

Close-Up and Macro Photography A Primer

Book Two:
Macro & Close-up Lenses



Text and Photos by Michael Erlewine



Heart Center Publications
315 Marion Avenue
Big Rapids, Michigan 49307

Michael@Erlewine.net

First Published 2011

© Michael Erlewine 2011

ISBN 925182-73-7

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. This photo book may be shared provided no fee is charged.

All photos taken by Michael Erlewine, ©
2007-2011 Michael Erlewine

Dedication

This book is dedicated to my father
Ralph L. Erlewine

who placed a Kodak Retina-2a 35mm camera, tripod, and light meter in my hand in 1956, showed me how to use them, and turned me loose. Thanks dad!

May these books be of benefit to all photographers and nature lovers, and may everyone experience awe, beauty, and instruction from the natural world that I have.

Macro and Close-up Lenses

Considerations for Selection a Close-up/Macro Lens

What follows necessarily is somewhat of an exercise in futility as the variables in assessing fine lenses for close work are many and their permutations seemingly infinite. Still we can't own them all and in the end must make some attempt to compare lenses, one to another, in order to decide what lens might be most useful to us for a particular kind of work. There are several types of information presented here, the various specifications for each lens, a photo of the lens, and photographs taken with that lens.

The specifications and lens photo I am sure you will find useful because they are seldom gathered in one place and this should save you searching for this information. I am more dubious as to the actual photos taken with the lenses and I include them here because I have them and not because I myself found them all that illuminating. By reviewing these images I see that almost all of the lenses included here are sharp and are worthy of taking very fine photos if we know their limitations. I am certain that if you pick through the data and photos you will come up with opinions of your own that will elevate one lens relative to another, and so on.

Taking comparison lens photos is a thankless job because, although the subject matter and lighting remained the same, the distance of each lens from the subject differed and this affects the light and so on and so on. I did make an attempt to take several shots and pick what to me seemed to be the shot most in focus, but again: it was very difficult to grade them. And since these shots are not of a test pattern, which is the usual way to compare lenses, but rather of a subject with color and texture, all you can expect is to get some basic idea of what each lens is capable of. To repeat, after doing all of this, I found that most of the lenses listed here are plenty sharp enough to own and use. For me that is my own take away from the photos.

I also include a quick shot of the lens itself and any comments I have about the lens. By all means take my comments with a grain of salt. They are impression from my use of the lens and since in day-to-day use I have my favorites, many of these lenses got only cursory use. Still, some of my observations may be helpful. At least that is my hope. I will say just a few words about what in my opinion makes a good lens for close-up, macro work, and also for focus stacking.

How to Pick a Lens

There are a number of key factors that figure into what makes a good close-up or macro lens. Not all lenses have all the desired factors and some of it depends on the particular kind of photography you want to do. No lens (or very few anyway) seem to have everything. Some lenses will have better sharpness, some better color, and so on. As you read about the factors and qualities of various lenses, you will want to keep your eye on the qualities that are most important to your work.

My first attempts at macro photography were sometime around 1956 when armed with a Kodak Retina 2a and a close-up lens I began to take some macro shots. They were not too successful but I was only fifteen years old. In recent years I have spent a lot of time doing close-up and macro nature photography. In my search for the right lenses I have

tried a good number of them. Here is what I value most in a lens for near focus:

Sharpness

Of course I want it sharp but the more I work the less I am concerned about 'absolute' sharpness. There are a lot of very fine sharp lenses available in the Nikon mount or that can be converted to that mount. Most of the lens mentioned in this article are sharp or "sharp enough" for good macro work. Sharpness is not the only consideration. A lens can be very sharp but difficult to use for other reasons, like it is too sensitive to light or the widest aperture does not give enough light in the viewfinder, etc.

Fast Lens

I value a fast lens (one with very small f-stop numbers like f/1.4, f/2.8, etc.) not because I shoot wide open but because I need to have maximum light in my viewfinder for focusing well. Since I often am photographing around dawn or when the light is still fairly dim (but nice) I need to see what I am doing. The bright light of full sun is not what I am looking for.

Also I do a lot of focus stacking and I need to see what to focus on at each step. I don't entirely agree with those who say that to focus stack you need to just get to the front of the subject and then automatically click on through and not focus on anything in particular but just make sure to have regular intervals.

Of course I understand what they are pointing at but in my experience this is not enough. For example round, spherical objects in the frame do not stack well. Your increments have to be much finer (shorter) than otherwise if your subject is round. In fact in many subjects there are key points that you don't want to just auto-increment past but very carefully be sure to get them in extreme focus. In other words: if I am blindly incrementing along with a stack and reach a key point I do finer increments before, at, and after that point to make sure that that area is in prime focus.

There often are several such points in the series and I need to be able to see to focus in the viewfinder to do that and I want a fast lens for visibility. For example, someone commented recently about the Nikon 70-180 Zoom Macro. I spent a couple of years intensely using that lens but gradually abandoned it because its widest aperture is f/4.5. This morning I got that lens out in case I had made a misjudgment or might see it differently today. It was about 8:30 AM here and the sun had not really gotten strong.

Looking through the 70-180mm it was very dim indeed and not at all bright enough for my work. On a bright day the lens would be fine but I don't shoot in bright sunlight and even tend to avoid bare sunlight, concentrating more in shadows or light haze. The 70-180mm is a wonderful lens, but not for me for the reasons mentioned.

Focus Throw

Something not often mentioned is the focus throw of a lens, how many degrees does the barrel have to rotate to go from close-up to infinity. I was surprised at some of the fine macro lenses that have a short focus throw. For macro work and especially for focus stacking I need a longish focus throw or else put the camera on a focusing

Macro and Close-up Lenses

rail. I prefer the long focus throw on a lens to carrying a rail around.

I was shocked to find that the very expensive Coastal Optics 60mm APO macro lens has a focus throw on only 210 degrees. For example the CV-125 APO has a focus throw of 630 degrees and the Leica 100mm Elmarit has one of 710 degrees. However, the old Micro-Nikkor 60mm f/2.8 D macro has a throw of only 120 degrees and that is not desirable.

The wider the angle macro lens (50mm, 60mm, etc.) the more important it is to have a long focus throw. Macro work is just the opposite of sports photography where you want a short focus throw. In macro and most of all in focus stacking a long focus throw is a big advantage. You need it or use a focusing rail.

Reproduction Ratio

Another feature to keep in mind is the reproduction ratio. How large is the image in the frame? Most macro aficionados prefer a lens that goes to 1:1. "1:1" means that the image in the sensor and the subject image are the same size. Not too many good macro lenses get to 1:1. In fact there are whole businesses that help you get from smaller ratios (like 1:2) to 1:1 image size.

There are not all that many lenses that will give you the 1:1 ratio and my view of putting close-up diopters on the front of my lenses or extension tubes on the rear of my lenses (or both) is not flattering. I have all the key diopters, tubes, etc., but I use them only as a very last resort. Actually I hardly ever use them at all. I know that many photographers love them but I feel a lens just as it is sold is a perfectly balanced thing and anything added to it can only lead to a degraded image. This is a fact.

Luckily for a lot of my work I don't always need to have a 1:1 reproduction ratio. I shoot a lot of close-up work, what I call mini landscapes or dioramas and can use lenses that are not ultra-close.

APO (Achromatic)

Not absolutely required but very helpful are lenses that are APO enabled. Achromatic lenses are corrected for chromatic and spherical aberration more than the common achromat lenses. There are not many good ones, the most well-known in the Nikon format being the Cosina/Voigtlander 125mm APO-Lanthar, the Leica 100mm APO Elmarit, and the Coastal Optics 60mm APO. I prefer APO lenses in my work most of the time. IMO the differences in coloring can be dramatic.

Minimum Focus Distance

Most lenses used for macro work have a very short minimum focus distance, in fact many can appear too short if working with live critters... like 50-60mm lenses.

If you are shooting insects or live-whatever, some lenses require you to be so close to the subject that the end of the lens actually blocks the light or the close proximity of the lens scares off whatever you are photographing. The 60mm range of macro lenses are in this category. And while the 100mm to 105mm macro lenses are very popular, many photographers would rather work with lenses in the 200mm range because it gives them just enough extra distance to not disturb their subjects. If you are really into photographing critters then a lens in the 200mm range may

be what you are looking for.

One odd technique I like is to use a telephoto like the Nikon 300mm F/4 ED-IF lens which has a minimum focus distance of something like 4.9 feet on the Nikon D3x and crop out a photo. I can photograph a frog out in the middle of the pond, crop it out, and still have enough pixels for a fine photo.

Summary

Those are some of my main considerations when choosing a macro lens. I don't care how heavy or bulky a lens is. Carting these things around is second nature to me now. It is easy to see that if we insist on having all of the above points in a single lens we quickly are down to almost none. In fact the one lens I have that is sharp, fast, has a long focus throw, goes to 1:1, and has APO is the Voigtlander 125mm f/2.5 APO-Lanthar. No other lens has all of these features without adding diopters or settling for a short focus throw, etc. It is no wonder that this lens is in great demand. The Nikon 105mm VR macro is pretty good as well... in terms of having many of the features.

Michael Erleiwne

October 24, 2011

Note: Photos shot on the same day, same light, at f/5.6, but are varying distances from the subject. This is not any kind of rigorous test, but simply to show that most of these lenses are sharp enough for what most of us might want to do with them.



Macro, Close-up, and Other Lenses	Page
Introduction	003
Voigtlander 125 F/2.5 Macro APO-Lanthar	007
Zeiss 50mm f/2 ZF.2 Makro-Planar	012
Micro-Nikkor 45mm f/2.8 PC-E Tilt/Shift	016
Nikon Nikkor 24mm WA PC-E F/3.5 ED U.S.	019
Zeiss 100mm F/2 ZF.2 Makro-Planar	022
Micro-Nikkor 60mm f/2.8 G Lens	026
Nikon Nikkor 35mm f/1.4 G	030
Coastal Optics 60mm f/4.0 APO	034
Voigtlander 58mm f/1.4 Nokton	039
Nikon Nikkor 24mm-70mm AF-S f/2.8 G ED	042
Nikon Nikkor 16mm f/2.8 Fisheye	045
Leica 100mm Apo Macro Elmarit R Lens F2.8	048
Leica Elpro 1:2-1:1 Close-Up Lens R	052
Micro-Nikkor 105mm f/2.8 AIS Manual Focus	055
Micro-Nikkor 105mm F/2.8 VR Lens	055
Nikon Nikkor 85mm F/1.4 G	059
Micro-Nikkor 70mm-180mm AF f/4.5-5.6 D	062
Micro-Nikkor 200m AF F/4 ED-IF Macro	066
Nikon Nikkor 35-70mm AF Zoom F/2.8 D Lens	070
Nikon Nikkor 135mm AF DC f/2	073
Nikon Nikkor 85mm f/1.4 D	076
Nikon Nikkor 300mm AF-S f/4 ED IF	079
Nikon Nikkor 70mm-200mm AF VR II F/2.8 G II AFS ED-IF	082
Voigtlander 180mm APO f/4	085
Micro-Nikkor 85mm f/2.8 PC Tilt/Shift Lens	088
Voigtlander 90mm f/3.5 SL	092
Nikon Nikkor 105mm F/2.5	097
Kiron (Lester A. Dine) 100mm f/2.8 Macro	100
Micro-Nikkor 55mm P Auto 55mm f/3.5	104
Micro-Nikkor 105mm P F/4 Macro Bellows Lens	108
Nikon Nikkor 28mm f/2.8 AI-S	110
Micro-Nikkor 60mm f/2.8 D Lens	113
Nikon Nikkor 50mm f/1.8 AIS	117
Nikon Nikkor 24mm f/2.8	120
Voigtlander 40mm Ultron f/2.0 SL II	123
Nikon Nikkor 35mm f/2.8 AF K-Series	126
Nikon Nikkor 28mm-105mm 1:35/4.5mm D Zoom	130
Micro-Nikkor 105mm P F/4 Macro Lens	133
Nikon Nikkor 14mm-24mm AF-S f/1.28 G ED	136
Nikon Nikkor 50mm AF-S f/1.4 D	139
Nikon Nikkor 50mm AF-S f/1.4 G Lens	142
Cosina 70mm-210mm f/4.5-f/5/6 Macro Zoom	145
Unsolicited Advice	147
My Key to Good Photos	151
About the Author	153

Macro and Close-up Lenses



Lens: Voigtlander 125mm f/2.5 Macro APO-Lanthar
Focal Length: 125mm
Widest Aperture: f/2.5
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 58mm
Hood: Included, Square
Close Focus Distance: 14.96 inches (38 centimeters)
Reproduction Ratio: 1:1
Focus Throw: 630°
Weight: 28 ounces (794 grams)

Pros: Very fast lens, very sharp lens, 9 blades, close focus, goes 1:1, long focus throw.

Cons: None. Perhaps a little heavy.

I could write a book about this lens, but I will spare you. The CV-125 is, hands down, the best macro lens I own and I use it all the time, even though I have a shelf full of some of the best macro lenses in the world at the ready. It has no major negatives. It is very fast, very sharp, focuses close, reproduced to 1:1, has 9 blades (great bokeh) – the works. If I want to complain, it is on the heavy side, but I am always happy to carry this piece of glass in the field.

The lens is very difficult to find in the Nikon format and also very expensive, with copies now going for \$2500 or so. Despite all the good qualities, probably the features that set this lens apart from other fine macro lenses are the fact that it is truly apochromatic (APO) and has such exceptional bokeh (lovely out-of-focus blur in the background).

