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**Birder’s Guide to Gear**

December 2013 • Vol. 25, No. 4

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**On the cover:** Extreme birding conditions demand careful choice of gear. The right clothes, binocular, camera, and scope can make all the difference between a thrilling birding experience and an agonizing one. Here, John Puschock tests the limits of his kit on a blustery morning in Barrow, Alaska, during the Ross’s Gull Extension to the ABA’s Pribilofs Rarity-hunting event. *Photo © Jess Findlay.*
ne of the most-frequently cited virtues of birding is that you don’t need much stuff to do it. Get your hands on a pair of binoculars and a field guide, and you’re set for a lifetime of fun—and on the path to a deeper, more vital relationship with the world around you.

Truly, one doesn’t even need that much. One requires nothing more than a pair of eyes and/or ears to become a skilled and knowledgeable birder. I’ve seen plenty of ecotourism guides who make their living showing birds and wildlife to others, yet don’t own binoculars themselves. All of us can benefit by occasionally forsaking our optics and our apps, and relying on only the gear that we were born with.

But it’s also true that technologies, from older ones like optics to newer ones like eBird, can add so much to your birding practice, making it far more intellectually and aesthetically satisfying. The trick is finding that point where the amount of money you spend on gear, and—even more importantly—the time you spend learning about it, cleaning it, packing it, curating it, and otherwise maintaining it are in balance with the advantages and opportunities that your gear affords you.

Fortunately, the basic items in the birder’s tool kit like binoculars, spotting scopes, cameras, and outdoor clothing are largely of excellent quality, widely available, and in most instances getting steadily better and less expensive. Whatever your style of birding and size of budget, there are tools that will help you get more from your time afield.

The ABA’s Birder’s Guide to Gear is designed to be an opinionated, practical guide to just that: choosing and using tools that will make your birding better. Of course, there will be hymns of praise to the latest and greatest gotta-have-it-or-at-least-see-it innovations. But we also want to help you get more from the gear you already own; this isn’t solely about convincing you to part with more cash.

Because photography—even fundamentals like what we consider a field-worthy camera—is in a particularly rapid period of change, this issue features quite a bit of emphasis on capturing images of the birds you see and the places you see them.

We hope you’ll find that content, and all that we present here, as useful and reliable as a favorite hat or jacket and as revealing as the view through a fine binocular. Together, we can all benefit from the experiences and insights gained from thousands of hours in the field with thousands of different types of gear.

Good birding,

Jeffrey A. Gordon
President, American Birding Association
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Welcome to the first issue of the ABA’s Birder’s Guide to Gear. From roof-prism binoculars and SLR cameras to woolen mittens and waterproof sketchbooks, the choices can be daunting. But don’t fear! We’ve lined up a slate of experts who have helped to distill the available information (and disinformation) into an easy-to-read, no-nonsense set of suggestions and advice.

Some people are real “gear-heads” and love checking out the newest products, comparing them to what’s already out there, and making their own decisions about what to buy. But if you’re like me, you just don’t have the time, the ability, or—bluntly—the interest in devoting hours upon hours to decide which is the best Product X to achieve Goal Y. I just want someone I trust to tell me which model is best.

But often, there is no one-size-fits-all answer. In those cases, it pays to have at least a basic understanding of the products you’re considering. That’s where Ben Lizdas’s “Binocular 101” comes in. This primer on how binoculars work, and how they differ from one another, is essential reading for all birders.

Whether they’re built into your phone, separate and in your coat pocket, or slung over your shoulder, cameras have undergone a revolution in the last decade. The quality of image has increased exponentially, and the cost has decreased, even if not as quickly. Consequently, more and more birders are carrying—or considering carrying—a camera into the field. But what kind is right for you? In “Birding Photography” Derek Lovitch groups the thousands of models into just a few, easy-to-understand categories, outlining the pros and cons of each. Sherrie Duris and Sharon Stiteler then go into more detail about two of those categories in their articles.

But there’s more to birding than just the high-tech. Bird artist Sophie Webb explains the virtues of carrying a simple notebook into the field and how to best utilize that tool. And Duluth resident Erik Bruhnke offers his (well-tested!) suggestions for how to keep warm during winter birding.

As always, we at the ABA love to hear from folks who want to offer their own advice to fellow members, so please don’t hesitate to contact me with ideas for your own future articles. Was this issue useful to you? If not, please let us know what you thought was missing, so we can try to offer it in future issues. And in the meantime, I invite all of you to join in the online conversation at <aba.org/birdersguide>.

Good birding,

Michael L. P. Retter
Editor, Birder’s Guide
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**Erik Bruhnke** has had a love for birds since he was a child. Since graduating from Northland College with a Natural Resources degree in 2008, Erik has worked every fall as an interpretive naturalist at Hawk Ridge Bird Observatory in Duluth, Minnesota, where he also assists with the spring raptor count. A board member of the Duluth Audubon Society, Erik has spoken and led field trips at birding festivals across the U.S. His wildlife photos have won several national photography contests. Erik resides in Duluth, where he offers birding tours and bird identification workshops year-round through his business, Naturally Avian. Although he is fascinated by all birds, Erik is a devoted raptor and gull nerd.

**Sherrie Duris**, known to many as “Bird Girl”, is an avid birder and nature photographer in northwest Ohio. She serves as Vice President of the Toledo Naturalists’ Association and is one of Ohio’s top county listers. She volunteers for Ottawa National Wildlife Refuge as a bird guide and shorebird surveyor. Sherrie also guides field trips for the Ohio Ornithological Society and the Midwest Birding Symposium.

A former restoration ecologist, **Ben Lizdas** first fell in love with birds and birding while doing vegetation studies on the prairies and oak savannahs of southern Wisconsin. He’s been an avid birder for 15 years and continues to pursue this interest through his travels to birding and nature festivals across the country. Having witnessed and appreciated much of the avian diversity of North America while on the road, he still maintains a fondness for those grassland birds that first piqued his interest a decade and a half ago. Ben is currently the sales manager of Eagle Optics, an optics specialty store which caters to birdwatchers.

**Derek Lovitch** lives in Maine, where he and his wife own and operate the independent Freeport Wild Bird Supply, a retail store that caters to birders of all levels. Derek serves on his town’s Conservation Commission and works as a consultant for bird surveys and habitat restoration projects. Derek also guides locally and as a Senior Leader for WINGS. His first book, *How to Be a Better Birder*, was published by Princeton University Press in 2012, and he was *Birding’s* “Tools of the Trade” Department Editor from 2005–2010.

Since 1997, **Sharon Stiteler** has successfully made it her goal to get paid to go birding. In 2004, she founded the popular blog Birdchick.com. She travels the world as a field trip leader, birding consultant, humorous keynote speaker, bird surveyor, and writer. She wrote the books *Disapproving Rabbits*, *City Birds/Country Birds*, and *1001 Secrets Every Birder Should Know*, is #32 in the Geek A Week Trading Card set, and works part-time as a National Park Service ranger. She appears regularly on Outdoor News Radio and *All Things Considered* and has been on NBC Nightly News answering bird questions. When she’s not digiscoping or performing improv, she’s a blue ribbon beekeeper. You can find her on Twitter, Facebook, Instagram, YouTube, and Google+ as “Birdchick”.

**Sophie Webb** is one of the judges for the illustration module of the ABA’s Young Birder of the Year contest. A biologist, author, and artist living in northern California, she co-authored and illustrated *A Guide to the Birds of Mexico and Northern Central America* with Steve Howell and continues to work on plates for a variety of Neotropical bird guides, including the recent *Field Guide to the Marine Mammals of the Pacific Coast*. While working in the Antarctic and at sea on research vessels, she started writing and illustrating children’s books. Sophie serves as a director of Oikonos: Ecosystem Knowledge, is a research associate of Point Blue Conservation Science, and is an occasional employee of NOAA’s Southwest Fisheries Science Center.

**Rick Wright** is the Book Review Editor at *Birding* and The ABA Blog. Earlier this century, he served as Editor of the Sources department at *Birding* and as Editor of *Winging It*; he also coordinated the field trip program for the the ABA’s 2009 conference in Xalapa, Mexico. Rick is a Senior Leader at WINGS, conducting tours in North America and Europe, and is a frequent and sought-after lecturer and field trip leader at festivals and other birding events. He lives in Bloomfield, New Jersey, with his wife, Alison Beringer, and their chocolate lab, Gellert. You can read about their adventures at Rick’s blog, Birding New Jersey.
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Looking at birds in the wild just isn’t the same without a good binocular slung ’round your neck. A basic understanding of how optics work will put you well on your way to making the most of your birding excursions. But, like the birders who use them, binoculars come in an abundance of shapes and sizes, and prices. So how does a birder pick out the perfect binocular? Is there such thing? A good starting point is to have a solid understanding of how a binocular works, along with the realization that there is no one perfect model. It’s all about tradeoffs, and what you choose to gain (and, consequently, sacrifice) is what makes binocular selection such a personal endeavor.

The Anatomy of a Binocular
Let’s start by taking a quick tour of your binocular. There are two dominant binocular designs: Porro-prism and roof-prism. Porro-prism binoculars are the “old-fashioned” or traditional type, with a sharp jog in the barrel; roof-prism binoculars can be identified by their two straight barrels. Both styles feature the same basic parts.

- **Prisms.** Whether Porro- or roof-prism, these mirrored pieces of glass inside the housing of the binoculars serve the same function: to correctly orient the image vertically and horizontally.

*Photo © courtesy of Swarovski Optik.*
Binocular 101

• Objective lenses. These are the big lenses at the “far end” of the binocular, whose function is to collect light.

• Ocular lenses. These are the lenses you put up to your eyes; they magnify the information collected by the objective lenses.

• Focus wheel. Turning this wheel focuses both barrels of the binocular in unison. Some binoculars have separate adjustments for each barrel; for birding, I recommend avoiding binoculars with eyepieces that focus individually.

