



ORION Trapezium

June 2017 Volume 44, Issue 6

Who are we?

ORION was founded in April 1974, by a group of scientists at the United States Department of Energy facilities in Oak Ridge, Tennessee. Our original goal was to perform correlated, instrumented observations of atmospheric and astrophysical phenomena. Since then, we have expanded in many directions, including optical and radio astronomy and instrument design. Have a look at <https://orioninc.org> and <https://orionastronomy.wordpress.com/meetings/upcoming-meetings/>

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Future Events

ORION Meeting

Wednesday, June 28, 2017
1900 hours (7 pm)
City Room
Roane State Comm. College
Oak Ridge Campus

**NOTE CHANGE OF DATE
AND VENUE**

TAO Public Stargazes

Saturday, July 1, 2017
Saturday, July 15, 2017
Roane State Community College
Tamke-Allan Observatory (TAO)
7:30 pm to 12:00 am
8:00 pm program
Look at
<http://www.roanestate.edu/obs/>

TAO Notes

ORION people are invited to arrive early (if announced on email) to prepare for evening viewing. Bring a telescope, red flashlight and munchies.
First time visitors – drive out before dark. Map available at www.roanestate.edu/obs.visit.htm

**June 2017 Meeting and Program
(Wed. June 28, 7 PM, Roane State Oak Ridge, City Room)**

Speaker: John Rather, Ph.D.



Dr. John Rather is an astronomer/physicist/defense & aerospace scientist whose primary areas of focus have included creation of major technology programs, scientific innovation, invention of medical technologies, and development of clean energy sources. His career experience includes government work with NASA, the U.S. Department of Energy (DOE), and the Department of Defense. Additionally, he has worked extensively in private sector research, development, and management, including serving as Vice President of an aerospace company. He has authored 9 U.S. patents.

Rather was raised in Tennessee and began his career as a research technician/physicist at the Oak Ridge National Laboratory (ORNL), where he worked on the team that created and developed the Bumpy Torus controlled fusion concept. He attended the University of Tennessee, Knoxville, earning a bachelor of science degree in physics and graduating with honors in 1963. Following graduation Rather went to work at the Lawrence Livermore National Laboratory (LLNL) in California. While continuing his work at LLNL, Rather pursued graduate studies at the University of California at Berkeley, completing his Ph.D. in astronomy in 1970. His thesis work resulted in the first accurate measurements of millimeter wavelength radio emissions from extragalactic sources.

After earning his Ph.D., Rather went to work for the National Radio Astronomy Observatory (NRAO) facility at Kitt Peak near Tucson, Arizona, where he built a state-of-the-art device for 1-millimeter wavelength observations of the sun, planets, and galactic and extragalactic objects. Rather developed a system that he took to Kenya in 1973 to observe a maximum total solar eclipse. To enable the experiment, he obtained support from the USAF, the RAF, the Kenya Air Force, and the US National Science Foundation. This inter-agency experience led to major broadening of his career path.

