Issue 2018-07

IO - July 2018

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EAS is a proud member of The Astronomical League

Next Meeting Thursday, July 19th – Two Topics:
Big Bear Solar Observatory by Randy Beiderwell and Annette Brieske
and 3D Printing of Telescope Parts by Robert Asumendi

At our July 19th meeting we will have two short topics instead of one long one:

Randy Beiderwell and Annette Brieske visited Big Bear Solar Observatory in southern California last month, and took lots of photos. Big Bear is one of the largest solar observatories in the world, with a 1.6-meter unobstructed aperture. It's in the middle of a lake at 6742 feet of elevation to minimize air turbulence, and has adaptive optics to knock down what little is left. It's a fabulous telescope, and Randy and Annette will tell us what it's like on the inside.

Robert Asumendi is building a somewhat more modest telescope, but you won't think so when you learn how he's doing it: by printing many of the parts on a 3D printer. Robert has already printed several prototypes and is zeroing in on the final design. He'll tell us what he has learned about 3D fabrication and what modern computerized design and printing might be able to do for all of us.

As always, our meetings start at 7:00 sharp in the Eugene Science Center planetarium. Come early to visit with other club members and to get a seat.

Big Thanks to Andy Edelen and Cheryl Ernst

Andy and Cheryl took over the assembly and publication of the *Io* when Jerry Oltion couldn't do it anymore. They gave it a new look and kept it going for two years while Jerry recharged. Jerry is now ready to take it on again, and offers a huge "Thank you!" to Andy and Cheryl for keeping it going when he couldn't.

Next First Quarter Friday: July 20th

Our June 15th star party went reasonably well, considering the sky was mostly cloudy. There were enough sucker holes to keep the dozen or so guests looking at double stars and clusters and the Moon and planets, so we considered it a success. Better than previous months, anyway.

First Quarter Fridays are laid-back opportunities to do some observing and promote astronomy at the same time. Mark your calendar and bring your scope to the College Hill Reservoir (24th and Lawrence in Eugene) and share the view with whoever shows up. Here's the schedule for the rest of 2018. Star parties start at dusk or 6:00, whichever is later. (About 9:00 this month.)

July 20 (64% lit)	August 17 (48% lit)	September 14 (32% lit)
October 12 (17% lit)	November 9 (6% lit)	December 14 (46% lit)

June 21st Meeting Report

Astronomical Distance Measurement by Jerry Oltion

At our June 21st meeting, Jerry Oltion gave a talk on how we measure astronomical distances. We can't run a tape measure to the Moon or planets or distant stars, so how do we measure their distances? With geometry. Starting with distances we know, like the distance from Aswan to Alexandria, ancient Greek astronomers were able to measure the angle of shadows cast on the solstices and determine the circumference of the Earth with reasonably good accuracy. During an eclipse of the Moon they could measure the Moon's motion through Earth's shadow and derive the size and distance to the Moon. Using the Moon's distance and more geometry they could calculate the distance to the Sun and planets, and using the Earth's distance from the Sun as a baseline more modern astronomers could calculate the distance to the nearest stars.

Variable stars give us a "standard candle" that we can use when geometry becomes too imprecise, and supernovae give us a brighter standard candle when variable stars become too dim. After supernovae we use the redshift of galaxies as space itself expands between them. In this manner we build a "cosmic distance ladder" in which each rung builds on the previous ones until we have tools that let us measure distances all the way to the edge of the known universe. Of course each rung of the ladder is only as strong as the rungs below it, and we're constantly refining those methods, so distance measurement is an ongoing, evolving science.

We have a new tool that only recently became available: gravitational waves. With those, we're able to measure distances to colliding black holes pretty much anywhere in the universe. Astronomers are hopeful that this new method will help us refine our previous methods and strengthen the entire ladder.

More Star Parties This Month

In addition to our regular First Quarter Friday on July 20th, we have two more star parties in July: the Dorris Ranch star party on Friday the 13th and the Camp Wilani star party on Wednesday the 25th. Both are fun star parties that we're happy to do again this year.