Of course, IMO, I would add that it has a “magic” quality that words can’t express and a very-long focus throw that makes macros and stacked-photos so very easy. I find it very stable when it comes to handling various types of light in the same frame, like shade with rays of sunlight. This is real workhorse and I have used mine day in and day out for years.

It focuses to 1:1 and lets you get very close in on your subjects. A feature not often mentioned about this lens is that it is also very sharp at mid-range and even at landscape distances. This is the little lens that could and it does. If you ever find one, buy it. You will never be sorry.









Voigtlander 125mm f/2.5 Macro APO-Lanthar (crop from full size)

Macro and Close-up Lenses



Lens: Zeiss 50mm f/2 ZF.2 Makro-Planar
Focal Length: 50mm
Widest Aperture: f/2
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 67mm
Hood: Included
Close Focus Distance: 9.5 inches (24 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 300°
Weight: 18.72 ounces (531 grams)

Pros: Very sharp lens, fast lens, 9 blades, good focus distance, good focus throw.

Cons: No 1:1, heavy-ish.

This is a wonderful little lens, more interesting to me than its big brother the 100mm Makro-Planar. It is very, very sharp and with such a close focus you can treat it like a wide-angle lens and poke it right into the middle of things. It stacks very well and has a luxurious 300 degrees focus throw. It does not reach 1:1, but I don't care because I don't use it for the nitty-gritty ultra-close shots. I treat it, as mentioned above, more as a wide angle lens and reserve it for that.

It has a superb build and if there is any fault at all with this lens (IMO) it is that it may be perhaps too contrasty and not quite subtle enough in color. It is not an APO lens and that is the only thing I have noticed that I do not love.





Zeiss 50mm f/2 ZF.2 Makro-Planar (close-focus)



Zeiss 50mm f/2 ZF.2 Makro-Planar (crop from full size)

Macro and Close-up Lenses



Lens: Micro-Nikkon 45mm f/2.8 PC-E Tilt/Shift
Focal Length: 45mm
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 77mm
Hood: HB-43
Close Focus Distance: 10 inches (25 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 120°
Weight: 26 ounces (737 grams)

Pros: Fast lens, 9 blades, very sharp, good close focus.

Cons: Short focus throw, does not go to 1:1, tilt/shift features require a learning curve.

I have all three of the most recent Nikon PC (tilt/shift) lenses, this one plus the 85mm and 24mm PC. While all three are exemplary lenses, I find the 45mm PC the most useful for macro and close-up work. The “PC” stands for perspective control through the tilt and shift features.

The tilt feature allows the lens to tilt (either up and down, or right and left) a total of 8.5 degrees. There are many tutorials on the web for learning to use this feature, but the idea is that in any photo there is one and only one plane of focus. “Tilt” allows the lens to align the plane the lens with that of the image plain. An example might be a field of flowers stretching toward the horizon. Instead of just having the front flowers in focus, by tilting the lens it can be possible have the whole field in focus.

The shift feature allows the lens to be shifted right or left (or up and down) bringing what normally would be out-of-frame in frame without having to move the camera. Notice that these lenses have large box-like midsections. This allows a lens to have a larger image circle than a normal lens, so that shifting the lens to either side allows more or less of the subject to come into view. At total shift of 11.5 mm to either side is permitted.

In addition the whole lens barrel can be rotated plus or minus 90-degrees by 30-degree increments allowing you to combine the tilt/shift features in various combinations. Sound amazing? It is, but don't run out and buy one unless you really need these features. These lenses are bulky and heavy. Both the tilt and shift features (and especially the tilt feature) have a steep learning curve and are not easy to learn. The focus throw is very smooth but also very short, making it not ideal for close-up focus stacking.

That being said, the Nikon 45mm PC-E lens is a lens I frequently carry with me for wider views than my CV-125 requires. Using this lens I can stick it very close to a flower and capture it and the surrounding space easily. The shift feature allows me to take three photos (left-shift, middle, right-shift) and combine them with a stitching program to produce a seamless mini-panorama. Since all three photos already share a common image circle within the camera, this guarantees a seamless panorama. However, I find that I can only shift (left or right) one-half of the permitted distance without causing some vignetting. Still, I can produce a three-shot panorama with no special panorama head in a jiffy and they are excellent. I don't feel they are as perfect for stacked three-shot panoramas than using the CV-125 and a pano head, however.





Macro and Close-up Lenses



Lens: Nikon Nikkor 24mm PC-E f/3.5
Focal Length: 24mm
Widest Aperture: f/3.5
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 77mm
Hood: HB-41
Close Focus Distance: 8.267 inches (21 centimeters)
Reproduction Ratio: 1:2.7
Focus Throw: 90°
Weight: 25.76 ounces (730 grams)
Pros: Sharp lens, 9 blades, tilt/shift, very close focus distance.

Cons: No 1:1, very short focus throw, heavy.

Pros: Fast lens, 9 blades, very sharp, good close focus.

Cons: Short focus throw, does not go to 1:1, tilt/shift features require a learning curve.

I have all three of the most recent Nikon PC (tilt/shift) lenses, this one plus the 85mm and 45mm PC. The “PC” stands for perspective control through the tilt and shift features.

The tilt feature allows the lens to tilt (either up and down, or right and left) a total of 8.5 degrees. There are many tutorials on the web for learning to use this feature, but the idea is that in any photo there is one and only one plane of focus. “Tilt” allows the lens to align the plane the lens with that of the image plain. An example might be a field of flowers stretching toward the horizon. Instead of just having the front flowers in focus, by tilting the lens it can be possible have the whole field in focus.

The shift feature allows the lens to be shifted right or left (or up and down) bringing what normally would be out-of-frame in frame without having to move the camera. Notice that these lenses have large box-like midsections. This allows a lens to have a larger image circle than a normal lens, so that shifting the lens to either side allows more or less of the subject to come into view. At total shift of 11.5 mm to either side is permitted.

In addition the whole lens barrel can be rotated plus or minus 90-degrees by 30-degree increments allowing you to combine the tilt/shift features in various combinations. Sound amazing? It is, but don't run out and buy one unless you really need these features. These lenses are bulky and heavy. Both the tilt and shift features (and especially the tilt feature) have a steep learning curve and are not easy to learn. The focus throw is very smooth but also very short, making it not ideal for close-up focus stacking.

That being said, the Nikon 24mm PC-E lens is a lens I don't frequently carry with me for wider views than my CV-125 requires. I tend to favor the 45mm PC-E lens. Using the 24mm PC-E lens I can stick it very close to a flower and capture the flower and the surrounding space easily. The shift feature allows me to take three photos (left-shift, middle, right-shift) and combine them with a stitching program to produce a seamless mini-panorama. Since all three photos already share a common image circle within the camera, this guarantees a seamless panorama. However, I find that I can only shift (left or right) one-half of the permitted distance without causing some vignetting. Still, I can produce a three-shot panorama with no special panorama head in a jiffy and they are excellent. I don't feel they are as perfect for stacked three-shot panoramas than using the CV-125 and a pano head, however.





Macro and Close-up Lenses



Lens: Zeiss 100mm f/2 ZF.2 Makro-Planar
Focal Length: 100mm
Widest Aperture: f/2
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 67mm
Hood: Included
Close Focus Distance: 16.8 inches (43 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 360°
Weight: 26.5 ounces (751 grams)

Pros: Very sharp lens, Fast lens, good focus throw, 9 blades.

Cons: No 1:1, heavy-ish, near focus could be closer.

This is a wonderful lens and, like its little brother the 50mm Makro-Planar, it very, very sharp. The build is tough and elegant. I wish its near-focus distance was a little shorter and it does not go to 1:1, which is perhaps its main fault. It is no wonder it has such fanatical followers. As for my use of it, IMO there is a little too much contrast in the output and the colors are not APO and seem to lack some of the subtlety found in APO lenses like the CV-125 APO-Lantar, Leica 100mm APO Elmarit R, and the Coastal Optics 60mm APO lens.

That aside this would be a wonderful lens for anyone.



Zeiss 100mm f/2 ZF.2 Makro-Planar (crop from full frame)





Macro and Close-up Lenses



Lens: Micro-Nikkor 60mm f/2.8 G
Focal Length: 60mm
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 62mm
Hood: HB-42
Close Focus Distance: 7.28 inches (18 centimeters)
Reproduction Ratio: 1:1
Focus Throw: 120°
Weight: 15 ounces (425 grams)

Pros: Fast lens, 9 blades, close focus, VERY sharp, goes to 1:1.

Cons: Short focus throw.

This is a real workhorse of a macro lens, especially for copy work. I shot over 30,000 concert posters with this lens and it worked better than any other lens I could put my hands on. If I had the Coastal Optics 60mm at the time, perhaps only that would have been a better lens for copy work.

The 60mm Nikon macro is not what the 105mm focal range can provide and most macro photographers want that extra distance between them and their subjects. The 60mm does not provide that and I never use it for that ultra-close work that the 100mm or 200mm macro lenses provide. Instead, 60mm macros are for larger subjects, what I call dioramas or mini-landscapes such as a close-up of a flower and as much of the bush it is on also in the same frame, and so on.

If you are thinking of macro as the eye of the dragonfly or the bee's knees, this lens is not that. But the more I learn about close-up photography, the more the 60mm focal length is becoming useful to me. This lens is all about context and story. Wider-angle lenses allow us to tell more of a story than do the longer focal lengths.

However, the 120° focus throw is too short and makes focusing a real problem, especially if you want to stack photos. The 1:1 image frame is a real plus and makes this lens very attractive. And it is light and can slip into a pocket.







Macro and Close-up Lenses



Lens: Nikon Nikkor 35mm f/1.4 G
Focal Length: 35mm
Widest Aperture: f/1.4
Narrowest Aperture: 16
Aperture Blades: 9
Filter Size: 77mm
Hood: HB-59
Close Focus Distance: 9.85 inches (25 centimeters)
Reproduction Ratio: 0.179x
Focus Throw: 090°
Weight: 21.165 ounces (600 grams)

Pros: Very fast lens, VERY sharp, 9 blades, short focus.

Cons: Short focus throw, no 1:1, heavy-ish.

This quite new and very expensive lens is very, very sharp. And while it may have been designed (only 1 90-degree focus throw) for people photos and as a walking-around lens, it makes a very good wide-angle close-up lens for macro shooters. With a very close near focus (< 10 inches), you can poke this little baby right in the midst of a bunch of flowers and get one very close and see everything else in the vicinity at the same time.

There has been some discussion about auto-focus not being exact on this lens but as a macro shooter that means little to me. I shoot with manual focus anyway. I am sorry the focus throw is so darned short, which makes focus stacking trickier than it otherwise would have been. And of course, as a wide angle it does not go to 1:1. There are older Nikon wide-angle lenses (35mm and 28mm) that also do a superb job at a much lower cost, so don't ignore those.

IMO this is a magic lens that is very useful for mini-landscapes, dioramas, and the like plus it is great for people and parties at the same time.







Macro and Close-up Lenses



Lens: Coastal Optics 60mm f/4.0 APO Macro
Focal Length: 60mm
Widest Aperture: f/4
Narrowest Aperture: 45
Aperture Blades: 7
Filter Size: 52mm
Hood: Does not include a hood. Use Nikon HR-2
Close Focus Distance: 10.4 inches (26 centimeters)
Reproduction Ratio: 1:1.5 (2/3rds original size)
Focus Throw: 210°
Weight: 19 ounces (535 grams)

Pros: Wickedly sharp, short focus distance.

Cons: Slow lens, only 7 blades, short focus throw, does not go to 1:1, hot spot at 1:3.

Aside from being very expensive (\$4500), the CO-60 APO lens is somewhat of a specialized lens. It is designed for use not only in the visual spectrum but also in the infrared and ultra-violet spectrums on either side of the visual spectrum. It was designed for forensic and scientific use. If you were looking for a copy-camera lens in a studio, this would be just about perfect. Lens expert Lloyd Chambers states that the CO-60mm is “a reference lens for other lenses... On a scale of 1 to 5, it is a 5+.”

It does have its problems, foremost among them is the fact that this lens has a prominent hotspot at smaller apertures around magnifications of 1:3. For distances longer than this, there is no problem. However, as a macro photographer the 1:3 range means I have run into these hotspots many times and they do ruin a photo. Not sure what the thinking is on why such an expensive and perfect lens should have such a glaring fault. Perhaps it is that we should be grateful to have this fantastic lens, warts and all. A workaround is to use the very smallest extension ring to help bypass the hotspot range. Another trick is to use a high-megapixel camera like the Nikon D3x and avoid the hotspot range and then crop out what you are trying to capture, given the extra pixels. I have done both successfully.

Aside from the hotspot I have other issues with this lens, in particular the very short focus throw of around 210° degrees. Compared to 630° on the CV-125, 210° is difficult especially since a focal length of 60mm is wide enough that even the smallest change in the focusing barrel produces a noticeable change. This makes it hard to focus stack with the CO-60mm. Macro lenses benefit from having long focus throws, more so the wider they get.

The other issue that I have encountered, although no one else seems to worry about this, is that when shooting in mixed light such in the shadows of a forest canopy where a shaft of sunlight is cutting through the shade, the CO-60mm appears to be more sensitive to light dynamics. The result is the need to use diffusers carefully to filter the brighter light areas.

That being said, this is a wonderful lens indeed. It comes with no hood, but really needs one. I use the rubber hood, Nikon HR-2 on my copy.