• Diopter. This secondary focus mechanism allows you to calibrate one side of the binocular to accommodate differences in focus length between your left and right eyes. Almost always, the diopter will focus the right eye independently from the left. Adjusting the diopter is simple and—provided you don’t lend your binocular to someone else, or the diopter doesn’t slip—it needs to be readjusted only as your eyes change. Generally, the diopter will be located somewhere on the right side of the binocular, just below the eyecup. Some binoculars have locking diopters built into the center focus mechanism.

• Eyecups. The primary function of the eyecups on your binocular is to prevent your eyes from getting too close to the ocular lenses. Eyecups can also help block out lateral light. If you wear eyeglasses when using binoculars, you’ll want to be sure that the eyecup is folded back (if it’s of a soft rubber design) or twisted down (if it’s a mechanical eyecup, which most modern binoculars employ). Why do this? Your eyeglasses will provide a barrier that spaces your pupil farther from the ocular lens, thus negating the need for the eyecup to serve this function. Otherwise, it’s like peering into a keyhole.

What the Numbers Mean
Now that we have an understanding of the parts of a binocular, let’s look at some essential concepts. When we talk about the size of a binocular, we refer to it in a configuration, such as 8x42, 10x25, 7x50, etc. The first number (which will always be the smaller of the two) refers to the binocular’s magnification: how much larger it will present an object to the user.

---

How to Adjust the Diopter on Your Binocular
Find a stationary object to focus on at an intermediate distance, and, while closing the right eye, use the center focus wheel to get a sharp image in the left eye. Once this is done, close the left eye and check the right barrel for image sharpness. If it isn’t as clear as the left side, use the diopter to focus the right side so that it matches the left. Once you’ve done this, both eyes should see a sharp image as you use the center focus wheel to watch birds both near and far. Unless your eyes change or the diopter is moved, you shouldn’t have to repeat this exercise.
compared to that same object seen with the naked eye. Magnification can’t answer the question, “How far can I see?” (After all, the sun is 93 million miles away and visible with the naked eye.) What it does answer is, “How small of an object can I see at a particular distance?” With binoculars, we might be able to see a freight liner a few miles out from shore, but that doesn’t mean we will be able to see a gull at the same distance.

As you increase the magnification of binoculars, you have the advantage of making something farther away appear closer. As magnification increases, the “power” goes up, but as that number increases, it has other consequences that will make the binocular less user-friendly. Any movement of your body will be exaggerated through the optics, causing a bouncier image and resulting in eye fatigue and a reduction of resolution. This is why we have to mount spotting scopes (which have higher power) on tripods. The conventional wisdom here is that magnifications beyond 10x become really challenging to hand hold, and any benefit of the added magnification is offset by a “bouncier” image. Another point to note about magnification is that as you increase power, your depth of field becomes shallower. This means that as birds come toward you or move away from you, you will have to change the focus wheel more often to maintain a crisp view of them, whereas you tend to have more distances in focus at the same moment with lower magnifications.

Magnification has practically no impact on a binocular’s dimensions or weight. The second number, however, is indicative of the binocular’s physical dimensions. The number following the “x” refers to the diameter, measured in millimeters, of the binocular’s objective lenses. This is referred to as the binocular’s aperture. The bigger this number is, the larger and heavier you can expect the binocular to be, and the more light the binocular will be able to collect. We love a bright image but also want lightweight binoculars; as with many other aspects of binocular design, it’s all about tradeoffs. Binoculars are often lumped into three general size categories: compact, mid-sized, and full-sized. The term “compact” refers to binoculars with objective lenses smaller than 30mm, “mid-sized” binoculars are those with 30–35mm objectives, and “full-sized” binoculars start at about 40mm and go up to 50mm.

### A Useful Equation

I’m not a big believer in throwing out a lot of numbers to illustrate a technical point, but a binocular’s exit pupil is a great concept to be familiar with. Understanding this concept will allow you to see how magnification and objective lens size work together to impact your experience using a binocular.

The exit pupil is the diameter of the shaft of light (measured in millimeters) exiting the ocular lens. The larger a binocular’s exit pupil, the brighter your image will be. Here is a simple equation that will tell you how to determine the size of a binocular’s exit pupil:

\[
\text{exit pupil} = \frac{\text{objective lens diameter}}{\text{magnification}}
\]
All 8x42 binoculars have an exit pupil of 5.25 mm (42/8 = 5.25). When we take a look at a 10x binocular with that same objective lens size, you can see that the exit pupil shrinks to 4.2 mm (42/10 = 4.2), providing less light to the viewer; this is especially noticeable in low-light situations, when our pupils are more dilated. During a bright afternoon when our pupils are generally dilated to 2–3 mm, the difference between 4 mm and 5 mm exit pupils is inconsequential. It’s a different story at dawn and dusk, however, when wildlife tends to be more active. For birding purposes, the best binoculars have an exit pupil of at least 4.0 mm.

Understanding the exit pupil isn’t the whole story regarding a binocular’s brightness. Take any two different makes of 8x42 binocular (remember, both have the same exit pupil: 5.25 mm); it’s quite possible that the image you see through one will be brighter than the other. The quality of the glass used in the binoculars and the coatings put on lenses also have an impact on brightness. While two 8x42s will collect the same amount of light, the higher-quality binocular will use that light more efficiently, with more light reaching your eye and less reflected off the glass surfaces to other directions.

Price tags usually indicate quality: more expensive binoculars are brighter.

Features and Tradeoffs

With an understanding of the exit pupil, you can see the tradeoff between a compact, lightweight binocular and a larger one that will perform best in low-light conditions. There are some other binocular specifications that are affected by size and design.

A binocular’s field of view (FOV) is a measurement of how far a user will be able to see, from left to right, when looking through the binocular. A wide FOV is always useful, as it makes it easier for us to scan flocks of birds, to draw size and shape comparisons, and to follow fast-moving birds in flight or through the canopy. FOV is often measured as X feet at 1,000 yards. X is the number of feet an observer can see, from left to right, at a distance of 1,000 yards. Another way to measure this is in degrees. You can convert degrees to feet at 1,000 yards by multiplying the degrees by 52.36.

This may seem counterintuitive, but a larger objective lens does not mean a binocular will necessarily have a wider field of view. In fact, as a binocular’s objectives lenses get bigger, the barrels often get longer, which tends to decrease a binocular’s FOV. The specification which will have the greatest impact on FOV is magnification. In general, the lower the power, the wider the field of view.

When comparing roof-prism to Porro-prism models, one tradeoff to be aware of is that Porros will often have a wider FOV. This is because the two objective lenses of the binocular are farther apart. Unlike the measurement for exit pupil, FOV varies from one make and model to the next. Not all 8x42s have the same FOV.

Although all binoculars can focus on the distant horizon and the moon, there are limitations as to how closely they can focus. In general, a binocular’s close focus won’t be affected only by its power, though models with a larger objective lens (and thus a longer barrel) often have a reduced ability to focus closely. When comparing Porro- to roof-prism models, that same feature which helps Porros get a wider FOV—widely spaced objectives—hinders their ability to focus closely. The more closely set barrels of a roof-prism binocular make this an ideal design for close focusing.

Eye Relief

Particularly for the eyeglasses wearer, it’s important to note a binocular’s stated eye relief. Eye relief is the optimal distance (measured in millimeters) that the ocular lens should be held from the surface of the eye (Fig. 4). Imagine a movie projector displaying an image on a screen. If the ocular lens is that projector and your eyeball is the movie screen, then the optimal distance from the projector to the screen is the eye relief.

The optimal distance from lens to eye is a fixed figure on a given set of binoculars, regardless of whether you have the eyecups twisted down or fully extended. This is important to consider for glasses wearers because glasses limit the ocular lenses’ ability to get close to your pupils. Simply stated, most eyeglass wearers get a more comfortable view from bin-
oculars offering 15mm of eye relief or greater. If your eyes are particularly deep set or if your glasses sit toward the front of the bridge of your nose, you may see better with 18mm of eye relief. This figure generally doesn’t exceed 20mm, and, like close focus, it will vary from model to model. In general, compact binoculars often have less eye relief than full- or mid-sized binoculars. Fortunately for the birder who wears glasses, most full- and mid-sized binocular choices on the market today offer ample eye relief, and this specification generally isn’t a limiting factor in finding a good binocular.

Having the right binocular in your hand isn’t necessarily the result of finding the “perfect” one. I’m convinced that perfection doesn’t exist. With an understanding of how binoculars function, you can begin to see the game of give and take when opting to enhance one feature at the expense of another. Some birders approach this dilemma by having multiple binoculars at their disposal and choosing the one to best suit a particular outing. Others choose a binocular for all their birding needs after prioritizing features and realize that it will be the best in most, but not all, situations. While the perfect binocular might not be a reality, a working knowledge of how a binocular’s size, style, and features can impact your experience in the field goes a long way in helping you find the binocular that’s best for you.

**Editor’s note:** For more information on understanding optics, from in-depth articles to videos, visit the educational section of the Eagle Optics website: [tinyurl.com/EO-tech-guide](http://tinyurl.com/EO-tech-guide) This topic is also discussed in Rich Wright’s book review on p. 46.

**Glossary**

**Aperture.** The diameter of the objective lens, measured in millimeters.

**Close focus.** The shortest distance at which a binocular can focus. If, in viewing things like butterflies, you need to be close to the subject, choose a binocular with a low close focus number, ideally six feet or less.

**Depth of field.** This refers to what you actually see in focus at any one time. It is the area in focus between the foreground and background of the viewing area.

**Diopter.** A focus mechanism on all center-focus binoculars to allow adjustment of one eyepiece separately from the other. This is done to compensate for differences between left and right eyes.

**Exit pupil.** The point at which all of the light rays that entered the objective lens and passed through the binocular exit through the eyepiece to form a magnified, circular image. If you hold the binocular away from your eyes and look through the ocular lens, you will be able to see the clear circular exit pupil.

**Eye relief.** The distance images are projected from the ocular lens to their focal point. The eye relief of a binocular can vary from 5mm to as much as 23mm.

