May 2003
Volume 2, Issue 5

Stars and Scopes

Newsletter of the Rocky Mountain Astronomy Club
www.rmastronomy.com

Upcoming Events

May 3 – **Club Star Party,** 7 pm at the so. fishing area, Pueblo Reservoir

May 12 – **Board Meeting,** 6 pm, **Club Meeting** and Program, 7 pm at University of Southern Colorado

May 15 – **Eclipse Watch** and Telespoce Workshop, 6 pm at the Raptor Center

May 24 – **Public Star Watch** 7 pm at the Southern Colorado Observatory

May 31 – **Club Star Watch** 7 pm at Graneros Gorge

Jun 9 – **Board Meeting,** 6 pm, **Club Meeting** and Program, 7 pm at University of Southern Colorado

Jun 21 – **Public Star Watch** 7 pm at the Southern Colorado Observatory

The seething nucleus of Halley's Comet, as photographed on May 8, 1910, by the 60-inch telescope at Mount Wilson Observatory in California. Courtesy Carnegie Institution of Washington.

Eta Aquarids: Halley's Comet Crumbs

By By Garry W. Kronk, Sky & Telescope Website

After the spectacular display of Leonid meteors in November 2001, skywatchers might have difficulty readjusting to "normal" showers that traditionally display only a few dozen meteors per hour. One of these, the Eta Aquarids, peaks on the night of May 5–6, 2003, and while it may not dazzle you with large numbers, this shower has one significant claim to fame: its particles come from the reigning king of comets, Halley.

Earth passes near the long, looping orbit of Comet Halley twice per year, and each approach peppers our atmosphere with dust strewn along Halley's orbit. Yet, despite their impressive lineage, the Eta Aquarids in May and the Orionids in October are not particularly well known. In fact, the Eta Aquarid shower remained unrecognized as such until the late 1800s.

Hints of a pulse of meteor activity at the end of April and in early May first arose in 1863, when Hubert A. Newton noticed a coincidence in the dates of a series of showers in historical records dating back to A.D. 401. But official credit for discovering the Eta Aquarids

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May Meeting Guest Speaker

"A Case for Mars"

Our guest speaker for the May Club Meeting will be Mr. Husain Sarper. Mr. Sarper is a professor at the University of Southern Colorado and is a member of the MARS Society. He will be speaking on "A Case for Mars."

Celestial Events

May 15, 2003
Lunar eclipse; Moon rises in eclipse—totality lasts 55 minutes.

August 27, 2003
Mars closest to Earth in many centuries. Don't miss it!

October 2003
Comet Encke; 3.3 year orbit will bring it close enough to almost see naked eye nice with binoculars or scopes.

November 23, 2003
Lunar eclipse; totality lasts 24 minutes

December 2003
At Midnight, **Saturn** will be at its highest point in the sky in 30 years. Spectacular viewing!

April Club Program

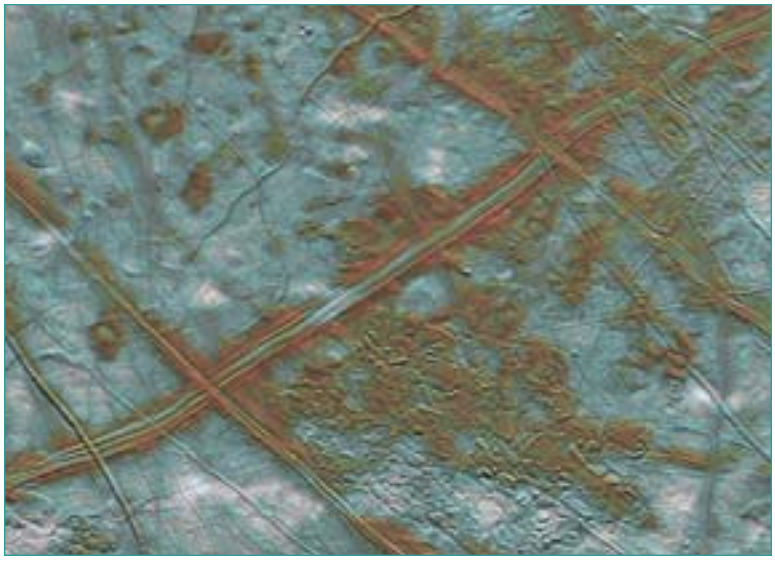
"Using Starry Night Pro to Navigate the Sky"

The April club meeting began with Bill Brown giving an update on the observatory scope. The corrector plate and mirrors will need to be manufactured as a classical cassegrain in order for the scope to be properly focused. The grand opening for the scope was weathered out on both nights set aside for the club and for the public. So alternate event will be planned to "christen" the observatory. Phil Brown then started his presentation of using Starry Night Pro to navigate the night sky. Phil demonstarted the time difference in how the Sun rises and sets. Phil also demonstrated how by programming in the sky movements over the course of a year, you can watch the Sun move higher and lower in the sky. Phil continued his presentation with showing how the Moon moves during a 24 hour period. By watching the differences in the Earth's rotation over the course of a month, you could see the phases of the Moon and its rise and set times. Phil also spoke on how Starry Night Pro can be used in the field for navigating while observing and how to create your own star charts.