The Dorris Ranch star party is held in an open field to the east of the main buildings. Google Maps calls it 2nd Street, but it's just a gravel road leading out of the forest into a wide clearing. It's smooth enough for any car and it lets us set up right beside our vehicles so we don't have to carry our gear anywhere. We typically get 25-50 people over the course of the evening, so it's a laid-back and friendly atmosphere. The sky is reasonably good for a site between Eugene and Springfield. We won't be showing off any 10th-magnitude galaxies, but it's great for planets and star clusters and even the bright nebulae in Sagittarius.

The Camp Wilani star party is southwest of Veneta, so the sky is considerably darker there. Galaxies are definitely on the menu here. This is a camp for teenage kids, and they come full of curiosity and enthusiasm and questions. They typically come in small groups for 20 minutes or so each, so thegroups are quite manageable and we're never at a loss for something to show them.

Directions to each of these events will be posted on our email list a few days beforehand. Consider bringing your scope to one or both of these star parties. You'll have a good time there, and you'll be helping spread the joy to people who don't normally attend our monthly star parties at the College Hill Reservoir.

Also see p.4 for our new SUN-day solar viewing star parties, and p.5 for information about our annual dark sky star party at Dexter State Park, held this year on August 4th.

8" FrankenDob Added to Lending Library

Two years ago the EAS was given an old 8-inch Parks telescope that had a few "issues." The secondary had come unglued from its mount and had fallen on the primary, shattering the secondary into three pieces and chipping the primary. The scope had been stored in a closet near the coast for several years, and the salt air had eaten away the coating on the primary. A Ronchi test showed that the primary's figure was badly under-parabolized as well. Despite all that, the primary was salvageable. Jerry Oltion stripped what was left of the coating and re-figured its parabola, then sent it off to Majestic Coatings in New Jersey for aluminizing.

The freshly coated mirror sat in storage for about a year before Jerry found the time to refurbish the rest of the scope, but he finally got to it this summer. The refigured mirror focused two inches too short for the tube, so he cut down the tube to fit. The old focuser was junk, so he built a new Crayford focuser. The club had a spare 9 x 50 finder, so he mounted that on the tube and made a peep-sight finder-finder to help aim it. And a friend out in Waldport was about to throw away an 8" Orion Dobsonian base, so Jerry rescued that and modified it to fit the Parks tube (which was wider than the Orion tube and wouldn't fit into the base without separating the sides a quarter inch).

A new secondary mirror from Scopestuff completed the package. When Jerry turned the scope on the stars for its first light, he was pleasantly surprised at the quality of the optics. Stars came to pinpoint focus, and he was able to split a 0.8 arcsecond double with it, which is close to the theoretical resolution limit for an 8-inch scope.

Jerry named the scope "FrankenDob" to commemorate all the various sources of parts and the rejuvenated mirror. He brought it to our June 21st meeting to present it to the club, and it was immediately checked out for its first loan to Lori Bosteder, one of our newer club members. Lori and her friend Junia Clark plan to do a lot of observing through it this summer.

Our telescope lending library holds several more scopes, one of which might be just right for you. Check them out at *www.eugeneastro.org*

Lori Bosteder and Junia Clark with FrankenDob, which Lori is borrowing for the summer.

Thank You Storage Junction

Storage Junction has donated the use of a storage unit for us to hold our loaner telescopes when they're not in use. EAS would like to thank Storage Junction for their generosity and support for our group. Please give them a call if you need a storage space, and tell your friends. Storage Junction is located at 93257 Prairie Road (at the intersection of Hwy 99 and Hwy 36, 3 miles south of Junction City) Phone: 541-998-5177

Solar Viewing on SUN-days

Dan Beacham just got a new H-alpha solar scope, and his cup runneth over with enthusiasm to share the incredible view of solar prominences, filaments, and granulation with everyone. He has stirred the enthusiasm of our club's other H-alpha telescope owners, as well as those of us who have white-light solar filters for our scopes. Accordingly, Dan has organized SUN-day solar viewing days in Alton Baker Park, where club members will set up their solar scopes and offer a look at our nearest star to the general public.