**Field of view.** The widest dimension of the circular viewing area seen through a binocular. This measurement may be listed on the binocular in either degrees or feet, measured at 1,000 yards. Note: One degree equals 52.36 feet/1,000 yards.

**Objective lens.** This lens is at the end of the binocular opposite the eyepiece. It gathers light into the binocular.

**Ocular lens.** The lens in the eyepiece of the binocular that magnifies the image presented by the objective lens.

**Prism.** A mirrored piece of glass inside the binocular housing which reorients the image projected to the eye so that it is right side up and correctly oriented from left to right.
Birding and bird photography are, in many ways, incompatible. To truly focus on birding, whether it is seeing more birds or learning more about birds, it is much better to observe and study birds through binoculars than through a viewfinder. Bird photography, on the other hand, takes a much larger amount of patience, requiring the photographer to remain stationary, focusing on “the photo” and often ignoring all of the other birds around. Sure, this is an oversimplification, but practically speaking, the most dedicated bird photographers are lugging around 500-plus-mm lenses, which are not conducive to the mobility usually required for active birding.

Some will debate the merits of this argument, but for sake of conversation, let us assume that most birders are not focusing their time, effort, and money on being stationed behind a massive lens for a host of reasons. Therefore, what I want to talk about is not “bird photography” but “taking pictures while birding”, or, as I call it, “birding photography”. That means portability is a serious issue, as are time and financial investments. Few of us are willing to drop $25,000 or more on professional equipment for what amounts to a secondary pursuit.

Photo © Franck Camhi.
Instead, most birders are looking for ways to document what they see (especially rarities), to take the occasionally pretty picture to put on the wall, or to have study shots of that odd 3rd-cycle large gull for later reference. In other words, they care about the birding first and the photography second. I call myself an “opportunistic” birding photographer; when some great opportunity presents itself (a confiding bird, nice light, a lucky find, etc.), I try to grab a shot in one way or another. I am constantly evaluating what approach to employ on a given day, based on weighing (pun intended) the costs and benefits of each tool. This article offers some suggestions and considerations to guide your choices, especially if Birding Photography is new to you or you are looking to upgrade your current system.

**DSLR**

There is really no way to compete with the image produced by a DSLR (Digital Single Lens Reflex) camera. (D)SLR is what usually comes to mind when someone hears the word “camera”: a body in which the magic happens (using a mirror and prism system; the word “reflex” refers to the mirror’s reflection) and a variety of interchangeable lenses that run the gamut from macro to telephoto. The amount of light that enters and is transmitted through the lens and body of a quality SLR provides the highest-quality photo, especially in less-than-perfect conditions, allowing you to publish, share online with other birders, or print and enjoy on your living room wall that photo of that Great Gray Owl clutching a vole atop a snag in a snow-draped coniferous landscape. This is the tool to use if flight photography is a goal, or if you are birding in low-light conditions.

For lenses, a minimum of 300mm is usually required, and 400mm is preferable. Either way, stick with fixed-power lenses, which are lighter, produce sharper images, and—all things being equal—are less expensive than zooms. Anything larger requires a tripod for most people, and a lot more cash. Many folks will add a 1.4x teleconverter to, for example, increase a 300mm to the equivalent of 420mm. Unfortunately, with that increased power, some light transmission is lost: the higher the power, the less light that will register. At a morning flight at dawn, for instance, the loss of light transmission becomes a major problem, as the sun is low and the birds are on the move. Still, it adds versatility to your kit.

Unfortunately for me, complications from a significant shoulder injury limit my tolerance for carrying a heavy camera (even the lightest SLR camera body with a 400mm lens) for long periods. Many other birders will have other reasons for not wanting to be bogged down. For longer walks, my SLR stays behind. This practice, by the way, is perhaps the best way to find some great rarity that has to be documented! I’ve done a few long runs back to the car to grab the camera I didn’t carry. Sometimes the bird remains and sometimes it doesn’t; I think I need a Sherpa. But if you want the next cover shot of North American Birds, then SLR is the only way to go.

**BENEFITS**

- **Quality**: SLR offers the best image, all things being equal, of any of the options.

- **Reproduction**: Especially when shooting in “raw” mode, the density of the pixels allows enlargement and quality reproduction.

- **Focus**: Fastest autofocus and easiest manual focus.

- **Moving targets**: The best for photographing moving targets due to superior tracking ability.

**COSTS**

- **Money**: SLR is the most expensive of the Birding Photography options (assuming you already own a spotting scope). A respectable entry-level body like the Canon Rebel series and equivalent Nikons start at a little more than $400, while the “pro” models range up...
It’s still hard to beat the overall quality produced by a DSLR camera with a good lens. Using a Canon EOS 7D with a 400mm F5.6 lens, my wife captures the best photos in the family. That includes birds in flight and even the challenging grays, blacks, and whites of gulls flying in bright sunlight, such as this winter-plumaged Bonaparte’s Gull. Photo © Jeannette Lovitch.

to almost $7000. Telephoto lenses (at least one of which is necessary to pair with the camera body) run the gamut from off-brand options for as little as another $500 up to more than $20,000! As an example, my wife recently upgraded her birding photography gear to the very popular Canon 7D with a 400mm lens, which, combined, set us back about $3,000. That’s a lot of photo notecards for us to sell at the store to make it back!

• Size and weight: SLR is the heaviest camera option, and the one that requires the most space in your bag (not including an entire digiscoping setup).

• Diversity of subjects: For extreme distance (for example, photographing shorebirds on a distant mud-flat), this is not a good option.

• Learning curve: SLR is harder to learn than other methods, especially if you are unfamiliar with exposure and other manual settings.

For more information on SLR cameras, check out Sherrie Duris’s article on page 40 and Bill Schmoker’s ABA Blog post at <tinyurl.com/ABABlog-SLRvids>.

Super-zoom

Super-zoom cameras are defined as having an optical zoom of at least 15x, although today’s options are much more powerful. (Note that camera zooms use a different zoom ratio than birding optics, so a 15x zoom does not equate to a 15x, or 15 power, binocular—see blue box on page 20.) While some have interchangeable lenses, you’re usually looking at an all-in-one package. Rapidly advancing and improving, these run the range from fully automatic point-and-shoots with more power to complex, advanced photography.
tools that have all of the controls, manipulations, and many of the bells and whistles of a traditional camera.

These are lightweight and exceptionally portable cameras. Unfortunately, the image quality is just not quite the same as an SLRs, and a super-zoom’s performance under low-light conditions usually leaves something to be desired. Although my practice with them has been limited, I find it awkward and cumbersome to get on a bird, and especially to follow a bird in flight. Of course, like everything else, practice makes a big difference.

More and more of my birding friends, however, are employing super-zooms for much, if not all, of their birding photography needs. Cameras such as the Leica V-Lux and Canon SX50 are impressive tools that do most of what a SLR can do, at a fraction of the price, size, and weight. Keep in mind that when shopping for a super-zoom (and a point-and-shoot; see below), you should pay attention only to the optical zoom capability. “Digital zoom” is nothing more than cropping, which you can do later on your computer anyway.

BENEFITS

• **Quality**: Especially in bright sunlight, a high-quality super-zoom will produce a splendid image that can be enlarged and reproduced.

• **Size and weight**: Portable and packable, super-zooms are easy to transport, carry in the field, and pack for travel.

• **Cost**: Ranging from as little as $100 to as much as $1,000, there’s a super-zoom for every budget, and even the most expensive are a fraction of the price of an equivalent (in terms of magnification) SLR. There are a lot of good offerings in the $300 to $500 range.

COSTS

• **Quality**: Most are a significant step down from SLRs in performance and image quality, especially under low-light conditions.

• **Focus**: Getting on the bird is often a significant challenge. Most super-zooms are not recommended for flight photography, for example. However, some cameras—such as the Leica V-Lux 4—have a 12-frame burst that can be very helpful for scoring crisp shots of warblers whizzing by the Higbee dike in Cape May.

• **Size**: Larger than a pocket-sized point-and-shoot camera. In fact, most super-zooms are the size of the body of a typical SLR.

**Optical Zoom vs. Power**

As we all know, a “10x” binocular roughly means that the image is magnified by a factor of 10. That is, the image is larger (or more “powerful”) by 10 times. On a camera, however, “10x” does not mean the same thing. Instead, it is simply a ratio of a zoom lens’s shortest focal length to its longest. For example, a 30mm–300mm lens would have “zoom ratio” of 10, or “10x”. A bigger zoom ratio just means that there is a greater difference between the longest and shortest focal lengths. On the other hand, a “prime lens” is a fixed power (e.g., “a 300mm lens”), so it does not have an optical zoom ratio.

Calculating the “power” (from a binocular point of view) of a camera lens is challenging as they are created by entirely different optical systems. With a camera, a variety of factors affect the magnification of the lens, including the range of focal lengths and the size of the camera’s sensor. That being said, it seems that for a rudimentary approximation for a digital camera, you can simply divide the maximum focal length by 50. Therefore, in our 30–300mm and 300mm lenses example, 300 divided by 50 = 6, or “6 power”.

Digiscoping

This technique couples a point-and-shoot digital camera with a standard birding spotting scope. You can simply hold the camera up to the ocular of your scope (careful, don’t scratch the glass! I recommend adding just a little duct tape to the plastic or metal surrounding the objective lens of the camera to help reduce this issue) with or without an adapter. Although adapters mean you have something else to carry, you will appreciate the photo quality from stabilizing your photography platform. Stay away from universal adapters that work on any scope and/or with any
camera, however; without a snug and secure fit on the ocular, digiscoping becomes unnecessarily challenging.

For many years, digiscoping was my method of choice. Because I often carry a spotting scope anyway, having a small point-and-shoot in a back pocket is hardly an inconvenience. Some adapters, especially more universal ones, look like and weigh almost as much as Medieval torture devices, but the best ones don’t weigh much and greatly enhance results. It’s best to purchase the adapter made specifically for a particular scope, or, better yet, made specifically for a particular scope and a specific camera. Leica and Nikon make adapters that fit their own cameras and their own scopes, for example, but most other companies produce a digiscoping adapter that works well with a variety of cameras. Manufacturers that do not make their own cameras strive to have a secure fit on their scopes, while accepting a broader range of camera options. Swaroski, for example, has some fine offerings to couple their scopes with a variety of cameras.

