



# A FIRST CLASS OF DSLR LENS

QIWEI LI

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# FEATURES

- Hood
- Focus ring
- Zoom ring
- Distance scale
- Focus mode and other switches
- Front and rear caps



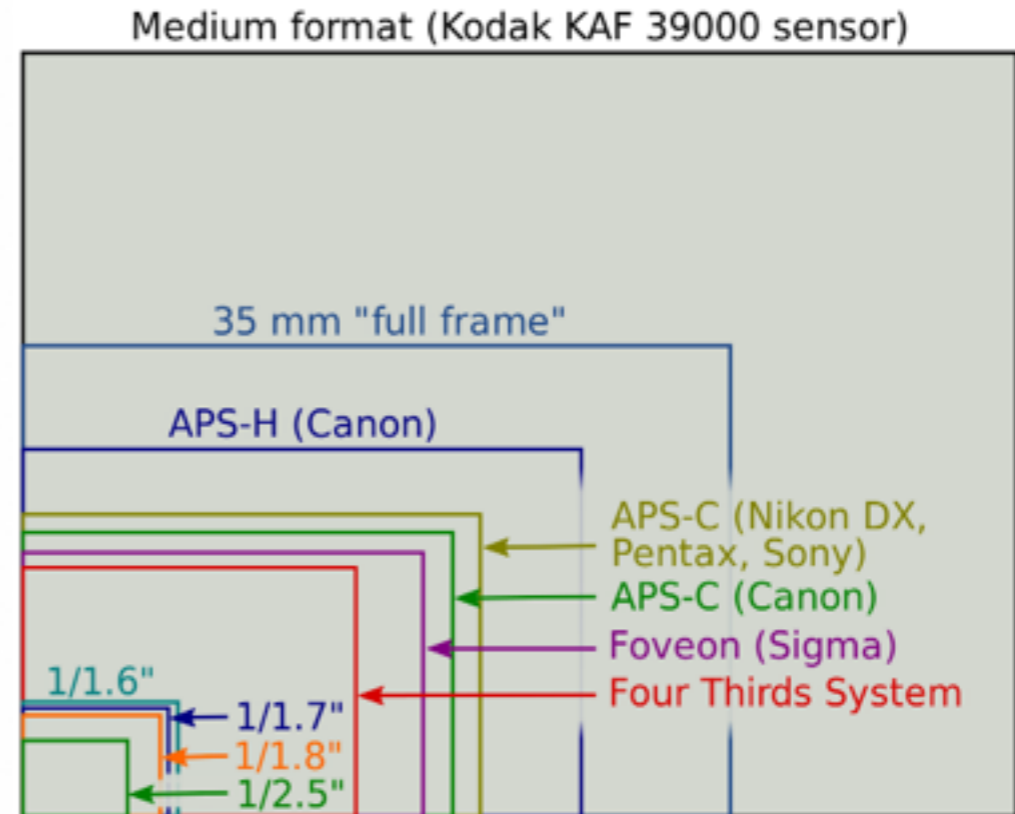
# UGLY NAMES

- Nikkor AF-S DX 24-85mm f/3.5-4.5G ED VR
- Canon EF 24-70mm f/2.8L II
- Sigma 50mm f/1.4 EX DG HSM
- Tamron AF 28-300mm f/3.5-6.3 XR Di LD VC IF Micro

# DESIGNATIONS

Brand	Autofocus	Lens format	Focal length	Maximum Aperture	Optical Design	Image Stabilization
Nikon Nikkor	AF-S / AF SWM (Silent Wave Motor)	DX / FX	A range of or a single number between 8mm - 600mm	A range of or a single number between f/ 1.2 - f/5.6	N, ED, IF, Micro	VR (Vibration Reduction)
Canon	USM (UltraSonic Motor)	EF-S / EF			L, Macro	IS (Image Stabilization)
Sigma	HSM (Hyper Sonic Motor)	DC / DG			EX, IF, APO, Macro	OS (Optical Stabilizer)
Tamron	AF USD (Ultrasonic Silent Drive)	Di II / Di			SP, IF, LD, XR, Macro	VC (Vibration Compensation)

# LENS FORMAT



	APS-C				Full-frame			
Nikon	D3000	D5000	D7000	D300	D600	D700 / D800	D3 / D4	
Canon	T3	T5	60D / 70D	7D	6D	5D	1D	

\*The illustrated figure is copied from *Wikipedia*

# FOCAL LENGTH



28mm

50mm

70mm

210mm

- Distance from the principal to focal point in mm
- Prime (fixed) and zoom (variable)
- Wide-angle ( $< 35\text{mm}$ ), normal, telephoto ( $> 85\text{mm}$ )
- Nikon ASP-C:  $f^*1.5$  and Canon ASP-C:  $f^*1.6$

\*The illustrated figure is copied from *Wikipedia*

# FOCAL LENGTH

- Increasing the focal length make less depth of field



- Decreasing the focal length widen field of view
- 35mm is the most comfortable for human



