IAAS Monthly Astronomy Newsletter
January 2021

The International Association for Astronomical Studies provides this newsletter as a service for interested persons worldwide.

This newsletter is published on the World Wide Web at The Home of KIØAR - and is received nationally and internationally. Download the PDF formatted version of the newsletter.

An Open Invitation - For amateur radio operators and scanner enthusiasts, when in the Denver metro area, please join the Colorado Astronomy Net on the Rocky Mountain Radio League's WØWYX **146.94 MHz** and **449.825 MHz** repeaters. Due to hardware issues, links with the Allstar node, Echolink and the Cripple Creek repeater are down until further notice. The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

Obtain your Amateur Radio (Ham) License or your General Radio Operator's License (GROL)! Visit the South Metro VE Team website for more information. The South Metro VE Team provides test sessions on the 1st Saturday of each month at our new Eagle Street Facility, The City of Centennial, 7272 South Eagle Street, Centennial, Colorado 80112-4244 at 9am.

** Check the website for current info during these COVID-19 times. **

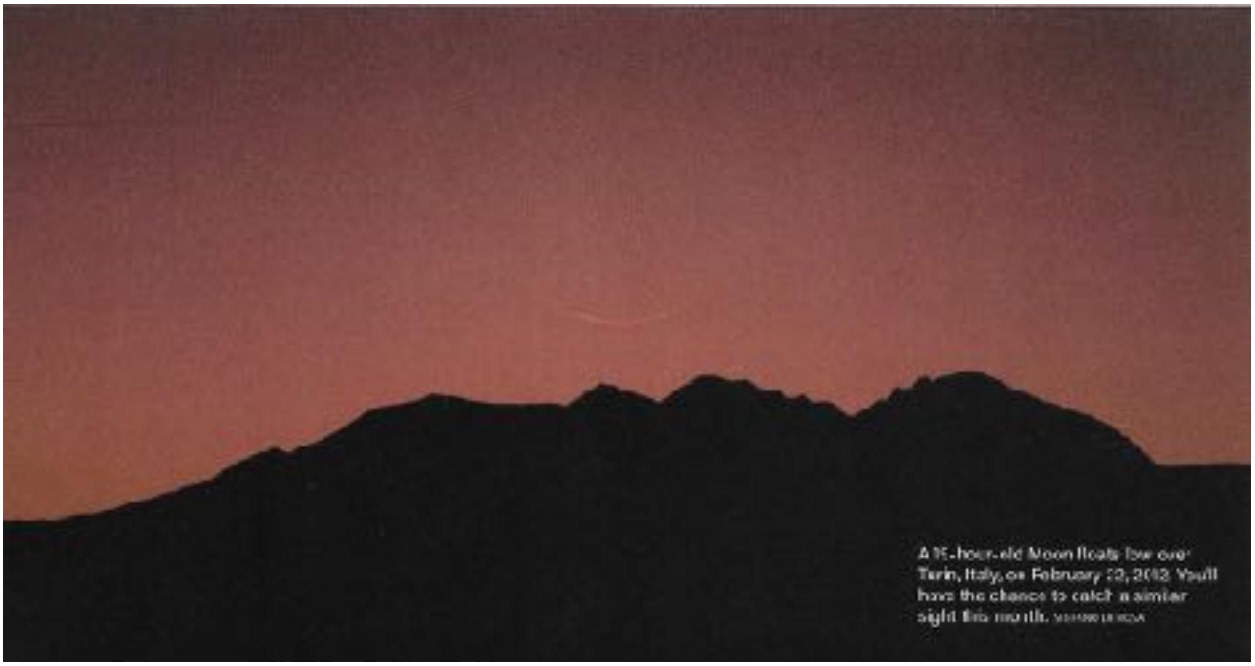
The Colorado Astronomy Net and the IAAS are on Facebook page. Be sure to "Like" us.

Excerpts from JPL mission updates are provided as a public service as part of the JPL Solar System Ambassador / NASA Outreach program.

Donate to the IAAS!