Benefits

- **Money**: Minimal cost to get started. Good point-and-shoots can be found for less than $200, and do-it-yourself adapters can be made for pennies.

- **Size**: A lot smaller and cheaper than an SLR.

- **Distance**: Performs better at a distance than super-zooms and, under good conditions, can outperform the SLRs most birders carry, at least for documentation-quality photographs.

Costs

- **Money**: The best adapters are often as expensive as the camera itself.

- **Size and weight**: The point-and-shoot plus the adapter usually involves more bulk than most pockets offer.

- **Setting up**: The setup works best if you match up the adapter and scope (and, in some cases, the camera) from the same company, which limits your options. Universal adapters are often poor performers. I recommend taking your scope, with or without an adapter, into your favorite camera store (I have been seen walking my spotting scope and tripod down the halls of the Maine Mall) and trying out a variety of cameras to see just how well they couple with your eyepiece, and how well they function when digiscoping. When shopping for a point-and-shoot, ignore the “digital zoom” pronouncement and focus on the stated “optical zoom”.

- **Speed**: Since getting a scope on a bird and then setting up your digiscoping rig takes some time, this method doesn’t work so well for birds in flight or birds that appear and disappear rapidly, or are otherwise moving quickly. Whether it’s a Bell’s Vireo briefly popping in and out of the scrub or a long-sought Gyrfalcon whizzing by your local hawkwatch, rapid motion is the downfall of digiscoping.

- **Focus**: Shake (and therefore

While this photo of a wayward Connecticut Warbler in Maine this fall would not normally see the light of print—except in this demonstration—it did provide adequate documentation of a state rarity. With steady rain, I left the “real” camera behind, and faced with such an unusually cooperative individual, I simply snapped a photo by hand-holding my iPhone 4S up to my binoculars. Photo © Derek Lovitch.
focus) is challenging at high magnifications.

Less often employed is the digiscoping technique of pairing a DSLR camera body with a spotting scope. The benefit is that, instead of carrying an additional telephoto lens, you carry the camera body, a special adapter (a must for this kind of digiscoping; no hand-holding here!), and the scope you are already birding with anyway. It’s a tradeoff with overall quality, as usual.

**Phone-scoping**

A few years from now, a rewrite of this article would likely not even include digiscoping, as I believe the wave of the future is the ultra-lightweight and portable “phone-scoping” technique. Whether because of family, business, keeping an eye on the weather, listservs, or entering your sightings into eBird, your phone is probably already in your pocket, so why even bother with a small point-and-shoot, especially considering the quality of the cameras in today’s best smartphones?

Once again, hand-holding is an option, especially in an emergency, but the adapters are relatively inexpensive, exceptionally lightweight, and easy to use. Homemade options include a cheap phone case and a lens cap (various techniques can be found online), but I prefer the adapters by either Meopta (“Meopix”) or Phone Skope <http://www.phoneskope.com/>. Both Meopta and Phone Skope make adapters that fit snugly over specific eyepieces, with Phone Skope having options for almost every scope on the market. Phone Skope also has a ratcheting adapter that they call their “C-4 Optic Universal Kit” that can be used with a range of scopes (that is, any of the scopes of your fellow travelers on a birding tour, or your regular scope and your compact travel scope, etc.) as well as with your binoculars (see blue box below). It’s a bit clunky to use and definitely takes some practice to be able to align quickly (when you learn the required eyecup setting on your optics, it gets easier). I am told that a new, improved adapter is right around the corner.

**BENEFITS**

- **Available phone:** You’re probably already carrying your phone, for better or worse.
- **Adapters:** Adapters are lightweight and relatively inexpensive. Do-it-yourself adapters are even cheaper but are much less secure.
- **Quality:** New phone cameras are often better than point-and-shoots of an equivalent price range.

- **Sharable:** With a decent data plan, photos can be instantly emailed, shared on Facebook, posted to websites and listservs, etc. Why wait until you get home to get the word out?
- **Control:** Photo apps for your phone can let you control focus and exposure with only a little practice.

**COSTS**

- **Phone case:** Most adapters cannot be used with protective cases for the phone.
- **Zoom:** Phone cameras usually max out at about 5x optical zoom (see blue box on p. 20 for a definition), and cropping beyond that will rapidly reduce resolution.
- **Quality:** The image quality is only as good as a photo with a phone can be. The resolution is fixed; there is no “raw” setting.
- **Distractions:** Because your phone is at the ready even more often, you probably can’t ignore that phone call, and you’ll probably check your work email. Staring at birds is more rewarding than staring at your phone, after all.

**Adapter:** Finding the best-fit adapter for your scope can be difficult, especially with older models. You can find custom-cut O-rings to use the 55mm and 55.5mm MeoPix with Nikon’s small-diameter Fieldscope eyepieces. (Contact me for more information.)

**Digi-binning and Digi-phoning**

In addition to coupling either your point-and-shoot digital camera or your smartphone with your spotting scope, you can also—with a steady hand and some practice (especially with lining up the camera to the binocular)—apply either of these techniques to your binoculars. Swarovski makes a spiffy little “Snap Shot Adapter”, which comes standard with their binoculars, that works well with a point-and-shoot. You can also use a phone-scoping adapter, although, for most binoculars, you’ll need a smaller size. Therefore, if you are thinking of going the route of both phone-binning and phone-scoping, you’ll probably want the Phone Skope C-4 Universal (see above) so that you don’t have to switch back and forth between different adapters.
For more in-depth coverage of phone-scopying, check out Sharon Stiteler’s article on p. 30.

Notice I have not mentioned binoculars or spotting scopes with built-in cameras? For now, these are still mostly gimmicks that are best suited for those Air Mall magazines to browse on the plane. A few years ago, Zeiss came out with a real, functional spotting scope with a built-in digital camera, but at over $7,000 the cost is prohibitive for most people—at least for the time being. I very much look forward to what I expect will be rapid innovations in this category.

With the rapid advancement of every one of these options, our photos get better, get cheaper, and are easier to share. While I ardently believe that field notes are an invaluable way to document rarities (and to learn an unfamiliar bird; see Sophie Webb’s article on p. 24), it’s hard to argue the value of some sort of record shot, no matter how lousy. On one hand, I lament how some bird records committees insist on photo documentation; on the other, I find it hard to believe that, in most birding situations, there isn’t some sort of photography option available nowadays.

There is no right answer. Instead of recommending any particular tool or technique, I have outlined the costs and the benefits of each option for you to start the process. Each one of the four options deserves its own full-length treatment; think of this as merely scratching the surface. We have to ask: What is our priority? How much energy and money do we want to invest? How much physical exertion do we want to put forth? Perhaps most important, ask what level of quality you will really be satisfied with. What is good enough for you? And how much effort do you want to put into learning how to do this? Do you want a bunch of dials and buttons, or just a plug-and-play system? See if you can test someone else’s system on a field trip. Most birding festivals have at least one person attending, whether a presenter or vendor, that you can learn from, and many offer workshops or photography field trips.

For me, the SLR is the way to go when I know I am going to spend the time for a good bird shot, or if I am pursuing something specific to add to my photo library. In the peak of rarity season, I usually deal with the weight, carry the camera, and whine to my physical therapist. Most of the rest of the time, I just stick my phone, with its Phone Skope adapter, in my pocket. And after seeing what my friend was doing with the new slow-motion, high-definition video on the iPhone 5, I think it’s time for an upgrade.

The author greatly appreciates comments and suggestions offered by Cameron Cox, David La Puma, Jeannette Lovitch, and Clay Taylor on an earlier draft of this article.

Whichever camera you use—or even if you don’t use one at all—never forget that birding is about having fun! Photo © Jeffrey Gordon.
**Editor’s note:** So far, you’ve read a lot about new technologies and how they can make your birding better. But sometimes, there really is no re-inventing the wheel. In this article, bird artist, author, and field biologist Sophie Webb explains why—even in 2013—you should probably be taking a pencil and paper with you when you go birding.

### Field Sketching

When planning a birding trip, whether it’s just for the day or longer, I bring with me my binocular, a telescope, and perhaps my SLR camera. However, these are not the only tools I carry into the field. A field notebook is a cheap, simple, and easy-to-use tool for anyone to take birding. I always have one at hand, small and pocket-sized for regular birding trips or something larger for sketching excursions. It is far easier (and more accurate) to record numbers and locations of birds as they happen than to recreate your travels and sightings at the end of a tiring day. Not only is a notebook useful for keeping track of numbers and species, but it is also handy for jotting down notes about the plumage and behavior of any interesting bird you may encounter—perhaps even a simple sketch for future reference. After all, that bird may just turn out to be a rarity! Photos are great, but not everyone birds with a camera, and I find that I am far more observant when writing notes or sketching than when I am looking through a camera lens (and instead concentrating on things like focus and exposure levels).

*Photo © courtesy of Celestron.*
Although it may seem tedious at times, note-taking is invaluable. I have often been surprised at how many times I referred back to a journal or sketchbook from 10 or 20 years ago. It always jogs my memory about the time, the place, and the birds seen there, often far beyond what I am looking for.

A notebook is a good place to keep track of photo frames, times, and dates. Many cameras automatically attach such information to a photo file, but if you forget to set the date and time correctly, those data can be incorrect. I admit that I am not diligent about keeping track of what I see locally (which in some ways is most useful over the long term), but whenever I travel, even if just a short way from home, I usually carry both a small notebook and sketchbook. Here, I suggest some options for notebooks and sketchbooks that can be taken into the field and discuss some of the pros and cons of each.

The simplest option is a small notebook and a pencil or pen. With the advent of the Moleskine brand and its imitators (which may be a good deal cheaper), there are many choices for nice, well-bound notebooks. I like to have something that is big enough for taking notes—and perhaps doing a small ID sketch—without feeling too confined.