# FOCAL LENGTH

- Angle of view

24mm



35mm



50mm



85mm



100mm

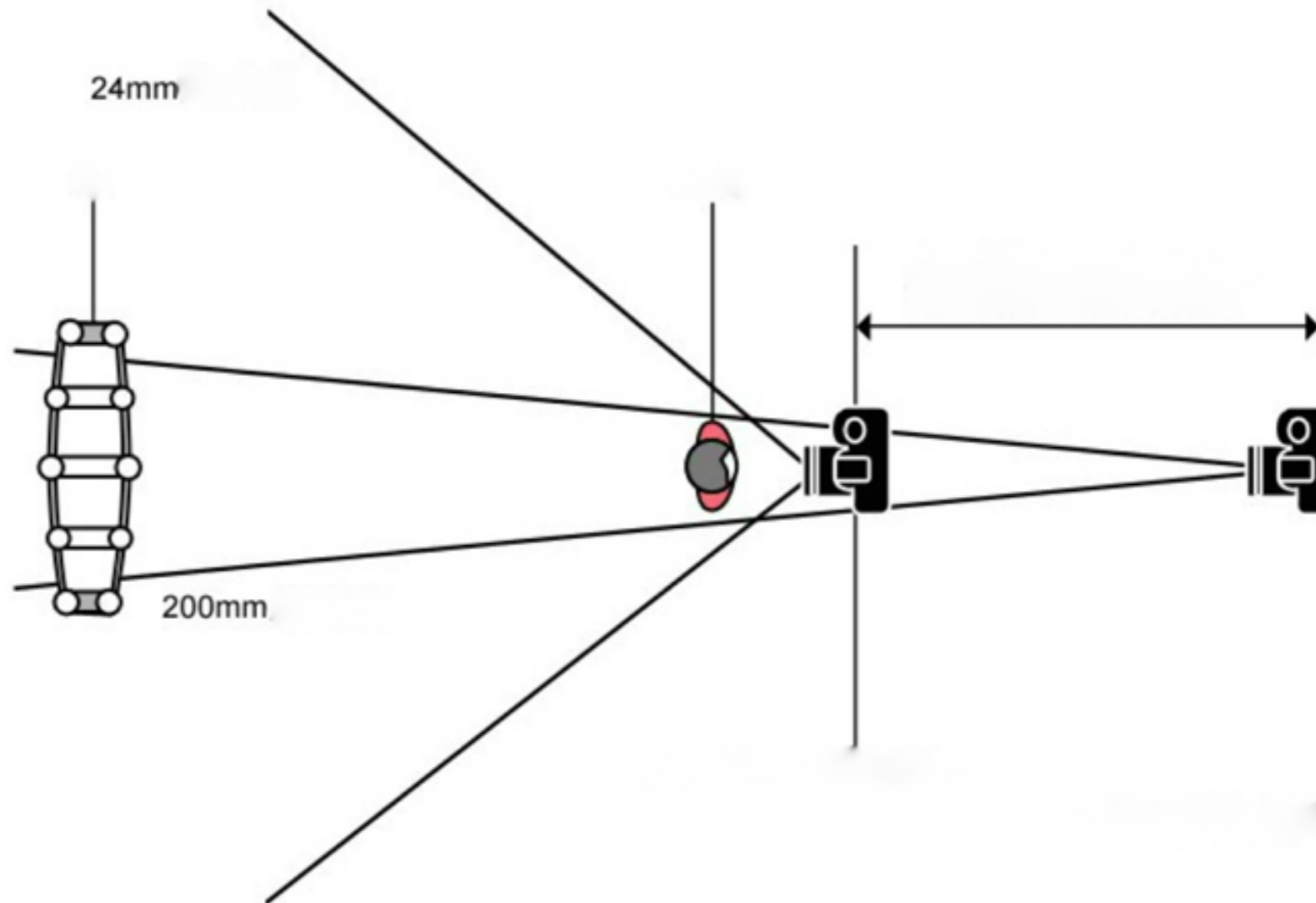


200mm



# FOCAL LENGTH

- Angle of view



\*The illustrated figure is copied from *Nikon Lens World Special Volume 1*

# APERTURE



f/2.8

f/4

f/8

f/22

f/1.4

f/2

f/2.8

f/4

f/5.6

f/8

f/11

f/16



- Measure of the size of the lens opening
- Fixed or variable aperture

# APERTURE

- Increasing the aperture makes less depth of field
- Increasing the aperture makes faster shutter speed
- f/8 - f/11 is the best for photo quality

# IMAGE STABILIZATION

- Nikkor VR: Vibration Reduction
- Canon IS: Image Stabilization
- Sigma OS: Optical Stabilizer
- Tamron VC: Vibration Compensation
- Compensate for image blur caused by shake
- Most zoom lens have this technique

WHICH ONE TO BUY?

# APS-C VS FULL-FRAME

- Camera body
- Future upgrade
- APS-C body + APS-C lens: no problem
- Full-frame body + full-frame lens: no problem
- APS-C body + full-frame lens: no problem
- Full-frame body + APS-C lens: dark corners



# ZOOM VS PRIME

- A range of focal length (e.g., 18-300mm) vs a fixed focal length (e.g., 24mm, 35mm, 50mm, 85mm)
- Variable maximum apertures (e.g., f/2.8, f/4, f/3.5 - f/5.6) vs a constant and larger maximum aperture (e.g., f/1.4, f/1.8)
- Heavy vs light weight
- Slow vs fast shutter speed



# WIDE-ANGLE

- Focal length: 8mm (fisheye)  $< f < 35\text{mm}$
- Less magnification of the object
- Wider field of view
- Greater depth of field
- Distortion at the edges



AF-S DX 12-24mm f/4G ED, ISO 200, 24mm, f/8, 1/200



AF-S 18-35mm f/3.5-4.5G ED, ISO 100, 18mm, f/8, 1/320



# NORMAL

- Focal length: 35mm (human eye)  $< f < 85\text{mm}$
- Natural to human observer



AF-S 24-85mm f/3.5-4.5G ED VR, ISO 100, 85mm, f/8, 1/400



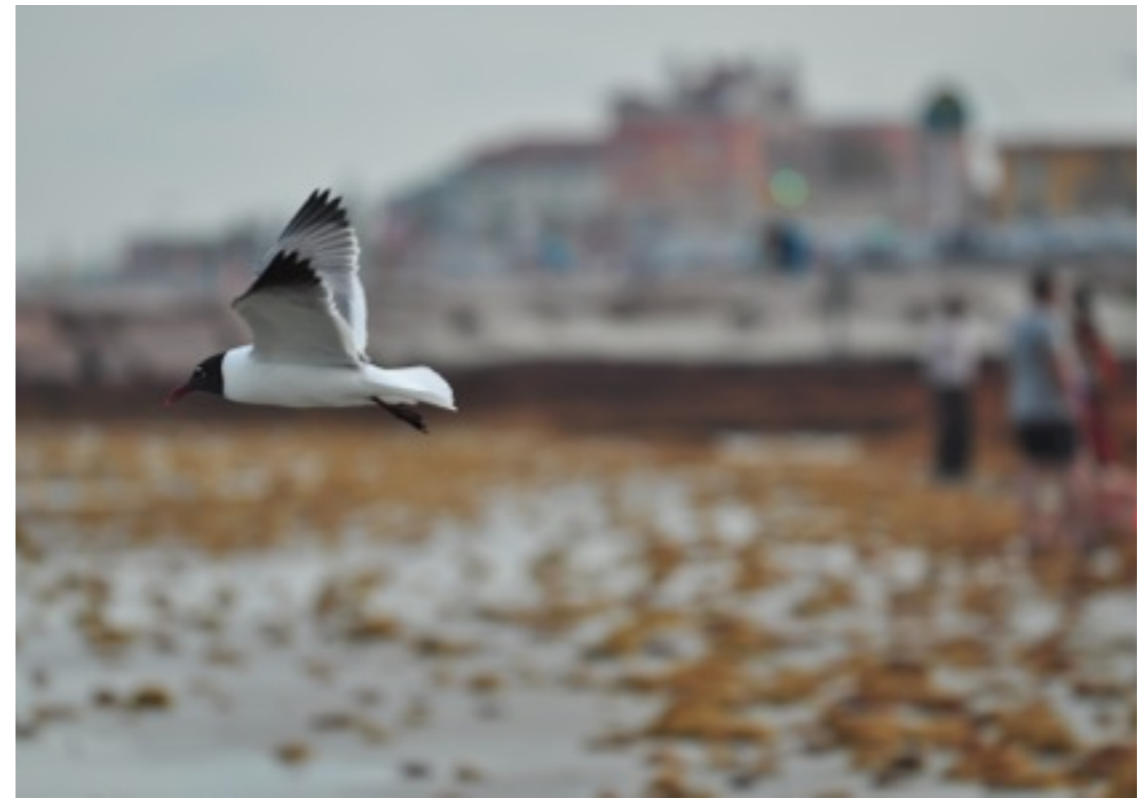
AF-S DX 35mm f/1.8G ED, ISO 800, 35mm, f/1.8, 1/200 AF-S DX 35mm f/1.8G ED, ISO 100, 35mm, f/2.8, 1/500