Presentation

Chasing Total Eclipses: An Addictive Obsession

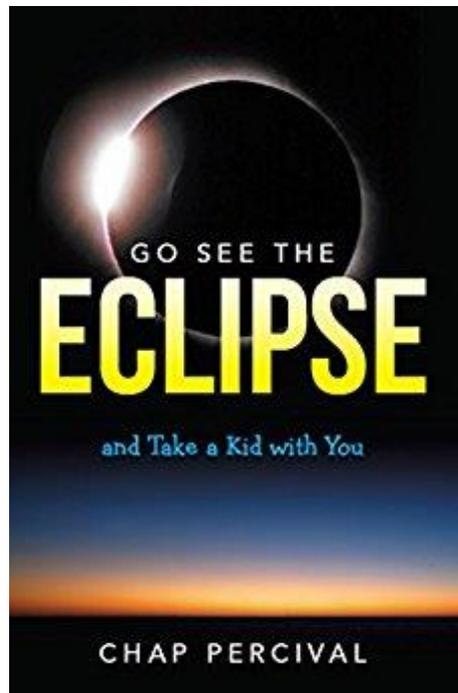
Abstract

The August 21st total solar eclipse provides a uniquely wonderful opportunity for many Americans. Many people have viewed partial eclipses with scarcely a ho-hum glance, but they missed the crucial point: There is a literally mind-blowing difference between a 99.9 % partial and a 105% Total Eclipse. For a few precious minutes viewers are transported to a different world that can be remarkably beautiful and inspiringly memorable if the weather cooperates. This is why eclipse chasing has become a worldwide obsession for many people who are willing to go to strange places to discover new cultural, geographical and psychological excitement. It is unique indeed for this rare opportunity to offer itself free to vast numbers of people across the United States. In this talk Astronomer John Rather will describe his adventures, beginning with scientific motivations that evolved into the thrill of the hunt combined with many inspirational human interactions. He will show short movies of his experiences at five total eclipses around the world, hoping that this motivates parents and children to get to the centerline of totality for an unprecedented tail-gating experience.

Our May 2017 ORION Speaker

Chap Percival presented the Dick Smyser Lecture at the American Museum of Science and Energy on May 18. ORION and the National Park Service co-sponsored this FORNL community lecture. Mr. Percival is a science educator from Sarasota, Florida and visited the entire eclipse path from Oregon to South Carolina. He will be staying on the eclipse line near Cookville, TN on August 21.

Chap had a nice conversation with several of us ORION folks after his presentation. He has published an eclipse book, which is a nice thing to read and to share:



ORION President's Perspective – Obed Wild and Scenic Rivers

June 2017 - David Fields

Hope to see all of you at our June 28 meeting at the Roane State Oak Ridge Campus! I reserved the City Room for 7 PM. Our speaker will be my friend, Dr. John Rather – please see the announcement on page 2.

One of our local assets is the Obed Wild and Scenic River area. This is especially important to astronomers since they have beautiful sites for viewing the celestial sites, and they are our friends. So let's help them when we can. I'll share a letter of support that I sent to the International Dark-Sky Association (IDA) for the Obed Wild and Scenic River (WSR) to be granted "International Dark Sky Park" status. Their location is a short drive from Wartburg.



May 3, 2017

International Dark-Sky Association
Board of Directors
3225 North First Avenue
Tuscon, AZ 85719

Re: Obed Wild and Scenic River (WSR) Application for "International Dark Sky Park"

Sirs,

I am most delighted to support the application of our nearby Obed Wild and Scenic River (WSR) Site to be granted "International Dark Sky Park" status. I've participated in astronomy events at WSR on several occasions, and their beautiful and unique site is a quality viewing area for those of us in the eastern part of the country. Their attention to lighting control as well as objective measures of lighting place them in the "silver" tier designation, which is exceptionally good by our corrupted 'eastern' viewing standards.

This beauty, the exceptional primitive unspoiled quality of their site, and the beauty of their sky place them ahead of all other local facilities, yet they are still not so distant as to be unused. Their interpretive programs are well-planned and implemented and they serve the public exceptionally well.

They also deserve commendation for partnering with our observatory and with our local astronomy clubs. Both the ORION and Knoxville Observer groups have greatly enjoyed our visits to the Obed. The Obed WSR supports scout and student activities as well.

Please accept this recommendation as an invitation to visit and enjoy the Obed WSR and to visit us at Tamke-Allan Observatory. Consider it also an endorsement of your work to return Clear Dark Skies and preserve the beautiful nighttime environment – our greatest park!

Best,



David E. Fields, PhD
Director, Tamke-Allan Observatory
Roane State Community College

and

Director
ORION, Inc. [Oak Ridge Isochronous Observation Network]

HOT NEWS FLASH:

My photochromic Eclipse stamps arrived today!!!! Did you get any? They are very cool. Sometimes. Other times, they are rather warm.