These SUN-days will hopefully become a regular thing. They're not intended to be major events; just fun get-togethers of club members interested in doing a little public outreach. We expect there to be some Sundays when nobody can make it, and others when we have quite a crowd. We just want people — club members and the general public — to get into the habit of heading to Alton Baker Park on Sundays if they can for a look at the Sun.

Where will we meet? Next to the Sun, of course! There's a scale model solar system along the bike/walking path, and the Sun is a five-foot yellow ball just to the south of the duck pond. That seems like a perfect place to meet.

And the time? High noon, of course, when the Sun is at its peak. Daylight savings time actually puts the peak at1:00, which is perfect since we'll likely be there from noon until 2:00 or so.

Our first Solar SUN-day will be held on July 15th. Let's kick this one off in style with lots of scopes. If you're set up for solar viewing, or just want to have a look and join the party, come to the park on the 15th and let's have some fun in the sun.

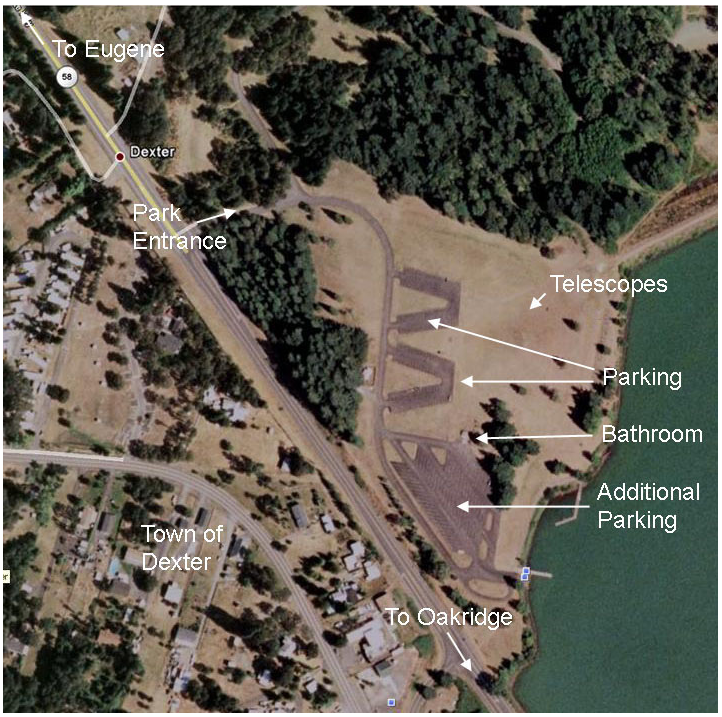
Dark-Sky Star Party at Dexter State Park August 4th

Our tenth annual Dark Sky Star Party (yes, we've been doing this for a decade!) sponsored by the State Park Service with scopes and expertise provided by the Eugene Astronomical Society, will be held on Saturday, August 4th at Dexter State Park, about 15 miles southeast of Eugene on Highway 58. The site is right at the lower end of Dexter Reservoir, and just across the highway from the town of Dexter itself. It has wonderful wide-open views in all directions, and sky dark enough to reveal the Milky Way.

On page 6 is a flyer that you can — and should! — print out and photocopy and post at work and wherever else you can think of that's appropriate. Always ask permission before posting flyers, but do get out there and post them. The farther we spread the word, the more people will come to the party, and the more people who will understand the value of dark sky.

The party will start at dusk, which should be around 9:00. Get there early to set up and learn where everything is. We'll be setting up in the grass to the east of the first parking lot.

To get there, head up Hwy 58 from Goshen. Just as you approach the town of Dexter, you'll see signs for Dexter State Park on the left (north). Park in the first parking lot you come to and set up in the grass toward the reservoir from there. Note that the closer you set up to the parking lot, the more you risk being in the glare of yard lights across the highway in the town of Dexter.



We'll be giving away two telescopes this year, so interest should be high. We need volunteers to direct parking, run the information table, help put red filter material on flashlights, and so on. We'll coordinate things via the email list, and hopefully between us all we'll anticipate everything we need and have a smooth party.

The main thing is to have lots of club members there with telescopes! Bring yours, and help show people how beautiful the deep, dark sky can be. We have the park all night if we want it, so we can stay and observe on our own after the public has gone home.

