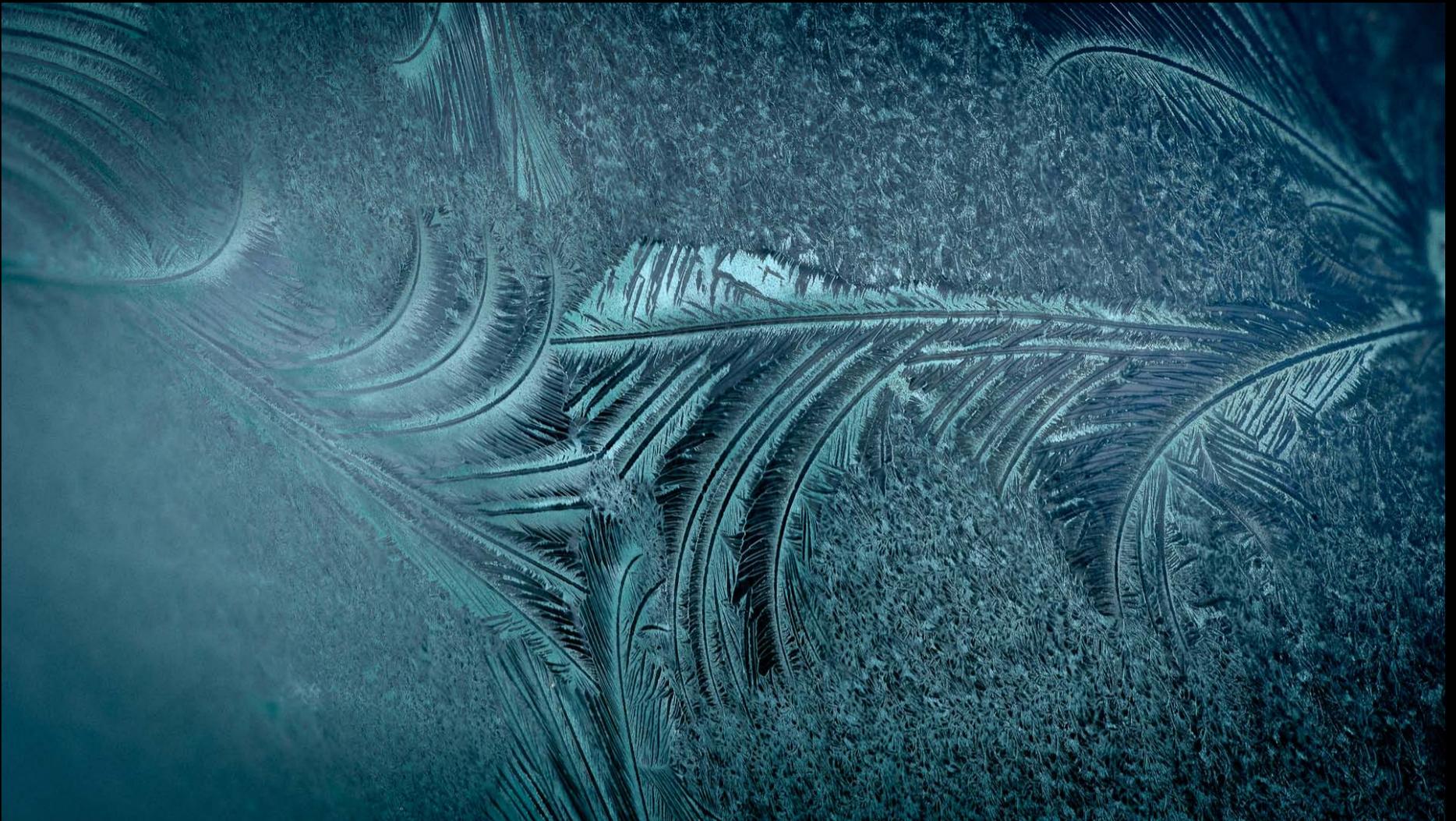


The Art of Focus Stacking

Book Two: Photos

Macro and Close-up Photography

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Nature Photography

What motivates me in nature photography is probably a little unusual and I will sketch it out so that you know where I am coming from. I was a naturalist from the time I was six-years old until I discovered how beautiful women are at the age of say sixteen. So I kind of segued out of nature study when I was around seventeen. We can perhaps all agree that nature is serene and beautiful but I am not as sure that all of us are aware that nature is also fierce, a very harsh mistress.

I find it hard to look nature in the eye. And I usually blink first, because she never blinks. There is some tough love there. And while I loved nature, as I grew older, I also gradually shied away from looking directly at the harder parts. I find the same problem with Billie Holliday recordings, my favorite woman singer. Even though I love her singing, I am not always willing to put myself through the emotions she brings out in her voice. I can't go there without paying the price of my full attention and all that entails.

It is the same thing with nature. Nature is so absolutely direct and not all of her story is happy. There is an enormous amount of suffering to be witnessed in nature, creatures living in fear their entire lives of being eaten and at the same time struggling to find something to eat, and so on. Nature tells a touching story and I did not always want to be touched. I was not willing at times to go there and over the years I kind of opted out of that kind of directness. I was out of shape in that department and like exercise I found it hard to get back into the rhythm of it.

Then some years ago I had a very tough personal time, one that kind of popped me out of whatever groove or bubble I was in and I found myself kind of waking up in the middle of this personal crisis. Some part of me was back from wherever it had gone to years before. At that time I was somewhat inconsolable and soon wandered outside of whatever box I normally was happy in.

One of the places I went was out into nature once again. Whatever pain I didn't want to face in nature all those years was nothing compared to how I was feeling at that time and before I knew it I was out in the fields and meadows watching the sun come up every morning. Unless it rained or something, I believe I saw the sun come up every morning from late May until it was too cold to go out that early, sometime in October. And here is what is interesting.

When I went back out into nature, this time I took a camera. I just happened to. I had been photographing since the late 1950s, but not as intensely as I was about to. Perhaps the camera was my excuse to get out there, a better reason than the truth which was that I was desperate at some level. And I took pictures. Looking at nature real close up was a good antidote for what I was suffering from. Perhaps it was the pristine mini worlds that I could see into through a macro lens, worlds untouched by all in the world that had recently touched me so painfully.

Anyway the fact of the matter is that here I was out in nature with my eye glued to a lens peering at her truths and lessons after many years of not being able to really look. Somehow my mind was calmed by what I was seeing and before long I found myself searching for and learning to use better and better macro lenses. Yes, it was therapy.

The story is actually a bit more complex than I have described it here and I wrote it all out in two free e-books for those inquiring minds who really want to know more. The books are "The Lama of Appearances: Learning Dharma through Nature" and "Experiences with Mahamudra: The Dharma of Meditation." They can be found at MacroStop.com. I don't need to go into those details now.

I retell this story here to explain to readers why the resulting nature photographs from my photography were never the reason I did photography. Some photographers find this hard to understand, so I present it here.

It was not the resulting photos (stacked or unstacked) that interested me, but rather the process, the mental therapy I got out of being out there in the meadows and peering through my lenses at whatever was there. It was not what I was seeing through the lenses that was important, but rather the act of "seeing" itself. It was all about the "seeing." It was about getting my mind right and about ever-so-carefully setting up and taking these close-up photographs, holding ever so still for ever so long until the wind died down or the critter stopped moving, and then taking one, two, or ten photos without anything moving whatsoever. This elaborate and slow process did something to my mind, something clarifying and bright.

So over quite some period of time I healed myself not with pills and potions but with the ritual of taking precise photographs and the mental clarity that came out of that process. It was the "process" not the product that was important and it has remained so to this day. For the longest time I hardly (sometimes never) looked at the resulting photos or, if so, just long enough to get some bearings on how I might perfect the process. Again, it was the process and the "seeing" that was satisfying.

Over the years the resulting photos also happened to get better but it is only recently that I have even begun or bothered finishing these photos so that I might show them to others. After all, there are probably more than 125,000 of them at this point.

I did become a better photographer through the process and the patience required in macro photography but most of all I became a much clearer person in the mind. And all of this time I was more and more aware of what nature is all about. And as the Buddhists say, the laws of nature accurately reflect the dharma, the path to clarity and awareness set out by the Buddha. So, I was learning dharma during all this time as well. This is a synopsis of my story and what macro photography for me is all about.