In Search of Alien Oceans

By Patrick L. Barry and Dr. Tony Phillips

A robotic submarine plunges into the dark ocean of a distant world, beaming back humanity's first views from an alien ocean. The craft's floodlights pierce the silty water, searching for the first, historic sign of extraterrestrial life. Such a scenario may not be as fantastic as it sounds. Many scientists believe that Jupiter's moon Europa conceals a vast ocean under its icy crust. If so, heat from the moon's interior-which would keep the ocean from freezing solid-may also drive subaquatic volcanoes and hydrothermal vents. On Earth, such deep-sea vents provide chemical energy for ecosystems that thrive without sunlight, and some scientists even suggest that Earthly life first got started around these vents. So a warm Europan ocean spotted with thermal vents could be a natural incubator for life. That's why some scientists hope that someday we will send a probe to Europa that could bore through the ice and explore the ocean below like a submarine.



Cracks on the icy surface of Jupiter's moon Europa give evidence of a liquid ocean below.

To plan for such a mission, scientists would first need to put a camera in orbit around Europa. By looking for places where water has welled up to fill the spindly cracks that riddle Europa's surface, scientists can estimate where the ice is thinnest-and thus easiest to bore through. That mission scenario presents a problem, though. Europa orbits Jupiter inside the giant planet's punishing radiation belts. Continuous exposure to such high radiation would damage today's scientific cameras, making the information they gather less reliable and perhaps ruining them completely. That's why NASA is designing a more radiation-tolerant CCD that could be used on a mapping mission to Europa. A CCD (short for "charge-coupled device") is a digital camera's chip-like core, which converts light into electric signals.

"We've seen the effects of this radiation during the Galileo mission to Jupiter," says JPL's Andy Collins, principal investigator for the Planetary Imager Project. "Galileo has orbited Jupiter for many years, dipping inside the radiation belts only for brief intervals. Even so," he says, "we've seen clear signs of damage to its instruments." By using the hardier CCD's developed by the Planetary Imager Project, a future probe could remain in Jupiter's radiation belts for many months, gathering the maps scientists will need to finally get a peek behind Europa's icy veil. And who knows, maybe there will be something peeking back!

Halley's Comet Crumbs (continued from page 1)

goes to English astronomer George Lyon Tupman. On the nights of April 30 and May 2, 1870, he observed more than two dozen meteors streaming from a radiant in north-central Aquarius. A year later Tupman again recorded a weak shower radiating from this location.

The Eta Aquarids remained poorly observed due to a lack of active meteor observers in the Southern Hemisphere. Only occasional hints of an active shower were reported, since northern observers had to face the beginnings of twilight shortly after the radiant rose above the eastern horizon. However, in 1876 Alexander Stewart Herschel deduced that on May 4th, when Comet Halley's orbit is closest to Earth, it should create a meteor radiant at right ascension 22h 28m, declination 0°. Herschel immediately noted that the radiants observed by Tupman in 1870 and 1871 were very near these predictions, and within a few years the link between Comet Halley and the Eta Aquarids was secure. Fortunately, several good meteor observers appeared in the Southern Hemisphere during the 1920s, and the knowledge of primarily southern meteor showers increased dramatically.

Although Eta Aquarid meteors appear to radiate across the sky from a point near the celestial equator, their annual appearance favors observers in the Southern Hemisphere, where nights are longer this time of year. These diagrams show the view toward east when the radiant is 32° up. Twilight is already bright in Atlanta, Georgia (latitude +34°), but skywatchers "down under" in Sydney, Australia (–34°) get to see the Eta Aquarid radiant climb still higher — for another hour and a half — before dawn twilight interferes. Sky & Telescope diagram by Steven Simpson.

Beginning in 1947, the Eta Aquarids joined the ranks of the first streams to be detected by radar. From 1958 through 1967, the sensitive radar equipment at Springhill Meteor Observatory near Ottawa, Canada, detected hourly rates typically between 350 and 500 at the shower's peak.

As with most annual showers, this one exhibits year-to-year variations in intensity, and observers have noted unusual peaks and valleys in the activity of the related Orionids as well — undoubtedly due to Earth's encounter with denser filaments within the stream of particles along Halley's orbit. In 1962, for example, the radar-echo rates climbed to 328 per hour on May 2nd, only to drop to 133 the following day. By May 4th they had climbed back to 468.