These thin, soft, Moleskine notebooks run from $3 to $20, depending on size. The paper in these notebooks may get damp, however, which could be a problem if you’re working or traveling anywhere that is humid.

When I started working as a biologist many years ago (before the age of entering data directly into a computer), I was...
introduced to Rite in the Rain notebooks. On the Farallon Islands, all the biologists still carry these. The paper in these notebooks has a coating that prevents it from becoming soggy when wet, thus allowing you to write in them with a pencil in any weather. But this is also a downside: these notebooks really don’t work well with anything but a graphite pencil or one of those incredibly expensive “space pens”. Felt-tipped markers, even the good indelible sort, smudge readily, and ballpoint pens work only sporadically. Rite in the Rain notebooks may average less in cost than Moleskines.

As the years have gone by, I have modified what I bring into the field, often depending on space and the type of trip. When I first started traveling extensively after college, I had one notebook in which I both sketched and kept my journal. Now, even though it requires more space, I have separated the two.

Strathmore and other brands make decent, affordable, recycled-paper notebooks that are suitable for field sketching. A 6” x 9” notebook, about the size of a field guide, can fit into most day packs, and

Fig. 4. Here are a few different sketchbooks, all of which I have used. Potentially losing pages is the biggest drawback to spiral-bound notebooks with thin paper.

Fig. 5a

An assortment of pens (5a) and pencils (5b).

Fig. 5b

Two types of watercolor boxes. Fig. 7b, made by Da Vinci, comes with a small water bottle and two water cups that fold up into one box. I prefer my small Winsor & Newton set of half pans (Fig. 7a).

Fig. 7a

Fig. 7b

Fig. 6. Watercolor pencils are versatile, offering both a colored pencil and the ability to make a wash. A knife—which is a wise thing to pack in your checked luggage, anyway—can be used as a pencil sharpener.
may be purchased at most arts and crafts stores for $6 to $10. They are great for pencils and pens of any type, but they don’t handle wet media particularly well. Skip the watercolor, unless it’s only for light tinting.

Good pens for both sketching and journal-keeping are made by Sakura, Faber-Castell, and Staedtler. These all have permanent ink and a variety of tip sizes (from 0.005 to 0.8 mm), the smaller the number, the smaller the nib. I like these for travel as there is only a minor chance of leaking and clogging on flights—unlike with Koh-I-Noor Rapidograph pens. I don’t like ball-point pens, but this is only a personal preference. I use mechanical pencils. Although they can fail when wet, there are no worries about sharpening. I also use drafting pencils with thick lead; they must be sharpened, which inconveniently requires a pencil sharpener (but they can also be sharpened with a knife if need be).

There are many great, compact tools that make working in the field easier. For adding color, I prefer watercolors, but many artists like colored pencils. Either option travels well. A set of a few pencils with a standard spectrum of colors is light and can produce almost any color needed.

Watercolor boxes vary greatly in price; you can spend a dollar for a tiny tin or several hundred dollars. I travel with a small Winsor & Newton watercolor box. One of the less expensive ones costs only about $20 and has 12 colors. When mixed, they provide just about any color you need. I bring a few extra brushes, not relying only on the tiny collapsible one that frequently comes with a small box of half pans (the blocks of watercolor pigment). The obvious drawback with watercolors is the need for water. I carry a dog water bottle that has a small dish attached.

Recently, I have been trying Niji Waterbrushes. The plastic handle is hollow, effectively making it a tiny water bottle.

As you squeeze, water enters the brush tip to wet the paint or clean the brush. Very handy! Two drawbacks are the dismal brush quality and the price. These are a bit costly for what they are at $10 to $15.
I have begun to opt for slightly larger sketchbooks, which allow me to create pages with multiple images. I really enjoy Holbein Multimedia Books, which are made in a variety of sizes. These are more expensive and run from $10 to $25 for about 30 pages. But the paper handles watercolor fairly well, and it is thick enough that the ring binding rarely tears.

When on a long trip, I always have another sort of notebook with me. This is usually a nice hardbound journal into which I transfer the notes of the day from my pocket-sized notebook; I also include my daily bird list and keep a journal of any notable activities and events. When I am doing a lot of sketching, some of this information, such as behavioral and plumage notes, remains solely on the sketch. I suppose that for many people, some of the functions of this notebook could be filled by a tablet or laptop computer.

Much of taking notes and sketching is personal preference, and we each find what works best for us. Because recording observations through writing and drawing assists in creating strong memories of what you have seen, it helps you to become a more skillful birder. Bird artist/illustrator Debby Kaspari uses a tiny watercolor box and a waterbrush to tint her lovely field sketches, and Canadian painter/naturalist Robert Bateman did fantastic sketches in Africa with a ballpoint pen.

Steve Howell, one of the most observant people I know, is never without a small notebook and a ballpoint pen to use for his continuous note-taking and sketching. It is up to you to find whatever medium you feel comfortable with. Keeping good field notes and a journal is not only useful as a future reference, but is also greatly enjoyable and satisfying. Even on a dreary day when you can’t get out into the field, flipping through a sketchbook is a virtual time machine, helping you to relive past experiences. Whether for utility or pleasure, sketching with a notebook in the field is an essential activity for all birders and naturalists.

The totality of what I bring with me into the field for art: unpacked (Fig. 11a) and packed, plus small notebooks (Fig. 11b), along with binoculars, a spotting scope, and maybe even a travel chair (Fig. 11c).
The digiscoping game has changed, thanks to smartphones. When point-and-shoot digital cameras hit the scene, they seemed a natural fit for birding. You could keep the small camera in a jacket pocket, ready to line it up to a spotting scope to document a rarity. These cameras were not expensive, many were versatile because you could get landscape and group shots, and quite a few had excellent macro features.

Camera companies were not thrilled with this. Point-and-shoots were made 100,000 at a time and were meant, in part, to get folks interested in spending more money on larger camera bodies and lenses. So when people asked camera companies to make point-and-shoots to work with adapters for spotting scopes, the companies weren’t too interested.

But then many people stopped digiscoping and started using more expensive single lens reflex (SLR) digital cameras. What started out as a relatively easy way for people to get photos in the field became a sometimes-unwieldy and increasingly expensive hobby. But, with the right scope and camera body, you can still get some amazing shots. I’ve had some of my digiscoped images printed in books and magazines.

When smartphones hit the scene, they changed everything, from digiscoping to listing to field guides. Smartphones incorporate high-quality still and video camera options, especially in low-light conditions. You don’t need multiple lenses, and you can easily snap a group shot of your friends, take a picture of that out-of-range Brown Booby through your scope, and send your photos to all your social media outlets. The latest version of the iPhone 5 even offers the option of burst mode shutter (taking several photos at once) and slow motion video. Nokia Lumia 1020

Leica’s David La Puma demonstrated the technique of coupling an iPhone 5S with a Leica scope via a MeoPix adapter. While not all subjects are as cooperative as this particular Red-tailed Hawk, you can see the possibilities of this convenient method. Photo © Derek Lovitch.
and Samsung Galaxy S4 smartphones also offer versatile cameras to capture images of birds.

As always with digiscoping, half the battle is the equipment. Spotting scopes with better glass and coatings—such as Zeiss, Kowa, Leica, and Swarovski—will make better images than lower-end scopes. But if you are simply documenting a rarity or capturing a souvenir of a lifer Boreal Owl, just about any decent scope will work with a smartphone.

The other half of the battle is practice. Some photographers say that for every great photo you see printed, at least 250 more were out of focus or in the wrong light. I think the number is probably double that. Practice digiscoping at a bird feeder. Once you have mastered easy birds like House Sparrow and European Starling, move on to chickadees and nuthatches. After you have those birds down, you are ready for the field.

**Hand-holding a Phone**

It is possible to hand-hold your phone and get photos and video. Rather than eyeballing the aim of your phone’s camera to the scope eyepiece, try lining it up with the viewing screen. Start by twisting out the eyecup on your scope. This gives your phone a little “eye relief” and prevents you from accidentally scratching the lens of your scope with your phone as you line them up.

Look through the scope and focus on the bird you want to digiscope. Hold the phone away from your scope so you can see the entire eyepiece on the viewing screen of your phone. You will see what looks like a small point of light in the eyepiece. Slowly lower your phone towards the eyepiece while keeping the light towards the center of the screen. As the point of light increases on the screen, you should start to see the image of the bird or branch.

Keep lowering your phone until you can feel it rest on the eyepiece; at this point, the phone lens and scope should
be lined up. If not, back up and try again. Try to hold the phone against the eyepiece securely with one hand. I am right-handed, so I hold the phone against the scope eyepiece with my left hand. This frees up the right hand to adjust focus and hit the shutter. After making sure the bird is focused in the telescope, use the phone to further refine the focus. Tap the screen where the bird is or whatever part of the bird that you want to be in focus. The phone will automatically focus and, in some cases, even adjust the light metering.

If you have any vignetting (the black circle around the edge of the image), use your thumb and forefinger to zoom in just enough to get rid of it. This technique takes a lot of practice. You’ll need time to figure out exactly how to line up the phone lens with the eyepiece. It may well require a two-hour practice session to get it down. But, with practice, you can master the technique and start digiscoping in the field.

Smartphone Adapters

For some of us, hand-holding a smartphone is just not an option, especially if you drink too much coffee to hold a phone steady. Smartphone digiscoping adapters can help. They fit over some phones and work with some spotting scopes and binoculars.

Binocular adapters should be considered only in a desperate situation. It is incredibly difficult to hold your binoculars steadily on a bird with one hand while taking photos with your smartphone in the other. I highly recommend investing in a smartphone adapter for spotting scopes. Let the tripod do some of the work. Or lean the binocular against a car, or a tree, or even an understanding friend’s shoulder.

It seemed at first that spotting scope companies were ready for the smartphone challenge. Kowa developed a sleek iPhone 4 case with an adapter that fit not only their 77/88mm zoom
eyepieces but also the Swarovski ATS/ATM eyepieces, the Vortex Optics Razor HD zoom eyepieces, and the Zeiss 15–45/20–60 zoom eyepieces. However, Kowa hasn’t come out with an adapter for the iPhone 5 and doesn’t appear to be making adapters for use with other scopes. Perhaps optics companies will shy away from making adapters as phones change shape with new releases.