The Art of Focus Stacking Examples



Note: Don't imagine that critters never stay still. They do, especially in the early morning or whenever they want to. You can stack a photo with just a couple shots and the result is better than a single shot.

The Art of Focus Stacking Examples



Note: Repetitive patterns like these leaves make for nice composition. I wish I had a scrim or diffuser to lower the light causing the shine on these leaves.

The Art of Focus Stacking Examples



Note: Common plants like these maple leaves if treated subtly, are always good subjects.

The Art of Focus Stacking Examples



Note: The common poppy is a treasure trove of macro possibilities. This multi-stack photo of a poppy would do justice to one of Dante's circles of Hell.

The Art of Focus Stacking Examples



Note: The Milkweed is photogenic. Our yard is filled with Milkweed because we encourage it and have great plots of them. They also are a constant draw for butterflies, bees, wasps, spiders, and many other insects.

The Art of Focus Stacking Examples



Note: Contrast this shot with the following one. Here I have not included the back layers of the stack which creates a very nice sense of bokeh in the background. Common Milkweed.

The Art of Focus Stacking Examples



Note: Here I have included stacked layers at the back so everything on these Milkweed flower buds is in focus, with the plant's leaves out of focus in the rear. Both this and the previous shot are interesting for different reasons.

The Art of Focus Stacking Examples



Note: Who says Daddy-Long-Legs don't take a motion break and hold still. They do and often. This one on some Milkweed has a nice look and composition.

The Art of Focus Stacking Examples



Note: One of my interests is the subtle coloring of simple plants like this Milkweed. Note the fine shades of green and white on the leaves and buds toward the center of the shot.

The Art of Focus Stacking Examples



Note: Here is the the Milkweed Beetle cresting a bunch of buds and holding still enough to stack a few layers.

The Art of Focus Stacking Examples



Note: The common Raspberry is always interesting and a place where many insects and amphibians can be found in the early summer mornings when the dew is still out. Spring Peepers and the Gray Tree Toad hang out here for breakfast.

The Art of Focus Stacking Examples



Note: I find early-morning dew and delicate plants make a great combination. I prefer subtle tones like this to more more brilliant colors much of the time.

The Art of Focus Stacking Examples



Note: It looks like the dew here is really wet and perhaps cold too because it has bunched up. It might even be a light frost. I am not sure.

The Art of Focus Stacking Examples



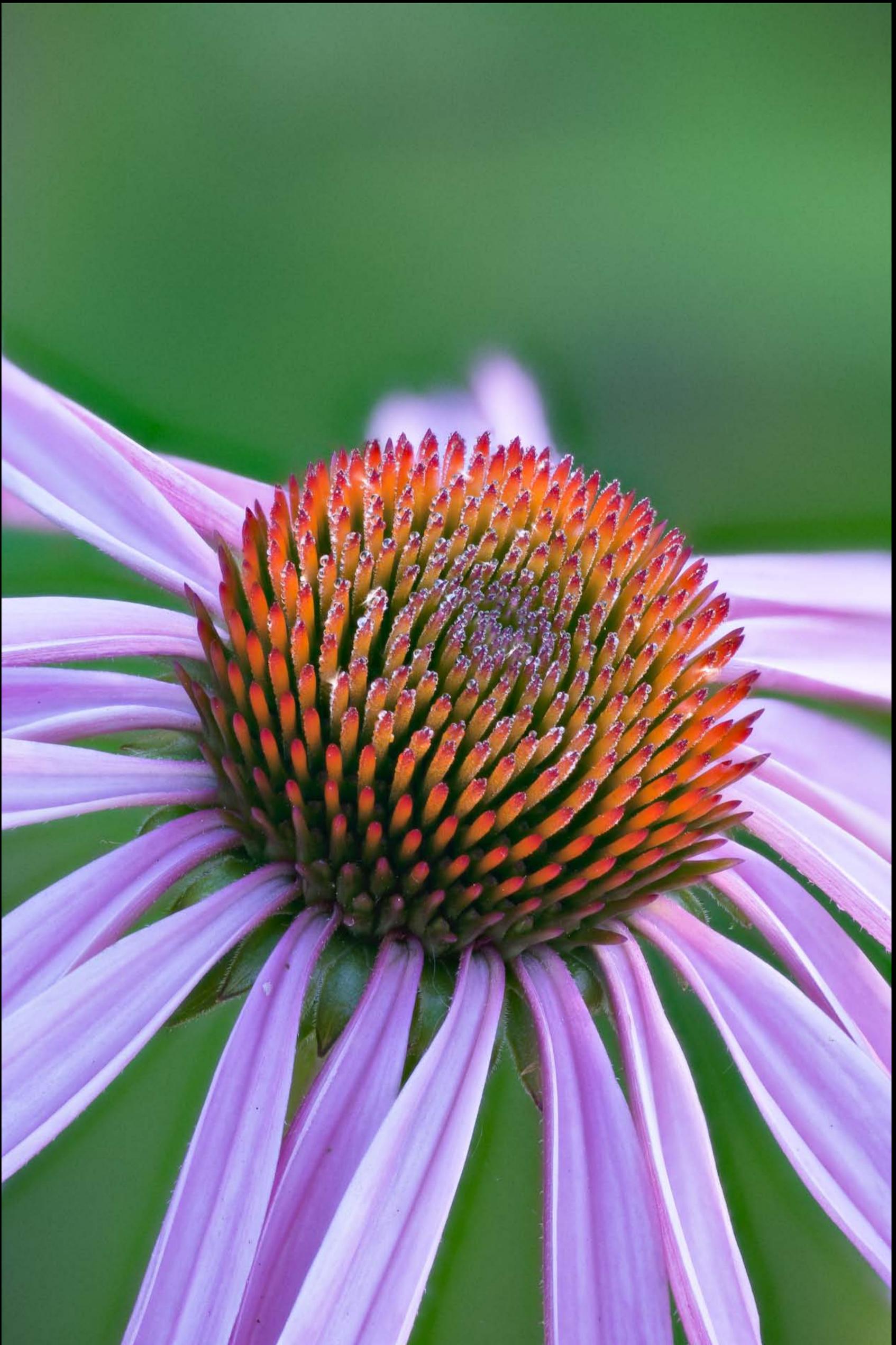
Note: Here is another dew-covered plant in those early morning (not-yet-touched-by-the-sun) tones. I am fond of simple shades and tones like this.

The Art of Focus Stacking Examples



Note: I believe this is a Goatsbeard seed cluster on its way out and in the early morning dew.

The Art of Focus Stacking Examples



Note: Echinacea is almost always a great subject for macro work. A little bit of sun is playing on the brilliant colors of the flower and lighting them up.

The Art of Focus Stacking Examples



Note: A pale rose to me is always lovely and I like the composition, especially the long grass in the upper left behind the flower.

The Art of Focus Stacking Examples



Note: Lilies of all kinds are dramatic and colorful whether shot from a little ways back or close-up or even closer and right into the center of the flower. And the colors here are very delicate.

The Art of Focus Stacking Examples



Note: Lilies make good stacking subjects because you can, if you are careful, get the stamens, stigma, and the petals all in focus. I like the shadows of the anthers from the morning sun.