In 1973 Anton Hajduk (Astronomical Institute of the Slovak Academy of Sciences) noted that the Eta Aquarids occur when Earth is 0.065 astronomical units (10 million kilometers) from Halley's orbit, presumably when the stream is most dense, while the Orionids occur when Earth is 0.15 a.u. (22 million km) away. Moreover, the Eta Aquarid stream has an orbit somewhat different from the one now occupied by Halley. Apparently these comet crumbs made their escape from the nucleus many centuries ago.

Because Halley has a large retrograde orbit, its meteoric dust slams into our atmosphere at very high speed — 65 km per second for the Eta Aquarids and 66 km per second for the Orionids. The "typical" Eta Aquarid is rather bright, averaging about 3rd magnitude. Many of these meteors leave persistent trains that linger as glowing fingers of light in the sky after the bright flash ends.

In 2003 the shower's peak is predicted for the night of May 5–6 (about 6h Universal Time on the 5th). The radiant, centered at right ascension 22h 30m, declination –1.3°, is just a few degrees from the intersection of Aquarius, Pegasus, and Pisces. Activity remains high from about May 3rd to 10th.

Shower activity will become noticeable once the radiant clears the eastern horizon at about 2:30 a.m. local daylight (summer) time. Make a point to be ready and watching when

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Halley's Comet Crumbs (continued from page 2)

the radiant is low on the horizon. That's when a bright Eta Aquarid may skim overhead, creating a long, dramatic "Earth-grazer."

At this time of year, nights are longer in the Southern Hemisphere, so even though the Eta Aquarid radiant straddles the celestial equator, it climbs higher in the sky before dawn for southern observers than it can for those in the Northern Hemisphere. Consequently, from far-southern vantage points the shower's hourly rates can be significantly higher. Indeed, this shower is usually the year's richest for observers south of the equator.

Don't expect a big, showy display: average rates tend to be about 20 per hour in the Northern Hemisphere and 40–50 per hour in the Southern Hemisphere. But studies suggest a secondary maximum may occur two to five days after the main peak, and the near-absence of moonlight makes 2003 an excellent year to check on this behavior.

Although these rates are a far cry from the spectacular Leonid displays of 1999, 2000, and 2001, think of the Eta Aquarids as interplanetary postcards from the most famous comet of them all, currently coasting out near the orbit of Neptune.

Where to Look

Observers in the Northern and Southern Hemispheres can use our interactive sky chart to see the appearance of the sky at 4:00 a.m. during the peak morning of the Eta Aquarids. The northern chart is set at 40° north latitude for central North America; the southern is at 35° south for eastern Australia. On the chart, the meteor shower name and symbol is visible in both windows. Click on the "change" button to alter either the date and time or viewing location displayed by the chart. Generally, there will be more meteors than usual visible for a few days on either side of the peak of a meteor shower.

This letter is being reprinted with permission by Dr. John Huntsberger. John lives in Austin, Texas, and vacations in Antonito, Colorado during the summer months. He is planning to become a member of RMAC.

Wednesday, 23 Apr 2003

Dear RMAC friends,

I went to my garage this morning at 11:15 a.m. and found that my Pelican Cases of eyepieces and photo equipment, along with my Denkmeier Binoviewer were stolen. The main door was closed but the side door was closed and unlocked.

I have no list of what was taken other than what I can remember. I heard two voices about 4:30 a.m. and thought it was my renter and friend, who is a good friend, coming in. It was not. I suppose that's when the theft took place.

Eyepieces: Brandon 48mm, Pentax 40mm, TeleVue 31mm Type 5, Pentax 21mm, Pentax 14mm, Leica adapter and 32mm ocular, TeleVue 2" Barlow, Celestron 1.25" Barlow, Celestron 12.5mm Astrometric, Celestron 40mm, Celestron 35mm and at least two of my Moon filters.

In another Pelican case was a Leica R6 35mm camera body, Questar 1.25" adapter, Questar camera mount, Leica finder adapters, Questar counterweights, Questar direction booklet, and a Questar full-aperture Baader solar filter.

In another Pelican case was the Denkmeier Binocular Viewer with a pair of Celestron 30mm eyepieces, a pair of Celestron Axion 19mm eyepieces, and a pair of Edmund Optical 15mm eyepieces and the StarSweeper.

My three telescopes are still intact along with my 20 x 80 binoculars and Leica Trinovid spotting 'scope. Fortunately for me, they left the Celestron $99.00 aluminum case with my complete set of Brandon 1.25" eyepieces and the Celestron sale eyepieces there.

There may well have been more, but I can't remember now. The 'barn door' is now locked, but the horses are gone. I have called the police, but there is probably no hope of recovering any of it. Thanks for reading this.

Dr. John Huntsberger

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Ed. Note: If any RMAC member happens to see a large amount of equipment similar to what was stolen from John for sale through one of the Internet astromarts or eBay, please contact him immediately. Thank you for any help you be able to give.