Shop Smile.Amazon.com, sign up or sign in to smile.amazon.com and select the **International Association for Astronomical Studies**. 0.5% of every purchase will be donated to the group. Thank you!

In This Newsletter...



A 15-hour-old Moon floats low over Turin, Italy, on February 22, 2012. You'll have the chance to catch a similar sight this month.

The Month At-A-Glance

The current month's calendar displaying the daily astronomical events.

The Moon

Phases:

- Last Quarter Moon occurs on the 6th.
- New Moon occurs on the 13th.
- First Quarter Moon occurs on the 20th
- Full Moon occurs on the 28th.

- The Moon is at Perigee on the 9th, 228,284 miles from Earth.
- The Moon is at Apogee on the 21st, 251,258 miles from Earth.

Moon/Planet Pairs:

- Mercury passes 1.5° south of Jupiter on the 11th.
- The Moon passes 1.5° south of Venus on the 11th.
- The Moon passes 3° south of Saturn on the 13th.
- The Moon passes 3° south of Jupiter on the 13th.
- The Moon passes 2° south of Mercury on the 14th.
- The Moon passes 4° south of Neptune on the 17th.
- The Moon passes 5° south of Mars on the 21st.
- The Moon passes 3° south of Uranus on the 21st.
- Mars passes 1.7° north of Uranus on the 21st.

For reference: The Full Moon subtends an angle of ~0.5°.

The Planets & Dwarf Planets

Planetary Reports are generated by "TheSkyX" software. These reports provide predicted data for the planets on the first of each month for the current year. The rise and set times for the Sun and the Moon for each day of the month as well as meteor shower radiants are also included in the reports. These reports have been optimized for the Denver, Colorado location, however, the times will be approximate for other locations on Earth.

(All times are local unless otherwise noted.)a

Planetary Highlights for January

Start the new year off by continuing to follow Saturn and Jupiter as they slowly drift apart. By the end of the first week of the month, Mercury joins the two gas giants in the early evening sky. View Jupiter and Saturn during the first two weeks of the month as they will both be in conjunction with the Sun by the end of the month. Mars, Uranus and Neptune are still visible in the early evening as well. Venus shines brilliantly in the morning sky before sunrise.

Mercury

Is at greatest eastern elongation (19°) on the 23rd. Mercury sets at 5:13 p.m. on the 1st and about 6:27 p.m. by month's end. Mercury is stationary on the 29th. Mercury can be spotted low on the western horizon about 30 minutes after sunset for the entire month. Mercury moves from the constellation of Sagittarius into Capricornus shining at magnitude -0.9 on the 15th.

Venus

Rises at 5:52 a.m. on the 1st and about 6:31 a.m. by month's end. Look for Venus in the east before sunrise. On the morning of the 12th, look for the crescent Moon suspended over the planet Venus. Venus moves from the constellation of Ophiuchus into Capricornus shining at magnitude -3.9 on the 15th.

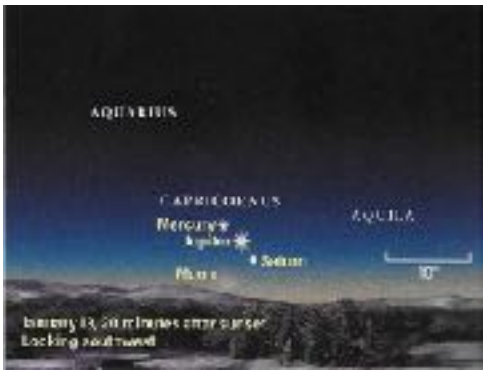
Earth

Is at perihelion (91.4 million miles from the Sun) on the 2nd.

Mars

Sets at 1:37 a.m. on the 1st and about 12:54 a.m. by month's end. Look for Mars high in the sky soon after sunset and follow it to the west as the evening progresses. The best time to observe Mars will be around 8 p.m. in the evenings when Mars is highest in the south. Mars moves from the constellation of Pisces into Aries shining at magnitude 0.1.