# TELEPHOTO

- Telephoto lens:  $85\text{mm} < f < 600\text{mm}$
- Great magnification of the object
- Narrower field of view
- Less depth of field



AF-S 24-120mm f/4G ED VR, ISO 200, 98mm, f/4, 1/2500



AF-S 70-200mm f/4G ED VR, ISO 100, 200mm, f/4, 1/500



AF-S 70-300mm f/4.5-5.6G ED VR, ISO 400, 70mm, f/4.5, 1/1600

# ZOOM LENS SET (F/2.8)

- Nikkor AF-S 14-24mm f/2.8G ED
- Nikkor AF-S 24-70mm f/2.8G ED
- Nikkor AF-S 70-200mm f/2.8G ED VR II
- Average weight: 2.56 lb
- Total price: \$6,290



# ZOOM LENS SET (F/4)

- Nikkor AF-S 16-35mm f/4G ED VR
- Nikkor AF-S 24-120mm f/4G ED VR
- Nikkor AF-S 70-200mm f/4G ED VR
- Average weight: 1.62 lb
- Total price: \$3,960





# PRIME LENS SET (F/1.4)

- Nikkor AF-S 24mm f/1.4G ED
- Nikkor AF-S 35mm f/1.4G
- Nikkor AF-S 50mm f/1.4G
- Nikkor AF-S 85mm f/1.4G
- Average weight: 1.15 lb
- Total price: \$6,185



# PRIME LENS SET (F/1.8)

- Nikkor AF-S 28mm f/1.8G
- Nikkor AF-S 35mm f/1.8G ED
- Nikkor AF-S 50mm f/1.8G
- Nikkor AF-S 85mm f/1.8G
- Average weight: 0.64 lb
- Total price: \$2,020



# ALL-IN-ONE ZOOM LENS

- Nikkor AF-S DX18-300mm f/3.5-5.6G ED VR
  - Weight: 1.83 lb
  - Price: \$1,000
- 



- Nikkor AF-S 28-300mm f/3.5-5.6G ED VR
- Weight: 1.76 lb
- Price: \$1,050



# ALL-IN-ONE ZOOM LENS



\*The illustrated figure is copied from internet

# ALL-IN-ONE ZOOM LENS

Brand	Lens	Weight	Price
Nikkor	AF-S DX 18-300mm f/ 3.5-5.6 ED VR	1.83 lb	\$1,000
Canon	EF-S 18-200mm f/3.5-5.6 IS	1.30 lb	\$700
Sigma	18-250mm f/ 3.5-6.3 DC Macro OS HSM	1.00 lb	\$350
Tamron	AF 18-200mm f/ 3.5-6.3 XR Di II	0.88 lb	\$200

# WHERE & WHEN TO BUY

- Nikon, Canon, Sigma, Tamron store: new
  - Amazon, Adorama, B&H: new or refurbished
  - eBay, Craigslist: grey market or used
- 

- Black Friday
- Nikon: rebate every March
- Canon: promotion frequently

WHICH ONE TO USE?

# DEPTH OF FIELD

- Increasing the aperture gives less depth of field
- Increasing the focal length gives less depth of field
- Less subject distance gives less depth of field
- Wide-angle lens gives both sharp foreground and background: landscape
- Telephoto lens gives blur and simple foreground and background: portrait





AF-S DX 35mm f/1.8G, ISO 200, 35mm, f/2.2, 1/400



AF 50mm f/1.8D, ISO 160, 50mm, f/5, 1/1250



AF-S 16-35mm f/4G ED VR, ISO 100, 31mm, f/8, 1/400

# FIELD OF VIEW

- Increasing the focal length narrow field of view and gives greater magnification of the object
- Decreasing the focal length widen field of view but may distort the object at the edges
- Wide-angle lens gives wider field of view: landscape
- Telephoto lens gives narrower field of view: sports and birds



AF-S DX 24-85mm f/3.5-4.5G ED VR, ISO 100, 85mm, f/8, 1/30



AF-S DX 12-24mm f/4G ED, ISO 200, 12mm, f/11, 1/500



AF-S DX 12-24mm f/4G ED, ISO 200, 12mm, f/4, 1/1250

# DISTANCE TO THE SUBJECT

- Minimum focusing distance: if you get closer to the subject than this distance, you cannot focus on the subject properly
- Wide-angle lens has smaller minimum focusing distance: food
- Telephoto lens has larger minimum focusing distance



AF-S 70-200mm f/4G ED VR, ISO 100, 160mm, f/4, 1/250



AF-S 18-35mm f/3.5-4.5G ED, ISO 200, 18mm, f/4, 1/60



AF-S 70-300mm f/4.5-5.6G ED VR, ISO 100, 300mm, f/8, 1/160

# LIGHTING

- Increasing the aperture gives faster shutter speed
- Increasing the ISO gives faster shutter speed
- Image stabilization technique gives faster shutter speed
- External speedlight illuminates the subject and gives a larger and soft light source
- Prime lens: indoor



AF-S DX 35mm f/1.8G, ISO 400, 35mm, f/2.2, 1/25



AF-S DX 35mm f/1.8G, ISO 800, 35mm, f/1.8, 1/125



AF-S DX 35mm f/1.8G, ISO 800, 35mm, f/1.8, 1/60

HOW TO TAKE CARE?