The Art of Focus Stacking Examples



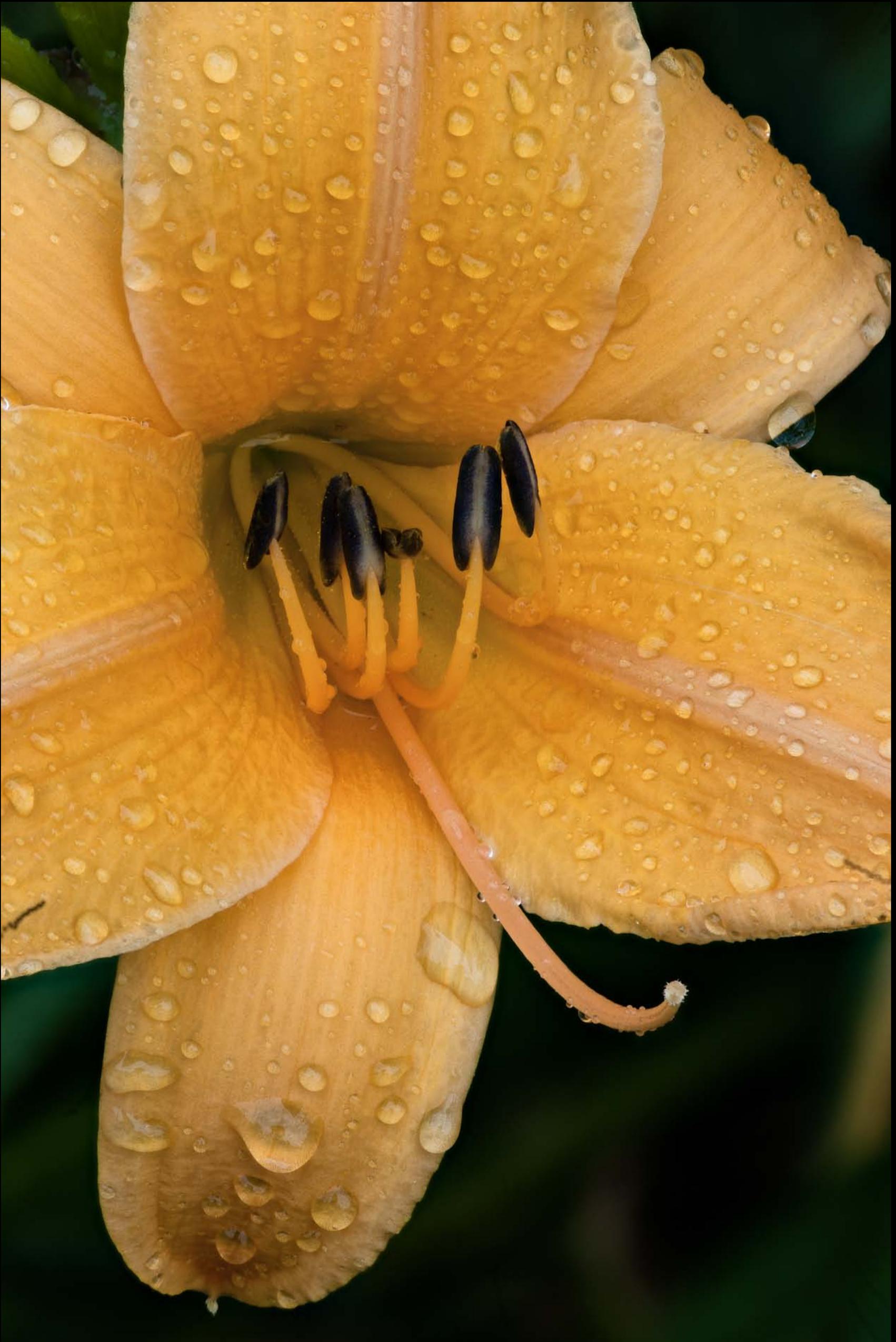
Note: Here is another of the non-dramatic, subtle-colored, and nicely patterned plant shots that are my favorites.

The Art of Focus Stacking Examples



Note: The Common Sweet Pea flowers are lovely and colorful, especially in the early light and morning dew.

The Art of Focus Stacking Examples



Note: Here is another lily and with dew. Notice how the long-extension of the stigma is also in focus. This can take some fiddling in the studio to enhance the sharpness at times of the tip.

The Art of Focus Stacking Examples



Note: I like to get in real close with lilies and catch the inner tunnel of the flower and also resolve the anthers.

The Art of Focus Stacking Examples



Note: Another shot of the common Sweet Pea, a sprawling vine. The soft bokeh in this shot is thanks to the Voigtlander 125mm f/2.5 APO-Lanthar lens.

The Art of Focus Stacking Examples



Note: Not a studio shot, but a lucky coincidence of light, shadow, and good bokeh. These flowers almost seem unworldly as they reach out toward us.

The Art of Focus Stacking Examples



Note: Here is another shot of the same plant taken under a shady tree at the edge of someone's garden. It almost looks like the flowers are made of wax or candy.

The Art of Focus Stacking Examples



Note: As time goes by I get more and more pleasure out of simple shots like this. Note the balance between what is in focus in the foreground and what makes for a nicely blurred background.

The Art of Focus Stacking Examples



Note: This is a studio shot of the common Bee Balm seed pod. This would be a multi-layered stack perhaps done on a focusing rail.

The Art of Focus Stacking Examples



Note: When some of the tall grasses go to seed they look great. Here is one catching the light with a nice quiet bokeh in the background.

The Art of Focus Stacking Examples



Note: Some subjects are not dramatic or colorful but I love them just the same, perhaps even more for their simplicity.

The Art of Focus Stacking Examples



Note: Crab spiders are one subject that likes to hold still, especially when they are disturbed. This one was very cooperative and held this pose for a good stack. He hung around for days.

The Art of Focus Stacking Examples



Note: Someday I will make a whole book of these low-profile subtly-colored plants and ones like them. They relax me in a way that more brightly-colored subjects seldom do.

The Art of Focus Stacking Examples



Note: The poppy bud and its pop-off cover have to be one of the great subjects for photography the world over. Early in the morning with some dew and a little early light they never fail to provide one of the best subjects.

The Art of Focus Stacking Examples



Note: The various evergreens are difficult but ever-so-nice plants to photograph and they are all around us.

The Art of Focus Stacking Examples



Note: Simple mono-toned branches make for an interesting composition as they delicately intertwine.

The Art of Focus Stacking Examples



Note: In winter and early spring the snow is an ever-present background for the various plants and seedpods that have made it through the winter.

The Art of Focus Stacking Examples



Note: Just some evergreen branches with a little early morning light and fine dew are about as good a subject as anyone could ask for.

The Art of Focus Stacking Examples



Note: Without focus stacking this shot would be difficult to impossible. See the 3D quality of the branch heading straight out of the photo?

The Art of Focus Stacking Examples



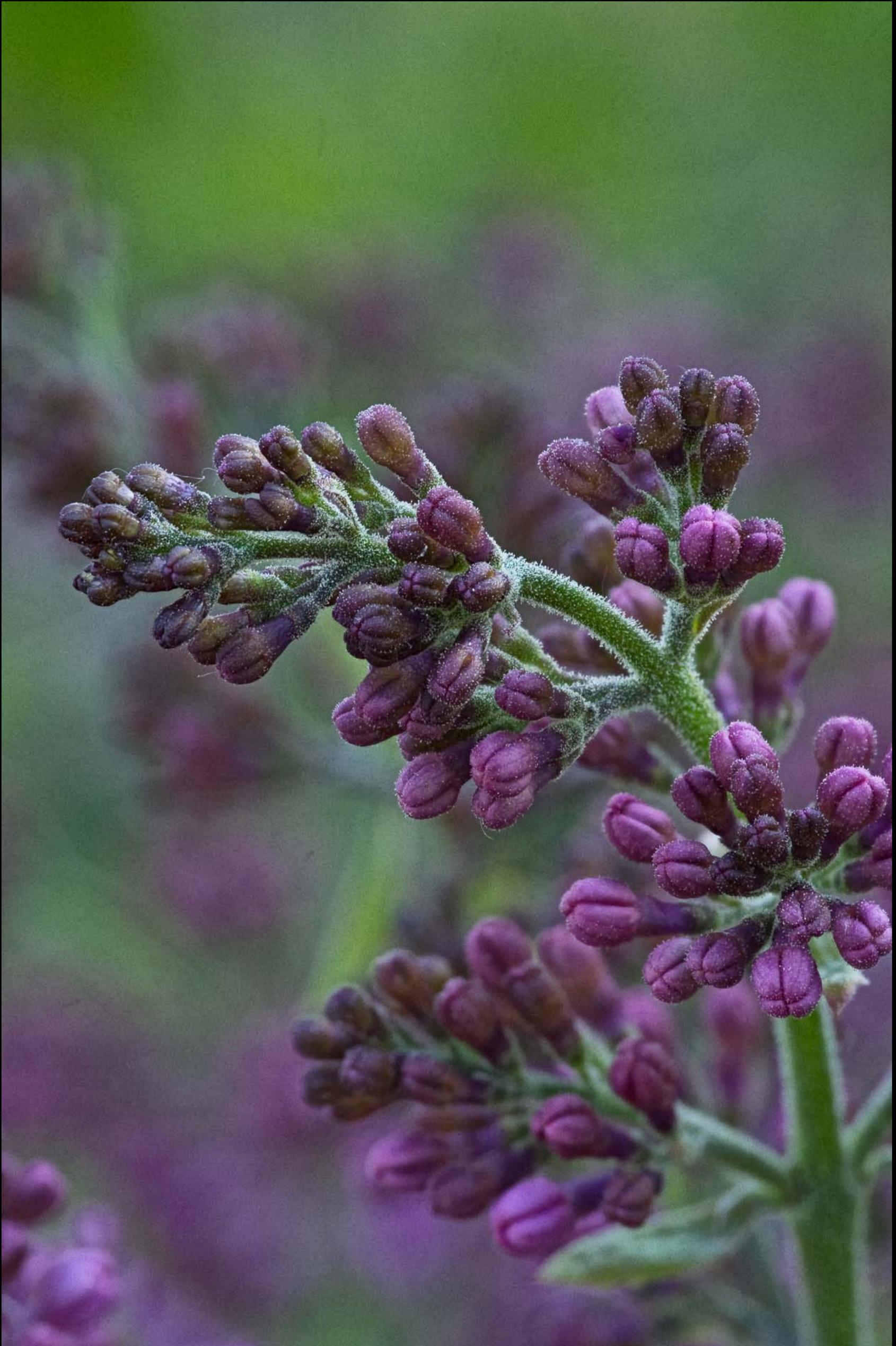
Note: In fall and winter, when the flowers are gone, dried leaves become one of the main subjects for my camera, like these oak leaves.