Jupiter
Is in conjunction with the Sun on the 28th. Jupiter sets at 6:26 p.m. on the 1st and about 5:02 p.m. by month's end. Look for Jupiter soon after sunset to the west-southwest. By midmonth, Jupiter will be too low to observe as it disappears into the evening twilight glow. After conjunction, Jupiter returns to the morning sky rising just minutes before the Sun. Jupiter is in the constellation of Capricornus shining at magnitude -1.9.



Saturn
Is in conjunction with the Sun on the 23rd. Saturn sets at 6:20 p.m. on the 1st and about 4:38 p.m. by month's end. Look for Saturn soon after sunset to the west-southwest. By midmonth, Saturn will also be too low to observe as it disappears into the evening twilight glow. After conjunction, Saturn returns to the morning sky rising minutes before the Sun. Saturn is in the constellation of Capricornus shining at magnitude 0.5.

Uranus
Sets at 2:21 a.m. on the 1st and around 12:20 a.m. by month's end. Uranus is visible in the evening. Look to the south soon after sunset to spot Uranus. Uranus is in the constellation of Aries shining at magnitude 5.8.

Neptune
Sets at 10:15 a.m. on the 1st and about 8:18 p.m. by month's end. Neptune can be spotted to the southwest once the skies darken. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets
Ceres
Sets at 9:30 p.m. on the 1st and around 8:24 p.m. by month's end. Ceres can be spotted to the southwest soon after sunset. Neptune and Ceres are relatively close to each other but will still be difficult to see this month. Ceres is in the constellation of Aquarius shining at magnitude 9.4.

Pluto
Is in conjunction with the Sun on the 14th. Sets at 5:39 p.m. on the 1st. After conjunction, Pluto returns to the morning sky rising and around 6:17 a.m. by month's end. Pluto is too close to the Sun to be spotted this month as it is lost in the twilight glow of the Sun all month. Pluto is in the constellation of Sagittarius shining at magnitude 15.1.

As always, good luck at spotting Neptune, Ceres and Pluto, a large telescope and dark skies will be needed.

Astronomical Events

Meteor Showers

- The Quadrantids - This shower is generally visible between December 28 and January 7, with a very sharp maximum of 45 to 200 meteors per hour occurring during January 3 and 4. The meteors tend to be bluish and possess an average magnitude of about 2.8.

For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

Meteor Shower Radiant Report

Meteor Scatter (or Meteor burst communications) -- "is a radio propagation mode that exploits the ionized trails of meteors during atmospheric entry to establish brief communications paths between radio stations up to 2,250 kilometres (1,400 mi) apart." Tune your shortwave or your HF amateur radio to 54.310 MHz USB CW and see if you can hear any pings. Try other frequencies as well... 6m FT8 digital - 50.313 Mhz & 50.276 Mhz, JP-65 digital mode and the carrier frequencies of the lower VHF bands for TV channels 2, 3 & 4.

Meteor Rx How-To by Terry Bullett (WØASP).

Comets

- Comet 88P/Howell is now passing through the constellation of Aquarius heading toward Neptune. Look for Comet Howell about 90 minutes after sunset dimming to about 11th or 12th magnitude. Two other comets are near Comet Howell this month, Comet 141P/Machholz 2, shining around 10th magnitude, and Comet 19P/Holmes just a few degrees west and north of Comet Howell. Fr observers south of the equator, Comet C/2019 N1 (ATLAS)possibly shining a bit brighter than the others passes south of Alpha Centauri.

For information, orbital elements and ephemerides on observable comets visit the Observable Comets page from the Harvard-Smithsonian Center for Astrophysics.

For more information about Comets, check out Gary Kronk's 6-volume series of books on Cometography.

Eclipses

- No solar eclipse activity this month.
-
- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

- Look for Mercury, Jupiter, Saturn, Neptune, Mars and Uranus in the evening.
- Look for Comet Howell in the early evening.
- Look for Venus in the morning before sunrise.

Asteroids

(From west to east)

- **Flora** is in constellation of Cetus.
- **Eunomia** is at opposition on the 21st in the constellation of Cancer.
- **Irene** is at opposition on the 24th in the constellation of Cancer.
- **Melpomene** is in the constellation of Cancer.
- **Amphitrite** is in the constellation of Leo.
- **Vesta** is in the constellation of Leo.