Macro and Close-up Lenses



Lens: Voigtlander 58mm f/1.4 Nokton
Focal Length: 58mm
Widest Aperture: f/4
Narrowest Aperture: 16
Aperture Blades: 9
Filter Size: 58mm
Hood: Use Pearstone 58mm snap-on Tulip hood.
Close Focus Distance: 17.76 inches (45 centimeters)
Reproduction Ratio: 1:5.8
Focus Throw: 210°
Weight: 11.29 ounces (320 grams)
Price 2010: \$409 at B&H.

Pros: Very fast lens, very sharp lens, 9 blades.

Cons: Not close focus, no 1:1, 16mm smallest aperture.

This lens is an all-metal construction with a hard-rubber focusing ring. The included lens cap is a pain and should not be used as it requires you to remove the screw-in hood each time you use it. I bought a Nikon 52mm pinch-cap and that solved the problem. I intend to find a rubber 52mm hood and get rid of the original metal dome.

No less an authority than Lloyd Chambers states that this lens is equal to the Zeiss 50mm f/1.4 Makro-Planar and better than the “Holy Grail” of Nikons, the legendary Noct-Nikkor 58mm/f.1.2. This is saying a lot. Test results by others show this lens not great wide open but very strong from f/4 or f/5.6 and even stronger at f/8 and fine at f/11. This is unusual and makes the Nokton perfect for close-up nature photography. It is also one of the least-expensive top quality lenses available today.





Macro and Close-up Lenses

This is not a macro lens or even a close-up lens, but at the wide end it can do in a pinch for close-up mini-landscape shots. It is very sharp, fast, but has a very limited focus throw, typical for a lens designed (I guess) for shooting moving targets.



Lens: Nikon Nikkor 24mm-70mm AF-S f/2.8 G ED
Focal Length: 24mm-70mm
Widest Aperture: f/2.8
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 77mm
Hood: HB-40
Close Focus Distance: 14.96 inches (38 centimeters)
Reproduction Ratio: 1:3.7
Focus Throw: 90°
Weight: 31.68 ounces (898 grams)

Pros: Fast lens, sharp lens, close focus distance, 9 blades.

Cons: No 1:1, very short focus throw, heavy.





Macro and Close-up Lenses

The Nikon 16mm Fisheye lens is the opposite of a macro lens which oddly enough makes it useful to me in my work as antidote for what I normally do. Instead of getting close, up this rectilinear (framed like any other lens and not a circular fisheye lens) is able to cram almost the entire world into the shot, including my feet and too often the tripod itself.

Thanks to special software in post (I use the built-in feature in Adobe Lightroom) the resulting photos can be more-or-less straightened out to appear as a normal photo, but one maybe on LSD. For myself, I love this lens and it is small enough to jam in a pocket or a bag. With a near focus distance of some 10 inches I can highlight a single flower close-up and have the whole meadow in which it sits looking over its shoulder.

Although this lens is relatively sharp, it is not sharp enough to be totally convincing, but that is not its purpose anyway. I love the 3D or otherworldly sense that this lens offers and I have sought to replicate this effect but with deep focus by using a panoramic head and focus stacking, and with some success. It took my years to succumb to owning this lens, but that was a mistake on my part. The 16mm rectilinear fisheye is a lens I would not part with.



Lens: Nikon Nkikor 16mm f/2.8 Fisheye

Focal Length: 16mm

Widest Aperture: f/2.8

Narrowest Aperture: 22

Aperture Blades: 7

Filter Size: CAP

Hood: Built In

Close Focus Distance: 9.84 inches (25 centimeters)

Reproduction Ratio: 1:10

Focus Throw: 60°

Weight: 10.12 ounces (287 grams)

Pros: Fast lens, sharp-ish, good close focus, goes 1:1, 7 blades.

Cons: Very short focus throw, not sharp enough for the finest work.





Macro and Close-up Lenses



Lens: Leica 100mm Apo Macro Elmarit R Lens f/2.8
Focal Length: 100mm
Widest Aperture: f/2.8
Narrowest Aperture: 22
Aperture Blades: 7
Filter Size: 60mm
Hood: Pull out hood.
Close Focus Distance: 17.71 inches (45 centimeters)
Reproduction Ratio: 1:2/1:1
Focus Throw: 710
Weight: 27 ounces (765 grams)

Pros: Fast lens, 7 blades, reasonable short focus, great focus throw.

Cons: Does not go to 1:1 without help, no automatic aperture (have to open to focus and close to shoot).



This is one of the legendary macro lenses, a true APO (apochromatic) lens. 100mm is a great macro focal length, and the focus throw is a whoppin' 710°, just what a focus-stacker like me is looking for – incremental focus. This lens was never made for the Nikon mount, so if you find one of these and want it on a Nikon, you will have to make the conversion yourself. That is what I did.

Not only is this one of the sharpest macro lenses ever made, but it has an almost movie-like feel to the color, very soft and delicate. It does not go to 1:1, but only to 1:2, so that is not great, although the accompanying Elpro diopter can be purchased which brings it to 1:1. However, as a rule I don't like close-up adapters, although this is probably the best one I have ever seen. But there is some bad news with this lens on a Nikon Camera.

There is no way that you can enable the ability of this lens on a Nikon to automatically open up when you use the viewfinder and then stop down at the appropriate aperture when the shot is taken. Can't be done because what is needed is a mechanical lever and it just is not present. So, what this means is that for every shot you have to manually turn the aperture ring wide open, focus, and then look to see and turn the aperture to where you want it for the exposure.

This is an acquired taste and the learning curve involves forgetting to stop down and the resultant over-exposure. The net result is that, although this is one of the great lenses, I seldom choose it when I have other lenses that will let me see at the widest aperture in the viewfinder and automatically stop down for the exposure.

This lens is outstanding (a class act) and comes in a little form-fitting leather case that zips up.







Macro and Close-up Lenses



Lens: Leica Elpro 1:2-1:1 Close-Up Lens R
Focal Length: 100mm
Widest Aperture: f/2.8
Narrowest Aperture: N/A
Aperture Blades: N/A
Filter Size: 60mm
Hood: Included
Close Focus Distance: Filter
Reproduction Ratio: 1:2/1:1
Focus Throw: N/A, filter
Weight: 7 ounces (198 grams)

Pros: Works quite well with the 100mm Leica

Cons: Still is an add-on lens to get to 1:1.

This is one of the legendary macro lenses, a true APO (apochromatic) lens. 100mm is a great macro focal length, and the focus throw is a whoppin' 710°, just what a focus-stacker like me is looking for – incremental focus. This lens was never made for the Nikon mount, so if you find one of these and want it on a Nikon, you will have to make the conversion yourself. That is what I did.

Not only is this one of the sharpest macro lenses ever made, but it has an almost movie-like feel to the color, very soft and delicate. It does not get to 1:1, but only to 1:2, so that is not great, although the accompanying Elpro diopter can be purchased which brings it to 1:1. However, as a rule I don't like close-up adapters, although this is probably the best one I have ever seen. But there is some bad news with this lens on a Nikon Camera.

There is no way that you can enable the ability of this lens on a Nikon to automatically open up when you use the viewfinder and then stop down at the appropriate aperture when the shot is taken. Can't be done because what is needed is a mechanical lever and it just is not present. So, what this means is that for every shot you have to manually turn the aperture ring wide open, focus, and then look to see and turn the aperture to where you want it for the exposure.

This is an acquired taste and the learning curve involves forgetting to stop down and the resultant over-exposure. The net result is that, although this is one of the great lenses, I seldom choose it when I have other lenses that will let me see at the widest aperture in the viewfinder and automatically stop down for the exposure.

This lens is outstanding (a class act) and comes in a little form-fitting leather case that zips up.





Macro and Close-up Lenses



Lens: Micro-Nikkor 105mm f/2.8 VR Lens
Focal Length: 105mm
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 62mm
Hood: HB-38
Close Focus Distance: 12.36 inches (31 centimeters)
Reproduction Ratio: 1:1
Focus Throw: 270°
Weight: 27.84 ounces (789 grams)

Pros: Sharp lens, 9 blades, good near focus, ample focus throw, VR, gets to 1:1.

Cons: Could be sharper, a little heavy.

This is the current version of the classic Nikon 105mm Micro-Nikkor but is much bulkier, heavier, and more expensive than pulling an earlier model off Ebay. I would stick with the earlier models since (believe it or not) they are sharper, at least for very close work.

There is one and only one reason I still own this lens and that is for hand-held chase-the-butterfly photography. For the most part I am always on a tripod, but for some subjects I need to sneak up on them and follow their movements. The addition of the VR in this version works quite well and makes it the best lens for this kind of job.

The VR 105mm lens also is relatively fast and goes to the 1:1 reproduction ratio without the addition of extension tubes or close-up lenses. This alone is a big plus. In fact, if I sit down and add up all the qualities needed for a good macro lens, the Nikon 105mm VR is always near the top. It is fast, goes to 1:1, focuses close, has 9 blades for good bokeh, and has a reasonable focus throw. All these added together suggest that this might be the best all-around macro lens for beginners.

OLDER 105mm Micro-Nikkors

There were a number of older 105mm macros. Here are the specs for the version before the VR release. All of these earlier 105mm macros are good basic macro lenses and worth picking up if the price is right.

Lens: Micro-Nikkor 105mm f/2.8 V
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 52mm-62mm
Hood: HS-7
Focus Throw: 180°
Weight: 19.75 ounces (560 grams)

Pros: Sharp lens, 9 blades, good near focus

Cons: Could be sharper, a little heavy, marginal focus throw.







Macro and Close-up Lenses

I mention this and the new “D” version of the classic 85mm f/1.4 not because I use it often but because it is a sharp lens that many professional photographers already have in their kit. I use it once in a while for extremely low-light occasions for shooting mid-sized bushes, plants, etc. Actually, more of the time now in low-light situations I am now using the D3s and pushing the ISO, so I list it here just to keep it in mind.



Lens: Nikon Nikkor 85mm f/1.4 G
Focal Length: 85mm
Widest Aperture: f/1.4
Narrowest Aperture: 16
Aperture Blades: 9
Filter Size: 77mm
Hood: N/A
Close Focus Distance: 36 inches (91 centimeters)
Reproduction Ratio: 1:8.3
Focus Throw: 90°
Weight: 20.98 ounces (595 grams)

Pros: Very fast lens, VERY sharp, 9 blades.

Cons: long focus distance, no 1:1, very short focus throw, heavy-ish.





Macro and Close-up Lenses

The 70-180mm Micro-Nikkor is a nice idea, a macro lens that zooms. I used this lens almost exclusively for almost two years, so I really know it inside and out. It is nice to zoom around, to pull out or focus in to adjust a shot without having to move the tripod. All this is fine. But I never do much macro or close-up work at 70mm. Most to all is done at the other end of the focus range, around 180mm and when down there the f-stop for this lens is f/5.6 which (simply put) is too damned dim for my eyes in the viewfinder. I like the early morning light of dawn or the twilight to shoot and I find there is not enough light to see to focus with this lens, especially if I want to stack photos. The viewfinder is dark at f/5.6 except in bright light. Why bother?

I will say that there is a “magic” with this lens that I do love. Somehow the images have an almost film look to them which I like. And the lens is sharp enough, but not tack sharp and the resulting photos tend to be too dark or heavy/contrast-y in some sense not present in my Zeiss or Voigtlander lenses. And it weight almost two pounds!

If you work in bright light a lot, you might consider this lens. Otherwise, you are better off with a lens that will go 1:1 and is faster like the Nikon 105mm Micro-Nikkors.



Lens: Micro-Nikkor 70mm-180mm AF f/4.5-5.6 D
Focal Length: 70mm-180mm
Widest Aperture: f/4.5-5.6
Narrowest Aperture: 32-40
Aperture Blades: 9
Filter Size: 62mm
Hood: HB-14,HN-23
Close Focus Distance: 19.42 inches (49 centimeters)
Reproduction Ratio: 1:32/1:3.2
Focus Throw: 180°
Weight: 35 ounces (992 grams)

Pros: Zoom macro lens, 9 blades, reasonable focus throw.

Cons: VERY slow lens, long near focus, does not get close to 1:1, heavy.







Macro and Close-up Lenses



Lens: Micro-Nikkor 200m AF f/4 ED-IF Macro
Focal Length: 200mm
Widest Aperture: f/4
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 62mm
Hood: HN-30, HN-23, HN-30
Close Focus Distance: 19.68 inches (50 centimeters)
Reproduction Ratio: 1:1
Focus Throw: 300°
Weight: 41.6 ounces (1179 grams)

Pros: Very sharp lens, gets to 1:1, good focus throw, 10 inches from front of lens, rotating collar.

Cons: Slow lens, heavy, not great bokeh.

This is probably Nikon's sharpest macro lens and also its heaviest (over two pounds), so it really can only be used effectively on a solid tripod. This lens is well built, very sharp, and the focus throw is a healthy 300 degrees, which is good for focus stacking. My only complaint is that the f/4 wide aperture dims my viewfinder too much for really low light work, and it is heavy!

According to Canon users this Micro-Nikkor 200mm lens bests even the classic Canon 180mm f/3.5 L USM. This lens can also be used for normal landscape photography as can any macro lens. Not all macros are sharp for distance shots, but this lens is, so it has a dual purpose, macro and landscape.

This is an auto-focus lens, but it is quite slow and no good macro shooter I have met ever uses auto-focus except perhaps to jump to the general ballpark area for the shot. This lens has internal focusing, so there is no change in the lens length while focusing. The tripod collar rotates 90-degrees so you can switch from horizontal to vertical (or back) in a moment, which is a real plus.

However it does get to 1:1 and is as sharp as you could want (a classic), so it is the favorite of many Nikon macro shooters. I have one but use it seldom as the Voigtlander 125mm APO is better in all ways I care about.