• MEOPIX
www.meoptasportsoptics.com

One of the first companies to develop an adapter was Meopta Sports Optics, which created the Meopix iScoping adapter. Its thin, simple design makes it easy to slip in a pocket and tote in the field, but the adapter currently is available only for the iPhone 4/4s and 5/5s, and only fits certain spotting scopes with 42mm, 49mm, or 55mm eyepieces. If you are an iPhone user and have a scope eyepiece in that range, the Meopix is an affordable and easy-to-use adapter in the $60 to $70 range. Meopta has a Galaxy S4 adapter in the works and plans to release it for sale in mid-December of 2013.

• PHONE SKOPE
www.phoneskope.com

Phone Skope offers the largest variety of cases and adapters for phones at the moment. Because they have so many options, the easiest thing to do is visit the “System Builder” page in their store. Enter the brand and model of your phone and spotting scope. The System Builder will come up with a kit you can order that includes a case for your phone and a way to attach it to your scope eyepiece. Prices vary from kit to kit, but most fall in the $70 to $80 range. There can be some issues with this system. I noticed that in cold weather, the plastic adapter slides when I attach my phone horizontally rather than vertically. This can be fixed by adding a little duct tape inside the cup that attaches to the scope eyepiece. Overall, it works well.

If you cannot find a combination for your particular phone and scope, contact the company for help in developing an adapter system for you.

• SMART OPTIX
www.smartoptix.com

The Smart Optix adapter tries to accommodate every scope and phone possible. This large, plastic adapter is designed to nestle a phone in its grip and slide over almost any size of scope eyepiece. All you do is adjust the grips and the screws until it fits. Like any universal adapter, it takes some tweaking to get the fit just right, and the process can be a bit fussy and require constant adjustment. But it would work if you were, say, planted on a beach watching shorebirds or sitting in a blind in Kearney, Nebraska, watching Sandhill Cranes. The device is very large and doesn’t fit easily in a pocket, but the company offers a lanyard for carrying it around your neck in the field. It comes in either green or camouflage, and the price range is $55 to $75.

• NOVAGRADE
www.novagrade.com

The aluminum Novagrade adapter fits several phone types and can be used with a variety of spotting scopes. It’s a bit heavier than the other smartphone adapters but feels more durable than plastic adapters. This adapter is not an iPhone case, but a clamp-on mount that fits on the phone and works with a cup system to fit over your scope’s eyepiece. Because of the wide clamp that holds the phone, the Novagrade can be used with several types of phone cases, which offers your phone added protection from the elements in the field. At $159, it’s the most expensive adapter currently available.

Though all of these adapters will attach to scopes, it is still essential to practice. Don’t give up on the adapter until you have taken a few hundred photos to make sure you are used to this photography technique.

Smartphone Photo Tips

REMOTE SHUTTER RELEASE
Did you know you can probably use the headphones that come with your phone as a remote shutter release? Simply plug in your earbuds and use the volume down button to take photos. Also, the volume buttons on the side of your iPhone can be used to take photos.

Here is a video demonstrating the headphone technique:
<tinyurl.com/Birdchick-shutter>

TAKE VIDEO HORIZONTALLY
Most smartphone video systems are optimized for YouTube and Vimeo if you
hold the camera horizontally. This will give you a larger image of that rarity to share with friends.

EXTENDING BATTERY LIFE
Taking photos and videos can eat up quite a bit of battery on your phone. To extend battery life, go into “Location Services” on your phone and turn it off for any apps that don’t need it. If you know the exact location of the bird you are filming, you can shut off location services on your camera.

You can also purchase external batteries to charge your smartphone in the field. The mophie battery charging case is very popular. It will add some heft to your phone, but it will also triple the battery life. Although it cannot be used with any digiscoping adapters, there are plug-in batteries, like the Juice Pack, that will charge your phone and allow you to use a digiscoping iPhone case.

CAMERA+
The Camera+ app lets you do some adjusting to photos in the field. If your phone doesn’t have a burst mode, Camera+ will make it an option. This app also claims to have an image-stabilization feature, but in reality, all it is doing is waiting for the one second when you are not shaking your phone, and it can be frustrating in the field to wait after you hit the shutter for the photo to be taken. But it can help with lighting issues in low light conditions.

IMOVIE
This app is available for free when you purchase an iPhone 5s. It allows you to edit your videos on the iPhone and even includes templates with which you can easily make movie trailers and then immediately post them to YouTube, Vimeo, and even CNN iReport.

POSTING PHOTOS ONLINE
With a little practice, you’ll get great photos—and then you’ll want to share them on all your favorite birding social networks. Be judicious about where you post them. Your state’s Facebook birding page may be about sharing birding information, not posting the 20 Bald Eagle photos you got over the weekend. But do not worry. There are apps and communities that are dying to have your photos, including Instagram and Hipstamatic. These are photo community apps that even let you put filters over your photos to enhance color or make it appear that it was taken in 1974 and sat in a window getting sun bleached for 20 years. Post a picture of a Bald Eagle in the low-resolution setting and you will be an Instagram art hero. You will be showing birds to a community of folks that may not get much exposure to nature. They will love it. These apps can also be synced with your personal Facebook and Twitter accounts so that you can share your bird photos right from the field with your smartphone.

After all this, should we still be calling it a phone? Do we use it more as a phone or as a camera or as a computer? Perhaps it is a camera that happens to let you take phone calls, or, better yet, a portable computer that lets you take calls and photos and video. (Editor’s note: For more on this topic, check out <tinyurl.com/Strycker-iPod>) Regardless, if you’re carrying a smartphone and a telescope into the field, it’s worth learning the basics of phonescoping. Whether it’s for documenting a rare bird or just sharing with friends, the benefits far outweigh the effort.
Winter birding is exhilarating. Some birders move south for the winter, in search of a warmer climate, perhaps not coincidentally in the path of south-bound bird migration. Other northern birders stay put in hopes of seeing an Arctic-nesting bird as it overwinters near the areas they call home. And some birders even head north, aiming to meet up with these hardy birds of frozen shores, forests, and fields. No matter how thrilling winter birding can be, all it takes is a set of numb fingers or a shivery core to put a wet blanket on the experience.

Staying warm on bitter cold winter days can be a challenge, but there are methods to staying warm. “Bitter cold” is a relative term. To some, a mild winter day of 20°F is frightening. Personally, I break out the shorts on days when the air is near its freezing point in late winter to enjoy watching early spring raptors moving overhead on southerly breezes. Having spent the past 11 winters along the western tip of Lake Superior, I’ve found some tricks for keeping cozy and warm on even those coldest winter days. Throughout the past several years of leading birding trips throughout northern Minnesota, there have been many times when birders and I met up on a morning with temperatures near -20°F. Those bitter cold days produced some spectacular birds and sparked some warm and amazing memories. Winter birding is about being in the moment with the birds. When you stay warm, you realize how to survive and stay well in the coldest conditions; and, by doing so, you connect with the birds that spend their winters coping with these dangerously cold conditions, day after day.

**Base Layer: Synthetic and Wool**
Surviving winter birding starts at the core. The clothing layer that touches your skin can make or break your experience. A lightweight, long-sleeved/long-legged set of long underwear is an important base layer. Different clothing materials can alter the warmth and comfort that you experience. One of the most commonly available materials is synthetic fabric, which often has a polyester base. These synthetic materials are great for insulation. The fibers trap air and keep it close to the skin. Contained air = insulation. There is a catch, though. Synthetics do not breathe well and can cause your skin to become clammy throughout the course of a long day.

Another factor to consider is the duration of your outdoor birding experience. If you’re planning to be on the road for several days or weeks, synthetics will expose another weakness; they will develop an odor after several uses. Hand washing them on the road is always
Warming Up to Winter Birding

a possibility, but synthetics will have to be washed again after an additional use or two, unless you don’t mind stinking up the birding vehicle.

A comfortable and effective alternative to synthetics as a base layer is Merino wool. Although more expensive, Merino wool can improve the quality and enjoyment of your winter birding experience. I have found Merino wool to be a miracle material for cold-weather birding. Unlike synthetics, Merino wool breathes incredibly well and naturally resists odors. No fancy coating or chemicals are applied to the wool; the wool itself keeps odors at bay. While camping for several weeks in northern Minnesota, I have worn long underwear and socks made of pure Merino wool and returned to my bird nerd house with odorless socks and long underwear. Because of Merino wool’s breathable properties, you stay dry and comfortable, even when the air is clammy. My favorite brand of Merino wool clothing is Icebreaker, a company based in New Zealand. Icebreaker’s apparel lasts a long time and is incredibly comfortable and useful for trekking outdoors, especially on the coldest days. Merino wool comes from the Merino sheep, found in the Alps of New Zealand. Icebreaker makes a variety of layers, both thick and thin, for varying temperatures.

Insulating Layers: Cotton and Fleece

The insulating layers are placed on top of the base layer. The base layer keeps you comfortable and dry and adds a little bit of insulation, but the bulk of the insulation comes with the upcoming layers. A chickadee surviving brisk mid-winter days does not stay warm by relaxing the feathers. It’s all about fluffing the feathers and trapping air, which in turn traps the heat created by the little bird’s intense metabolism. The layers that go on top of the base layer should be made of materials that trap a lot of air. Heavy cotton hoodies are great at breaking any breeze that might shoot through the jacket, and hoodies trap a lot of air to keep you warm. The problem with cotton is that if it gets wet, it often stays wet and chills you to the bone. Next time you dry your clothes in the dryer, notice how slow a cotton hoodie dries compared to a fleece shirt. During my first year of count interpreting at Hawk Ridge in Duluth, I was unfamiliar with effective layering techniques for staying warm. “Epic” can hardly begin to describe a dozen Northern Goshawks ripping through the sky overhead, but I often felt very cold. Layering up with cotton shirt after cotton shirt (two sweatshirts under a cotton hoodie) kept me warm at first, but by midday my upper torso got chilled. After I learned about layering with different clothing materials, my future experiences of cold weather birding changed. Staying dry helps keep you warm.