Full Moon over Fern Ridge Reservoir. Photo copyright © 2018 by Alan Gillespie

Dark Sky Star Party

August 4, 2018

Dexter State Park

15 miles S.E. of Eugene on HWY 58

Come see the wonders of the night sky far from city lights

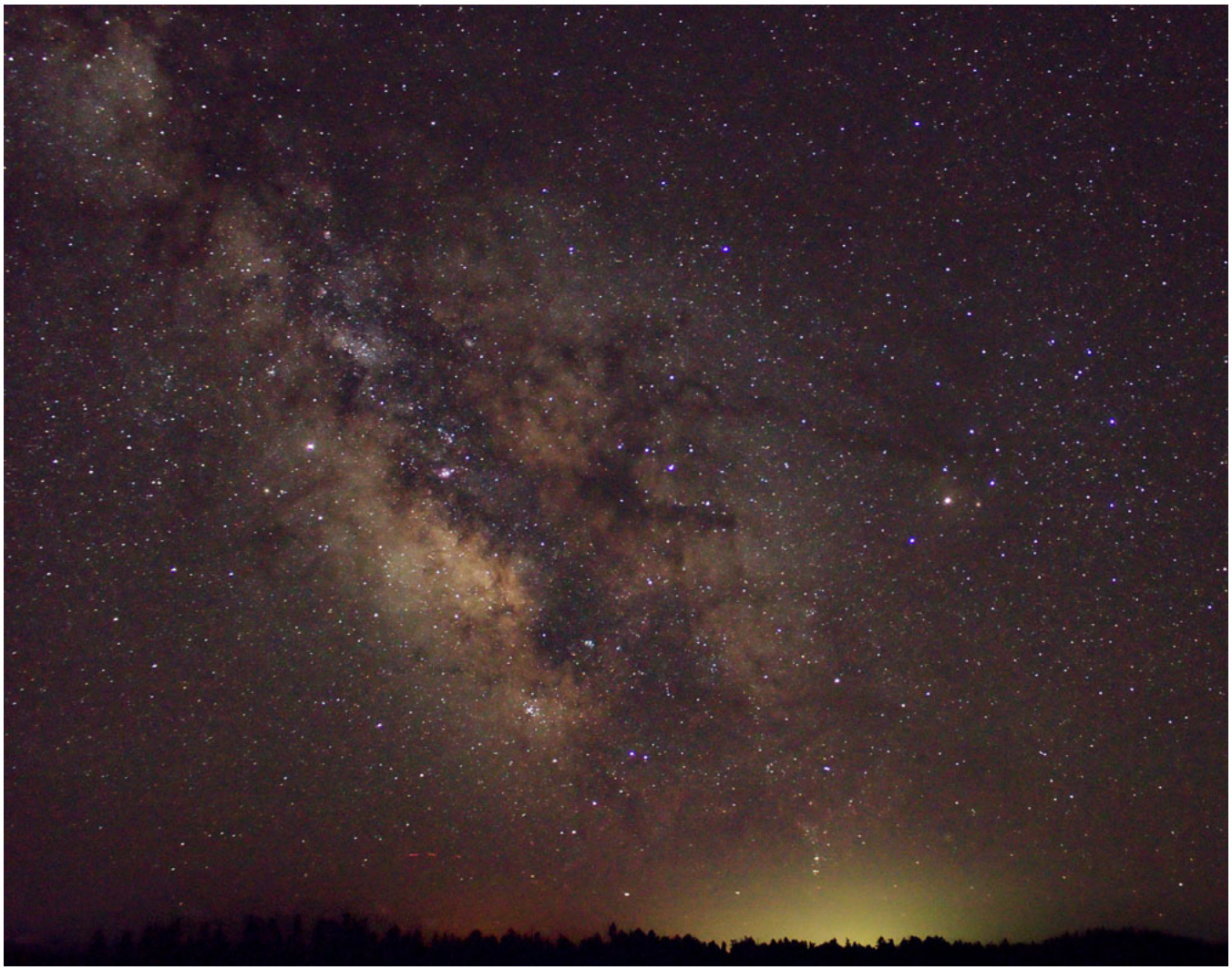
We bring the telescopes,
You bring curiosity and enthusiasm!