Lens expert Björn Rørslett points out that if you use the 6T close-up lens to extend the reproduction ratio, it should be mounted in reverse on this lens to obtain maximum corner sharpness. The lens collar that comes with this lens is weak and easily is broken. Instead, I use a lens collar from Kirk Enterprises (part # NC-300) which avoids that problem.



Micro-Nikkor 200mm AF f/4 ED-IF Macro (crop from full frame)



Micro-Nikkor 200m AF f/4 ED-IF Macro (maximum close-up)



Macro and Close-up Lenses



Lens: Nikon Nikkor 35-70mm AF Zoom f/2.8 D Lens
Focal Length: 35mm-70mm
Widest Aperture: f/2.8
Narrowest Aperture: 22
Aperture Blades: 7
Filter Size: 62mm
Hood: HB-1
Close Focus Distance: 14 inches (36 centimeters)
Reproduction Ratio: 1:4.3
Focus Throw: 360°
Weight: 23.43 ounces (664 grams)
Price 2011: Approximately \$300 on Ebay.

Pros: Fast lens, sharp lens, 7 blades, close focus distance, good focus throw.

Cons: No 1:1, heavy.

This was for years one of Nikon's best and sharpest lenses. This is not a dedicated macro lens, but has a macro mode which lets you get to around 14 inches (24 inches is as close as the non-macro mode allows). The macro mode is a little softer than the standard mode. Although the lens is an early auto-focus lens, in macro mode it defaults to manual focus, which is what macro shooters need anyway.

I list this lens because I had it early on and it is a kind of lens for all seasons, even if it is an old-ish lens by this point. It has those ancient pull-out tubes, which are not my favorite. Still, some of you just starting out and on a budget could pick up a copy that will do portraits, landscapes, and even a little macro. There is no question it is a sharp lens. It has a solid build.





Macro and Close-up Lenses

This is not a macro or a really a close-up lens, but rather a portrait lens that features a de-focus control that allows you to selectively blur the background. It is useful only for mini-landscapes, plants, bushes, and so on.

105DC (39.37 inches)



Lens: Nikon Nikkor 135mm AF DC f/2

Focal Length: 135mm

Widest Aperture: f/2

Narrowest Aperture: 16

Aperture Blades: 9

Filter Size: 72mm

Hood: BUILT-IN

Close Focus Distance: 3.6089 ' (1.0999 meters)

Reproduction Ratio: 1:7.1

Focus Throw: 130°

Weight: 30.68 ounces (870 grams)

Pro: Fast lens, sharp lens, 9 blades.

Cons: Long focus distance, no 1:1, very short focus throw, heavy.





Macro and Close-up Lenses

I mention this and the new “G” version of the classic 85mm f/1.4 not because I use it often but because it is a sharp lens that many professional photographers already have in their kit. I use it once in a while for extremely low-light occasions for shooting mid-sized bushes, plants, etc. Actually, more of the time now in low-light situations I am now using the D3s and pushing the ISO, so I list it here just to keep it in mind.



Lens: Nikon Nikkor 85mm f/1.4 D
Focal Length: 85mm
Widest Aperture: f/1.4
Narrowest Aperture: 16
Aperture Blades: 9
Filter Size: 77mm
Hood: HN-31
Close Focus Distance: 33.46 inches (85 centimeters)
Reproduction Ratio: 1.9.09
Focus Throw: 90°
Weight: 19.4 ounces (550 grams)

Pros: Very fast lens, very sharp, 9 blades

Cons: No close distance, no 1:1, heavy, short focus throw.





Macro and Close-up Lenses



Lens: Nikon Nikkor 300mm AF-S f/4 ED IF
Focal Length: 300mm
Widest Aperture: f/4
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 77mm
Hood: Built-in
Close Focus Distance: 4.75721 ' (1.4499 meters)
Reproduction Ratio: 1:3.7
Focus Throw: 180°
Weight: 50.79 ounces (1437 grams)

Pros: Sharp lens, 9 blades, short focus distance for a telephoto.

Cons: No 1:1, short focus throw, heavy (of course).

What is a 300mm lens doing in the same context as macro and close-up lenses? This very sharp telephoto lens is here for one purpose and that is for use with the Nikon D3x and that only thanks to the fact that it has relatively the shortest near distance of any good-sized telephoto lens, a little under five feet. Attach the Nikon 300mm f/4 lens on a D3x and you can pick off frogs in the middle of a pond and, because the resulting photo has so many megapixels, crop out the frog from the center of the image and still have enough pixels to make a decent photo out of your crop.

In addition, if you put the Nikon AF-S TC-20E-III 2x Teleconverter on any full-frame Nikon you can get right up close and take decent macro photos. No doubt that the Nikon 300mm needs plenty of light for your viewfinder, it won't be too useful in dim light.





Macro and Close-up Lenses



Lens: Nikon Nikkor 70mm-200mm AF VR II f/2.8 GII AFS ED-IF

Focal Length: 70mm-200mm

Widest Aperture: f/2.8

Narrowest Aperture: 22

Aperture Blades: 9

Filter Size: 77mm

Hood: HB-48, HN-28

Close Focus Distance: 4.59317 feet (1.3999 meters)

Reproduction Ratio: 1:8.3

Focus Throw: 90°

Weight: 51.79 ounces (1468 grams).

Pros: fast lens, sharp, VR, 9 blades.

Cons: Not close focus, very short focus throw, no 1:1, heavy.

This very sharp, fast, and ever-so-popular telephoto lens is something most professional photographers have in their bag and already own. Attach the Nikon 200mm VR II on a D3x and you can pick off frogs in the middle of a pond and, because the resulting photo has so many megapixels, crop out the frog from the center of the image and still have enough pixels to make a decent photo out of your crop.

In addition, if you put the Nikon AF-S TC-20E-III 2x Teleconverter on any full-frame Nikon you can get right up close and take decent macro photos.





Macro and Close-up Lenses



Lens: Voigtlander 180mm APO f/4
Focal Length: 180mm
Widest Aperture: f/4
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 49mm
Hood: Square, included.
Close Focus Distance: 47.24 inches (120 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 290°
Weight: 17 ounces (485 grams)

Pros: Sharp lens, 9 blades, reasonable focus throw.

Cons: No close focus, slow lens, heavy-ish.

This is not a macro lens and not really a close-up lens either, so let's say it is a semi-close-up lens. This lovely little lens looks like a miniature version of its big brother the Voigtlander 125m APO-Lanthar. And like its brother, the 180mm is also APO and very sharp. However, this lens is difficult to find and is no longer manufactured. Like the CV-125, this lens has an outer metal shell and a relatively long (and very smooth) focus ring. The lens is sharp by f/5.6 and also still strong at f/8.

For nature photography it gives you plenty of distance (you have no choice), so shots of butterflies on flowers and plants of all kinds are what it is best for. It is light compared to the CV-125. I have not used it for landscapes or infinity shooting, so I can't speak to that. It took me years to find a copy of this lens, so good luck!





Macro and Close-up Lenses



Lens: Micro-Nikkor 85mm f/2.8 PC Tilt/Shift Lens
Focal Length: 85mm
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 9
Filter Size: 77mm
Hood: HB-22
Close Focus Distance: 15.35 inches (39 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 120°
Weight: 22.4 ounces (635 grams)

Pros: Fast lens, 9 blades, sharp lens.

Cons: Near focus a little long, does not get to 1:1, very short focus throw.

I have all three of the most recent Nikon PC (tilt/shift) lenses, this one plus the 85mm and 24mm PC. While all three are exemplary lenses, I find the 45mm PC the most useful for macro and close-up work. The “PC” stands for perspective control through the tilt and shift features.

The tilt feature allows the lens to tilt (either up and down, or right and left) a total of 8.5 degrees. There are many tutorials on the web for learning to use this feature, but the idea is that in any photo there is one and only one plane of focus. “Tilt” allows the lens to align the plane the lens with that of the image plain. An example might be a field of flowers stretching toward the horizon. Instead of just having the front flowers in focus, by tilting the lens it can be possible have the whole field in focus.

The shift feature allows the lens to be shifted right or left (or up and down) bringing what normally would be out-of-frame in frame without having to move the camera. Notice that these lenses have large box-like midsections. This allows a lens to have a larger image circle than a normal lens, so that shifting the lens to either side allows more or less of the subject to come into view. At total shift of 11.5 mm to either side is permitted.

In addition the whole lens barrel can be rotated plus or minus 90-degrees by 30-degree increments allowing you to combine the tilt/shift features in various combinations. Sound amazing? It is, but don't run out and buy one unless you really need these features. These lenses are bulky and heavy. Both the tilt and shift features (and especially the tilt feature) have a steep learning curve and are not easy to learn. The focus throw is very smooth but also very short, making it not ideal for close-up focus stacking.

Using this lens I can stick it very close to a flower and capture it and the surrounding space easily. The shift feature allows me to take three photos (left-shift, middle, right-shift) and combine them with a stitching program to produce a seamless mini-panorama. Since all three photos already share a common image circle within the camera, this guarantees a seamless panorama. However, I find that I can only shift (left or right) one-half of the permitted distance without causing some vignetting. Still, I can produce a three-shot panorama with no special panorama head in a jiffy and they are excellent. I don't feel they are as perfect for stacked three-shot panoramas than using the CV-125 and a pano head, however.

This is a wonderful lens that is indeed very sharp and may interest some of you. That being said, the Nikon 85mm PC-E lens is a lens I don't frequently carry with me because I have a number of fine macro lenses in the 90-125mm focal range. Tilt and shift are not things I tend to do close-up although they can be useful on occasion. If I am shooting landscape or even mini-landscape I generally go wider than 85 degrees.







Macro and Close-up Lenses

This little gem is probably the least-expensive top quality APO lens on the market for the value you get. This is an all-metal lens that is built like a tank. It is smallish and includes a close-up filter that screws into the hood of the lens. This is an odd-shaped lens compared to most lenses, but the sharpness and clarity are right up there with the best of lenses and here is APO at a price anyone can afford. The SL-II version (most recent) of this lens is fully metered to Nikon bodies. It is a manual focus lens.

The little 39mm hood adaptor allows you to screw in the small close-up lens which has its own tiny lens cap. Otherwise you can bag the close-up and hood and treat this as any 52mm lens. Just get yourself a 52mm rubber lens cap like the Nikon HR-2 (and pinch-type lens cap) and presto!, you have a normal-looking lens.

If you yearn for the APO coloring you find in the Voigtlander CV-125 and Leica 100mm APO Elmarit, which are four or five times more expensive, then here is a lens that can get you there. It is a little slow and requires a close-up lens (so does the Leica) to get you to 1:1.



Lens: Voigtlander 90mm f/3.5 SL-II APO-Lanthar
Focal Length: 125mm
Widest Aperture: f/2.5
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 58mm
Hood: Include, small hood.
Close Focus Distance: 19.68 inches (50 centimeters), 12.6 inches (32 centimeters)
Reproduction Ratio: 1:3.5/1:1.8
Focus Throw: 270°
Weight: 11.29 ounces (320 grams)

Pros: Very sharp lens, APO, 9 blades, close focus only with close-up lens, ample focus throw.

Cons: Slow lens.









Macro and Close-up Lenses

This lens was very popular years ago and there are many still available on Ebay at reasonable prices. This is not a macro lens but just a very, very sharp 105mm manual focus lens that you can easily find. It is useful for mini-landscapes, bushes, etc. – anything about three feet from wherever you are.



Lens: Nikon Nikkor 105mm AI-S f/2.5 (built-in hood)
Focal Length: 105mm
Widest Aperture: f/2.5
Narrowest Aperture: 22
Aperture Blades: 7
Filter Size: 52mm
Hood: HN-8, HS-4
Close Focus Distance: 3.2808' (0.999 meters)
Reproduction Ratio: 1:7.7
Focus Throw: 140°
Weight: 15.34 ounces (435 grams)

Pros: Fast lens, very sharp, 7 blades.

Cons: Long focus, short focus throw, no 1:1, heavy.





Macro and Close-up Lenses

This lens produced by Kiron (Lester A. Dine) is a sharp lens and worth looking at especially if you are on a budget. There are many different lenses (both in 100mm and 105mm) that are essentially the same lens. They have also been issued not only under the Kiron and Lester A. Dine label, but also by Vivitar. I have seen them on Ebay for \$250. This lens does go to 1:1 (which is rare!) and has a very good focus throw. It was originally marketed mostly to dentists. The same lens has been advertised as a f/2.5 when sold by Elcar and as a f/2.8 when sold by Cosina, Panagor, Soligor, Vivitar, Kiron, and sold to dentists as the Lester A. Dine. The results with this lens are sharp and this lens should be on your short list if you want a solid macro lens and don't want to lay out the big bucks. It will do the job. You should be able to find one if you look for a while.



Lens: Kiron (Lester A. Dine) 100mm f/2.8 Macro
Focal Length: 100mm
Widest Aperture: f/2.8
Narrowest Aperture: 32
Aperture Blades: 8
Filter Size: 52mm
Hood: Pull out hood.
Close Focus Distance: 17.4 inches (44 centimeters)
Reproduction Ratio: 1:1
Focus Throw: 390°
Weight: 22 ounces (623.7 grams)

Pros: fast lens, Sharp, 8 blades, reasonable close focus, good focus throw, goes to 1:1.

Cons: None.