Information about the Minor Planets can be found at the Minor Planet Observer web site.

Occultations

Information on various occultations can be found at the International Occultation Timing Association's (IOTA) web site.

Member Meteor Sightings

In this section I will post meteor, fireball, etc sightings that have been published on the American Meteor Society's web site. I want to make this an active section of the web pages and newsletter and would like to publish the links to member sightings. If you have any published sightings, please provide me with the links and I will post them here for all to enjoy.

Event ID	Date/Time	Location	Observer	Link
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	3587aw
3829-2015	2015-12-05 18:06 MST	CO	Burness A	3829a
3871-2015	2015-11-13 01:55 MST	CO	Charles N	3871a
986-2020	2020-02-21 22:20 MST	CO	Lukas S	986
3716-2020	2020-07-24 23:22 MDT	CO	Lukas S	3716

Subscriber Gallery

I have created a web page containing images taken and submitted by subscribers to the email newsletter, check-ins to the Colorado Astronomy Net and readers of the online newsletter and some of my own images. Any one wishing to submit their images to the gallery, please let me know. The images must be taken by the submitter and be astronomy related. Please include a description and your information so that I can give proper credit to your work. I will post the most recent submissions here.

Jupiter/Saturn Conjunction Dec. 21, 2020

Several images from the recent conjunction.
Courtesy of Milton Omoto and Ed Hubbs

Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)

JPL Latest News

The Latest from Space

JPL Latest News

December 17, 2020
NASA Moves Forward With Campaign to Return Mars Samples to Earth

Full Article & Images

"NASA and ESA (European Space Agency) are moving to the next phase in a campaign to deepen understanding of whether life ever existed on Mars and, in turn, better understand the origins of life on Earth.

NASA has approved the Mars Sample Return (MSR) multi-mission effort to advance to Phase A, preparing to bring the first pristine samples from Mars back to Earth. During this phase, the program will mature critical technologies and make critical design decisions as well as assess industry partnerships."

Read the latest news and discoveries from JPL's dozens of active space missions exploring Earth, the solar system and worlds beyond.

Past, Present, Future and Proposed JPL Missions

For special JPL programs and presentations in your area visit the JPL Solar System Ambassador web site.

Juno

December 11, 2020
NASA's Juno Spacecraft Updates Quarter-Century Jupiter Mystery

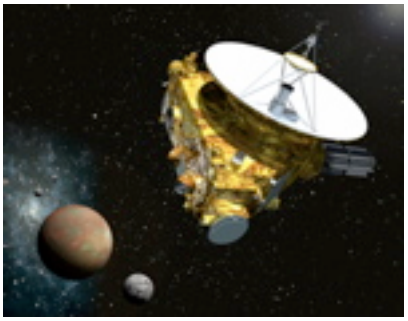
Full Article & Images

"*The spacecraft has been collecting data on the gas giant's interior since July 2016. Some of its latest findings touch on "hot spots" in the planet's atmosphere.*

Twenty-five years ago, NASA sent history's first probe into the atmosphere of the solar system's largest planet. But the information returned by the Galileo probe during its descent into Jupiter caused head-scratching: The atmosphere it was plunging into was much denser and hotter than scientists expected. New data from NASA's Juno spacecraft suggests that these "hot spots" are much wider and deeper than anticipated.

The findings on Jupiter's hot spots, along with an update on Jupiter's polar cyclones, were revealed on Dec. 11, during a virtual media briefing at the American Geophysical Union's fall conference."

Images from NASA's JunoCam.
More information on the Juno mission is available at Juno and Mission Juno.
The public can follow the mission on Facebook and Twitter.



New Horizons

November 4, 2020
The PI's Perspective: New Plans Afoot

Full Article & Images

"New Horizons is healthy and continuing to send data back from the flyby of the Kuiper Belt object (KBO) Arrokoth back in late 2018 and early 2019, even as it speeds deeper into the Kuiper Belt and farther from the Earth and the Sun.