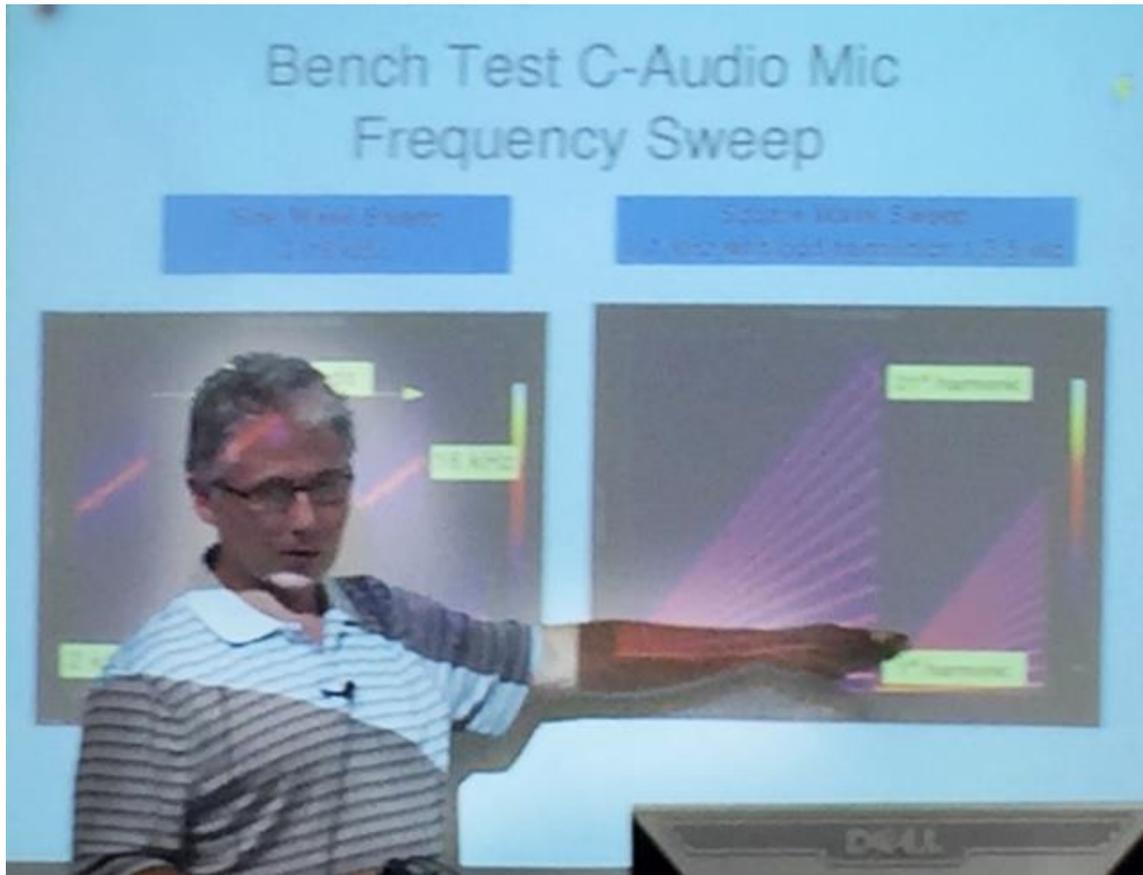
Looking forward to Aug. 21.

David

TAO Events

Public Stargaze June 3

June at TAO featured a series of presentations on radio astronomy. On June 3, Observatory Director David Fields presented an introduction to radio astronomy and the electromagnetic spectrum. Guest speakers Dave Rauen and Carl Lyster, both skilled in engineering aspects of radio astronomy, also gave presentations on computer options and data relay, respectively.