The Art of Focus Stacking Examples



Note: Sumac is a year-round subject, subtle greens in spring, bright reds in autumn, and strange branches through the long winters.

The Art of Focus Stacking Examples



Note: I consider the Lilac bush one of my favorite subjects from the earliest bud to full flower. They never fail to give me incredible color and shape. And they are all around us for a short while.

The Art of Focus Stacking Examples



Note: Focus stacking is not just for close-up. Look how the different layers, angles of hills, and distant trees combine to make for a wonderful photo and in focus!

The Art of Focus Stacking Examples



Note: The common Goatsbeard, that singular flower thrusting itself to the sky, is always a welcome sight. Yellow flowers are one of the more difficult colors to capture without getting oversaturated.

The Art of Focus Stacking Examples



Note: In the winter, we can do Zen. Notice how the stacked layers put the various levels of the shot in focus.

The Art of Focus Stacking Examples



Note: Yep, another of my "Plain Old Plant" photos where the colors are so delicate and soft.

The Art of Focus Stacking Examples



Note: Here it is again up close. I love the fuzzy coat of the stems and leaves.

The Art of Focus Stacking Examples



Note: Tall grass makes for nice photos everytime, especially up close as these are. Nice bokeh in the background.

The Art of Focus Stacking Examples



Note: Frost on a Yew bush. Frost is somewhat difficult to capture properly; it can be so bright yet tiny. This one is successful mostly because of the branches in the fore and background.

The Art of Focus Stacking Examples



Note: Bloodroot (*Sanguinaria*) is not only lovely for its spring flowers, but the leaves are great candidates for focus stacking because of the variations and how they protrude all over.

The Art of Focus Stacking Examples



Note: In the early cool morning dew many insects, like this grasshopper, have not had their cup of coffee and are not moving around just yet. When it warms up I might not be able to get near this fellow.

The Art of Focus Stacking Examples



Note: Often too much focus deep like this is no good. Here it just manages to work.

The Art of Focus Stacking Examples



Note: In the very early spring Brown Snakes (Dekay) can be found just out on the forest floor and not really moving around yet much at all.

The Art of Focus Stacking Examples



Note: The common Plantain plant is easy to find and if staged right makes for some good photos. The background bokeh really helps out here.

The Art of Focus Stacking Examples



Note: Here is another of my simple plants-with-fine-dew shots. I love them.

The Art of Focus Stacking Examples



Note: Another Lilac shot, early enough so that the little sun you see on the leaves here is not blown out. Lilacs are always a sure thing photographically.

The Art of Focus Stacking Examples



Note: This Daddy-Long-Legs parked himself in a poppy and was taking a rest which allow me to shoot him. Notice I did not get the near petals of the poppy in focus, which might have been better... hard to say. The blur is good too.

The Art of Focus Stacking Examples



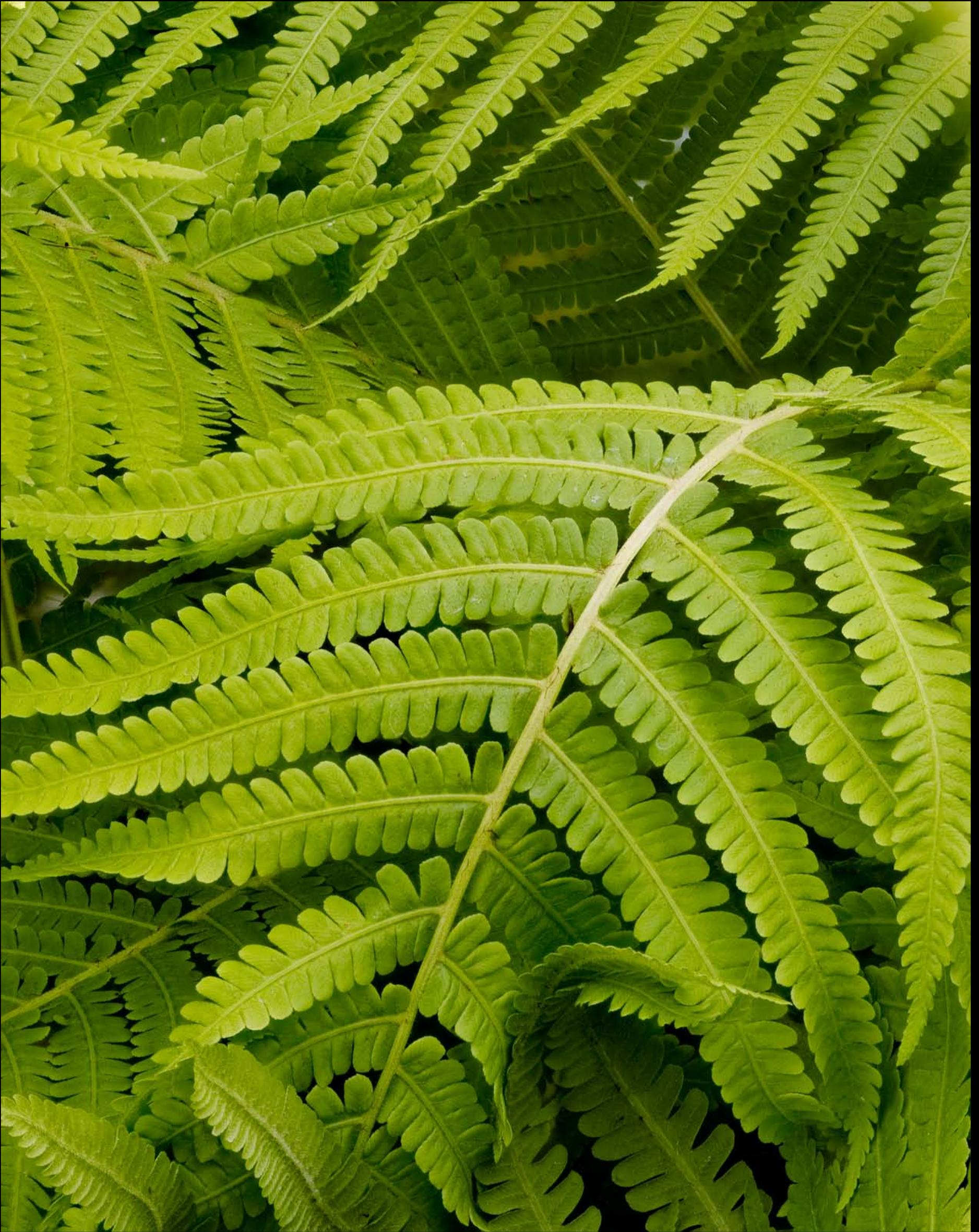
Note: This is frost not dew and early on in the day. I am still trying to learn how to handle frost on plants.

The Art of Focus Stacking Examples



Note: Here I combine a simple grass with good bokeh. The white you see in the background is actually a light tent to restrict wind moving the stems. It looks fine.

The Art of Focus Stacking Examples



Note: What's not to like about ferns and photography. Just get the right angle and composition and you have an instant photograph that is worth looking at.