By next spring, New Horizons will be 50 times as far from the Sun as the Earth is – only the fifth operating spacecraft to reach that distance. But as far as we've come, there's much more ahead! We plan to upgrade the spacecraft system and instrument software aboard New Horizons to enhance the mission's scientific capabilities and to search for new KBO targets to study or even fly by. I'll describe both of those plans just below."

New Horizons gallery

Find New Horizons in the iTunes App Store.

For more information on the New Horizons mission -- the first mission to the ninth planet -- visit the New Horizons home page.

TESS

October 26, 2020
New NASA Posters Feature Cosmic Frights for Halloween

Full Article & Images

"*The eye-catching posters depict some of the universe's most mysterious astronomical phenomena with artistic flair.*

With Halloween just around the corner, NASA has released its latest Galaxy of Horrors posters. Presented in the style of vintage horror movie advertisements, the new posters feature a dead galaxy, an explosive gamma ray burst caused by colliding stellar corpses, and ever-elusive dark matter."

For more news and information on the TESS mission, visit the Latest Tess Stories page.

Past, Present, Future and Proposed JPL Missions.

Mars Missions

Be A Martian

Mars website mobile version is here!
Simply type
http://mars.jpl.nasa.gov
into your mobile browser.

MARS WEATHER
Mars Daily Weather Report

Mars on the Go! NASA Be A Martian Mobile App
If you want the latest news as it happens, try our Be A Martian app.
Download on Mobile Devices
Android | iPhone | Windows Phone

JMARS

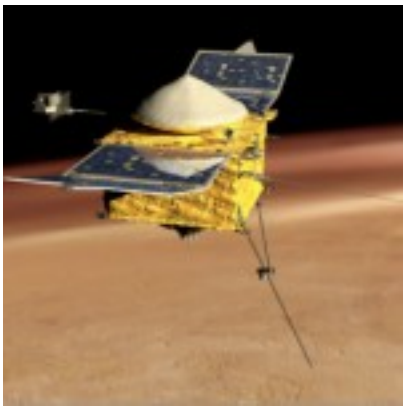
JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and the general public.

Laboratory for Atmospheric and Space Physics

"The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder (CU) began in 1948, a decade before NASA. We are the world's only research institute to have sent instruments to all eight planets and Pluto.

LASP combines all aspects of space exploration through our expertise in science, engineering, mission operations, and scientific data analysis. As part of CU, LASP also works to educate and train the next generation of space scientists, engineers and mission operators by integrating undergraduate and graduate students into working teams. Our students take their unique experiences with them into government or industry, or remain in academia to continue the cycle of exploration.

LASP is an affiliate of CU-Boulder AeroSpace Ventures, a collaboration among aerospace-related departments, institutes, centers, government labs, and industry partners."



LASP/MAVEN

December 7, 2020
LASP researcher reveals new clues on what makes the Sun's atmosphere so hot

Full Article & Images

"New research appears today in the Journal Nature Astronomy that may help resolve a long-standing mystery about the Sun: Why the solar atmosphere is millions of degrees hotter than the surface.

The study was led by Shah Bahauddin, a former graduate student at Rice University, and now a solar researcher at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado, Boulder."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

December 22, 2020
A Martian Roundtrip: NASA's Perseverance Rover Sample Tubes

Full Article & Images

"*Marvels of engineering, the rover's sample tubes must be tough enough to safely bring Red Planet samples on the long journey back to Earth in immaculate condition.*

The tubes carried in the belly of NASA's Mars 2020 Perseverance rover are destined to carry the first samples in history from another planet back to Earth. Future scientists will use these carefully selected representatives of Martian rock and regolith (broken rock

and dust) to look for evidence of potential microbial life present in Mars' ancient past and to answer other key questions about Mars and its history. Perseverance will land at Mars' Jezero Crater on Feb. 18, 2021."

Learn more about the upcoming Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

November 12, 2020

NASA's Curiosity Takes Selfie With 'Mary Anning' on the Red Planet

Full Article & Images

"NASA's Curiosity Mars rover has a new selfie. This latest is from a location named "Mary Anning," after a 19th-century English paleontologist whose discovery of marine-reptile fossils were ignored for generations because of her gender and class. The rover has been at the site since this past July, taking and analyzing drill samples."