Fleece is an excellent layer to put over long underwear. It traps air, breathes well (does not get clammy), and is very compressible, should you be traveling with limited space. I have been impressed by fleece made by Recreation Equipment Inc. (REI), and wear it regularly. REI offers a wide variety of outdoor gear for year-round outdoor activities and sells many higher-end brands of clothing to keep you warm and dry. REI has its own line of clothing, comparable to the higher-end brands but sold at a fraction of the price. I only own one fleece (an REI fleece), which was given to me in 2003. I have worn this fleece on most of my fall/winter/spring birding adventures since then, and it is still going strong. REI’s fleeces have a very comfortable cut and move without feeling baggy or giving a sense of resistance.

Keeping Fingers Warm

Once the late October winds and flurries come through northern Minnesota, and continue to build as the winter months progress, there is a layering trick for keeping the fingers warm. Thin fleece or wind-breaking gloves can provide a bit of insulation, and having them under a nice set of choppers can make all the difference. Many choppers (leather mittens) have a lining of wool throughout their inner profile to keep your fingers warm. Choppers can be found at many locally-owned outdoor gear stores, and come in a wide variety of brands (often locally-sourced, from what I have seen throughout the upper Midwest). Mittens overall are great for keeping the fingers warm, because the fingers are kept close together. When the temperatures really plunge, the separate inner linings can make an impressive difference compared to mittens alone. Another great advantage of wearing slightly oversized mittens with gloves underneath is that you’re only a split second away from peeling off your mittens and having your finger ready to hit the trigger to photograph the elusive Great Gray Owl as it flies past, or to focus the scope on that distant Iceland Gull approaching over the icy waters. REI makes gloves of various thicknesses and functionalities. Just like the higher-end brands, REI offers good-quality gloves at a fraction of the higher-end brand price. Note that these gloves alone aren’t suitable for the coldest conditions.

Keeping Feet Warm

Winter birding tests the warmest boots and socks. There are few things more frustrating than watching a Northern Hawk Owl sailing...
by with ease, as your toes tingle with the sharp bite of winter air. Just like the upper layers, well-insulating socks can keep you warm. When your extremities are warm, you are more likely to feel comfortable. Avoid cotton socks, for they often become clammy, which then leads to being cold. The warmest socks can be quite thick and are made of a wool or wool blend. My favorite sock brand is Darn Tough. These wool-based socks are made in Vermont and are covered under their “guaranteed for life” policy. Wool-based socks breathe and allow air to be trapped between the boot and your foot. Just like the upper garments, wool socks resist odors naturally, and are a great addition to a suitcase when packing for a long birding trip in the midwinter months.

Winter boots are your shield from the cold, as well as droppings from a Ross’s Gull (and other winter rarities that might be flying overhead). When considering boots for trekking around during the winter months, make sure that the outermost layer is waterproof. Leather boots are great, and synthetics are also great for beading off the moisture. Boots are one of those varieties of gear that give you pretty much what you pay for. Lots of insulation (often measured in grams) is important. Some boot manufacturers do not mention the weight of the insulation. The best way to find out which winter boots are best for you is to try them on in person. Make sure they fit comfortably and have plenty of room for a thick wool sock. I am a fan of Sorel boots. Although many of their products are now made in China (and quality may have decreased), Sorel is a company based out of Canada that specializes in warm footwear. For long hikes in the snow, warm feet will help your body stay warm.

Keeping in the Heat With a Hat

Wearing a warm and well-designed hat can eliminate those shivers creeping up your back on brisk winter days. Because we lose much of our heat through the tops of our heads, a hat can help with staying warm despite severe temperatures and windchills. I am a huge fan of the Stormy Kromer hats. Those of you that have been through northern Minnesota, northern Wisconsin, or the Upper Peninsula of Michigan during the winter, have seen the “Grumpy Old Men” hats being worn by passers-by. The Stormy Kromer hat is a baseball-like hat made of wool with a short brim on the front. Its claim to fame is that you have the option of protecting your ears against the cold or keeping your ears in the open air while listening to birds. Throughout the sides and back of the hat is a thin band of wool that folds down slightly, just enough to cover the backside of your head and much of the wind-exposed ears. Stormy Kromers are handmade in Ironwood, Michigan, the northernmost connection between the Upper Peninsula of Michigan and northern Wisconsin.

Stormy Kromer hats are some of the warmest hats around, even on drizzly days when the hat may become slightly saturated. Wool keeps you warm even if it becomes damp with sleet and snow. One catch is that each Stormy Kromer hat is pre-sized, so you’ll need to know your hat size to purchase one. Stormy Kromer has an impressive outlet in Ironwood, where you can find hats at a fraction of what they cost online. Sometimes if it gets very cold, adding a thin fleece beanie over the Stormy Kromer can make all the difference. Stormy Kromers are a sweet, northwoodsly way to make sure you stay warm. When you insulate your extremities properly, your core stays warmer. If you’re wearing a Stormy Kromer and want to hear a flock of winter finches flying overhead, just fold up the ear strap and you’re good to go! Stormy Kromer hats are awesome, you betcha, don’tcha know!

Final Layer: Overcoat

My winter jacket is a three-in-one Columbia. The outer layer is waterproof and acts like a shell over the under layers. Zipped within the jacket (or used by itself) is a thick fleece. When used with appropriately layered clothing underneath, this coat is a great way to take on the cold. Deeper pockets are crucial for an effective winter birding jacket, as shallow pockets will drop binocular wipes, camera batteries, and other bird nerd goodies. Deep pockets also allow you to put your entire gloved hand inside to stay warm. Either before or after putting on the jacket, wrapping a scarf around your neck can plug up the flow of heat lost through the neck area, and keep the cold from getting the best of you.

We can only attempt to insulate ourselves as well as birds. Northern birds have amazing adaptations to survive and endure the coldest conditions. As birders (and humans in general), we are poorly suited for the bitter bite of winter. By layering up appropriately, we can enjoy the outdoors during subzero days and stay warm. Whether you’re looking for Snowy Owls, Common Redpolls, or Iceland Gulls, it’s time to get out and bird the winter months away. Good birding!

Editor’s note: For more information on keeping warm while birding, check out tinyurl.com/ABA-Blog-Freiday>
Does this sound familiar? You’re out birding and ready to capture a few photos of those colorful, fast-moving birds flickering around in the branches above your head. The moment strikes and a bird pops out in front of you at eye level, but your fingers stumble around with the buttons on your SLR camera. A beautiful Kentucky Warbler! By the time you press the shutter button, the bird disappears. All that is left on your LCD screen is an image of some out-of-focus leaves and a few branches in bad lighting.

Or maybe the thought of buying a digital SLR is like trying to identify peeps. Not to fret, my birder friends, as digital SLRs aren’t as scary as you may think. They aren’t just for the professionals anymore. They can produce nice-quality photos if you are familiar with the three key elements that make up exposure: ISO, aperture, and shutter speed.

Before exploring these elements further, we need to understand what exposure is. Exposure is simple: It’s a measure of the amount of light that falls on the sensor of the camera. Light is the fundamental element that all photographs need because it illuminates the subject. Good lighting is imperative to enhance the sharpness and color of the birds you are photographing.

Now that you have an idea of what exposure is, let’s look at each of the three elements of exposure.

**ISO**

ISO stands for International Standards Organization, which standardizes sensitivity ratings for camera sensors. The ISO speed is a measure of your camera sensor’s sensitivity to light; a lower number is less sensitive, and a higher number is more sensitive. On bright, sunny days, using a lower ISO should be sufficient because there is plenty of light available. If you are in a darker wooded area or lower light, increasing the ISO will help add more light. Note, however, that in low-light conditions, especially, an increase in ISO will also cause grainier or “noisier” photos. Using a tripod to avoid camera shake will help stabilize the camera for sharper photos.
images, allowing a lower ISO.

One metaphor that might help you remember how ISO works is that it’s like “inverse sunscreen”. The higher the ISO number, the more light allowed to hit the sensor. The lower the number, the more light blocked. If you’re out on the beach on a cloudless summer day, you want a higher SPF in your sunscreen. Higher SPF = lower ISO number. You’ll want to be taking photos out there with an ISO in the low hundreds, or less.

If you’re in the forest on a cloudy day, you’ll need little if any sunscreen for your skin. Low SPF = high ISO number. If it’s really dark in there, you may even want to turn the ISO up into the low thousands.

The photo to the left was taken at f/16 and 1/1000 of a second while the photo to the right was taken at f/6.3 and 1/6400 of a second. In both cases, the focus point was the central breast of the front bird, below and in front of the eye. Compare the level of detail visible in the gull in the background and the vegetation in the foreground in the two shots, as well as the number of water ripples that are in focus. Note that the zone of acceptable focus extends farther behind the focus point than it does in front. In this case, the smaller f-stop number is probably better, as its faster shutter speed stopped the motion of the gull yawning, and the shallower depth of field has the effect of focusing attention on the subject itself rather than background and foreground elements. Photos by © Jeffrey A. Gordon.

