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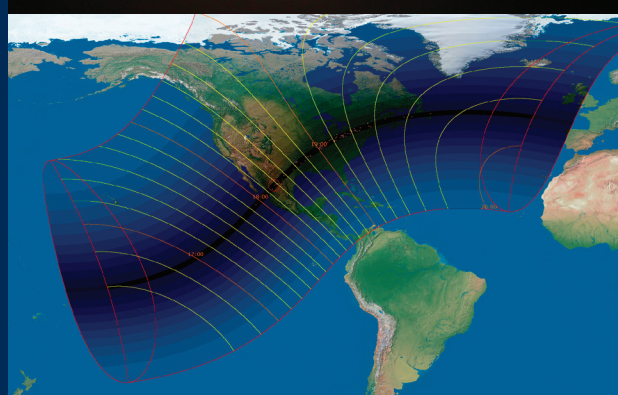
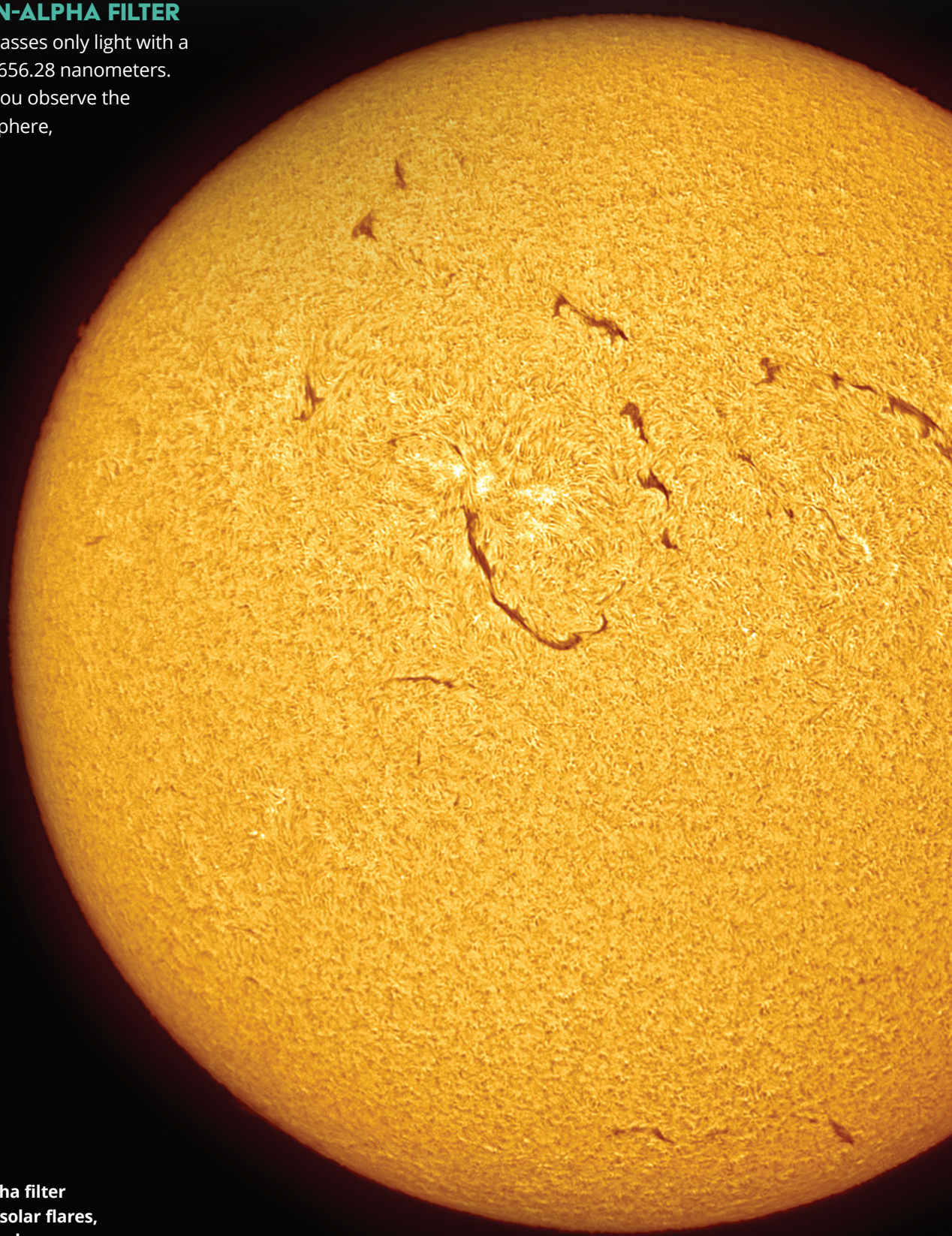
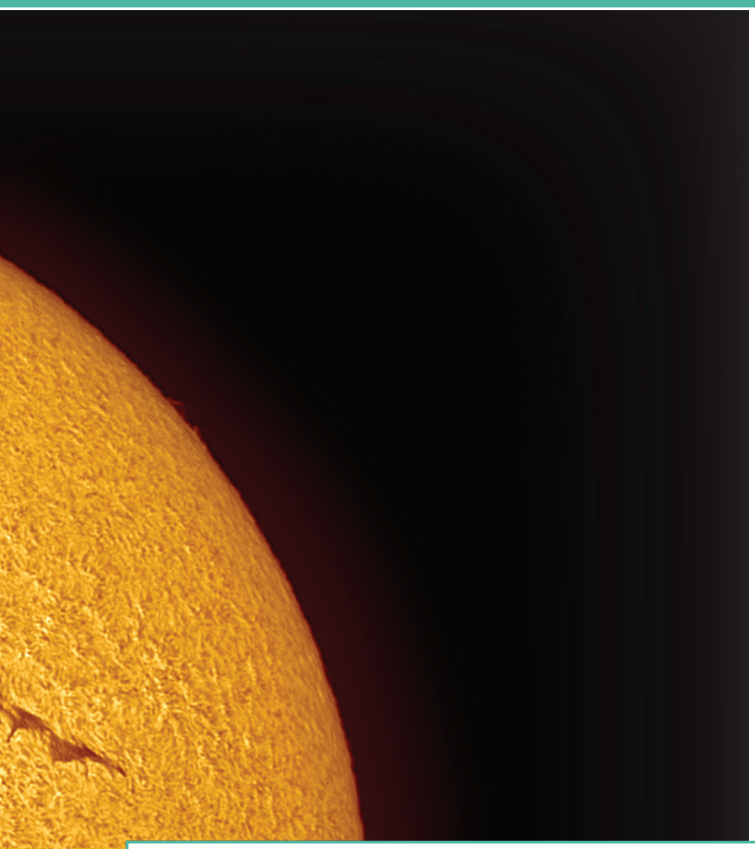