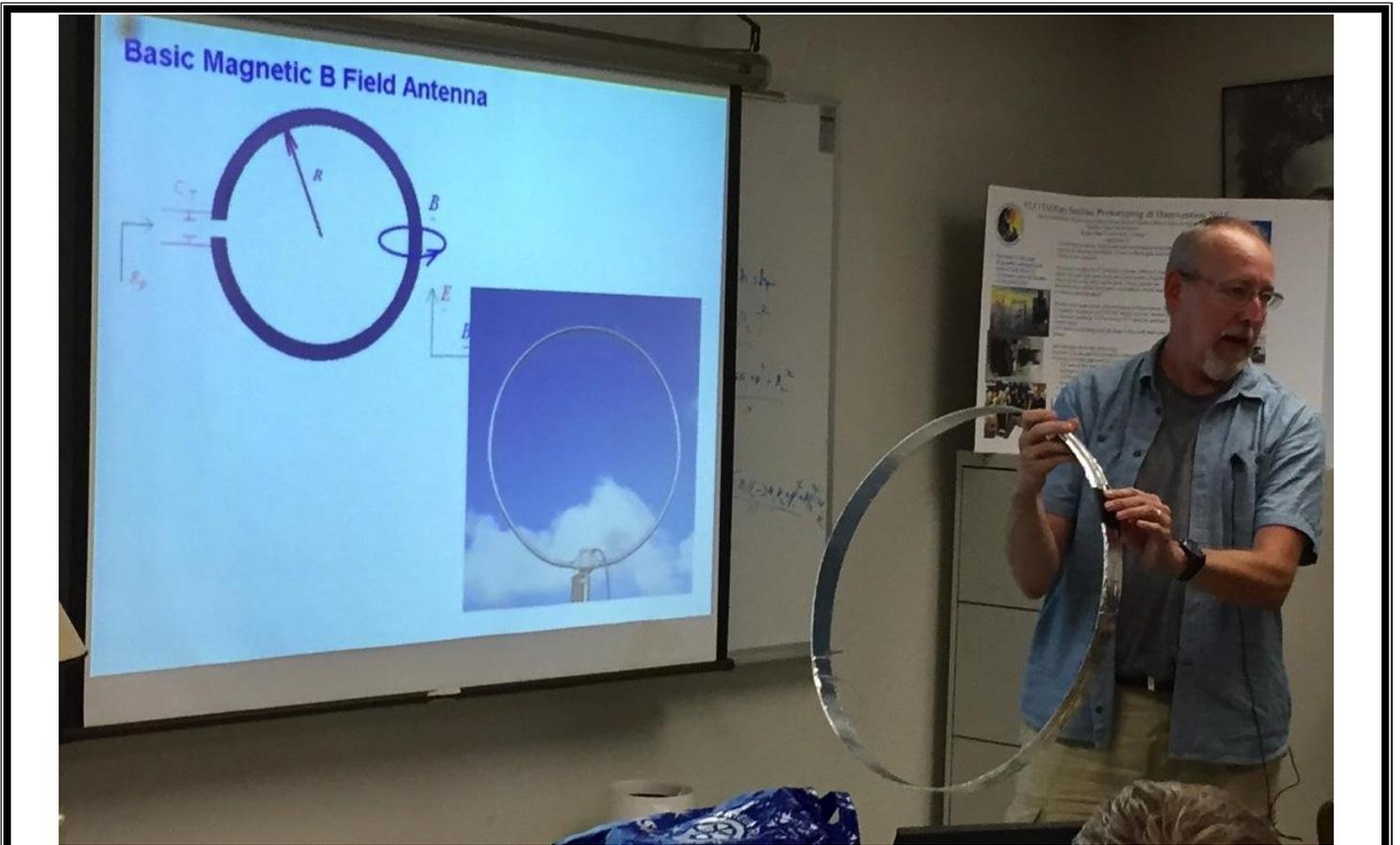
Dave Rauen: “RPi Computer Option for TAOSat Radio Astronomy”



Carl Lyster (seated at computer): "Data Relay from Remote Sensing Instrumentation"

Public Stargaze 17 June 17

On June 17, David Fields elaborated further on radio astronomy and electromagnetic spectra. The guest speakers that evening were Rob Scott, a systems engineer, who gave a presentation on the evolution of software-defined radios (SDRs) from very low frequency (VLF) radios that are often used by amateur radio astronomers, and Carl Lyster, who discussed "Radio Transmitter for GPS and Data Relay"



Rob Scott: "How Do Our VLF Radios Become SDR Radios?"

Rob is holding an antenna that he built using balsa wood wound with wire and covered with reflective duct tape.

The optical astronomers were for once greeted with rainless skies and decent viewing conditions for planets and deep sky objects.

Outreach and Education

The newly formed Tellico Astronomers Club held its first star party off the back patio of the Tellico Village Wellness Center on May 25. There is a considerable interest in Astronomy in the Village. The Club meetings usually have about 12 attendees and the e-mail list has 30+ recipients. The star party had six telescopes with 12 members present. They plan to team up with the Knoxville Observers on future events.