# UV FILTER

- Suffer scratches and breakage
- Keep the lens surface and coatings away from abrasion
- Complete weather sealing
- Reduce the level of ultraviolet light
- Cheap but depends on the size



# DRY BOX

- Keep at a low level of humidity
- Electronic dry box: contains a small Peltier cooler that removes moisture from the air by condensing it out
- Desiccant box: a sealed, airtight box that contains a desiccant (e.g., silica gel)





ALWAYS BE TENDER

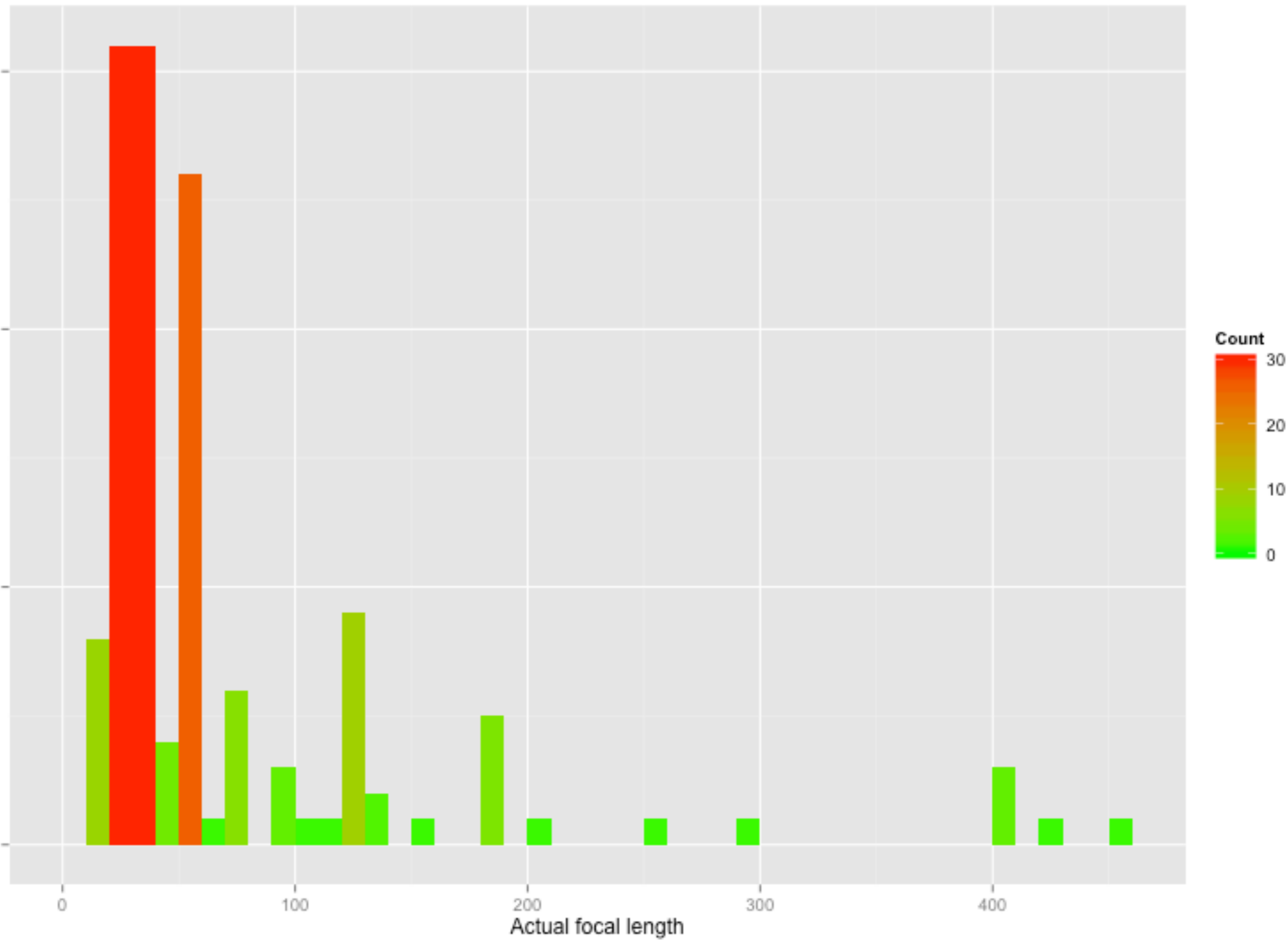
# DMC LENS

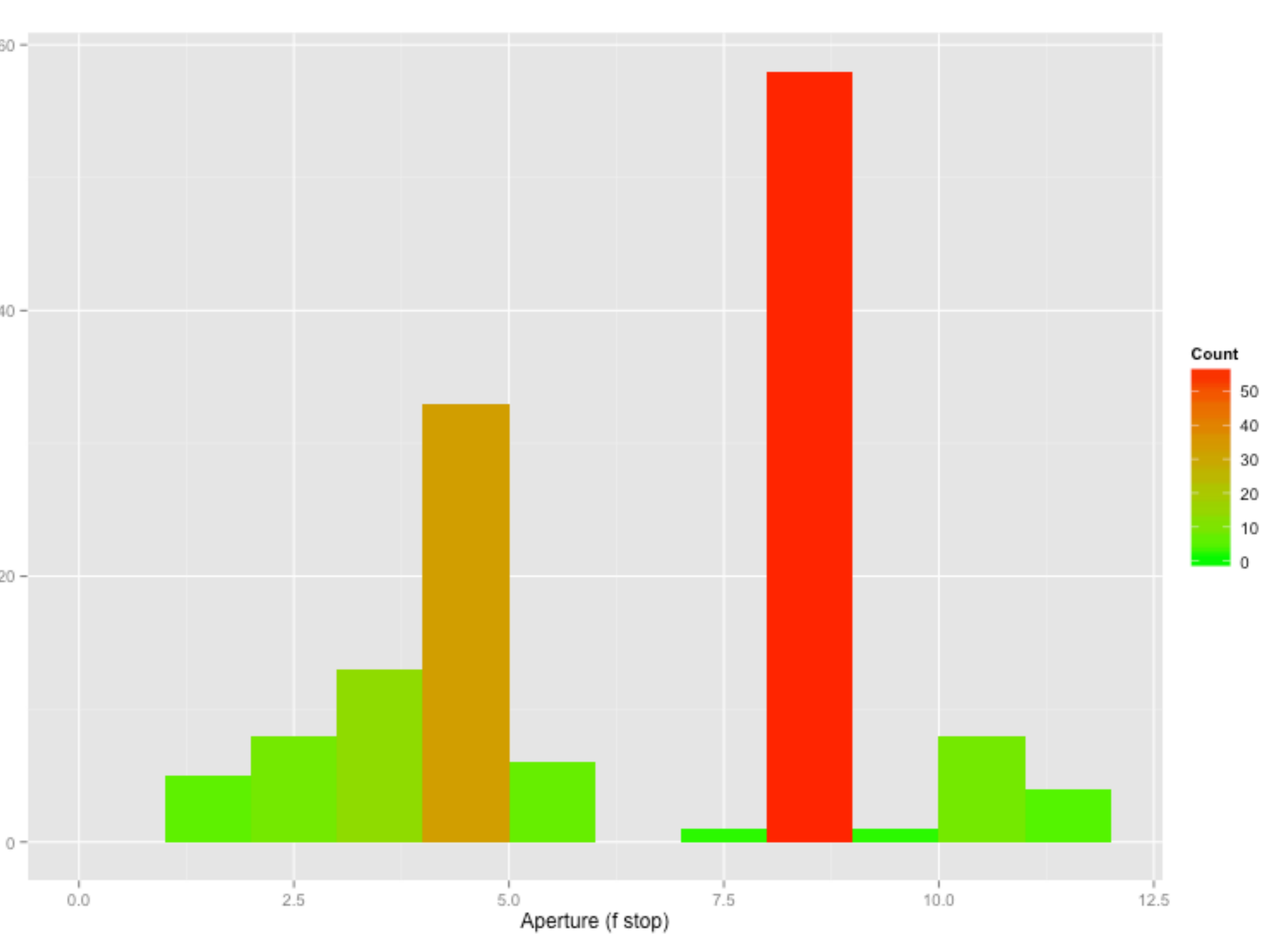
- Canon EF 28mm f/1.8 USM: landscape, indoor