The Art of Focus Stacking Examples



Note: A little daisy with a crab spider hidden under the leaves waiting for some insect to visit the upper bunk. I like the background bokeh in this shot.

The Art of Focus Stacking Examples



Note: Grass in the early morning with dew and a little light are a recipe for photography every time. I know some photographers that take a spray bottle of water and create their own dew. I have not yet done that.

The Art of Focus Stacking Examples



Note: Here is another one of my favorite kind of shots. The delicate colors and fluid look of the leaves does something for me.

The Art of Focus Stacking Examples



Note: A wonderful but difficult subject is the Honeysuckle, mostly do to getting the color saturation right and often wind movement.

The Art of Focus Stacking Examples



Note: Yes, this is my kind of shot, almost my signature shot.

The Art of Focus Stacking Examples



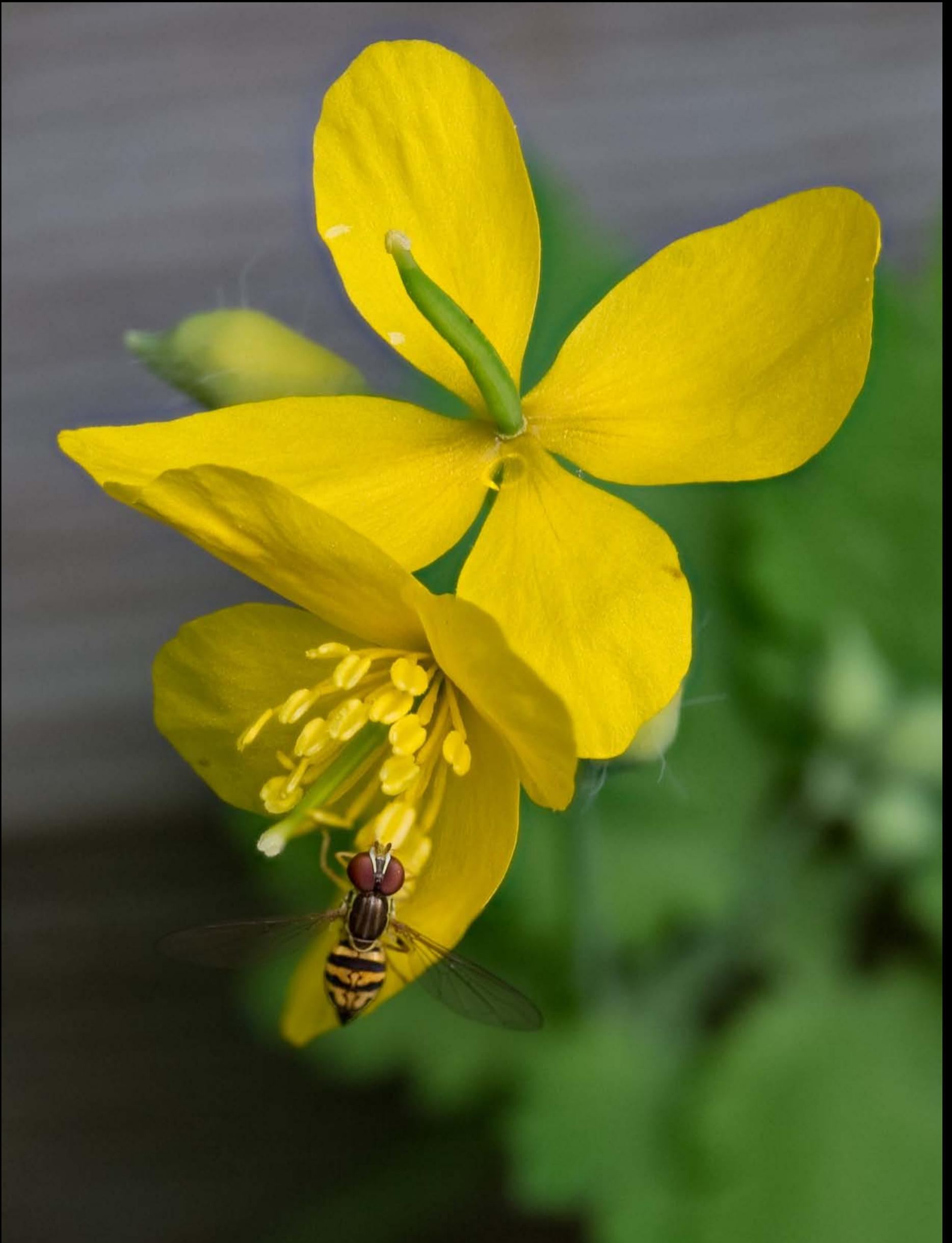
Note: I love this plant but have yet to really do it justice in a photo. Still, I like the leaves and seeds.

The Art of Focus Stacking Examples



Note: Focus stacking excels in short stacks like this one, just enough sharpness (2-3 layers) to bring some clarity magic to the photo. I like this shot.

The Art of Focus Stacking Examples



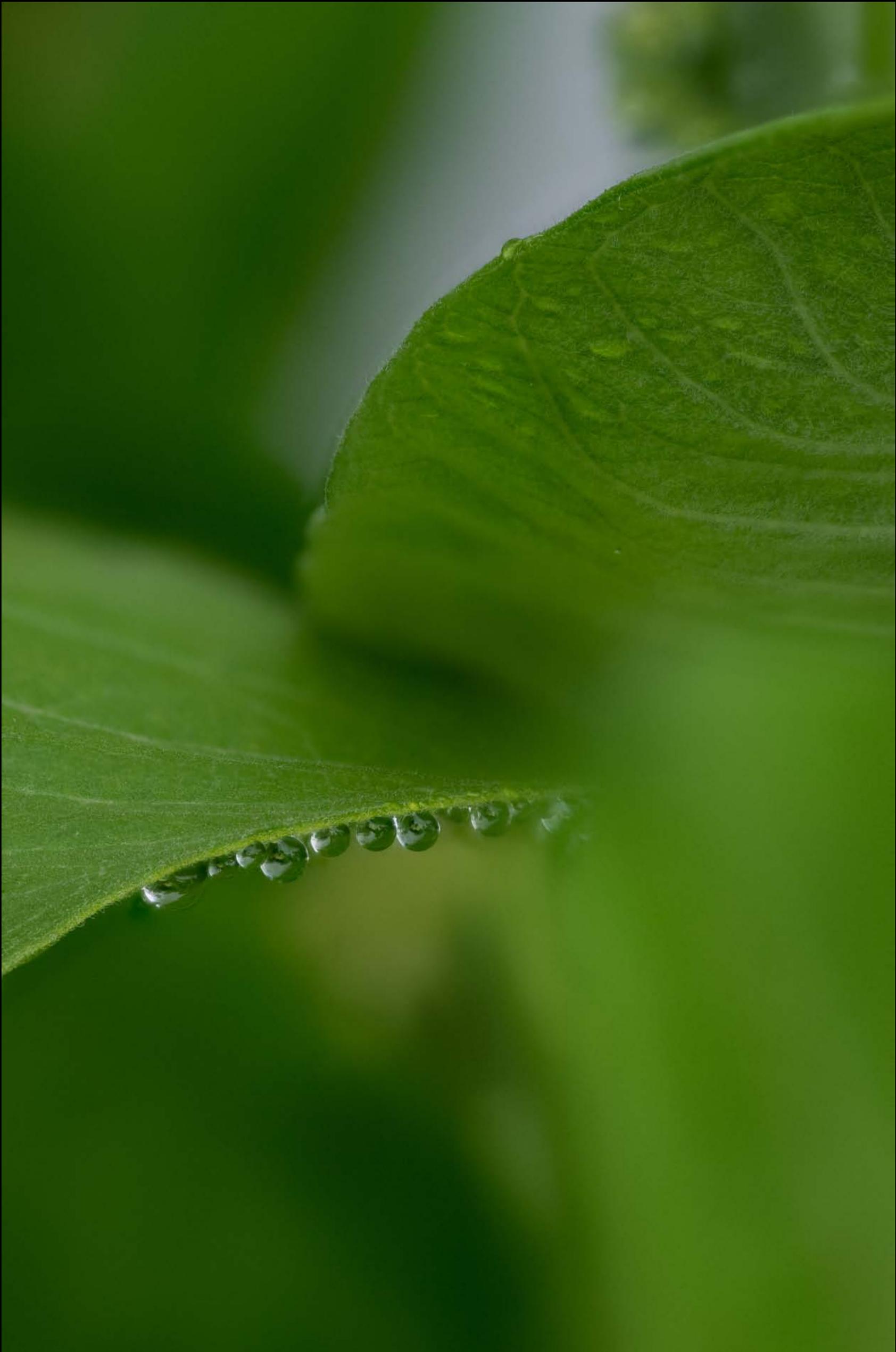
Note: Lovely flower and a little hover bee on a visit. This is a short stack, but still effective, especially the top flower.