HYDROGEN-ALPHA FILTER
—a filter that passes only light with a wavelength of 656.28 nanometers. This filter lets you observe the Sun's chromosphere, flares, and prominences.



A Hydrogen-alpha filter will let you see solar flares, prominences, and more.
PAUL STEWARD/WIKIMEDIA COMMONS



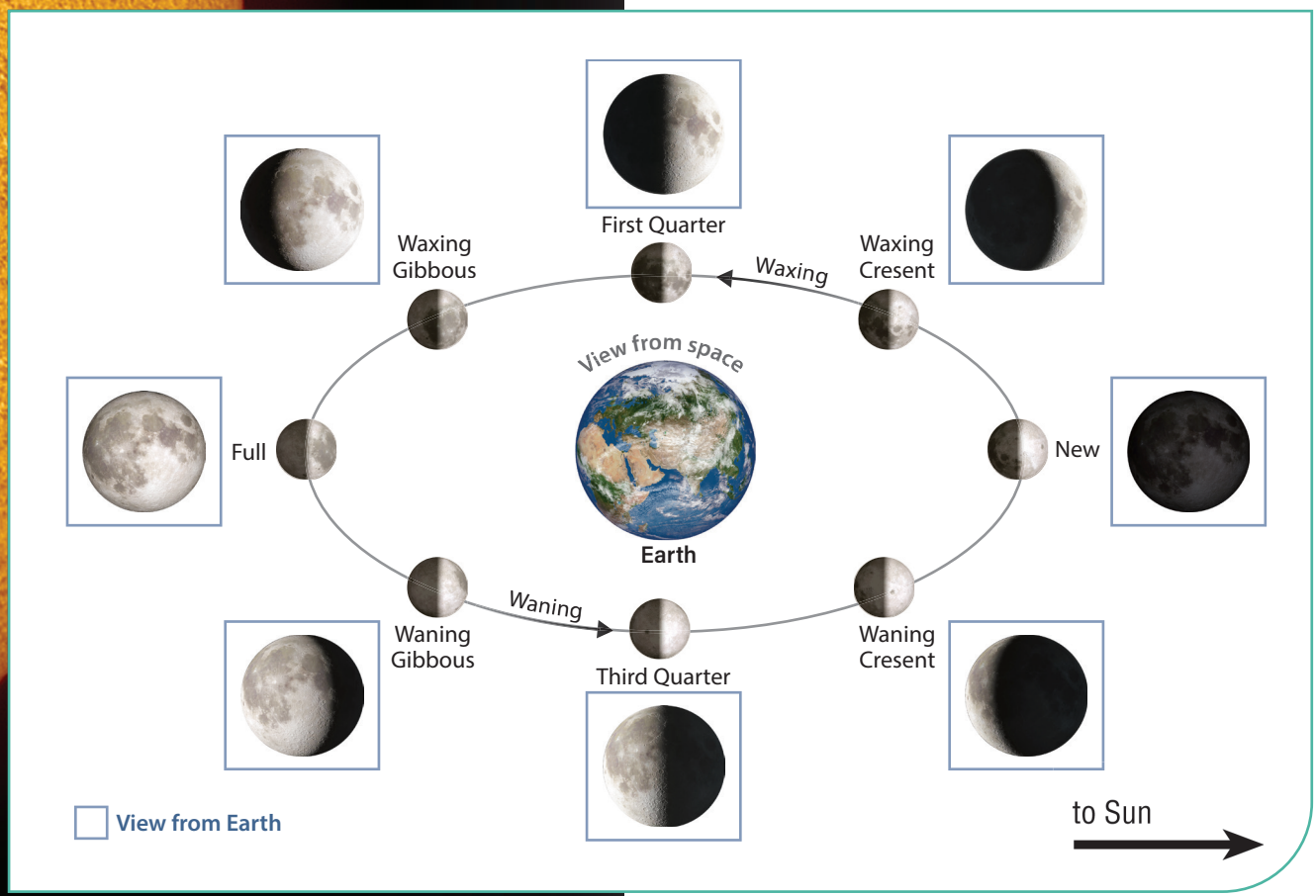
MAGNITUDE—the amount of the Sun's diameter the Moon covers during an eclipse; this is not the same as "obscuration."

NEW MOON—the phase where the Moon seems completely unlit from our perspective on Earth; the phase where the Moon is between Earth and the Sun; solar eclipses can occur only at New Moon.

NODES—the two places the plane of the Moon's orbit crosses the plane of Earth's orbit; eclipses can occur only near nodes.

OBSCURATION—the amount of the Sun's area the Moon covers during an eclipse; this is not the same as "magnitude."

ORBIT—the path of one celestial body around another.



Lunar phases. Solar eclipses occur only at New Moon.

HOLLEY Y. BAKICH

Project 5
CAMERA CADDY

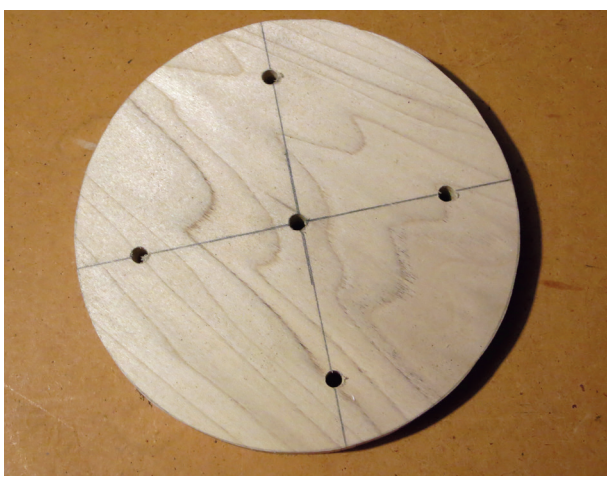
With the availability of inexpensive new as well as used point-and-shoot cameras, it's possible you may wish to carry out more than one of the following video projects. You can even invent your own. My thought was that I had invested enough in the cameras, so I didn't want to buy multiple tripods. Other considerations come into play besides the cost, of course: storage, transporting them to the eclipse site, carving out enough territory to set everything up, and ease of access.

To simplify my video projects, I came up with a simple device I made from materials lying around my shop coupled with an inexpensive online purchase. Here's how I did it.

