

TRI CITIES ASTRONOMY CLUB

ASTRONOMICAL CALENDAR, HIGHLIGHTS & CHALLENGES

**2016 SKIES
FOR
TRI CITIES, WASHINGTON**

**W119.280°, N46.280°
W 119° 16' 48", N 46° 16' 48"
(Richland, WA)**

Tom Page

Tri Cities Astronomy Club
<http://www.tricityastronomyclub.org/>

Number 28

January 2016

JANUARY

- ▶ Last Quarter Sat 2nd 3:31
- New Moon 9th 17:30
- ◐ First Quarter Sat 16th 17:26
- Full (Wolf) Moon 23rd 17:46

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- Mercury:** Mercury well positioned in the evening sky for mid-northern latitudes from the 1st to the 9th
- Venus:** is a brilliant object in the morning sky. In close conjunction with Saturn on the 9th
- Mars:** rises about 2:00 am
- Jupiter:** rises in east Leo late in in the evening.
- Saturn:** is in the Ophiuchus in the dawn sky and remains there all year. The North side of Saturn's rings are visible all year in 2016. Their tilt relative to the Earth remains in plus or minus of 26° all year. A good time to see the rings.
- Uranus:** is in the western evening sky in Pices. It sets in late evening.
- Neptune:** is in low western evening sky Aquarius.
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2 Sat Earth at perihelion closest to the Sun 147,199,181KM (91,403,815 miles)

5 Tue Tue the Dark Days of Winter End!

28 Tue 30 years ago Challenger exploded killing the crew.

FEBRUARY

- New Moon Mon 8th 6:49
- ☾ First Quarter Mon 15th 0:46
- Full (Lover's) Moon Mon 13:20

Mercury: at greatest elongation at 25.6° W of the Sun.

Venus: continues to be a brilliant object in the dawn sky. Venus – Crescent Moon – Mercury are in a 5° group very low at dawn on the 6th.

Mars rises about 01:00 AM

Jupiter rises in the early in the eastern evening sky. Approaching opposition on March 8th.

Saturn rises in the AM and is best viewed in at dawn

Uranus is low in western evening sky

Neptune vanishes early in the month in the evening twilight. in conjunction with the Sun on the 28th

2 Tue Candelmas. Celebrates the 40th day of Christmas and the presentation of the child Jesus. Now celebrated as Groundhog Day. First quarter-cross days, half way between the winter solstice and spring equinox.

6 Sat Alan shepherd played golf on the Moon during Apollo 14 mission, 45 years ago.

9 Tue Halley's Comet reached perihelion 30 years ago

27 Sat **Old crescent Moon 23 hours before new Moon in the W.**
A challenge just before sunrise Challenge 1

February is a good time to take a few minutes to look at Orion. Betelgeuse, Sirius, and Procyon form an equilateral Winter Triangle. Almost any optical aid will reveal M42 in Orion's sward.

MARCH

- ▶ Last Quarter Tue 1st 15:11
- New Moon Tue 8th 17:55
- ◐ First Quarter Tues 15th 10:03
- Full (Worm) Moon Wed 23rd 5:01
- ◑ First Quarter Thu 31st 8:17

Mercury	is hidden in the Sun's glare all month
Venus	visible low at dawn all month
Mars:	rises around midnight all month.
Jupiter	is visible dusk to dawn and highest near midnight. It is opposition on the 8 th in Leo with a mag.-2.5, 36 light minutes from Earth and 44" in equatorial diameter, Best with optics.
Saturn	rises in the AM, highest before dawn
Uranus	vanishes in the evening twilight at mid month
Neptune	difficult to see

9 Wed **Young Crescent Moon 25 hours after new in the W Challenge 2**

13 Sun **Daylight Savings Time** begins on the second Sunday in March, though no time is saved. Move your clocks ahead one hour. Officially, there is no clock-hour 2 AM to 3AM. From now on to the first Sunday in November it is as if you were displaced one time zone to the east.

Jupiter with only Callisto is visible in all of N America (2:47 AM) except for far E

15 Tue **Ides of March.** The buzzards (turkey vultures) return to Hinckley, OH. The resulting celebration has been going on for over 60 years.

20 Fri **Spring (Vernal) Equinox** Spring arrives in Tri Cities at 12:30 AM when the Sun crosses the equator into the northern hemisphere. The Sun rises due E and sets due W. The equinox marks mid-spring in some alternative calendars.