The Art of Focus Stacking Examples



Note: The flower of one of our most common plants in focus with a decent bokeh behind.

The Art of Focus Stacking Examples



Note: Water on leaves, leaves and water... always fun for photographers.

The Art of Focus Stacking Examples



Note: Another example similar to the previous shot. Lot's of possibilities anytime you come across leaves and dewdrops or raindrops.

The Art of Focus Stacking Examples



Note: Here I go again. My favorite subject, a delicately-colored plant.

The Art of Focus Stacking Examples



Note: Flowers never get old as a photographic subject. Everything about them is lovely, also the stems, buds, seeds - all of it.



Note: Another shot of the common Milkweed buds coming straight at you.

The Art of Focus Stacking Examples



Note: Taken in a light tent to lessen the wind, here is the top of the common Horsetail plant.

The Art of Focus Stacking Examples



Note: The Mullein plant, common almost everywhere, is perfect for focus stacking thanks to the wonderful shape of the leaves. The yellow flowers are a lot harder to capture without saturation problems.

The Art of Focus Stacking Examples



Note: In spring the fern is one of my favorite subjects and rewarding every time - a focus-stacker's dream for a subject..

The Art of Focus Stacking Examples



Note: Here we have a close-up of the head of a fern. Note the delicate colors and this is just sRGB. You should see these colors in full ProPhoto RGB color.

The Art of Focus Stacking Examples



Note: Another fern, always one of my favorites.

The Art of Focus Stacking Examples



Note: All I need is a warm spring day, no wind, and a woodland flower like this to get a great stacked photo.

The Art of Focus Stacking Examples



Note: The sumac in winter is an awesome plant to photograph. The birds have picked the berries clean and all we have left are the seed stems and some winter light.

The Art of Focus Stacking Examples



Note: Where we live here in Michigan the flowering of the Triliums means that spring is fully present.



Note: Lilies of the Valley have lovely white strings of bell-shaped flowers.

The Art of Focus Stacking Examples



Note: This time it is field grass and rain drops. This is not dew but the sun is back out and so am I trying to capture this scene.

The Art of Focus Stacking Examples



Note: Simple but elegant plant shots are what keep me going. I like the composition here a lot.

The Art of Focus Stacking Examples



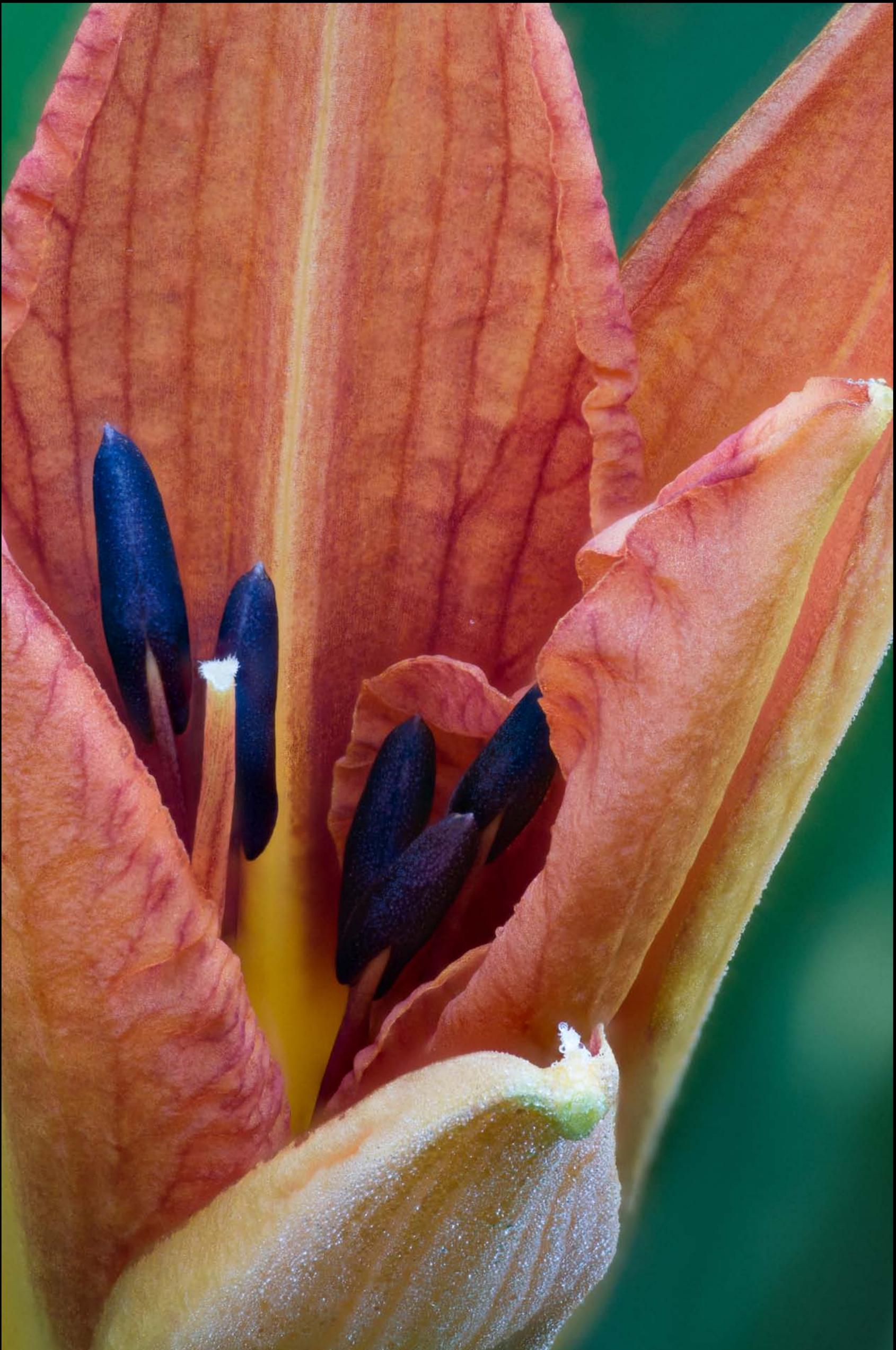
Note: Another non-dramatic plant with subtle coloring to take in.