1 • I started with a board 7½ inches square and ¾ inch thick. I used a piece of hardwood because I like the feel of it after sanding. Plywood, however, would work equally well.

2 • I marked the center of the board and, using a compass, scribed a circle. I didn't actually measure the circle at the time, but it turned out to be approximately 6¾ inches in diameter. NOTE: You can leave the board square. I cut the edges off because I wanted to get rid of as much extra weight as possible and because I think it looks a bit more finished. Go with your preference. After drawing the circle, I drilled a ¼-inch hole in the board's center.

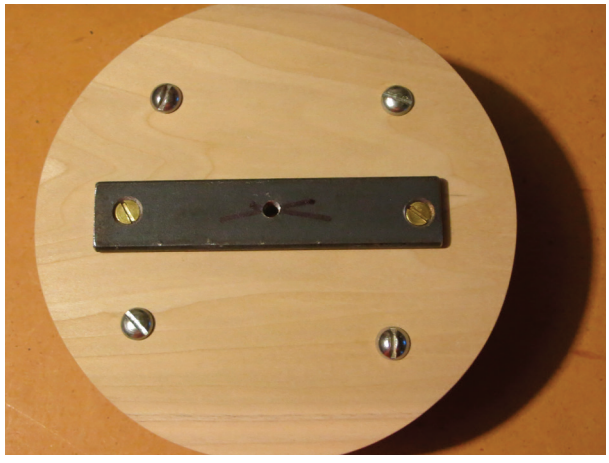
3 • I then used a band saw to cut along the circle.



4 • After extending the initial centering marks, I drilled four ¼-inch holes, each 1 inch in from the edge.

5 • I then found a piece of 1-inch-wide x ¼-inch-thick bar stock (you can purchase this at any home supply store). I cut mine about 4¾ inches long. I drilled and countersunk two mounting holes near each end and then drilled a hole that I tapped to ¼-20 size. Charts recommend a no. 7 drill for this purpose, or you can use the nearest fractional equivalent, 13/64 inches.

6 • To hold the cameras, I purchased four (actually, I bought six) mini-ball-head holders. Each of these measure only 2½ inches long and have a ¼-20 male end that screws into the bottoms of the cameras. I found them on eBay for $1.98 each, and shipping was free.



7 • This picture shows the bottom of the Camera Caddy. I sanded each edge of the metal bar and the wooden base so I won't get an injury if I have to move fast on eclipse day.

8 • And here's the top of the Camera Caddy with all four mini-ball-head mounts attached.

This last picture shows the completed project mounted atop a camera tripod.

are not the same as the transmittance requirements for welding filters. In our rationale for the transmittance levels, David Sliney and I wrote that the UV and IR levels in sunlight are not a significant factor for solar retinopathy—the injury is primarily due to short-wavelength visible light."

This means it's OK to use a polycarbonate welder's filter if you can find one with a dark enough shade (no. 14), though some differences do exist between them and the glass versions.

As for differences, glass lenses can break. Polycarbonate lenses will never break. Polycarbonate lenses scratch much easier than glass ones, so glass lenses will look much better over time, provided you don't drop them. Finally, glass welding lenses have reasonably good optical quality (as good as a ¼-inch-thick piece of glass can have); polycarbonate's optical quality is significantly lower.

SOLAR GLASSES

Today, the easiest and cheapest way to view the Sun is through solar viewing glasses. These devices have several advantages over welder's glass. Eclipse glasses are made of cardboard that hold filters made of solar Mylar—which is silver—or a black polymer (plastic) and are much lighter. The advantage of the polymer is that it holds up to use (and unintentional abuse) better than Mylar.

You don't have to hold eclipse glasses to view the Sun—you wear them. And although you can slip your welder's glass into goggles designed to hold them, that combination is heavy and bulky. And if you drop each of these on a hard surface, the glasses will survive.

One of the two large suppliers, American Paper Optics, claims to have sold two billion eclipse glasses in the past quarter-century. The retail price for these glasses is in the $2 range, less for quantities.

The other main retailer, Rainbow Symphony, recently introduced a line of designer eclipse glasses. Rather than cardboard, the new models have frames of molded plastic. Some were standard glasses, and others used a wrap-around style. All are safe for solar viewing. In fact, you can't see anything but the Sun through these glasses.