22 Tue Two shadows on Jupiter visible in all of North America 0:32

28 Mon Two shadows on Jupiter rising after 3:00

APRIL

- New Moon Thu 7th 1:24
- ◐ First Quarter Wed 13th 20:59
- Full (Pink) Moon Fri 22nd 23:24
- ◑ Last Quarter Fri 29th 23:29

Mercury:	visible at dawn through the 27th
Venus:	visible at dawn until the 9th
Mars:	rises late in the pm and is visible through dawn
Jupiter	high at dusk and sets before dawn
Saturn	rises near midnight and is highest before dawn
Uranus	in conjunction with the Sun on the 9 th reappears by mid May for northern observers
Neptune	Not well positioned for us

22 Fri **Lyrid Meteor** shower peaks. The shower is active from Apr 16 to 25, with a narrow peak. ZHR is variable usually around 15 to 20, but outbursts of up to 250/hour occur at times for a few minutes. The radiant is on the Lyra-Hercules border below and to the right of Vega and is in useful view by 10:00 PM and overhead by 4:00AM. This year, the Full Moon overcomes most of the meteors. Lyrids are medium swift meteors (49 km/s) occasionally bright with about 20-25% leaving persistent trains. Derived from Comet C/1861 G1 Thatcher, having been seen only in 1861, due to its period of 415 yr. This shower has the longest history with beginning with a Chinese chronicle of 687 BC. (Unassisted eye)

MAY

- New Moon Fri 6th 12:29
- ☾ First Quarter Fri 13th 10:02
- Full (Flower) Moon 21st 11:14

Mercury: **Transit of Mercury visible in all of North America. Challenge 3**

Venus: hidden in the Sun's glare all month

Mars is at opposition on the 22nd in Scorpius rising near sunset and visible night. Mars is closest to Earth on the 30th, 4.2 light minutes from Earth at Mag.-2.1 with a 19" disk and 21° S of the celestial equator.

Jupiter: is high at dusk and sets early in the AM

Saturn: rises in the late PM and is highest in the PM

Uranus: Not easily observed

Neptune: In the eastern morning sky in Aquarius

1 Sun **May Day or Beltane**, the 2nd cross-quarter day of the year, half way between the equinox and the solstice. May Day is celebrated in Spokane by people stripping to their running gear and racing through the streets (Blooms Day).

6 Wed Eta Aquarids Meteors. Active Apr 19 to May 28. ZHR is 60 varying between ~40 to 85. Very fast (66 km/s) bright meteors, frequently leaving persistent trains (40%-60%). This shower is the dust from Comet 1P Halley. The radiant, the "Y"-shaped water jar asterism of Aquarius, does not rise to a useful altitude in the E until about 3:30 am coincident with astronomical twilight. The year, the New Moon is ideal for observing.

9 Mon **Transit of Mercury visible in all of North America. PTD Transit begins before Sunrise. It appears at 7:58AM at Transit Midpoint. Transit ends at 11:42 AM. Challenge 3**

Mercury will transit the Sun for the first time since 2006. Transits are relatively rare occurrences. Looking from earth the only transits that are possible are of Mercury and Venus are possible. There are 13 or 14 transits of mercury each century. In comparison, transits of Venus occur in pairs with more than a century separating each pair. Mercury is only 1/158 of the Sun's apparent diameter and Mercury's apparent diameter is 10" to 13". A telescope with 50X to 100X is recommended.

IF YOU INTEND TO OBSERVE THIS EVENT, YOUR TELESCOPE MUST BE SUITABLY EQUIPTED WITH AN ADEQUATE FILTERS TO ENSURE SAFE SOLAR VIEWING.

JUNE

- New Moon Sat 4th 20:00
- First Quarter Sun 12th 1:00
- Full (Strawberry) Moon Mon 20th 4:02
- ▶ Last Quarter Mon 27th 11:19

Mercury:	well positioned in morning sky from the 1 st to the 30 th . In close conjunction with the Moon on the 3 rd
Venus:	too close to the Sun to be observed, at superior conjunction on the 6 th .
Mars:	visible most of the night
Jupiter:	is high at dusk and sets in the early morning
Saturn:	rises in the late evening and is highest at dawn
Uranus:	rises near midnight in Pisces. Retrograde motion begins on the 30 th
Neptune:	rises in late evening and retrograding in Aquarius

Sun 11 Jupiter visible in daylight on the 11th, 4° to right of Moon.
Challenge 4 just before Sunset.

Mon 20 Summer Solstice arrives on the longest day of the year, 15 hr 48 m of daylight in Tri Cities. Summer begins when the Sun reaches its farthest point N of the equator.

Earliest sunrise occurs in the Tri Cities at 05:05 PDT.

Latest Sun set occurs in the Tri Cities at 8:53 PM PDT in the Tri Cities.

JULY

- New Moon Mon 4th 4:01
- ☾ First Quarter Mon 11th 17:52
- Full (Thunder) Moon Tue 19th 15:57
- ☾ Last Quarter Tue 26th 16:00

Mercury: Very well placed evening twilight from the 15th to the 31st
Venus: reappears from behind the Sun in midmonth shining brightly low in sky
Mars: spends all month in Libra, setting after midnight
Jupiter low in the twilight and sets in the W near midnight
Saturn: in the S at dusk and sets in the WSW near 3 AM
Uranus: rises near midnight in Pisces.
Neptune: rises in late evening retrograding in Aquarius

Mid point of the year occurs at 1:00 PM PDT or (12:00 pm) 12:00 pm PST

**Sun July 10 Spot Arcturus can be seen unaided before Sunset this week.
Challenge 5**

AUGUST

- New Moon Tue 2nd 13:45
- ☾ First Quarter Wed 10th 11:21
- Full (Sturgeon) Moon 18th 2:57
- ☽ Last Quarter Wed 24th 20:41

Mercury:	well placed in the evening twilight all month.
Venus:	shines brightly after Sunset in the western sky
Mars:	in the SSW after dark. Sets in WSW near 1 AM
Jupiter:	very low in the W soon after sunset
Saturn:	very low in the evening twilight. Sets in the WSW near 1 AM
Uranus:	rises late in the evening and is visible the rest of the night
Neptune:	rises in mid evening

Sun 1 Lammas the 3rd quarter cross-day of the year, half way between the Summer Solstice and the Autumnal Equinox. Lammas is the only quarter cross day that is not celebrated.