- Canon EF 50mm f/1.8 II: portrait, events, indoor
- Canon EF-S 15-85mm f/3.5-5.6 IS USM: travel, events
- Canon EF-S 55-250mm f/4-5.6 IS II: portrait, sports

# STATISTICS

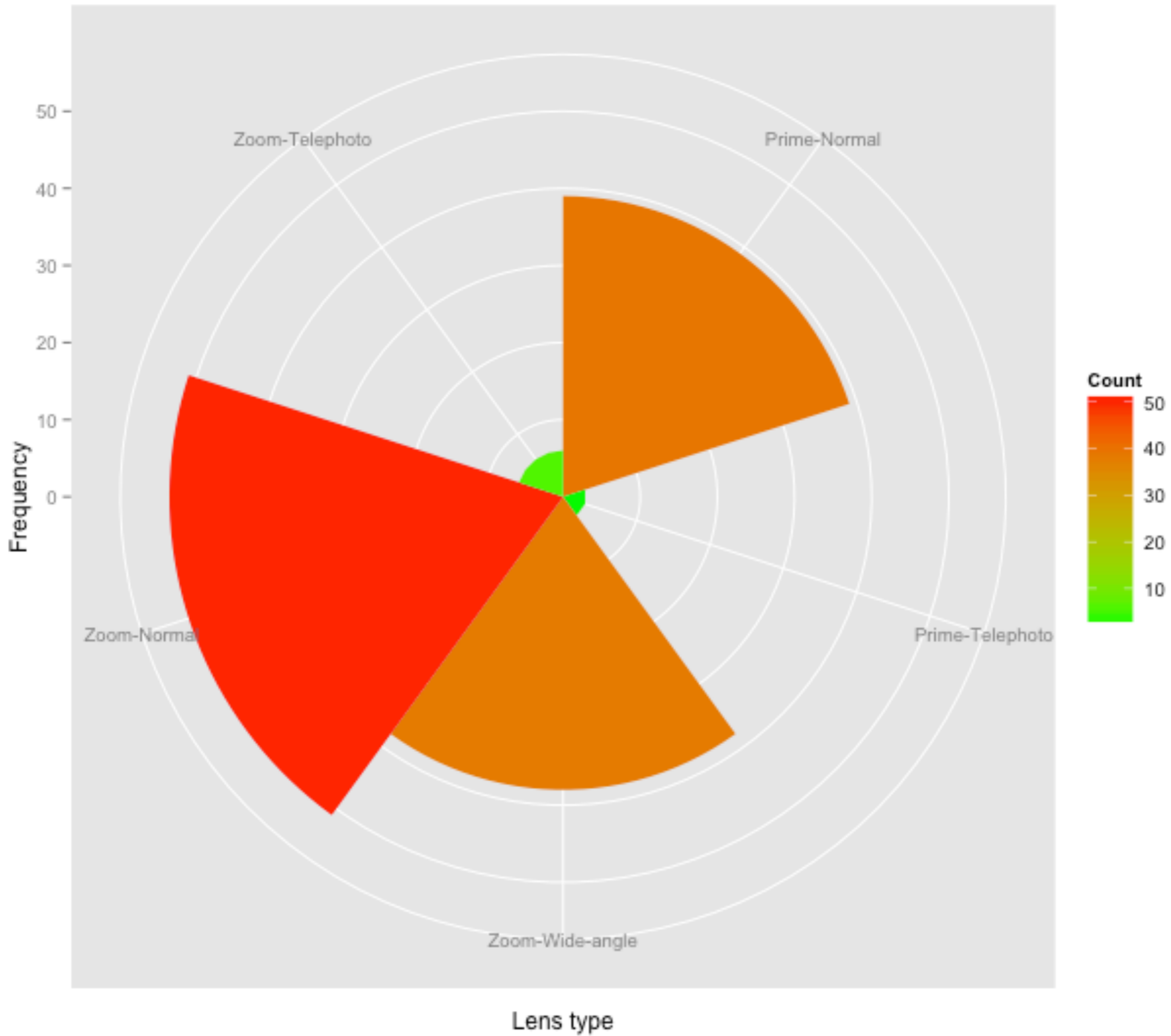
- Select 315 best portrait photos and 137 best landscape photos (<https://www.flickr.com/photos/liqiwei2000/>) from 50,000 photos in the past 5 years
- Use R to visualize the exif data
- Answer the following questions:
  - What's the most frequently used focal length?
  - What's the most frequently used aperture (f stop)?
  - What's the most frequently used lens and price?