Free telescopes given to two lucky youngsters
(Ages 8-18, no purchase necessary, must be present to win).

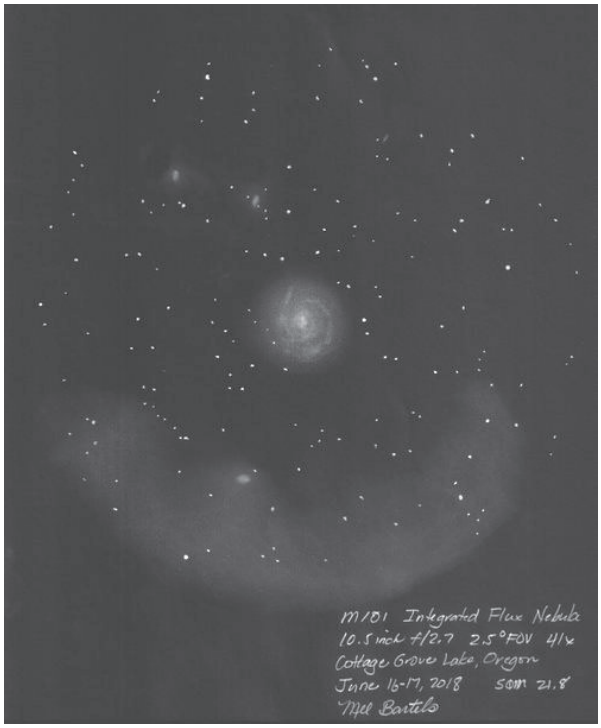
Starts at dusk (9:00) – Admission: FREE

Dress warmly. Please cover flashlights with red filter material to preserve night vision. We will have filters on hand if you need one.

Sponsored by Oregon State Parks and the Eugene Astronomical Society
For more information, visit www.eugeneastro.org

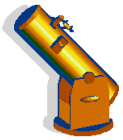


Above: The Milky Way from Eureka Ridge with Roseberg skyglow. Photo copyright © 2018 by Alan Gillespie
Below: Intergalactic Flux Nebula near M101. Sketch copyright © 2018 by Mel Bartels



Observing Items of Interest, continued from p.8

7/22 Io shadow transit 10:27 PM – 00:36 AM.
7/25 **Camp Wilani star party.** Jupiter's moons make double-double. Red Spot transits 10:50 PM.
7/26 Jupiter's moons cluster again.
7/27 Mars at opposition.
7/27-29 Mag 8.7 star masquerades as 5th Jupiter moon.
7/29 Europa shadow transit 10:23 PM – 00:39 AM.
7/30 **Mars closest to Earth.** Jupiter's Red Spot transits 10:00 PM.
7/31 Io shadow transit 6:50 – 9:00.
8/1 Red Spot transits 11:39 PM.
8/4 **Dexter Dark-Sky star party.** Red Spot transits 9:10. Callisto passes below Jupiter's south pole.



Observing in July

Last Q New 1st Q Full

July 6, 12:51 AM	July 12, 7:48 PM	July 19, 12:52 PM	July 27, 1:20 PM
Mercury Set: 10:22 PM	Mercury Set: 1:10 PM	Mercury Set: 9:47 PM	Mercury Set: 9:09 PM
Venus Set: 11:09 PM	Venus Set: 11:00 PM	Venus Set: 10:48 PM	Venus Set: 10:32 PM
Mars Rise: 10:37 PM	Mars Rise: 10:13 PM	Mars Rise: 9:43 PM	Mars Rise: 9:07 PM
Jupiter Set: 2:04 AM	Jupiter Set: 1:41 AM	Jupiter Set: 1:13 AM	Jupiter Set: 00:42 AM
Saturn Set: 5:06 AM	Saturn Set: 4:41 AM	Saturn Set: 4:11 AM	Saturn Set: 3:38 AM
Uranus Rise: 1:26 AM	Uranus Rise: 1:03 AM	Uranus Rise: 00:36 AM	Uranus Rise: 00:05 AM
Neptune Rise: 11:44 PM	Neptune Rise: 11:21 PM	Neptune Rise: 10:53 PM	Neptune Rise: 10:21 PM
Pluto Rise: 9:06 PM	Pluto Set: 5:50 AM	Pluto Set: 5:22 AM	Pluto Set: 4:49 AM