The photo to the left was taken at f/20 and 1/125 of a second while the photo to the right was taken at f/5.6 and 1/1600 of a second. Again, in this relatively bright situation, shooting with a smaller f-stop number and a fast shutter speed produces a better result. The 1/125 exposure was not fast enough to stop the motion of the wigeon’s head (note the blurred bill and neck), and the great depth of field of f/20 makes the background confusingly detailed. At 1/1600, the duck’s head motion is stopped, and the confusing background has been blurred more pleasingly by a shallow depth of field. Photos by © Jeffrey A. Gordon.
Photo 1 is at ISO 800 and f/5.6. Noise level looks good. Shutter speed is slow, but tripod and motionless subject keep subject sharp. Changing the f-stop to f/16 (Photo 2) brings the grass around and behind the decoy into better focus but isn’t necessarily an improvement. Shutter speed is quite slow at 1/40, and the shot would almost certainly have shown motion blur but for the tripod. f/6.3 is used on the next two photos to give them a pleasing background and foreground blur, yet also give them a touch greater depth of field on the subject. Photo 3 has ISO set at 1600, allowing a shutter speed of 1/400, hand-holdable under good conditions and with practice. Noise starts getting noticeable, but it is not especially bothersome. On Photo 4, f-stop is still f/6.3, but ISO is set at 6400, allowing a very fast shutter of 1/2000. Noise artifacts are quite noticeable now; note the “graininess” around the decoy’s head on the inset box. Photos by © Jeffrey A. Gordon.
Aperture
Aperture controls the amount of light hitting the sensor over a given length of time (that length of time—expressed in seconds—is the shutter speed). Aperture is the size of the opening in the lens when a photo is taken, and it is measured in “f-stops”. The numbering can be a little confusing. The lower the f-stop number, the wider the aperture, which lets in more light and—combined with other settings—results in a brighter image. For any fixed ISO and shutter speed, a lower f-stop will result in a brighter image.

An f-stop of 2.8, for instance, is a larger aperture than an f-stop of 22. Changing the f-stop can also change the distance in which objects are in focus in front of or behind the subject of your image. This distance is referred to as “depth of field”. A higher f-stop value keeps more of an image in focus, and smaller f-stop value isolates the subject.

For example, to create a blurred background of a bird in the open, decrease the depth of field by lowering the f-stop number. If you have eight American Avocets resting on a beach and you want all of them in focus, raise the f-stop number. But it’s important to note that you should raise the f-stop value only if there is enough light. It’s not possible to increase depth of field by increasing the f-stop, without trading for a longer shutter speed (possible blurry image) or a higher ISO (noisier image).

Shutter Speed
Shutter speed is measured in seconds (s.), or, in most cases, fractions of a second. The faster the speed, the less light the shutter is open, and the shorter the time the image sensor is exposed to light. The less time the image sensor is exposed to light, the darker the image. On the other hand, the slower the shutter speed, the longer the time the image sensor is exposed to light, and the brighter the image. The steps available are usually found in factors of 2 (for example, 1/125 s., 1/250 s., 1/500 s., 1/1000 s.). For birds in flight, a higher shutter speed will stop the movement of the bird and keep the bird in focus.

To blur a bird’s wings, you want a lower shutter speed. Or to make a waterfall too “misty”, a slower shutter speed and a tripod should do the trick.

All three exposure controls work together. There are many combinations of aperture and shutter speed that produce the same exposure. The key is light—always confining the photographer to find a set of correct settings to get the exposure. No amount of adjustments to the settings will compensate for the lack of light in a scene, and it’s important to understand that changing one setting will affect the other two. Once you become familiar with light and how to adjust your camera accordingly, the results will start showing up in your work. It often takes patience and lots of practice, but I guarantee that if you work at it, you will produce some great photos in no time. But beware: It can become addicting!

For more information, the internet (including <http://blog.aba.org/category/gears>) has a vast source of information on photography websites, forums, and Facebook groups with experienced photographers willing to help and share their knowledge. Remember, even professional photographers started somewhere. Being a good nature photographer is a skill. If you are serious about taking better photos, work on developing that skill into something that will reward you with images that are crisp, clear, one-of-a-kind masterpieces.
Submitting list totals for publication is one of the ABA’s oldest traditions, and we’re taking it to the next level. Now, you’ll be able to submit all of the numbers you have in the past, plus some new ones. Over 3,000 new ones, including county lists! And it’s all online, and continuously updated. We’ve preserved what was popular about the previous system, while vastly increasing its capabilities and bringing ABA’s listing functions fully into the 21st Century. GO ONLINE FOR DETAILS.
here are books we read and books we use. Birders know that better than most people, I think; we may not have read every single one of the field guides on that groaning, buckling shelf, but they all wait, patiently, for our next big trip—or just for that next puzzling creature to appear at the backyard feeder.

Alan Hale’s new review of optics for birders, hunters, and amateur astronomers is most decidedly a book to use. For most of us, binoculars and spotting scopes are significant purchases, and some of us are likely to spend more on our optics than on anything but our houses, our cars, and our pianos. It pays to be prepared, whether we’re buying our first binoculars or moving up to the German or Austrian or Japanese glass of our dreams.

Hale, the emeritus chairman at Celestron and veteran of more than half a century in the optics industry, is a birder, astronomer, and hunter. His interests and experiences come together in the privately published *Sport Optics*, a richly illustrated introduction to the science, technology, and manufacture of optical instruments, intended to give consumers all the information they need to make the right choice when the financial stakes are high.

Not all of that information is easy to find in the book, whose structure and prose would have benefited significantly from some very assertive editing. An index and a glossary will also be among the principal desiderata for any updated edition—and we can probably hope for updates, given how rapidly the world of birding optics seems to change.

Hale begins with an overview of the major types of optics used by amateurs, with brief discussions devoted to such specialty products as monoculars, opera glasses, image-stabilized binoculars, night-vision devices, and binocular rangefinders. He notes that novelties like the digital binocular and spotting scope, with built-in cameras, have virtually disappeared from the market with the wide availability of low-cost, high-power, and high-resolution digital cameras; as digiscoping continues to explode in popularity, I would not be surprised to see the renewal of experiments in the future featuring closer integration of scopes and cameras.

Good drawings explain the difference between roof- and Porro-prism designs; Hale also teaches us a neat trick for determining whether a manufacturer uses BK-7 or higher-index BAK-4 prisms. The upshot of four pages of discussion: If you can, opt for a phase-corrected, fully multicoated roof-prism binocular with dielectric coatings.

One factor often overlooked by the purchasers of binoculars is depth of field, defined here as “the distance from the nearest to the furthest objects in the field of view that appear to be sharp”. As Hale notes, there is no industry standard, and different users will have different notions of what constitutes acceptable depth of field; my own preference is to avoid refocusing as much as possible, and, fussy soul that I am, I find it distracting and annoying to look at a bird against a near background that is noticeably out of focus. Unfortunately, depth of field is very difficult to test, and any inadequacies may not become apparent until after days spent birding dense brush.

Brightness is one thing most birders notice immediately on picking up a binocular. Unlike depth of field, brightness is readily measured, and Hale provides readers with the mathematical tools to do so—accompanied by the warning that all of the indices are useless to those choosing sport optics; instead, birders are urged to pay attention to the size of the exit pupil, the type of prisms, the type and quality of glass, and the coatings used in a given model.

Unlike many technical introductions to birding optics, Hale’s book makes a point of reminding purchasers of a range of “subjective” considerations. Comfort should be at the top of every birder’s list, *ceteris paribus*: a binocular that is awkward to hold for more than a few seconds,
or a spotting scope that makes you uneasy in its length or bulk, is unlikely to add to the pleasure of a day afield whatever their optical superiority. Sheer mass is part of it, of course, but careful design can make even relatively heavy binoculars easier to handle than some lighter models—and, as the author reminds us, using a harness rather than a single strap can make a big difference.

Sport Optics also provides purchasers with a brief set of tests to assess the mechanical and optical fitness of a spotting scope or pair of binoculars; for many users, these two pages will be among the most useful of the entire book and are certain to make birders more confident as they face the biggest equipment choice they are likely to ever make.

Hale ends his book with a final, one-page chapter, “What New Technology Will Be Coming?”, a bulleted series of predictions as fascinating for the layman as it may well prove inspiring for the specialist. With his finger still firmly on the industrial pulse, Hale suggests that we can look forward to better-quality glass at lower prices, with new types of coatings to entirely eliminate glare and internal reflection. He also anticipates new image-stabilization technologies that do not increase the weight of the instruments that use them. Most intriguing, perhaps, is the suggestion that spotting scopes—limited, not that long ago to 30- or 40-power eyepieces—may go beyond even the 60-power magnification that is now largely standard.

Just how far in the future such things are, no one can say. What is obvious, though, is that we are fortunate already to live in a golden age for birding optics, full of excellent choices that this guide may make easier.
ABA Convention: Corpus Christi, Texas
April 22–27, 2014

ABA Convention Staff:
Jeff Gordon, Tom Johnson, Jennie Duberstein, Ted Floyd, Jen Brumfield, George Armistead, and more. Speakers include Gerrit Vyn, Brian Sullivan and Jeffrey Kimball.

Registration Fee: $1445

Migration is at its best in April along the Gulf Coast and there’s no better spot to take it all in than Corpus Christi. Join ABA members and staff for thrilling field trips in search of migrants and Texas specialties.

PHOTO BY © TOM JOHNSON

Snowy Plover

ABA Birding Rally: Plymouth, Massachusetts
January 31–February 3, 2014

Hosts: Marshall Iliff, Jeff & Liz Gordon, Wayne Petersen, Mark Faherty, George Armistead, and more. Cost: $750

When the Pilgrims arrived at Plymouth in 1620, what did they see? There must have been Razorbills, Black Guillemots, and probably murres, and even Great Auks working the coast. Things have changed a bit since Captain Myles Standish’s days, but a lot is still the same too. The Clam Chowder has always been good, and the tough, plump Purple Sandpipers still work the tide-line along the rocks, while scoters and Common Eiders still drift offshore, just as they did in 1620. The Cape Cod area is a hotbed for rarities too. Join your ABA birding friends in legendary Plymouth!

For all the latest details on these and more ABA events, go to events.aba.org, email us at events@aba.org, or call us at (800) 850-2473

South Africa Safari
October 7–17, 2014
Capetown and Kruger National Park

ABA Safari Staff: Adam Riley, Jeff & Liz Gordon, Forrest Rowland, George Armistead, and more.

Registration: Opens January, 2014

Big game, incredible birds, an amazing group of people all gathering for a great cause. Join the ABA, Rockjumper Worldwide Birding Adventures, and BirdLife South Africa for an utterly unique Safari experience. Safari profits will help support local conservation efforts through BirdLife South Africa.

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Saddle-billed Stork
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