Follow the Mars Curiosity rover on Foursquare.

Check out information about NASA's partnership with Foursquare.

Mars Rover Landing - Free for the Xbox 360 (requires Kinect)

Visit the Mars Science Laboratory page.

Mars Reconnaissance Orbiter Mission

October 1, 2020

AI Is Helping Scientists Discover Fresh Craters on Mars

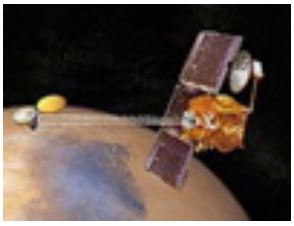
Full Article & Images

"It's the first time machine learning has been used to find previously unknown craters on the Red Planet.

Sometime between March 2010 and May 2012, a meteor streaked across the Martian sky and broke into pieces, slamming into the planet's surface. The resulting craters were relatively small -- just 13 feet (4 meters) in diameter. The smaller the features, the more difficult they are to spot using Mars orbiters. But in this case -- and for the first time -- scientists spotted them with a little extra help: artificial intelligence (AI)."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

View all of the archived HiRISE images.
More information about the MRO mission is available online.



Mars Odyssey Orbiter

June 8, 2020
Three New Views of Mars' Moon Phobos

Full Article & Images

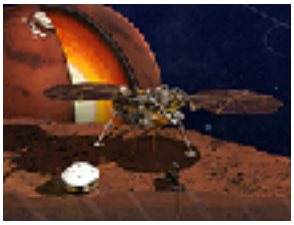
"Three new views of the Martian moon Phobos have been captured by NASA's Odyssey orbiter. Taken this past winter and this spring, they capture the moon as it drifts into and out of Mars' shadow.

The orbiter's infrared camera, the Thermal Emission Imaging System (THEMIS), has been used to measure temperature variations across the surface of Phobos that provide insight into the composition and physical properties of the moon. Further study could help settle a debate over whether Phobos, which is about 16 miles (25 kilometers) across, is a captured asteroid or an ancient chunk of Mars that was blasted off the surface by an impact."

DAILY MARS ODYSSEY THEMIS IMAGES
Thermal Emission Imaging System (THEMIS) web site.

The Odyssey data are available through a new online access system established by the Planetary Data System.

Visit the Mars Odyssey Mission page.



Mars InSight - Journey to Mars

InSight - Revealing the Heart of Mars
December 16, 2020
3 Things We've Learned From NASA's Mars InSight

Full Article & Images

"*Scientists are finding new mysteries since the geophysics mission landed two years ago.*

NASA's InSight spacecraft touched down Nov. 26, 2018, on Mars to study the planet's deep interior. A little more than one Martian year later, the stationary lander has detected more than 480 quakes and collected the most comprehensive weather data of

any surface mission sent to Mars. InSight's probe, which has struggled to dig underground to take the planet's temperature, has made progress, too."

Interactive selection of raw images taken by the cameras aboard InSight.

Learn more about the InSight mission.

Mars Missions Status

New Mars missions are being planned to include several new rover and sample collection missions. Check out the Mars Missions web page and the Mars Exploration page.

Astronomy Links and Other Space News

(If you have a link you would like to recommend to our readers, please feel free to submit it.)

Colorado Astronomy Links

Radio Astronomy Links

Other Astronomy Links

Acknowledgments and References

Much of the information in this newsletter is from "Astronomy Magazine" (Kalmbach Publishing), JPL mission status reports, "Meteor Showers - A Descriptive Catalog" by Gary W. Kronk and other astronomical sources that I have stashed on my book shelves.

The author will accept any suggestions, constructive criticisms, and corrections. Please feel free to send me any new links or articles to share as well. I will try to accommodate any reasonable requests. Please feel free to send questions, comments, criticisms, or donations to the email address listed below. Enjoy!

Subscription Information

- Email Newsletter archives.
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- The latest version of the newsletter.

Keep looking UP!

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JPL Solar System Ambassador, Colorado
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