Kiron (Lester A. Dine) 100mm f/2.8 Macro (crop from full frame)





Kiron (Lester A. Dine) 100mm f/2.8 Macro

Macro and Close-up Lenses



This top-quality manual-focus macro lens is very sharp, at least at close distances and is not recommended for landscape or distance shooting. There were two versions, one with a compensating diagram (marked "P") and one without (no "P" suffix). The "P" version is the one to get. There are a number of Nikon 55mm f/3.5 versions of this micro and some care has to be taken to find the correct lot. One way is to make sure the serial number of the lens is between 600001 and 728347. One good way to find this lens is to check KEH.com. They usually have a number of copies and at a reasonable price. This might be the sharpest macro lens for the least money available. It is all manual.

Lens expert Björn Rørslett suggests that the correct lens has a "chrome barrel, magnification factors printed in light blue, and hill-and-dale focusing and aperture collars." See his site for more details: <http://www.naturfotograf.com>

Lens: Micro-Nikkor 55mm P Auto 55mm f/3.5 (672490)
Focal Length: 55mm
Widest Aperture: f/3.5
Narrowest Aperture: 32
Aperture Blades: 6
Filter Size: 52mm
Hood: HN-3
Close Focus Distance: 9.488 inches (24 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 300°
Weight: 8.28 ounces (235 grams)

Pros: Close focus, long focus throw, very sharp.

Cons: 6 Blades, does not go to 1:1, slow lens.









Macro and Close-up Lenses

This is another of Nikon's classic primes. It is still available new and turns up on Ebay used as well. It is fast, wide, has great bokeh, lightweight, and has a close near focus. It has however, an extremely short focus throw so stacking photos must be done with care. However, wide angle lenses don't lend themselves to focus stacking and this is a very handy lens to throw in the bag or stick in a pocket so that you have wide-angle coverage when you need it. I use it for mini-landscapes and any larger-than-macro objects.



Lens: Nikon Nikkor 28mm f/2.8

Focal Length: 28mm

Widest Aperture: f/2.8

Narrowest Aperture: f/22

Aperture Blades: 7

Filter Size: 52mm

Hood: HN-1

Close Focus Distance: 12 inches (30 centimeters)

Reproduction Ratio: 1:8.8

Focus Throw: 80°

Weight: 9.52 (270 grams)

Pros: Very sharp lens, fast lens, 7 blades, close focus, light.

Cons: No 1:1, very short focus throw.





Macro and Close-up Lenses



Lens: Micro-Nikkor 60mm f/2.8 D Lens

Focal Length: 60mm

Widest Aperture: f/2.8

Narrowest Aperture: 32

Aperture Blades: 7

Filter Size: 62mm

Hood: H2.22

Close Focus Distance: 8.66 inches (22 centimeters)

Reproduction Ratio: 1:1

Focus Throw: 120°

Weight: 15.52 ounces (440 grams)

Pros: Fast lens, 7 blades, close focus, very sharp, goes to 1:1.

Cons: Short focus throw.

This is a real workhorse of a macro lens, especially for copy work. I shot over 30,000 concert posters with this lens and it worked better than any other lens I could put my hands on. If I had the Coastal Optics 60mm at the time, perhaps only that would have been a better lens for copy work.

The 60mm Nikon macro is not what the 105 focal range can provide and most macro photographers want that extra distance between them and their subjects. The 60mm does not provide that and I never use it for that ultra-close work that the 100mm or 200mm macro lenses provide. Instead, 60mm macros are for larger subjects, what I call dioramas or mini-landscapes such as a close-up of a flower and as much of the bush it is on also in the same frame, and so on.

If you are thinking of macro as the eye of the dragonfly or the bee's knees, this lens is not that. But the more I learn about close-up photography, the more the 60mm focal length is becoming useful to me. This lens is all about context and story. Wider-angle lenses allow us to tell more of a story than do the longer focal lengths.

However, the 120° focus throw is too short and makes focusing a real problem, especially if you want to stack photos. The 1:1 image frame is a real plus and makes this lens very attractive. And it is light and can slip into a pocket. That being said, if you don't own one already, get the new Nikon 60mm G version of this lens. I find it much sharper.







Macro and Close-up Lenses

This classic Nikon 50mm f/1.8 lens does not really belong here since it is neither a macro nor a wide-angle lens. However, it is very, very sharp and lightweight as well. If you are shooting mini-landscapes, bushes, gardens, dioramas, there is not reason to ignore this lens, especially if you already have it.



Lens: Nikon Nikkor 50mm f/1.8 AIS
Focal Length: 50MM
Widest Aperture: f/1.8
Narrowest Aperture: 22
Aperture Blades: 7
Filter Size: 52mm
Hood: HS-11, HR-1
Close Focus Distance: 17.71 inches (45 centimeters)
Reproduction Ratio: 1:6.6
Focus Throw: 130°
Weight: 5.64 ounces (160 grams)

Pros: Very fast lens, sharp, 7 blades, light

Cons: No close near focus, no 1;1, very short focus throw.





Macro and Close-up Lenses

This is another of Nikon's classic primes. It is still available new and turns up on Ebay used as well. It is fast, wide, has great bokeh, lightweight, and has a close near focus. It has however, an extremely short focus throw so stacking photos must be done with care. However, wide angle lenses don't lend themselves to focus stacking and this is a very handy lens to throw in the bag or stick in a pocket so that you have wide-angle coverage when you need it. I use it for mini-landscapes and any larger-than-macro objects.



Lens: Nikon Nikkor 24mm f/2.8
Focal Length: 24mm
Widest Aperture: f/2.8
Narrowest Aperture: f/22
Aperture Blades: 7
Filter Size: 52mm
Hood: HN-1
Close Focus Distance: 12 inches (30 centimeters)
Reproduction Ratio: 1:8.8
Focus Throw: 80°
Weight: 9.52 (270 grams)

Pros: Very sharp lens, fast lens, 7 blades, close focus, light.

Cons: No 1:1, very short focus throw.



Nikon Nikkor 24mm f/2.8 (crop from full frame)



Nikon Nikkor 24mm f/2.8 (maximum close-up)

Macro and Close-up Lenses

This little pancake lens is solid metal with a hard-rubber focus ring. It is less than one inch (24mm) long. The front element is non-rotational but the lens does extend just a bit while focusing. This is a manual focus lens but it does contain a CPU, so the Nikon matrix metering system works fine with it. There is a traditional aperture ring which you set to automatic aperture.

The lens is sharp wide open and very sharp at f/4 and f/5.6, but this is not APO and does show some chromatic aberration. The lens comes with a separate (and smaller) close-up lens that mounts via a dome-shaped step-down ring. On this ring sits a tiny lens cap. You may wish to keep the ring and lens cap together and get a standard 52mm rubber hood.

Because of its small size and weight, this lens is easy to carry in a pocket add to your bag. This is a high quality lens at a relatively low price.



Lens: Voigtlander 40mm Ultron f/2.0 SL II

Focal Length: 40mm

Widest Aperture: f/2

Narrowest Aperture: 22

Aperture Blades: 9

Filter Size: 52mm

Hood: A dome-shaped aperture ring is included, but it is very shallow. I use a Pearstone 52mm snap-on Tulip hood.

Close Focus Distance: 17.716 inches (45 centimeters), 9.84 inches (25 centimeters) with close-up lens.

Reproduction Ratio: 1:7/1:4

Focus Throw: 160°

Weight: 7 ounces (200 grams)

Price 2011: \$409 at B&H.

Pros: Very fast, very sharp lens, 9 blades, light. Close focus with close-up lens.

Cons: No 1:1, short focus throw.





Macro and Close-up Lenses

35mm is a classic-sized focal length. Here is a fast 35mm lens that can be picked up for very little money. If you don't have a 35, here is one worth picking up.



Lens: Nikon Nikkor 35mm f/2.8 AI K-Series
Focal Length: 35mm
Widest Aperture: f/2.8
Narrowest Aperture: 22
Aperture Blades: 6
Filter Size: 52mm
Hood: HN-3
Close Focus Distance: 11.811 inches (30 centimeters)
Reproduction Ratio: 1:5.7
Focus Throw: 195°
Weight: 8.302 ounces (235 grams)

Pros: Fast lens, sharp, good close focus, light.

Cons: Short focus throw, no 1:1.







Macro and Close-up Lenses

Not a macro lens, but it does have a macro mode and focuses to less than 9 inches. A once-common lens, professionals are finding this lens of higher quality than once thought and are beginning to collect it and add it to their bags. A nice compromise for a zoom.



Lens: Nikon Nikkor 28mm-105mm 1:3.5/4.5mm D Zoom
Lens 62mm
Focal Length: 28mm-105mm
Widest Aperture: f/3.5-4.5
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 62mm
Hood: HB-18, HB-23
Close Focus Distance: 8.66 inches (22 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 45°
Weight: 17 ounces (482 grams)

Pros: Versatile, close focus, 9 blades.

Cons: Slow, short focus throw, 1:2 reproduction ratio





Macro and Close-up Lenses

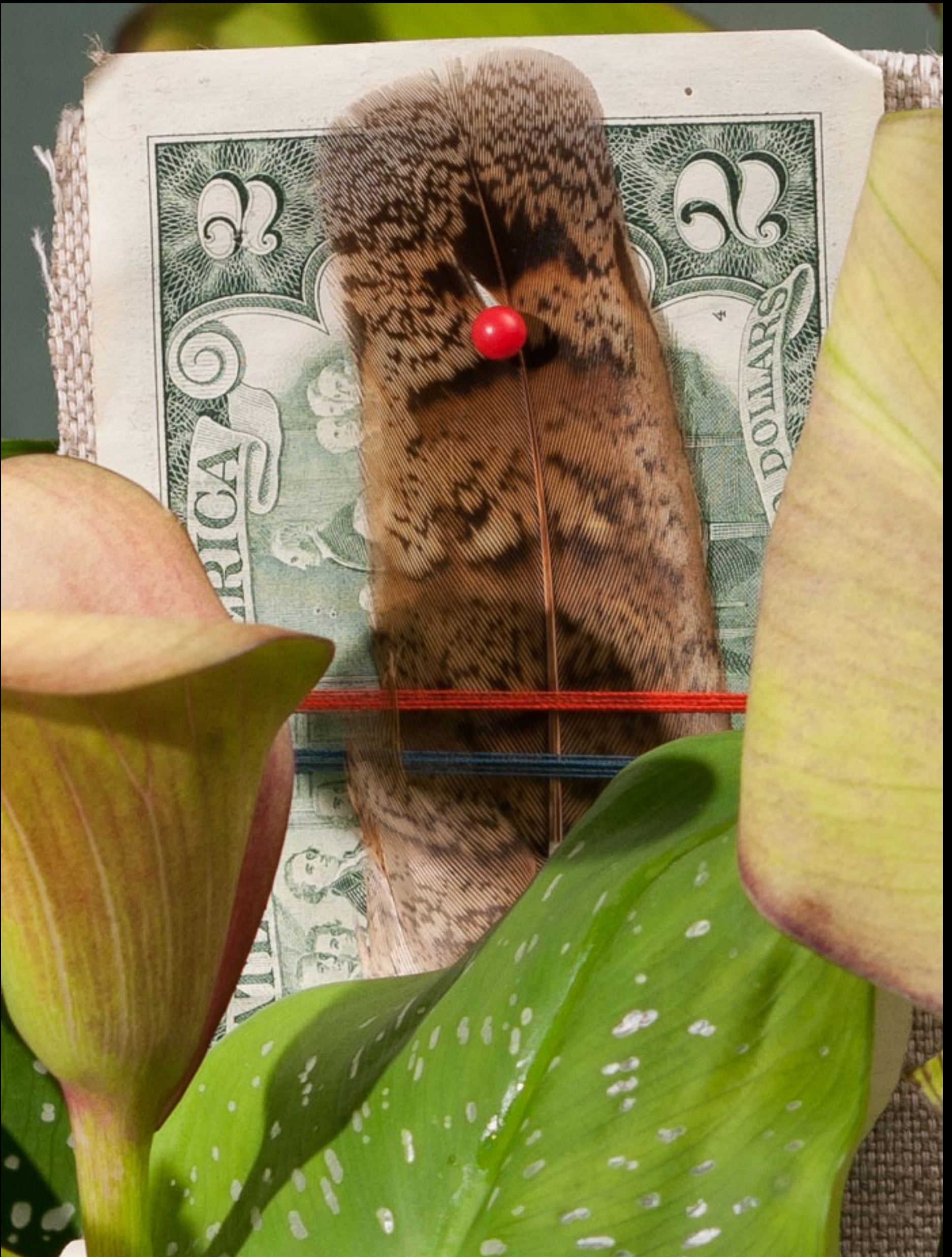
This classic lens has the same optics as the 105mm f/4 bellows lens. This is a very sharp lens and quite inexpensive for a quality lens. usually available used on Ebay at all times. It is manual focus and its only drawback is that it is slow (f/4), so viewfinders will not be as well lit if you are photographing in shade, dawn, or dusk. If you have plenty of light, no problem.



Lens: Micro-Nikkor 105mm P f/4 Macro Lens
Focal Length: 105mm
Widest Aperture: f/4
Narrowest Aperture: 32
Aperture Blades: 7
Filter Size: 52mm
Hood: HN-8,HS-4
Close Focus Distance: 18.5 inches (47 centimeters)
Reproduction Ratio: 1:2
Focus Throw: 320°
Weight: 17.63 ounces (500 grams)

Pros: Very sharp lens, good focus throw, inexpensive

Cons: Slow lens, long near focus, no 1:1.