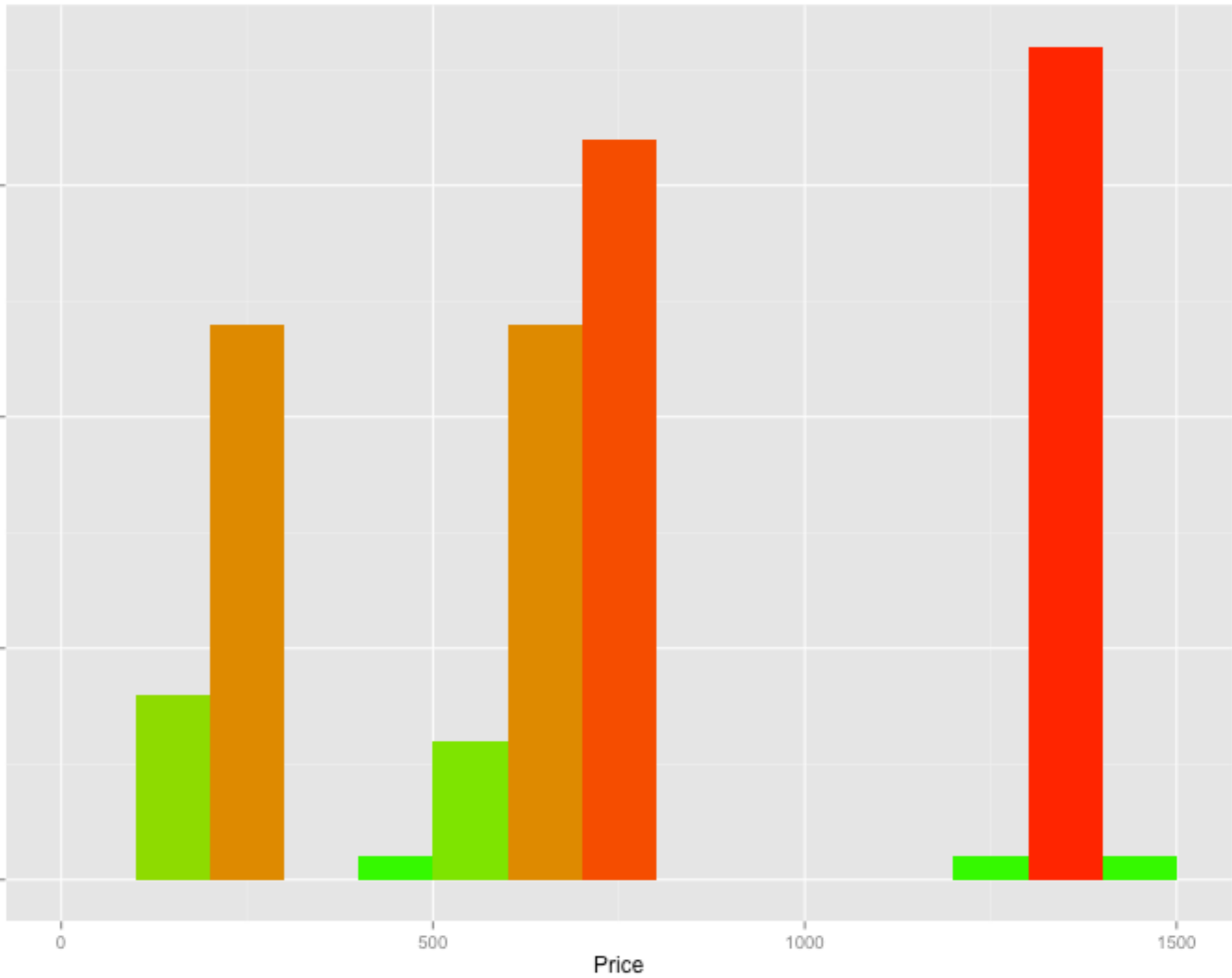
Landscape



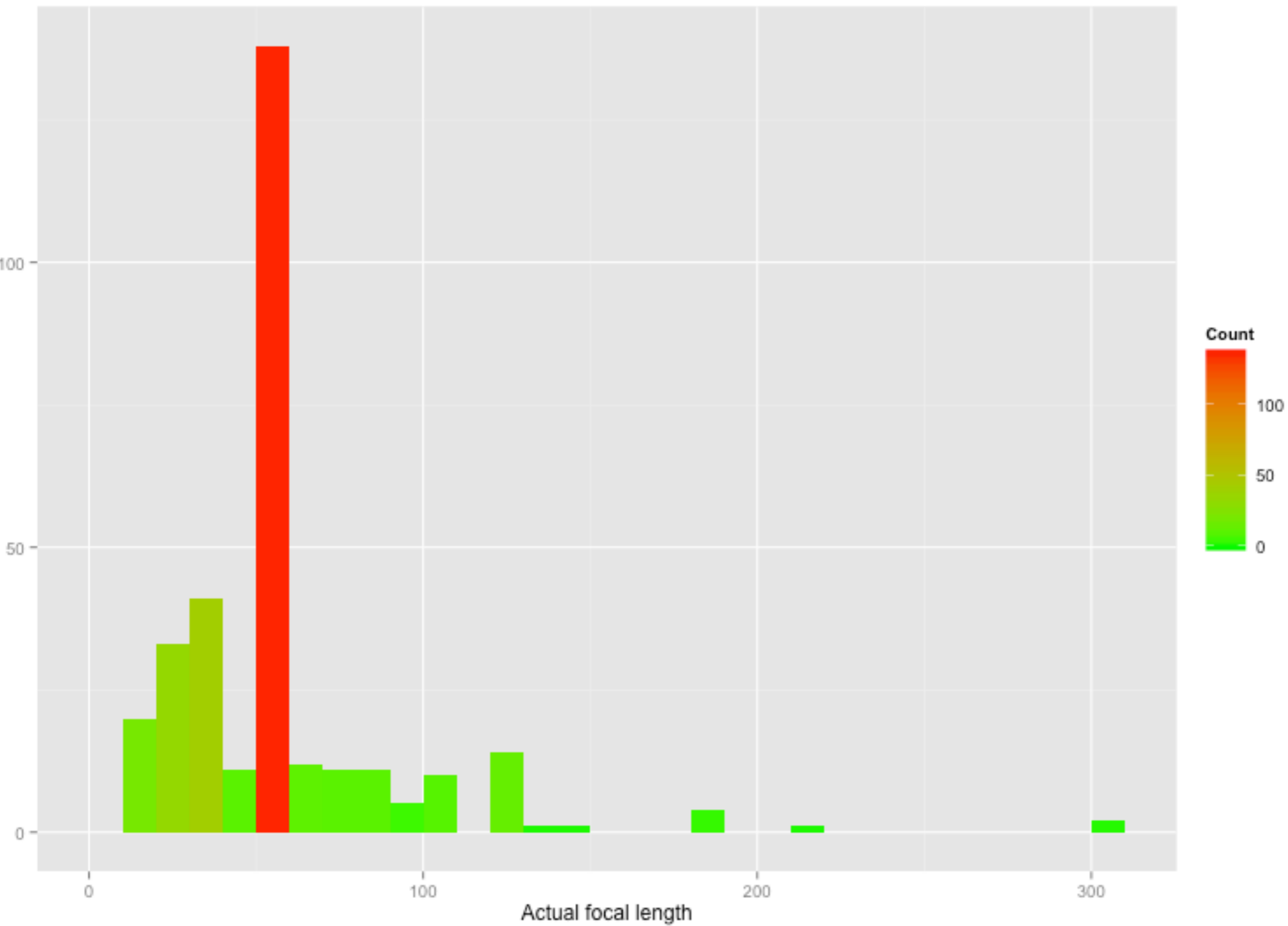


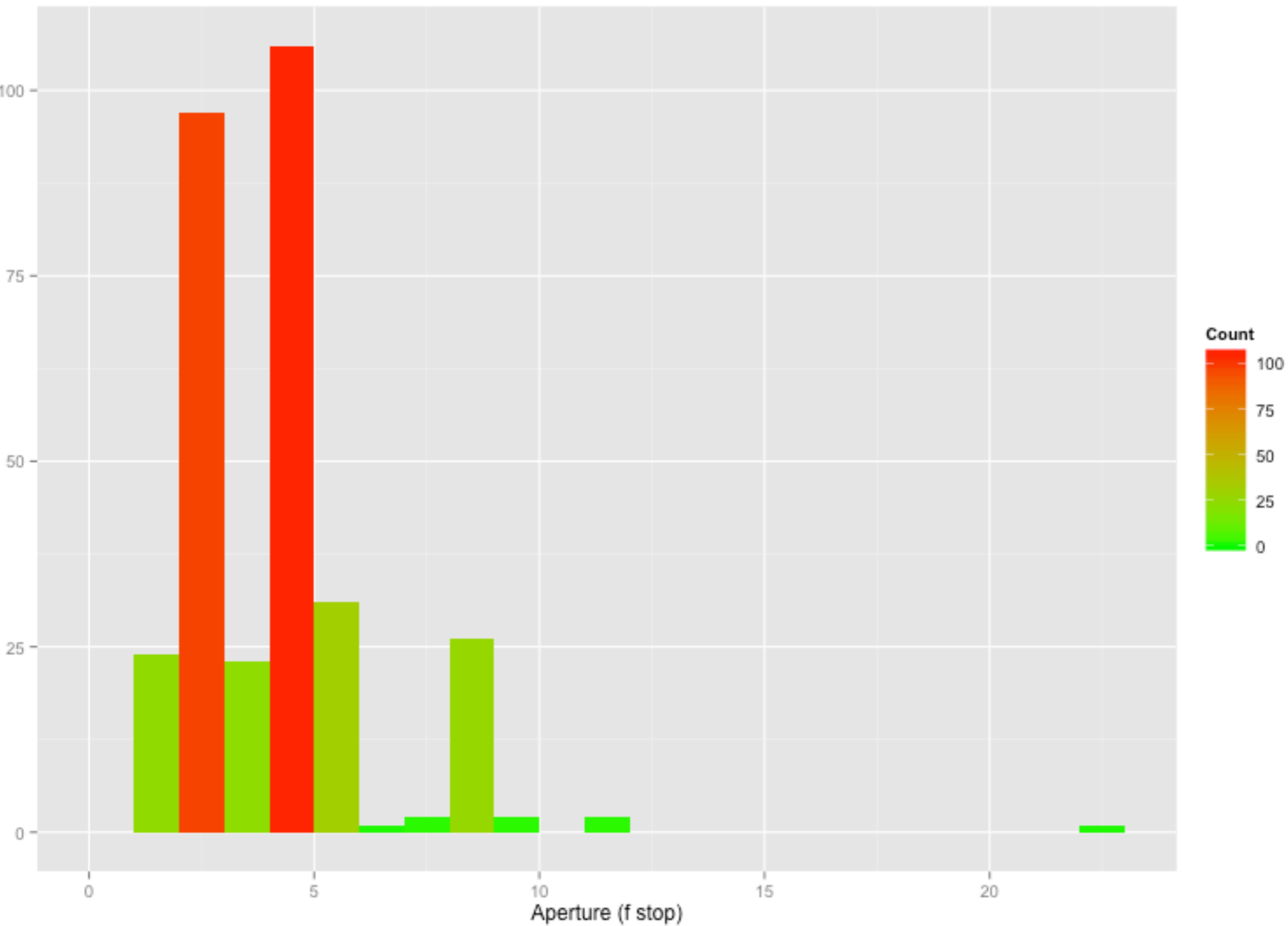