The Art of Focus Stacking Examples



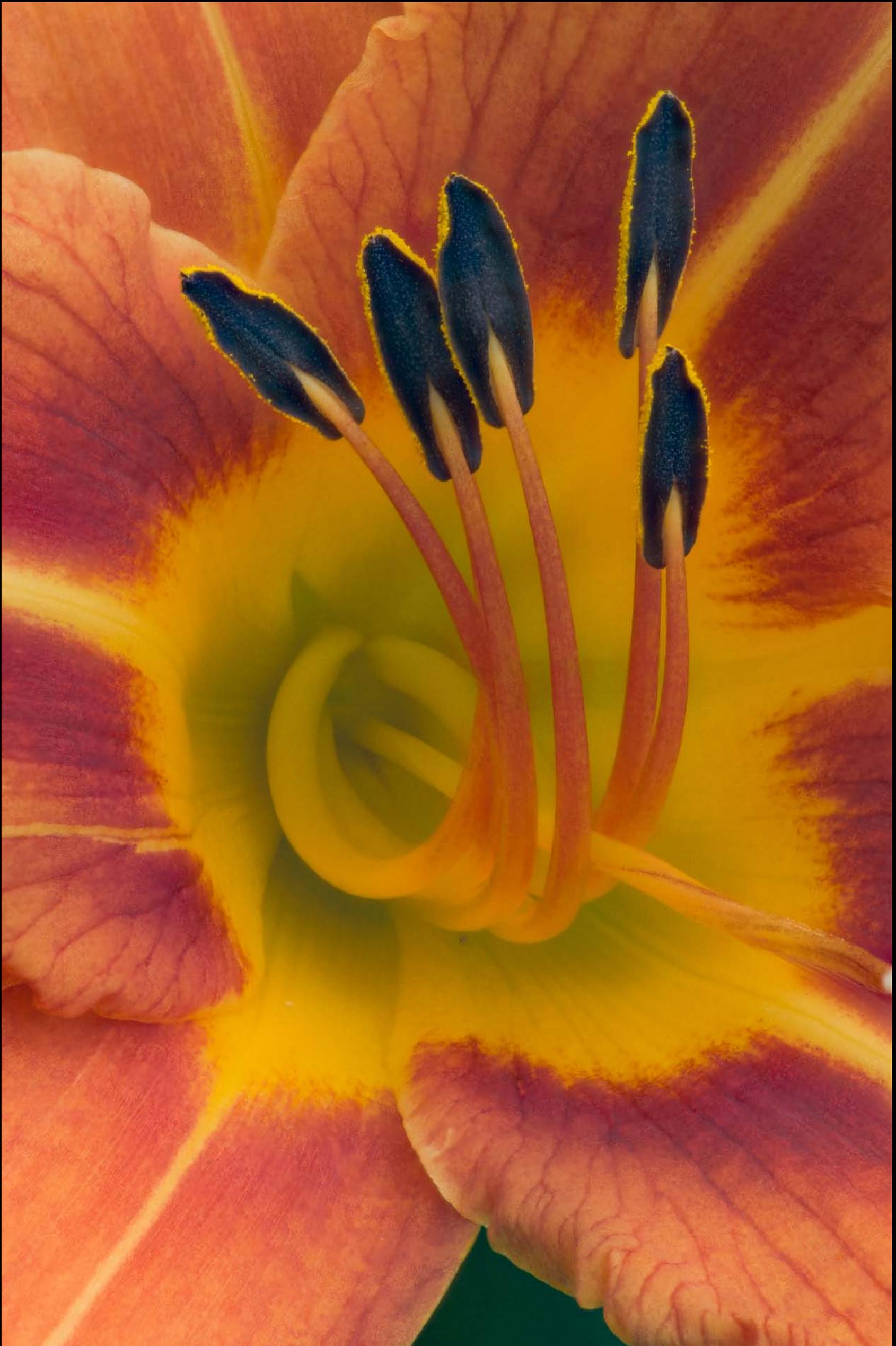
Note: Berries and frost tell the story.

The Art of Focus Stacking Examples



Note: The next couple of photos are close-ups of lilies, in particular the anthers.

The Art of Focus Stacking Examples



Note: Getting into the center of a lily makes for a good photo. Everyone knows the whole flower, but not everyone has ever really looked inside.

The Art of Focus Stacking Examples



Note: The bud of the common chive, always very gentle and delicate coloration.

The Art of Focus Stacking Examples



Note: New evergreen growth makes for a nice photo.

The Art of Focus Stacking Examples



Note: Toward the end of the season Black-eyed Susans and sunflowers of all kinds are totally worthy of photographing.

The Art of Focus Stacking Examples



Note: Here is another poppy bud, this time not opened. Stacking this subject shows all the delicate hairs.

The Art of Focus Stacking Examples



Note: A full-blown lilly in the field... and in focus too.

The Art of Focus Stacking Examples



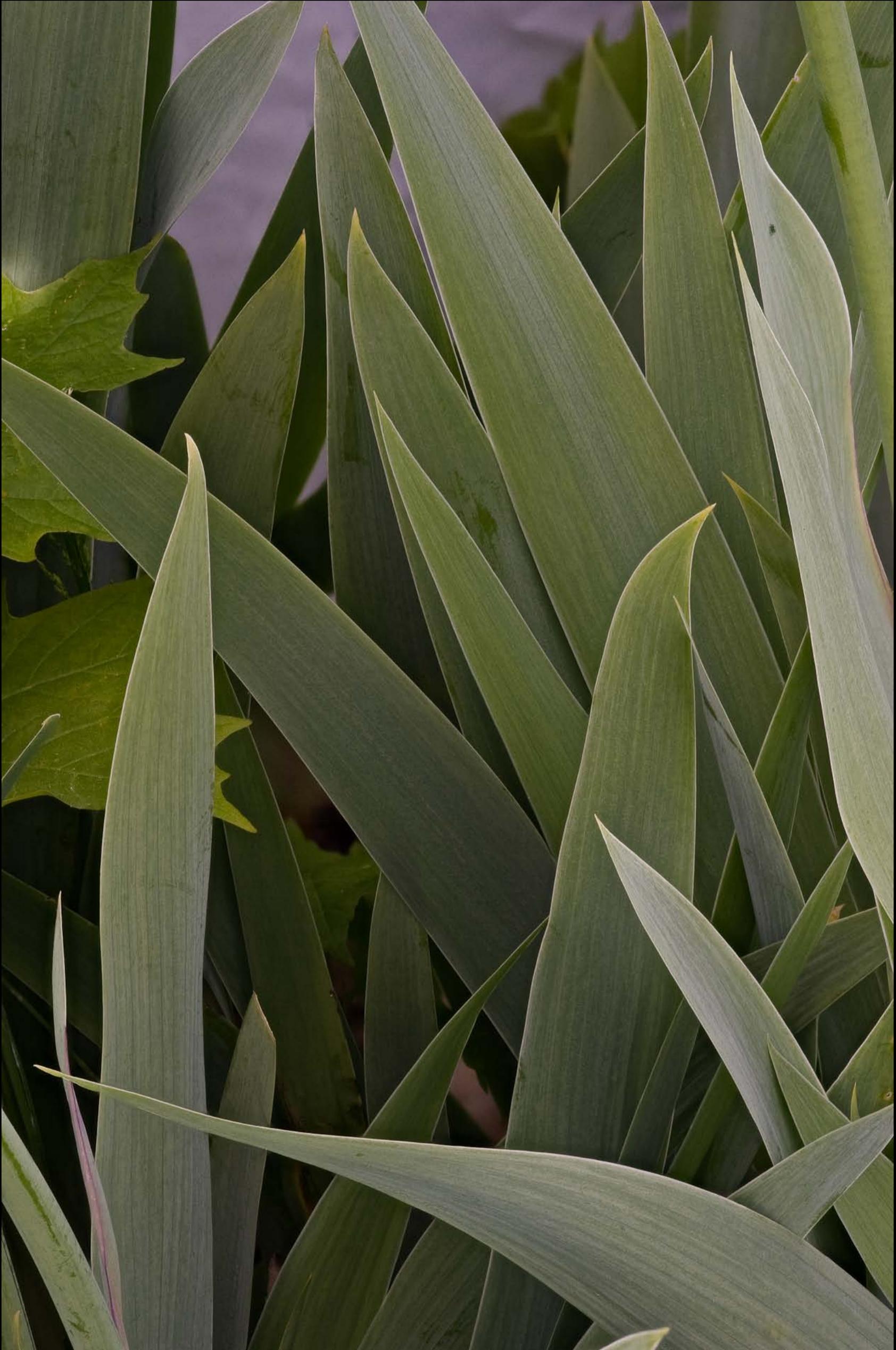
Note: Poppy with bud. Always interesting.

The Art of Focus Stacking Examples



Note: Another spring flower with nice out-of-focus leaves in the background.

The Art of Focus Stacking Examples



Note: Iris leaves make for great patterns. Flower beds are a wonderful place to shoot photos.

The Art of Focus Stacking Examples



Note: Deep in the woods are patterns. This and the next shot are some examples.

The Art of Focus Stacking Examples



Note: Another deep woods photo.

The Art of Focus Stacking Examples



Note: Once in a while even the common fly will hold still for a photo.



Note: What a lovely flower.



Note: Flowers in the early morning, the first sun rays, and dew.

The Art of Focus Stacking Examples



Note: The common roadside blue Chicory is an awesome flower and perfect for focus stacking.



Note: More gentle colors in leaves.

