

# We test Denkmeier's 3-D eyepieces

*This pair of eyepieces will bring a whole new depth to your observing.*

by Mike Reynolds

**W**e are fortunate to live in an age when creative individuals and companies have produced a number of outstanding accessories. Fifty years ago, cutting-edge accessories were items such as Orthoscopic eyepieces, multi-element Barlow lenses, floatation-type mirror cells, and (film) camera-to-telescope adapters.

Innovation and equipment evolution continue. We now have accessories that we couldn't imagine half a century ago. Among them are binoviewers, an optical-mechanical device that lets you to use both eyes at the telescope. Using two eyes means more light gets to your brain. That translates to an ability to observe fainter objects.

Other reasons exist for using two eyes. Resolution — the ability to distinguish between two closely aligned objects — increases. Image contrast — the ability to differentiate between fine details side by side — also increases. And many of us experience enhanced color in objects.

The latest accessory to hit the market is one developed by well-known binoviewer designer and manufacturer Denkmeier Optical and its founder, Russ Lederman. Many observers consider Denkmeier models to be among the top-of-the-line binoviewers. The company has a reputation

for precision-made products that yield incredible views at the telescope.

Its newest innovation is a set of eyepieces specifically designed for the company's Binotron-27 Super System, yet you can use them in other binoviewers as well as in binoculars with interchangeable eyepieces. Lederman has designed and manufactured eyepieces that produce what I would call an apparently three-dimensional image: the Denkmeier Lederman Optical Array 21, marketed as the L-O-A 21.

The basic L-O-A 21s are 1¼" eyepieces with a 21mm focal length and a 65° apparent field of view. The look of this eyepiece

set shouts high quality. The company machines the bodies out of aluminum, and then they receive a black anodizing. The eyepieces easily slip into the eyepiece holders and work well with different focusers.

Although the design and specifics are patented, you can see an array of five glass squares glued (using an optical glue) onto one of the L-O-A 21 eyepiece's field lenses. I detected no traces of the glue while observ-

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**Denkmeier's L-O-A 21 3D Eyepieces provide binocular views unlike any seen before.**

ALL IMAGES: WILLIAM PAOLINI



**This glass array, which Denkmeier attached to one of the eyepiece's field lenses, creates the 3-D effect.**

ing. This is the array eyepiece. You can distinguish it from the non-array eyepiece by the engraved "F" (for far) and the raised "N" (for near) on it. To achieve the 3-D effect, you must use the L-O-A 21 eyepiece set either in a binoviewer or a binocular with interchangeable eyepieces.

Now here's a cool feature: You can change the 3-D effect depending on the orientation of the array eyepiece. If the N is facing toward you, the object at the center of the field of view will appear to float in front of the rest of the objects visible. If the N is facing away from you, the object at the center of the field of view appears to be farther away. I refer to the N only and not to the F because Lederman included a smart design element here: The raised N is easy to feel in the dark.

I tested these eyepieces in different ways, over several months, under varying light conditions, and not only with the Denkmeier Binotron-27 on a few telescopes but also with the set inserted into 100mm binoculars. My comparisons also included a pair of 21mm non-array eyepieces.

First, the eye relief was excellent, even when I used the eyecups. Eye relief refers to the distance between the eye and the eyepiece. It is important to have significant eye relief to avoid issues such as vignetting.

The first celestial object I viewed with the L-O-A 21s was the Orion Nebula (M42). I arranged the array eyepiece so that M42 would appear in front of the field of view. I literally jumped back and rubbed my eyes at first light. The Orion Nebula appeared to float in the eyepiece. I've seen this object through a variety of binoculars and telescopes, as well as different eyepieces, through the years. Yet this was a different M42; it jumped out at me! Friends who were observing with me that first eve-

ning had the same "wow" reaction.

I next turned my attention to M41, an open cluster in Canis Major. The view dazzled me. Its star colors were easy to spot, and the bright red star near the cluster's center stood out more than I recalled.

While awaiting clear weather in Florida over a period of several months, I used the L-O-A 21s on a number of objects. I was disappointed only when the weather was poor. During the summer, the visibility of the Milky Way provided opportunities to use the L-O-A 21s on several objects. A few of my observations and field notes include:

- Globular cluster M80 in Scorpius: The stars hanging in front of the field of view looked like diamonds on a black cloth.
- The Lagoon Nebula (M8): The knots of nebulosity seem more prominent. Nebulosity and stars seem like they are at different distances.
- The Trifid Nebula (M20): The dark lanes that divide the Trifid into lobes were

## PRODUCT INFORMATION

### Denkmeier L-O-A 21 3D Eyepieces

**Type:** Binocular eyepieces

**Size:** 1¼"

**Included:** Plastic cases and rubber eyecaps; binoviewer or binoculars not included.

**Price:** \$599

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**Two views of the array eyepiece show the N (near) and F (far) markings. Denkmeier encased the N in a raised button, which is easy to feel in the dark.**

more noticeable when using the L-O-A 21s in either position. With the Trifid in the background, the object seems more spectacular. Looking at both the Trifid and Lagoon with ordinary eyepieces just did not come even close to the L-O-A 21 array eyepiece.

• Globular cluster M22 in Sagittarius: This bright object looked somewhat round (in 3-D) with a great amount of depth.

• The Hercules Cluster (M13): I just kept thinking of the book *2001: A Space Odyssey*: "Oh my God, it's full of stars!"

• The Andromeda Galaxy (M31): I reversed the L-O-A 21 array so M31 would seem to be more distant. Wow! What a showstopper through 100mm binoculars!

What makes the L-O-A 21s special is that they open an entirely new view of familiar objects. Instead of just a quick glance at old favorites, I spent more time at the eyepiece — I mean eyepieces!

To get the full 3-D effect, you need to observe under as dark a sky as possible. I did observe within my local urban setting, and the L-O-A 21s did not give me as much of the "wow" factor that I experienced under dark skies. Also, be sure to align your optical system properly, including your binoviewer.

"Revolutionary" and "groundbreaking" are terms we often hear associated with new products. But in my book, the Denkmeier L-O-A 21 eyepieces are just that: revolutionary and groundbreaking. If you're looking for something truly new in amateur astronomy, this is it. ☛