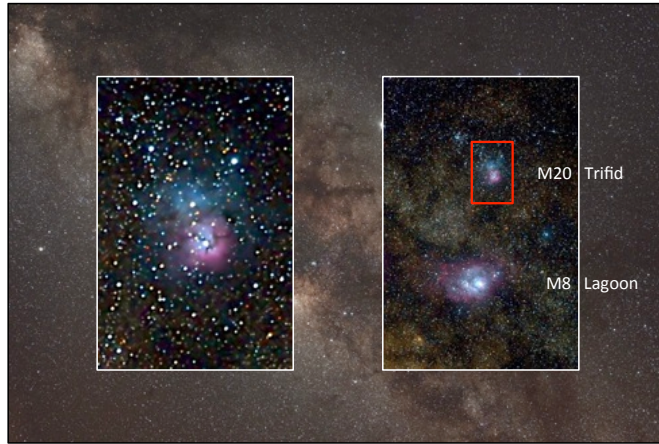


Taken by Steve / Nikon D7500 / 35mm lens / 10 x 120s

84

# Wild Astronomy

Lagoon and Trifid Nebulae



Taken by Steve / Nikon D7500 / 300mm lens / 1 x 30s

85

Milky Way



Taken by Steve / Nikon D7500 / 35mm lens / 10 x 120s

86

The End(s)



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Wildlife by day ...  
... stars by night

# Wild Astronomy

Dr Steve Barrett

SU3A 24 Nov 2021