Micro-Nikkor 105mm P f/4 Macro Lens (maximum close-up)

Macro and Close-up Lenses



Lens: Nikon Nikkor 14mm-24mm AF-S f/2.8 G ED
Focal Length: 14mm-24mm
Widest Aperture: f/2.8
Narrowest Aperture: 22
Aperture Blades: 9
Filter Size: 77mm
Hood: BUILT-IN
Close Focus Distance: 11.023 inches (28 centimeters)
Reproduction Ratio: 1:6.7
Focus Throw: 60°
Weight: 34 ounces (964 grams)

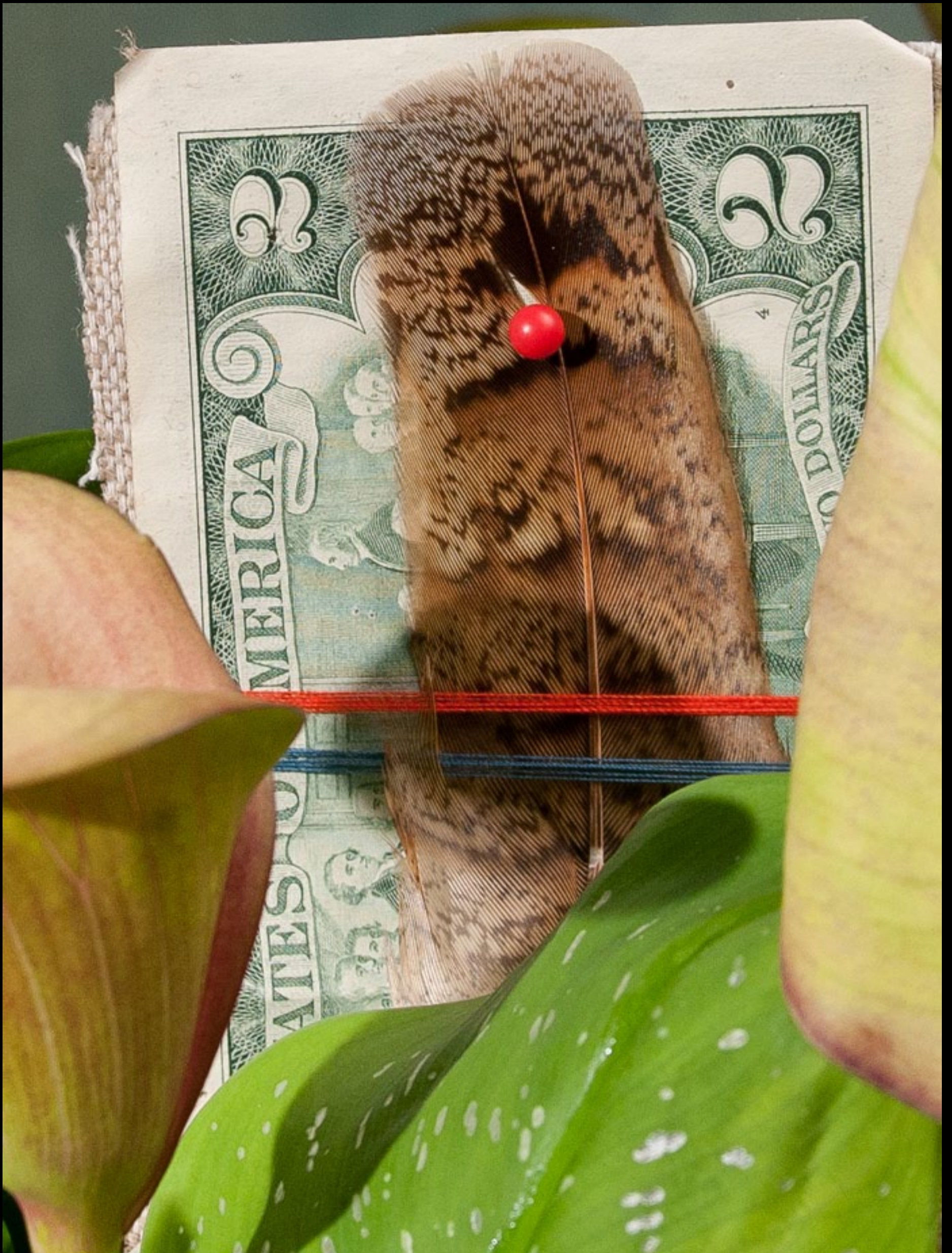
Pros: Fast lens, very sharp lens, close focus distance, 9 blades.

Cons: No 1:1, very short focus throw, heavy, no filters.

This is the lens of choice in my book when it comes to wide-angle zoom lenses and it pretty-much matches any primes in its range. Folks complain about its bulbous lens not taking filters and being unprotected, but that has not bothered me. Could it be that I seldom use filters? However, it might be possible for the plastic lens cap to slip off, so I have added some self-sticking velvet patches to the inside of the cap to make it fit more snugly.

Lens expert Björn Röslett refers to this lens as “the new reference for wide-angle zoom lenses.” The close-focus distance for this lens is very short so you can pretty much stick this lens right into a flower patch and get a flower and the whole patch. I don’t have to sing the praises of this lens as they are all over the web. Check it out.

Aside from the obvious landscape uses, I use this lens for mini-landscapes, dioramas, and any small scene where I can have something in the foreground in focus and as much of everything else as is possible. Expensive lens.





Macro and Close-up Lenses

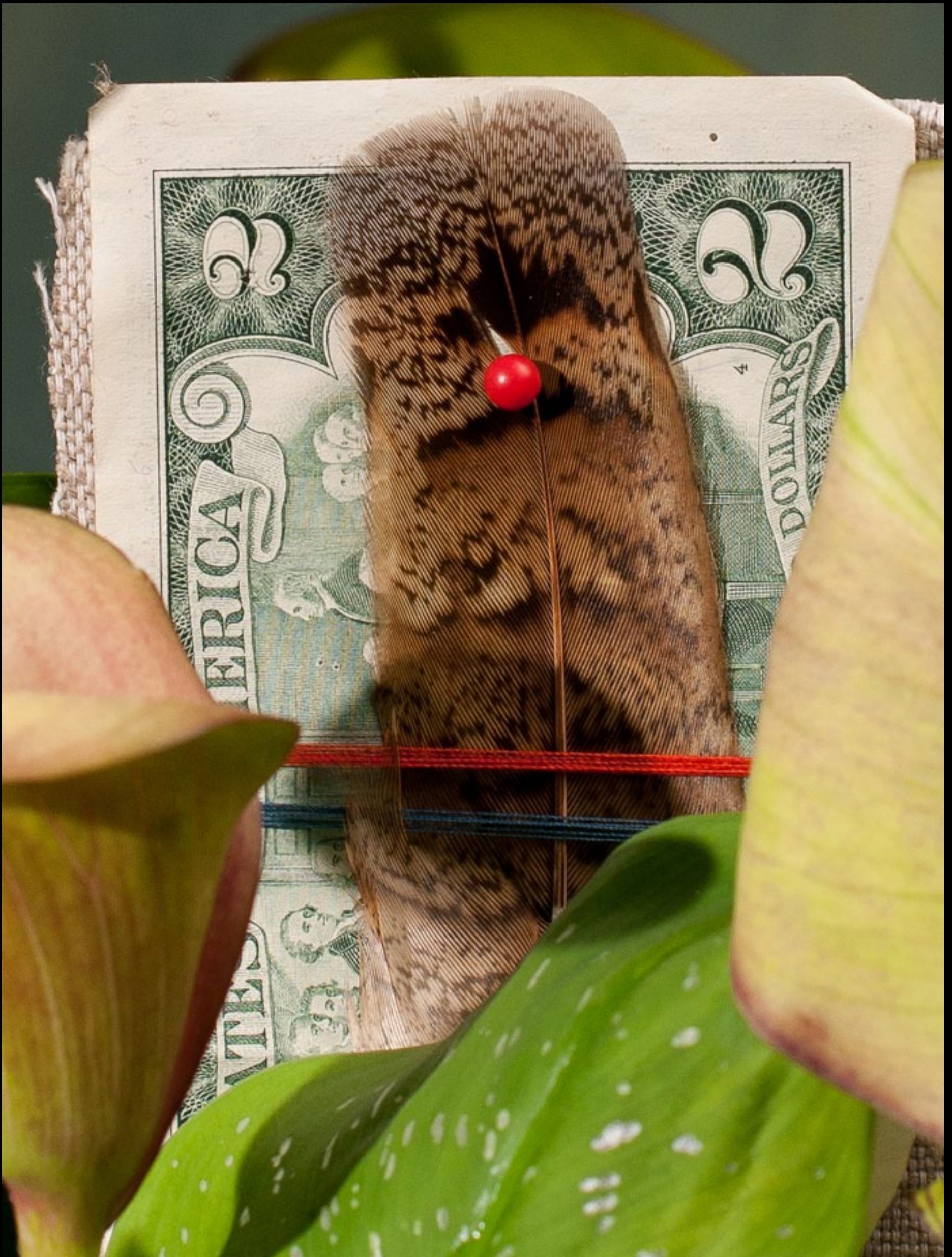
This classic Nikon 50mm f/1.4 lens does not really belong here since it is neither a macro nor a wide-angle lens. However, it is very, very sharp and lightweight as well. If you are shooting mini-landscapes, bushes, gardens, dioramas, there is not reason to ignore this lens, especially if you already have it.



Lens: Nikon Nikkor 50mm AF-S f/1.4 D
Focal Length: 50mm
Widest Aperture: f/1.4
Narrowest Aperture: 16
Aperture Blades: 7
Filter Size: 52mm
Hood: HR-2
Close Focus Distance: 17.71 inches (45 centimeters)
Reproduction Ratio: 1:6.6
Focus Throw: 140°
Weight: 8.1 ounces (230 grams)

Pros: Very fast lens, sharp, 7 blades, light

Cons: No close near focus, no 1:1, very short focus throw.





Macro and Close-up Lenses

This classic Nikon 50mm f/1.4 lens does not really belong here since it is neither a macro nor a wide-angle lens. However, it is very, very sharp and lightweight as well. If you are shooting mini-landscapes, bushes, gardens, dioramas, there is not reason to ignore this lens, especially if you already have it.



Lens: Nikon Nikkor 50mm AF-S f/1.4 G Lens
Focal Length: 50MM
Widest Aperture: f/1.4
Narrowest Aperture: 16
Aperture Blades: 9
Filter Size: 58mm
Hood: HB-47
Close Focus Distance: 17.71 inches (45 centimeters)
Reproduction Ratio: 1:6.6
Focus Throw: 180°
Weight: 9.876 ounces (280 grams)

Pros: Very fast lens, sharp, 9 blades, light

Cons: No close near focus, no 1:1, very short focus throw.





Macro and Close-up Lenses

This very cheap lens has appeared in a number of formats and mounts. The copy I have is plastic and barely holds together. It is labeled as a macro lens, but for any practical purpose it is useless. I would not advise buying this lens but have seen it on Ebay for under \$50. It does work, just is not a real macro lens. The lens at 210mm would mean the widest aperture is f/5.6 making the viewfinder (especially at dawn and dusk) very, very dim.



Lens: Cosina 70mm-210mm f/4.5-f/5.6 Macro Zoom

Focal Length: 70mm-210mm

Widest Aperture: f/4.5-5.6

Narrowest Aperture: 32

Aperture Blades: 9

Filter Size: 55mm

Hood: Included

Close Focus Distance: 23.62 inches (60 centimeters)

Reproduction Ratio: 1:4

Focus Throw: N/A

Weight: 13 ounces (368.5 grams)

Pros: Cheap, 9 blades

Cons: slowest of the slow aperture, long focus distance, does not go to 1:1, poorly made.



Macro and Close-up Lenses

Unsolicited Advice

What follows are comments, notes, suggestions, warnings, etc. related to photography, macro and close-up photography, and focus stacking. They are roughly organized and are intended to give you some information on commonly asked questions and areas where that I feel should be pointed out.

Equipment

Good Lenses – When I was just starting out and did not want to spend any money on a hobby that I might not stick with I was ingenious at rationalizing why I should buy cheap lenses. All I did was waste money because I ended up getting the expensive lenses anyway. The lens is “the thing” my friends, so get a good one. Good lenses are worth their weight in money.

Tripod – You need one for focus stacking and a good one at that. I have a whole bunch of lousy, cheap tripods I can't even sell that I bought trying to avoid buying one good tripod. A light and strong carbon-fiber tripod is a treasure. I use Gitzo carbon-fiber tripods, three-section (not four), and the model I use is the GT2531 and it weighs 3 lbs. and costs around \$500. Wirth every penny.

Ball Heads – Between your tripod and your camera you need some kind of connecting head. A good ball head with Arca-style quick-release clamp is superior to anything else I have tried. Markins make an inexpensive and good one (Q3) for about \$260 on Ebay. The BH-40 by Really Right Stuff is a more expensive ball head.

Quick Release – When you buy a ball head, make sure to get one that has a built-in quick release clamp compatible with the dovetail style plates (Arca). This is important because you need to be able to attach or detach the camera in a second. Otherwise you will be thumb-screwing the camera to the head and sooner than later the threads will get ruined on the camera and you will be in for a big expense. Also: I would avoid the Bogen/Manfrotto type quick release system.

L-Bracket -- A quick-release L-Bracket for the camera body for macro shooting is essential. Otherwise you are stuck with just one view. I shoot most of my photos with the camera rotated so that the long side of the photo is the vertical but I need the ability to change to the horizontal view at a moment's notice. I use Kirk Enterprises for all my plates.

My Standard Kit – I travel light. Aside from my camera and tripod, I usually take only one extra lens in a very small case hung over my shoulder, if that. Mostly I only take the lens on the camera. I might stuff a collapsible diffuser in my pocket. That's it.

What About Outside?