Tellico Astronomers Telescopes at Wellness Center Star Party

The latest educational outreach is the series of Radio Astronomy lectures that started at TAO on June 3. This is a list of the ones presented thus far:

TAO Program for June 3

Welcome: "Stars and Progress"

Radio Astronomy 1. "Introduction: Radio Astronomy and EM Spectra"

David Fields

Observatory Director

Radio Astronomy 2. "RPI Computer Option for TAOSat Radio Astronomy"

Dave Rauen

Signal Analysis NVH Engineer

TAO CP Spectrometer Project

Radio Astronomy 3. "Data Relay from Remote Sensing Instrumentation"

Carl Lyster

Instrumentation Engineer

TAOSat Spectral Relay Project

TAO Program for June 17:

Welcome: "Stars and Progress"

Radio Astronomy 4. "More on Radio Astronomy and EM Spectra"

David Fields

Observatory Director

Radio Astronomy 5. "How did our VLF Radios become SDR Radios?"

Rob Scott

Systems Engineer

ScottSystems

TAOSat Systems Design

Radio Astronomy 6. "Radio Transmitter for GPS and Data Relay"

Carl Lyster

Instrumentation Engineer

TAOSat Spectral Relay Project

BigFoot's Blog

Roger "bigfoot" Lane is a guest columnist for this issue of the Trapezium. This blog describes the star party of May 25 at the Look Rock overlook.

I thoroughly enjoyed the pristine skies at Look Rock on Chilhowee Mtn. last night. The evening turned out to be exceptional despite clouds rolling through on Friday afternoon. Members from both Knoxville Observers and Smoky Mountain Astronomical Society were gathered in the pull-off that is just south of Look Rock on the Foothills Pkwy.

I arrived and set up at 8:30. Visitors started pulling in immediately thereafter. Until it was dark enough to observe we simply enjoyed the vista overlooking Happy Valley and the rolling mountains. I also enjoyed going "old school," star hopping and using constellation ID with my newly rebuilt 12" Meade Starfinder Reflector scope (circa 1992) vs pushing a hand control button on my "go-to" 14" SCT.

Jupiter was first up. It showed crisp cloud bands on the surface and the Galilean moons were pin point. I hopped over to the Ring Nebula (M-57). Still can't see the white dwarf but its blue, green and red colors were showing nicely. I found M-104 (Sombrero Galaxy) in Virgo with its black dust lanes. Switching directions to Ursa Major I found M-81 (Bodes Galaxy) and M-82 (Cigar Galaxy). I found M-97 (Owl Nebula) without any effort, but I always seem to inadvertently find Galaxy M-108 while looking. When I found the Whirlpool Galaxy (M-51) it was still eating its companion (NGC 5195). There was M-106, M-61 and M-94 in Canes Venatici. The Beehive cluster (M-44) in Cancer was still buzzing. The Omega Nebula (M-17) in Sagittarius still looks like a one claw lobster to me. The prize for the evening was Omega Centauri (NGC 5139) @ 15,800 ly's. It is a Southern Hemisphere globular cluster with a very limited window for viewing. It was several degrees above the mountaintops. The visitors as well as the astronomers came over for a look through the eyepiece. For comparison I then showed them M-13 in Hercules at 25,000 ly's, but much brighter. There were several other targets that I passed over briefly but I closed the night with Saturn, rising up in Ophiucus. It was stately, with a prominent Cassini division in the tilted rings.

Just like the curtain dropping at the end of a play the wind picked up and clouds rolled in quite rapidly at 1:00 AM to stop the show. Having a Dobsonian Reflector scope has its advantages. I was broken down and packed into the car in 10 minutes, ready for the long 15-minute drive back to my home in Blount County. I was home by 2:00 and ready for a hot shower to soothe my aching back. I sit on my back porch this morning, looking at Look Rock Tower in the distance on Chilhowee Mountain, knowing how lucky I am to live where I do.

Clear Skies,

Roger

Editors Note: Very good Roger. I almost felt I was there! However, there were home plans that prevailed!