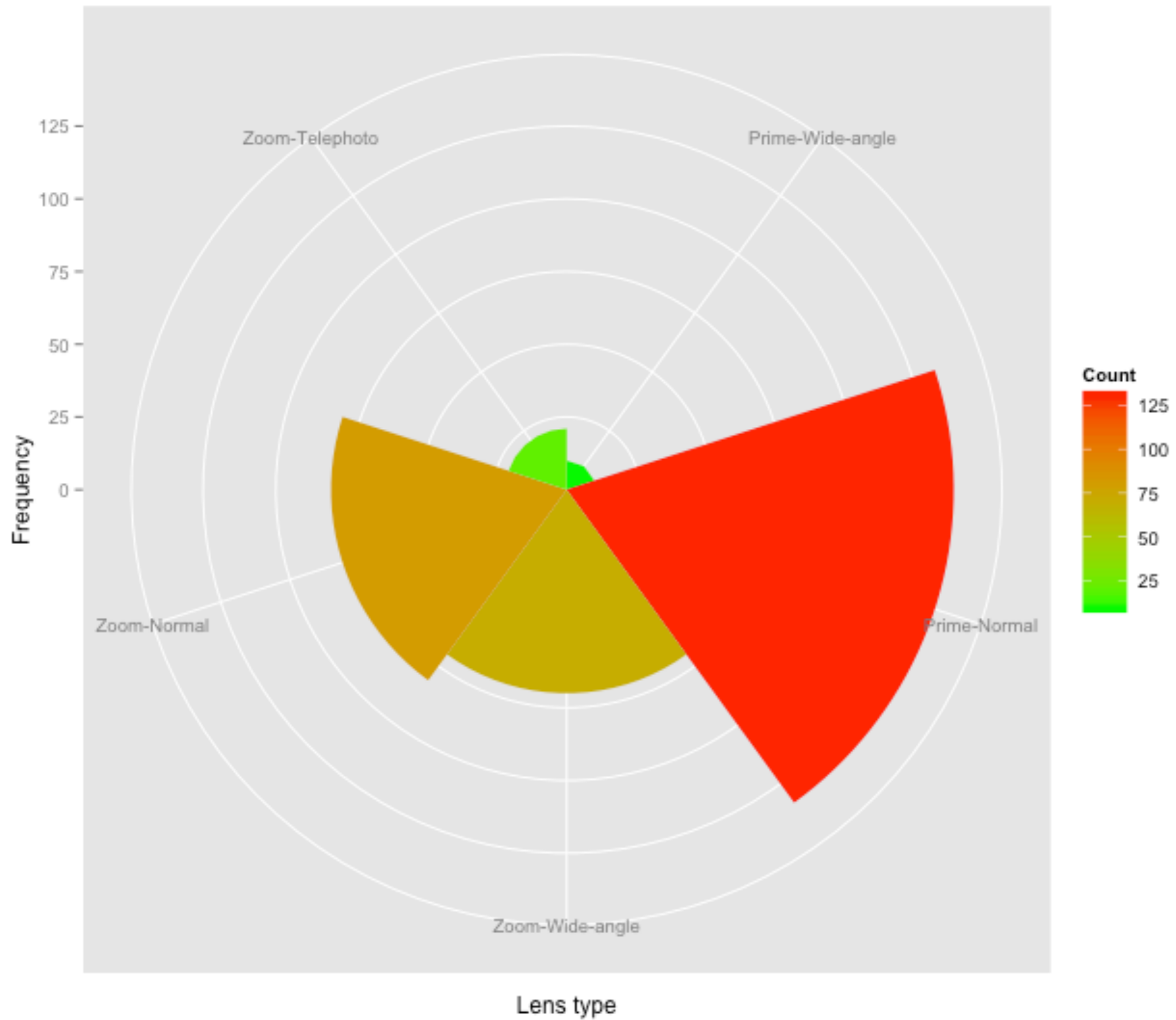


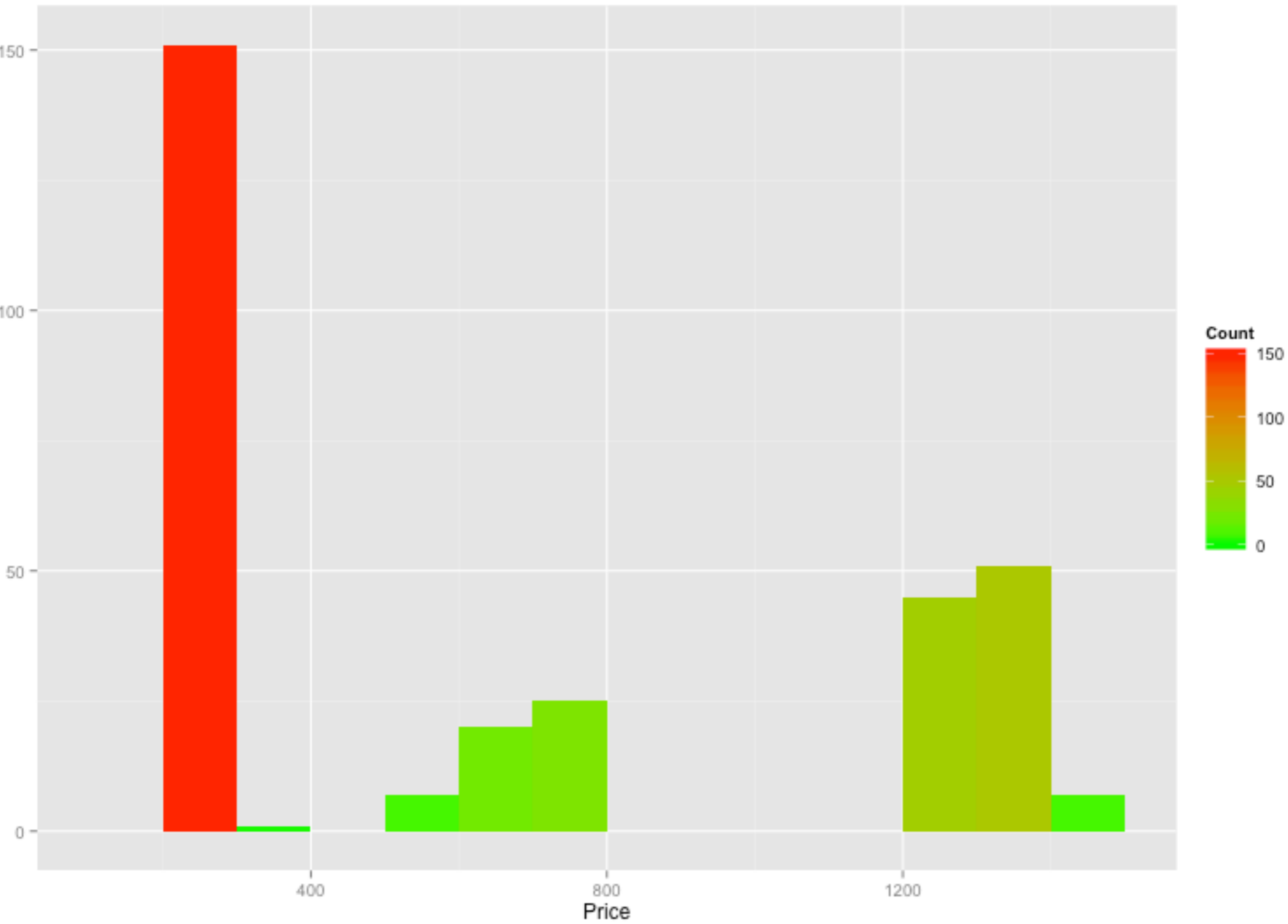


Portrait









“The heart and mind are the true lens of the camera.”

–Yousuf Karsh (a Turkish born Canadian Photographer and Journalist)