Direct Sun - Direct sun is very difficult to photograph in. Once the sun is up high in the sky, head for the shade or get out the diffusers because your photos will just not work out. Some part of your subject will catch or reflect the light and blow out that area leaving you with a photo that is both too dark and too light – one or the other. The hot spots will be hard to manage.

High-Haze Sky – Slightly overcast (hazy) skies are probably the best for photographing you can get. Grab

your camera and head outside. With no direct sun, the whole sky is your diffuser. You can't beat it because there are no hot spots. I am not talking here about really cloudy days, but just bright hazy skies.

Sun and Shade -- Shadows mottled with sun rays make for difficult photography, like a forest canopy with rays of sunlight. It can be very attractive, but those rays of sun blow out easily and conflict with all that shade. Better to have a fine diffuser at these times to filter the sun a bit and bring it down to being less stark.

Flash – I tried it (and a lot) and didn't like what it did to the photos and the subjects. I know it is the way to go for certain kinds of definition, but I don't need it at the expense of the alien-flash look. If you must use flash, use a tiny flash like the Nikon SB-400 and on top of that use a snap-on diffuser and even then rotate the flash upward and not straight at the subject. This can work. Natural light is better than any flash device. So I avoid flash if at all possible and if not possible, I soften it by using a diffuser.

When You Buy a Camera Be Sure it Has:

Histograms – Since most macro work requires manual focusing and many of the really good lenses don't synch with your in-camera light metering, it is essential to purchase a camera with a built-in histogram. I consider this essential. Read more about histograms here:

<http://www.bythom.com/histogram.htm>

Mirror Lock-Up – I have detailed this elsewhere, but I would not buy a camera without the ability to lock-up the mirror and thus remove the excess vibrations when the mirror snaps up out of the way of the lens viewfinder. It means I have to click the shutter, the mirror goes up, wait for the vibrations to die out, and click it again, but it makes a real difference. Stacking focus means: everything has to be motionless.

Remote Release Trigger – Absolutely essential. You can't touch the release button on the camera button without affecting the shot, however slightly. Make sure your camera can take a remote release, either tethered (cord) or untethered (infrared). Don't leave home without it.

Depth-of-Field Preview – Not available on all cameras, but I would not buy one without it. Otherwise you have no idea of how much depth of field you have. The best Nikon and Canon cameras have this.

Lens Focus Throw - A lens with a focus throw greater than 360-degrees is preferred. With focus stacking you want to take many photos incrementally. If the focus throw (turn of the focus ring) is too short, it is difficult to micro-inch forward. My favorite lens has a 720-degree focus throw (two turns of the focus ring) and that is a real pleasure to use. For action-sports it would be a liability – take too long. For macro it is perfection.

APO Lenses - APO (apochromatic) lens are rare and expensive, but they provide better color by not having chromatic aberration and other anomalies. The best APO lenses I know for macro use are the Voigtlander 125mm f/2.5 APO-Lanthar macro, the Leica 100mm f/2.8 Elmarit-R APO macro, and the Coastal Optics 60 mm f/4 APO macro lens. All of these are very expensive but very nice

Accessories

UV Filters – I use clear or UV filters to protect my lenses

Macro and Close-up Lenses

although I know they must degrade the quality of the lenses, however minutely.

Lens Hoods – Most lenses come with a hood and you need them to keep extraneous light out, so by all means use them and if you have a lens without one, track the appropriate lens hood down and buy it. They are there for a purpose.

Extra Batteries – I am a little obsessive about having extra batteries for my camera or whatever. I try to carry an extra one in the car but seldom on my person when I photograph. I seldom shoot more than several hundred photos at one shooting so the new Lithium batteries are enough for one outing.

Close-up Adaptors – These are little lenses that screw on the front of macro lenses to give them even more close-up magnification. I have them but don't use them. They may give you added magnification but for the most part they mess with your good glass. If you do get them get only diopters which have two elements (not one). There are scads of inexpensive one-element diopters on the market and they are not worth anything. They make your good lenses look crappy. I have all the good diopters and never use them. Almost never. Occasionally I fool myself into experimenting just to remind myself why I don't use them.

Polarizing Filter – Useful for darkening skies, reflections on water or leaves, etc. I have them but seldom if ever use them because I am doing close-up and macro, so not sky, shiny tree leaves, open water, etc.

Graduated Filter – I use the graduated filter in Adobe Lightroom for this instead of a filter you screw into the front of your lens. For my purposes that is good enough.

Memory Cards – I like to have lots of these and big ones. I mostly use Lexar and SanDisk, although I have some Delkin (because they were inexpensive). All work well. My little Nikon D7000 has two 64GB SD cards in it at all times. That's a lot of photos.

Extension Tubes – I have scads of them but seldom use them. They are used to give you greater magnification for a given lens but they always suck light out of your shot anytime you use them and I seldom feel it is worth it. In other words, if you have a f/2.8 lens and add an extension tube between the lens and the camera body, you will get greater magnification but lose one or more f-stops. Suddenly you have an f/2.8 lens that now is a f/3.5 lens or whatever f-stop. I seldom use them and am not happy with the results when I do.

Teleconverters – You can get a teleconverter lens that is placed between your lens and the camera body that will give you 1x or even 2x magnification. If you put a 2x teleconverter on a 200mm lens, you instantly have a 400mm lens. However, you lose light, meaning suddenly your widest aperture for that lens jumps from f/2.8 to f/3.5 or higher. I have these, but every time I use them I swear I will never use them again. It is very, very difficult to improve on a lens just as it is, which is why the lens was made just that way in the first place – optimum. Put anything on the front or back of it and you are (IMO) just taking a good or great lens and turning it into an average (or worse) a poor lens. I seldom ever, ever use one and don't suggest them. Of course, they are not for macro work but for distance photography. If I was shooting birds I would probably have to use them.

Neutral Density Filters – These are used for a variety of reason like adding blur or being able to use a wider aperture and still lesson diffraction. I don't use them and/or know much about them.

Gray Card – Can be useful for setting white balance on site but I seldom bring one along. Instead I do this in Adobe Lightroom. However, for very exact color work in the studio a Gretag Macbeth ColorChecker Passport system is what I use. In the field I seldom bring one along. I sometimes do.

Focusing Rail – Many macro photographers prefer to stack photos working with a focusing rail rather than turn the focus ring on the lens. Either way can produce good stacked photos. Using a focusing rail you mount your camera on the rail, the rail on your tripod, and by turning little geared wheels incrementally move your camera closer or farther from your subject, taking photos as you move along.

Bellows – Lenses can be mounted on a bellows which in turn is mounted on a focusing rail for very close macro work, usually in the studio. Special bellow lenses are often (and usually) used. They are similar to the old lenses used in enlargers back in the days of film. I am not going into this here, but some of you may want to learn about them. Bellows are used mostly for ultra-close macro work. I seldom use them.

Diffusers - A simple light diffuser can be very useful. Most on the market are too opaque for my taste, so I buy a cheap one, tear out the center, and sew in something that lets more light through. I go to walmart and pick some gauzy white fabric. All I want to do is cut back the strong sunlight a bit not block all of it.

Reflectors - In addition to diffusers, there are reflectors that reflect light onto your subject. Diffusers allow light to pass through them and you hold them in between the subject and the light source. Reflectors are held off at some angle to reflect light on the subject. I have tons of them but I mostly use them for video studio work. They can be helpful outdoors in taking macro shots where you are in the shade and trying to get more light on whatever you are photographing.

Other Stuff

Stacking Live Critters - Live critters do sometimes hold still long enough for stacking. Spiders, bees in the early morning, you would be surprised. Ants? Not likely. Butterflies yes and definitely dragonflies. Try for it. You will be surprised what even a two-shot stack will produce in terms of greater focus depth.

Dust Bunnies – Particles of dust, sticky pollen, and whatnot somewhere worm their way inside your camera and cling to your sensor. The results are little persistent spots on each and every photo you take. This is particularly bad when focus stacking because as you focus closer in that little dust-bunny spot becomes a long line on the finished stack photo or a bunch of lines which can be hard to remove. You must keep your sensor clean for focus stacking.

Sensor Cleaning – This is the ugliest part of digital camera work but you have to do it. There are different levels of cleaning the sensor. On my Nikon cameras I have to lock the mirror up, take off the lens, and look inside. Behind where the mirror was (before it was locked up)

Macro and Close-up Lenses

<http://www.bythom.com/cleaning.htm>

is the sensor actually covered by a Lithium Niobate filter which is pretty tough and does not scratch easily. Still doing anything with the sensor requires care and can be nerve wracking.

For beginners (and occasionally for any of us) cleaning the sensor is not only difficult but often fraught with worry about damaging the camera's sensor. It is no fun at all. The single most-important tool for cleaning the sensor is some way to know if you have it clean. The traditional way is to go outside, point the camera/lens at the sky and take a photo. Then get the photo off the card, put it in Photoshop (or somewhere), expand the photo, and minutely inspect it for dust, what are called "dust bunnies." This is a horrible method and can take a very long time, going outside and in, etc. It is easy to spend an hour doing this if you fail to remove the dust you can't see in any way except as describe above.

The best money I EVER SPENT was to buy a BriteVue Quasar Sensor Loupe which costs a whopping \$88. You can get them from VisibleDust. This is a 7x round magnifier that fits over your open lens hole (when the lens is off) and is lit by six bright LED lights. By looking through it you can easily see every speck of dust on the sensor. No more taking photos endlessly. If you value peace of mind and don't want to be ritually humiliated by the previously-mentioned process, just buy one. I know it is expensive, but you won't regret it. That said, here in general is what has to be done to clean a sensor. Please refer to your camera manual for exact details.

The first step is to place the LED sensor loupe on the camera and look inside. What is there? Is it a piece of hair, tiny dust bunnies, or a gooey piece of pollen? With the LED loupe you can see it all.

The next step is to take a special hand blower and blow air on the sensor to remove any dust particles that can be removed. Be sure to hold the camera with the lens-hole pointing to the ground so the dust stirred up by the blower will float down and out of the camera. Then look again at the sensor.

After blowing a few times, if there is still something there then try a special sensor brush (I use the one by VisibleDust, called the Artic Butterfly). These battery-operated brushes whirl around and become charged so they pick up dust. Very carefully brush the sensor WITHOUT going beyond the sensor and touching the sides, which can have grease. If you pick up the grease and wipe it on the sensor you are in for real problems. Using the loupe, see if this did the trick.

And the last and most scary resort is to use a special fluid and a special swab to actually clean the sensor manually. Again, I use swabs and fluid by Visible Dust made for my Nikon cameras. This may have to be done repeatedly and it is very tricky. Too little fluid and you don't get it all, too much and it leaves a residue. No fun at all folks.

If all of the above do not work, you will have to send the camera to the manufacturer. The above is a very general description of the process and is not definitive. You must refer to your camera manual for precise instructions. I cannot be responsible for errors you might make in attempts to clean your sensor. Use the procedures listed above at your own risk. Before doing anything please read this excellent article on sensor cleaning by expert photographer Thom Hogan:

Shower Cap – Buy one of those inexpensive plastic shower caps with an elastic band in them for rain protection for your camera. They take up almost no space and are totally useful if your camera and lenses get caught in a rainstorm. Just put them over the camera and lens while you get wet. You do not want to get your camera and lenses soaked. Period.

Camera Vests – I have them but don't use them. If I need that many pockets I am taking too much stuff with me. Walking around with a zillion pockets full of stuff is something I have done plenty of in third-world countries where if you don't carry everything, it gets stolen. Pocket-loaded vests are no fun and I really like to travel ultra-light.

Photo Software - We could write a book about photography software and many people have. All I am going to do here is briefly tell you what I use. There are many simple programs for processing digital photos and Adobe Elements is one that will do quite a lot and is inexpensive. However, most photographers use Adobe Photoshop and/or Adobe Lightroom.

I use Adobe Lightroom 3.0 and it is far easier to use than Photoshop plus it also allows me to catalog and keep track of all my photos. Compared to Lightroom Photoshop is a lot more expensive and difficult to learn, so I suggest you get Lightroom. However, and I am sure Adobe planned it this way, there are some tasks that you can't do in Lightroom and for which you need Photoshop or at least Adobe Elements. If you are on a budget, just get Lightroom and Elements. That will do you. And: you will love Adobe Lightroom. It is intuitive and adjusting photos in various ways is easy.

Focusing Rails - I do use focus rails in the studio but seldom outside because they are just one more thing to drag along and the focus ring works well enough for me. If you do buy a rail, get a good one. Read about them. Most of them IMO suck. Novoflex Focusing Rail Mini is a good one and Minolta (if you can find an old one) made a solid and really well-made rail.

Tripod Cleaning – I have several tripods but I primarily use one for dry work and one for wet work (ponds, swamps, etc.). The wet tripod has to be taken apart and carefully cleaned and dried every so often, and at the end of the season.

Manual Photography – I don't do close-up or macro on any other setting other than "Manual." It takes only a short time to adjust to doing everything manually and after that adjustment I would never go back. I use "Program Mode" for parties and anywhere I need quick, auto-focus results. Otherwise, I use only manual. I set my own aperture and shutter speed and get better results, the results I want. Turn the dial to manual and leave it there. Manual Mode requires setting aperture and shutter speed (and ISO), taking a photo, looking at the histogram, and either keeping that photo or deleting it, adjusting the settings further, and taking another photo. This is the way to go.

ISO – ISO dictates how your camera behaves in low light – how grainy things look. I keep my ISO as low as possible even though I have cameras that can handle very-low light levels like the Nikon D3s. If possible I have my ISO setting at 100 or 200 ISO. This means I have to sometimes use long shutter speeds but if I am doing still life, so who

Macro and Close-up Lenses

cares. If I am shooting moving critters, I adjust the ISO upward as needed.