All times Pacific Daylight Time (March 11 - Nov. 3, 2018 = UT -7 hours) or Pacific Standard Time (November 4, 2018 - March 9, 2019 =UT -8 hours)

Date	Moon Rise	Moon Set	Twilight Begin	Sun Rise	Sun Set	Twilight End
7/1/2018	23:21	08:46	03:10	05:33	20:59	23:22
7/2/2018	23:51	09:45	03:11	05:34	20:59	23:22
7/3/2018		10:45	03:12	05:35	20:59	23:21
7/4/2018	00:19	11:46	03:13	05:35	20:58	23:20
7/5/2018	00:46	12:48	03:14	05:36	20:58	23:19
7/6/2018	01:12	13:53	03:15	05:36	20:58	23:18
7/7/2018	01:40	14:59	03:17	05:37	20:57	23:17
7/8/2018	02:10	16:08	03:18	05:38	20:57	23:16
7/9/2018	02:45	17:20	03:19	05:39	20:56	23:15
7/10/2018	03:26	18:31	03:21	05:39	20:56	23:14
7/11/2018	04:16	19:40	03:22	05:40	20:55	23:12
7/12/2018	05:15	20:43	03:24	05:41	20:55	23:11
7/13/2018	06:23	21:37	03:25	05:42	20:54	23:10
7/14/2018	07:37	22:23	03:27	05:43	20:54	23:08
7/15/2018	08:52	23:01	03:29	05:44	20:53	23:07
7/16/2018	10:07	23:35	03:30	05:44	20:52	23:06
7/17/2018	11:19		03:32	05:45	20:51	23:04
7/18/2018	12:28	00:05	03:34	05:46	20:51	23:02
7/19/2018	13:34	00:34	03:35	05:47	20:50	23:01
7/20/2018	14:39	01:02	03:37	05:48	20:49	22:59
7/21/2018	15:42	01:32	03:39	05:49	20:48	22:57
7/22/2018	16:42	02:03	03:41	05:50	20:47	22:56
7/23/2018	17:40	02:38	03:42	05:51	20:46	22:54
7/24/2018	18:35	03:18	03:44	05:52	20:45	22:52
7/25/2018	19:24	04:02	03:46	05:53	20:44	22:50
7/26/2018	20:09	04:51	03:48	05:54	20:43	22:49
7/27/2018	20:49	05:44	03:50	05:55	20:42	22:47
7/28/2018	21:23	06:40	03:52	05:56	20:41	22:45
7/29/2018	21:55	07:38	03:53	05:57	20:40	22:43
7/30/2018	22:23	08:38	03:55	05:58	20:39	22:41
7/31/2018	22:50	09:39	03:57	06:00	20:37	22:39

All times are for Eugene, Oregon Latitude 44º 3' Longitude 123º 06'

Items of Interest This Month

Best month for observing Pluto.
7/4 Saturn occults 10th magnitude star.
7/6 Red Spot transits 10:06 PM.
7/8 Red Spot transits 11:44 PM.
7/9 Venus within 1° of Regulus. Good chance to see a planet and a star by day.
7/9 Ganymede transits polar region 9:13 – 11:01 PM. Ganymede shadow transit 1:57 – 3:40 AM.
7/10 Callisto crosses beneath Jupiter's S. pole.
7/12 Mercury at greatest eastern elongation (26° from Sun but only 12° above horizon at sunset).
7/13 **Dorris Ranch star party.** Red Spot transits 10:53 PM.
7/14 Mercury 3° below and to right of Moon at sunset (very tiny crescent Moon).
7/15 Moon within 1° of Venus at sunset. Io shadow transit 8:32 – 10:42 PM.
7/18 Io, Europa, Ganymede form diagonal line ~9:00 – 10:00. Red Spot transits 10:02 PM.
7/19 Jupiter's moons all pile up together.
7/20 **First Quarter Friday star party.** Red Spot transits 11:41 PM.

(Continued at bottom of previous page...)