The Art of Focus Stacking Examples



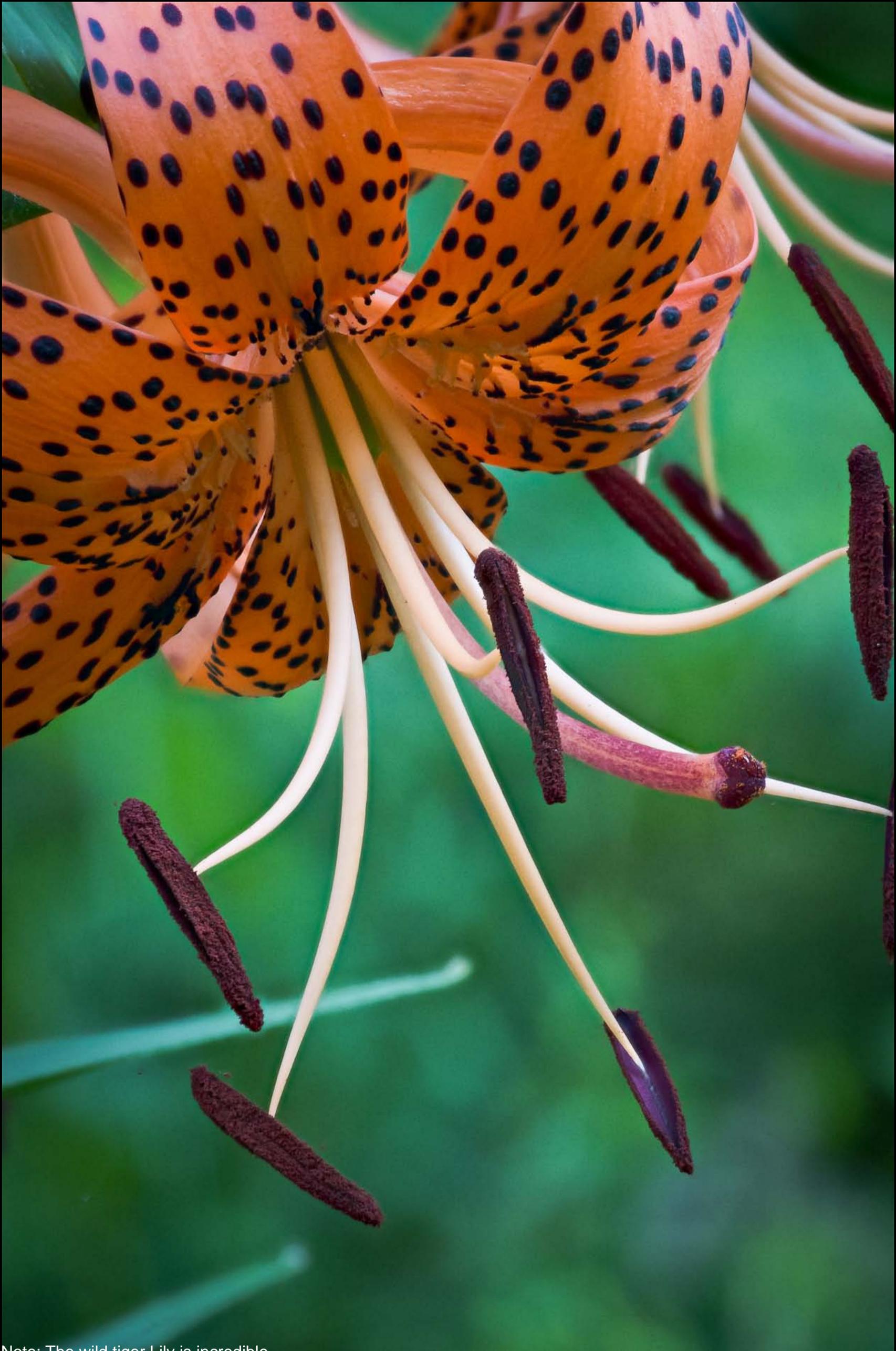
Note: This is the Pitcher Plant, an insect eater, and found mostly in bogs. Wonderful colors. Too much glare. Watch out for the poison sumac in bogs. I didn't.

The Art of Focus Stacking Examples



Note: I like this Echinacea family and the out-of-focus grass behind.

The Art of Focus Stacking Examples



Note: The wild tiger Lily is incredible.

The Art of Focus Stacking Examples



Note: This is our cover shot, the leaves of the common violet. Beautiful.

The Art of Focus Stacking Examples

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

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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)

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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:

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

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

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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.

In a Few Words.... the Key. The Art of Focus Stacking Examples

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 through which

In a Few Words.... the Key. The Art of Focus Stacking Examples

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.

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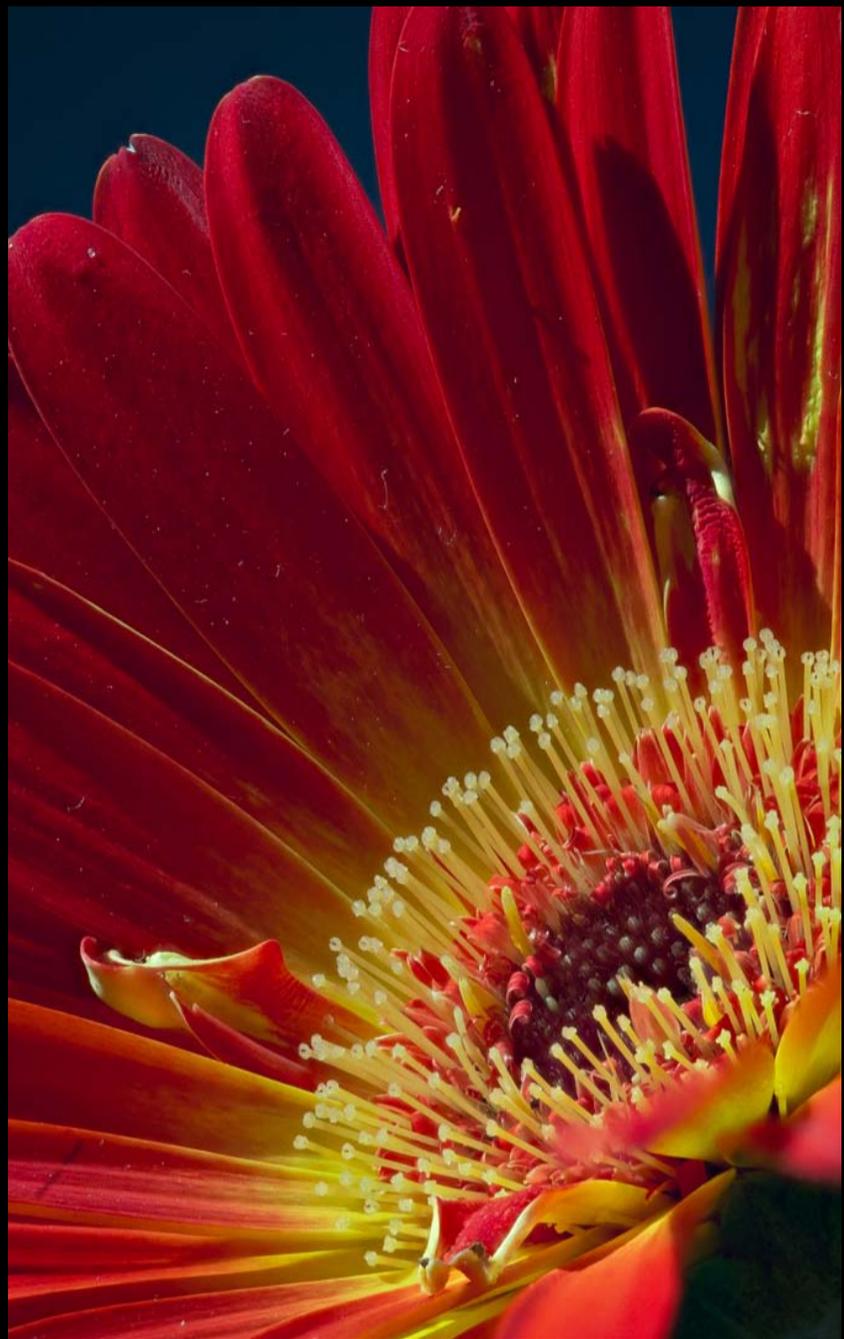
Archivist of Popular Culture Michael Erlewine is a well-known entrepreneur, the founder and creator of many large web sites including the All-Music Guide (allmusic.com), All-Movie Guide (allmovie.com), All-Game Guide (allgame.com), Matrix Software (AstrologySoftware.com), AstrologyLand.com, MacroStop,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



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.

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