Letter Supporting the Obed Wild and Scenic River IDA application

The Knoxville Observers and the ORION astronomy club are supporting the OBED Wild and Scenic River National preserve to establish an Intentional Dark Sky Park. Owen Hoffman often journeys to the Obed Park to help with astronomy events. Roger Lane's letter of support follows:

4/22/2017

IDA Board of Directors
International Dark-Sky Association
3225 North First Avenue
Tucson, Arizona 85719

Dear IDA Board of Directors,

It is with great enthusiasm that I nominate the Obed Wild & Scenic River area for an International Dark-Sky designation. At the very core of its mission the Obed is dedicated to preserving its river corridors as a "vestige of primitive America." In the 40 years since the park was created under the Wild and Scenic Rivers Act, this principle of limited or no development has preserved the wildness of a landscape largely untouched by human hands. Because of this mindset, the park has been diligent in avoiding the installation of artificial lighting in the park. Not only are there no lights, there is no electric service!

The Obed Wild and Scenic River Area is located approximately 30 miles north of suburban Knoxville, TN and approximately 15 miles from Oak Ridge, TN, yet two different methods of assessing the park's dark sky quality survey using a Sky Quality Meter & Observable Sky Phenomena) yield results firmly in the middle of the "silver" tier designation, as established by the IDA. This, of course, qualifies as exceptionally dark for our region of the country. The Knoxville Observers are primarily a visual observing club with an emphasis on astro photography. We find it more challenging with every passing year to find and maintain viewing areas with such pristine conditions. Therefore we, along with two other local astronomy societies frequently resort to the Obed for star parties and other astronomy outreach events.

For years, the Obed has embraced its dark skies and the users who come to enjoy them. Park rules are written in such a way that visitors are encouraged to use the park's night skies. Frequent interpretive programs such as "Owl Prowls", astronomy walks and programs dedicated specifically to the importance of protecting our dark skies have become a staple to the park's educational offerings. The Obed Wild & Scenic River has also actively used social media such as Twitter and Facebook as well as its website to highlight the intricacies of its dark skies. Finally, the Obed Wild & Scenic River has committed to partnering with the Knoxville Observers and other local astronomy clubs to educate the surrounding communities in the importance of dark skies and what can be done to protect and maintain them.

On behalf of the Knoxville Observers Astronomy Club, I wholeheartedly endorse the designation of Dark-Sky Park status to the Obed Wild & Scenic River

Warm Regards,
Roger Lane, President
Knoxville Observers Astronomy Club

Parting Shots

You know it is summer when the Milky Way rises revealing the many celestial sights along the plane of our galaxy. (Read Roger's Blog). A DSLR camera mounted on a tracking mount allows us to see the countless stars and the dust lanes of our galaxy. This image by Mike Rosette of Mandrin, FL . The dust along the central plane of our galaxy obscures many stars and results in the Prancing horse dark nebula. Can you see it?



Mike uses a Canon DSLR camera on an LXD 50 equatorial mount and a 50mm lens. Note the red emission and blue reflection nebulae around Antares the dying red giant star. A stack of 6 images.

Note: The editor is soliciting astrophotography from local club members for inclusion in the Trapezium. These images will also be used on the ORION webpage, www.orioninc.org. Readers are encouraged to submit images

HOT NEWS FLASH:

My Eclipse stamps arrived today!!!! Did you get any? They are very cool. Sometimes. Other times, they are rather warm.

Looking forward to Aug. 21.

David Fields

About ORION

ORION is an amateur science and astronomy club centered in Oak Ridge, TN that was founded in April 1974 by a group of scientists at the United States Department of Energy facility in Oak Ridge, Tennessee. We serve Oak Ridge, Knoxville, and the counties of Anderson, Knox, and Roane.

ORION's mission is to support science research, teaching, and amateur astronomy in East Tennessee, and therefore we are closely associated with and support TAO by volunteering to host their public events, share our knowledge of the skies with a variety of telescopes, and help provide intellectually stimulating programs at the observatory. ORION works to share the wonders of the cosmos and the culture of science to people from all walks of life.

Members are scientists, engineers, technicians, and others with varied talents and expertise. Over half have telescopes, many are amateur radio operators, and some have a technical interest in astrophotography.

ORION has working relationships with several organizations, including museums and amateur astronomy groups.

Membership is open to individuals who will actively contribute their time and ideas. Our annual membership dues are \$20.00 and student discounts are available.

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