The one possible issue with designer glasses is that someone might think you're watching the Sun through sunglasses, which nobody should ever do. If anyone's around when you have such glasses on, make sure to tell her or him about safe solar viewing. You can even let them try on the glasses for their first safe look at the Sun.

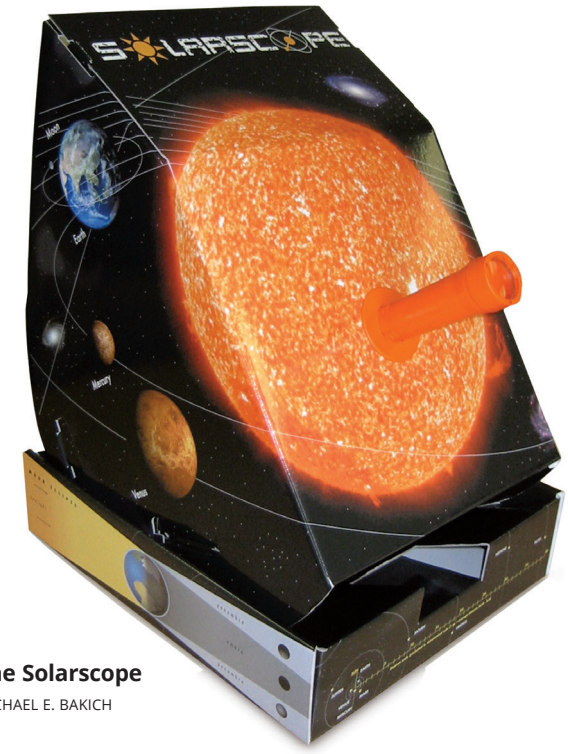
Rainbow Symphony's solar viewing glasses may resemble standard sunglasses, but the only thing you can see through them is the Sun. MICHAEL E. BAKICH

TELESCOPE FILTERS

The most important thing about using a filter with a telescope is that the filter always goes on the front end of the scope. Never use any filter that fits over or screws into an eyepiece. They have been known to crack, and if you're looking through one when that happens, eye damage will happen.

The oldest option uses a piece of flat, polished glass coated with aluminum, nickel, or chromium to

Michael constructed this filter by combining a hardwood frame and Baader AstroSolar Safety Film. The unit fits snugly over the front end of a telescope, and the black knob at the top, attached to a threaded brass rod, secures it. MICHAEL E. BAKICH



The Solarscope
MICHAEL E. BAKICH

drop the Sun's brightness to safe and comfortable levels. Most glass filters impart an orange color to the image.

Another type of Sun filter for your telescope is made of solar Mylar mounted in a metal or plastic cell. Usually, these cost less than glass filters. Mylar filters make the Sun appear slightly blue.

The third type of filter uses the "solar safety film" developed by Baader Planetarium in Germany. The filter material is a high-strength polymer metalized on both sides. Baader astrofilm provides a white image of the Sun.

Don't be concerned if you see wrinkles in the Mylar or Baader filters. Because your telescope isn't focusing on them, the image quality isn't affected. A "stretched flat" film filter is more likely to tear from even small impacts.

Finally, companies like DayStar Filters and Rainbow Symphony offer lines of polymer filters designed to fit the front ends of binoculars, telescopes, camera lenses, and even finder scopes.

All of these filters work well, and they come in two different types: full-aperture and off-axis. The first type covers the whole front of the scope. You'll use one of these if your telescope is a refractor. The second provides a smaller opening away from the center of reflectors and catadioptric telescopes, where the secondary mirrors sit.

Other options to welder and solar viewing glasses are available. Some are filters you add to existing telescopes, and some are stand-alone solar scopes. I currently own many of them.

SOLARSCOPE

Using no filters at all, the Solarscope projects the Sun's image. Set up this simple solar viewer during the partial phases of the eclipse, and you're sure to attract a crowd. It's an ideal product for Sun-viewing that combines safety and low cost.

The Solarscope was invented by astronomer Jean Gay from Cote d'Azur Observatory in Nice, France, as an easy way for groups to observe the Sun. The product produces an image that's totally safe to view.

The viewer comes in two sizes, for either one person or a group, and is made of sturdy cardboard. You have to put it together, but the manual has simple directions. With the Solarscope's cleverly designed base and hood assembly, the Sun's image projects onto a dark area, which makes it easy for a group to view.

Solarscope's optics are pretty clever. During

A group of people using the Solarscope can view the Sun's projected image. MICHAEL E. BAKICH