Be Ready To:

Get Wet - Be ready to get wet and not worry about it. Especially if you are out in the dew and fields early in the morning, you are going to get really wet or you are not doing your job. Sometimes I wear hip boots in the field to stay dry. Most macro work requires being on your knees or lower, so just accept it. I routinely get soaked out there in the dew.

Get Dirty - Be ready to get dirty. It is nearly impossible to assume all the positions a macro photographer has to take on and not get anything on you. You are going to get dirty. So what? My family is used to seeing me walking around with dirt residue on my knees from kneeling here and there.

Get Exercise – Macro photography is some of the best exercise possible because you are kneeling down, getting up, kneeling down, dozens or hundreds of times and it is all great exercise for your midsection especially. Best way to lose weight I know and still have fun. As I come across great subjects I am willing to get down again and again and hardly notice it, something an exercise program could not get you to do.

Get Cold - Be ready to get cold. Even summer mornings can be cold. Spring and fall mornings in the field can be very chilly. If the sun is out I start out cold and gradually warm up. The warmth of the rising sun is most welcome.

Things to Wear

Waterproof Boots - I need them and the Canadians make the best kind. Up in Canada they are serious about zipper ankle boots and they make them warm and waterproof.

Hip Boots – I use hip boots for streams, ponds, and swamps and also sometimes for wet grass in the early morning meadows. I can kneel in them and still not get wet. They are kind of cumbersome but sometimes it is just too cold to get soaked.

Running Shoes – In warm weather I use a pair of the lightest and most-breathable running shoes I can find and sometimes just let them get soaked. They dry quickly.

Pants – I find the ExOfficio superlight pants can get soaking wet and be almost dry twenty minutes later. I get wet a lot in the summer.

Clothes - Wear old comfortable clothes, just slightly less than what you need because you warm up. Include a floppy hat to protect the ears if in full sun. And footwear to season, but light, and waterproof. I usually wear a light synthetic down vest that I can take off if necessary.

Hats – In winter I use the old wool Navy Watch hats so that I can get my eye to the viewfinder. In summer I either use a baseball cap which I wear backward when photographing or a big (ventilated) loose floppy hat that protects my ears from too much sun.

Mosquito Netting - As the season grows longer and I still want to get into the deeper danker woods, I carry mosquito netting that goes under my hat and covers my face and neck. Any sports store has them for almost nothing.

Travel Light - Pack the car with stuff, but outside the car, travel very light: a camera, ball head, tripod, lens and maybe one extra lens and on too-bright days a small

collapsible diffuser. That's it. I don't carry food, water, etc. Sometimes a cell phone if I am going to some strange place. I seldom get more than half a mile from the car. I have my water in the car.

The Secret of Focus Stacking

... is practice, practice, practice.

There is no silver bullet. It looks easy, but is harder than you think. The only thing that worked for me was a lot of practice. Get good equipment if you can, get out in the fields and enjoy. When you see something that touches you, photograph it. If it does not touch you, don't bother.

My Key to Taking Good Photos

The poet Gerard Manley Hopkins came up with a concept that struck me as true. He even made up his own word to describe it, "inscape." Inscape was to Hopkins an insight or path into the eternal or beautiful, literally the way or sign of the beautiful in the world around us. Let me explain.

I look forward to my trips out into the fields and woods. They offer me a chance to get my head together, to relax from the day-to-day grind of running a business, and generally to relax a bit. This is not to say that just going outside and walking in nature means that I am instantly relaxed. That usually takes time.

It is the same with taking photos. In the first ten minutes of a photo shoot I often don't see all that much to photograph. This too takes time, time for me to slow down, open up, and 'see', and let the natural beauty all around me in. It could be that I am still filled with all the workaday-world thoughts, the things I have to do, problems, and what-have-you. It takes time for my mind to relax and let go of its constant chatter. This day-to-day endless worry and thinking affects my photography. And here is where the word 'inscape' comes in.

As I get out there and wander through the fields or wherever, I gradually start to slow down and begin to see things that are beautiful, scenes that I might actually want to photograph. Slowly my view of the natural world around me starts to open up again, and I begin to experience things differently. I begin to 'see'. It takes time and usually does not happen all at once.

This little pattern of leaves over here or the way the light comes through the forest canopy grabs me just a little bit and the chatter of my mind pauses and begins to slow down. As I walk along, some little thing or scene appears beautiful to me; I am touched by it, however lightly at first. I gradually get distracted from my daily distractions and begin to center.

These little moments are 'inscapes', ways out of my mundane world and into the beauty of nature or, more accurately, back into the state of my own mind or being. As I take my time, I am able to see the beauty in things once again, and what I am seeing suddenly seems worth photographing. Like most of us, I photograph what catches my interest, what I find beautiful or worthy in the world around me.

These inscapes are signals that catch my attention, and they flag me down on my busy way forward to nowhere-in-particular. These moments and signs are how I stop going nowhere and manage to almost miraculously arrive somewhere once again, perhaps only at my own peace of mind. This is one of the functions of the beautiful, to catch us in the turmoil of life, flag us down, and induce us to pull over and take

a moment of rest - some time out. These moments of inscape are different on different days and different for different people. They represent the clues or signs that catch our attention and show us the way into the beauty of the natural world, actually the beauty of our own mind. Another way of saying this might be: what is beauty actually? What happens when we see something beautiful?

Beauty is not simply somewhere out there in nature waiting to be found, but always here within us, locked within us, we who are seeing this nature. Only we can see the beautiful. Beauty breaks down the rush of the everyday world and opens our heart a wee bit, making us vulnerable once again, more open to experience and input.

Through the natural beauty outside we go inside and experience the inner beauty of things, which is none other than our own inner beauty. That is what beauty is for, to be touched on, seen, so that we find once again the beauty within our own hearts that we may have lost through the distractions of our daily life. We forgot. We look outside in nature to see in here, to see into our own heart once again.

We can be sensitive to beauty in our photography. I would hate to tell you how many photographs I have of this or that butterfly or critter that are perfectly good photographs, but are empty of magic or meaning. They are well lit, well composed, and have everything that makes a good photograph except that 'magic' that keys or excites me. Instead, they are 'pictures' of a butterfly, but they have not captured any essence of anything. They might as well be in a field guide – snapshots in time with no meaning.

The reason for this (so I tell myself) is because they just happened to be there, photographic opportunities. I saw them and I took a photograph, but at the time they did not instill or strike any particular beauty in me. This, to me, is "gotcha" photography, taking a photo because I can, not because I saw beauty in it or was moved to do so. There was no inscape moment, no moment of vision – snapshots only.

I find that it really worth paying attention to what strikes me as beautiful or meaningful and photograph that, rather than just photographing the Grand Canyon because it is there or I am there. A lasting photograph, in my opinion, requires more of me than that, by definition. It has to mean something to me and for that to happen I need to actually be moved or inspired. Photographs that have special meaning for me usually have some form of inscape into a special moment that inspires me to capture the scene in a photo.

We can wander for miles looking for something to photograph, chasing down this or that butterfly or animal... searching. Or, we can slow down and let nature herself show us the signs, the inscapes

In a Few Words.... the Key.

through which we can relax and begin to 'see' photographically once again. We can listen to our own intuition. This process of inscape, of insight into the sublime in nature (the sublime within us) I find to be the key to good photographs and to creating photographs that are real keepers, at least in my mind. If we don't touch our own inner self in our work, we touch no one at all, but when we are touched by a moment, I find that others also feel this. Touch one, touch all.

Michael Erlewine

Michael@Erlewine.net

Macro and Close-up Lenses



About the Author

Michael Erlewine

Archivist of Popular Culture Michael Erlewine is a well-known entrepreneur, the founder and creator of many large web sites including the All-Music Guide (allmusic.com), All-Movie Guide (allmovie.com), All-Game Guide (allgame.com), Matrix Software (AstrologySoftware.com), AstrologyLand.com, MacroStop, ACTastrology.com, StarTypes.com, ClassicPosters.com, MichaelErlewine.com, and others.

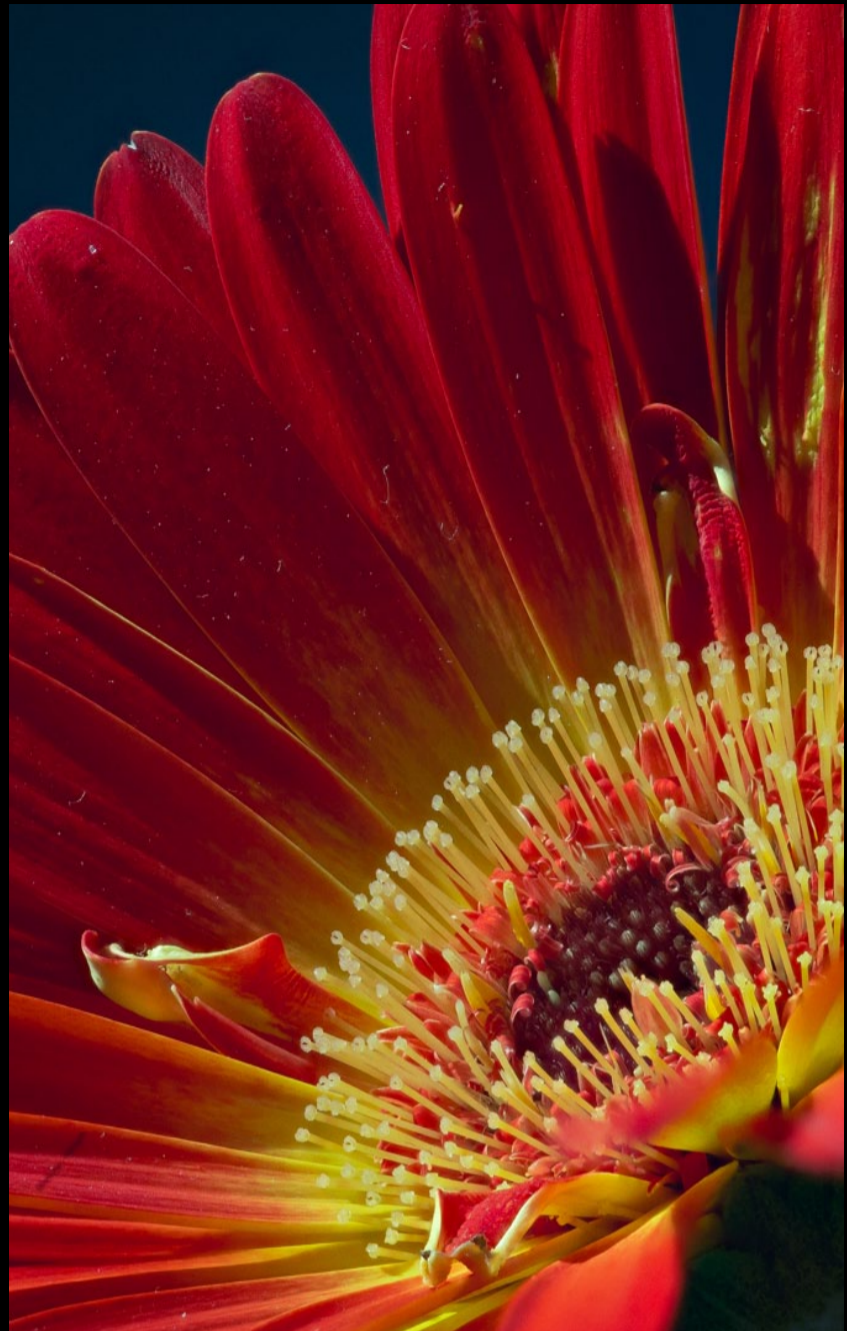
Erlewine was very active in the folk scene in the late 1950s and 1960s, especially in the Ann Arbor area, which included traveling with Bob Dylan (hitchhiking) in 1961. Later, as leader of the influential Prime Movers Blues Band (Iggy Pop was the drummer), Erlewine played a wide variety of venues, including the Fillmore Auditorium in San Francisco (during the "Summer of Love" in 1967) where his band opened for "Cream" during their first U.S. tour.

Erlewine was instrumental in the landmark Ann Arbor Blues Festivals of 1969 and 1970 as well as the Ann Arbor Blues & Jazz Festivals in 1972 and 1973, where he did audio and video interviews of almost all performers. This led to his becoming interested in archiving popular culture and founding the All-Music Guide (AMG), which today is the largest must review site on the planet. He did the same for film, video games, and rock and roll posters. Next to Microsoft, Matrix Astrological Software (founded by Erlewine) is the oldest software company on the Internet.

Erlewine still owns and runs the company today, which is located in Big Rapids, Michigan. Erlewine is also very active in Tibetan Buddhism and Macro Photography.

Photo Equipment In my work, I generally use the Nikon D3x, D3s, and D7000 cameras, with the Voigtlander 125mm 2.5 APO-Lanthar, the Coastal Optics 60mm f/4 APO lenses, and a Gitzo T2531 carbon-fiber tripod, with a Markins Q2 ball head. As for camera settings, I tend to shoot around f/11 at whatever shutter speed will bring down the ISO to 200 or so. -- Michael Erlewine

Macro and Close-up Lenses



Questions and comments can be addressed to Michael@Erlewine.net and there are other free books and PDF downloads at: <http://www.MacroStop.com>.

For kids there is "Nature in the Backyard" at the above web site.

You are free to distribute this to anyone who might enjoy it. No fee may be charged.

Other books by Michael Erlewine here:

<http://astrologysoftware.com/books/index.asp?orig=>