Fri 1 Perseid Meteors. In August 2016 there may be higher meteor rates than normal. The First Quarter Moon occurred on Wed the 10th. The radiant, a few degrees NE of double star cluster in Perseus reaches useable elevation after 10:00 PM. The best shower of the year. The Perseids are:

- Active from July 17 to August 24.
- Peak variable: ZHR 100.
- Swift atmospheric velocity 60 km/sec (~37 miles/sec) because the meteors are head on to earth's orbit.
- Beginning height 110-160 km.
- Average magnitude 2.27. Brighter meteors often end in flares or bursts.
- Some are fire balls, about 1/3 leave trains up to 2 degrees wide, lasting to 100 sec.
- Typically yellow, fewer white, brighter ones are green, orange, or red.
- Derived from comet Swift-Tuttle, period now receding.
- Historical record dates from 36 AD in China and 714 AD in Europe.

Middle of the best time to observe our night sky.

**Wed 31 Old crescent Moon 20 hrs before new in the W just before sunrise
Challenge 6**

SEPTEMBER

- New Moon Thu 1st 2:05
- ☾ First Quarter Fri 2th 17:16
- Full (Harvest) Moon Fri 16th 15:05
- ☽ Last Quarter Fri 23rd 2:56

Mercury:	moves into the morning sky from the 20 th to the 30 th reaching greatest elongation W 18° 28 th . Best morning apparition of the year for the northern latitudes.
Venus:	continues to shine brightly in W sky after sunset.
Mars:	spends in Ophiuchus moving to Sagittarius on the 22 nd setting in mid evening
Jupiter:	vanishes in the evening twilight sky and is conjunction with the Sun on the 26 th
Saturn:	Low in SW mid evening setting late in the evening.
Uranus:	rises in mid-evening and is nearing opposition.
Neptune:	Visible all night. At opposition on the 2 nd in Aquarius. At mag +7.8, 4.0 light hours from Earth, 2.4" in diameter and 8° S of the celestial equator.

Thu 1 Zodiacal light readily visible from a dark site in the E before morning twilight for the next two weeks. Zodiacal light is caused by Sunlight scattered space dust.

Thu 8 The television series Star Trek premiered 50 years ago

Thu 22 The Fall Equinox occurs on the 22nd from the Latin meaning equal night

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OCTOBER

- First Quarter Sun 9th 21:33
- Full (Hunter's) Moon Sun 16th 21:33
- ▶ Last Quarter Sat 22nd 12:14
- New Moon Sun 30th 10:38

Mercury:	visible at dawn through Oct 14 th
Venus:	continues to shine brightly in the western sky after sunset.
Mars:	low in the SSW after dark, sets in SW near 11 PM
Jupiter:	visible at dawn through Oct 14 th
Saturn:	very low in the SW after sunset, sets after dusk. In conjunction with Venus on the 30 th
Uranus:	at opposition on 15 th mag 5.7, 2.6 light hours from Earth, disk 3.7" and at declination +8.2
Neptune:	visible most of the night. Just past opposition.

Oct 21 Orionid meteors peak on this date. Shower is active from Oct 2nd to Nov 7th
ZHR 23 periodically variable ~15-30, can rise to 70. Very fast, 66 km/s.
Sometimes bright, 50%+ leave persistent trains. Radiant is in Orion's club.
The Moon is the last quarter and will interfere some with the shower.
Associated with Comet 1P/Halley.

Mon 31 Halloween, (eve of All Saints Day) the 4th quarter cross-day, half way between the autumnal equinox and the winter solstice.

Farthest lunar apogee of the year 406,659 KM (252,686 miles)

NOVEMBER

- ☾ First Quarter 7th 11:51
- Full (Beaver) Moon 14th 5:52
- ☾ Last Quarter 21st 0:33
- New Moon 29th 4:18

Mercury:	is well positioned in the evening twilight from the 13 th to 30 th
Venus:	is shining brightly in W sky after sunset
Mars:	in the SSW after dark sets in the WSW near 10 PM
Jupiter	low in the morning sky around 4 AM
Saturn:	lost in the twilight late this month
Uranus:	very well placed in the evening sky
Neptune	well placed in the early evening sky, setting at midnight

6 Sun Daylight Savings ends. Officially the hour 1 AM to 2 AM is repeated. As predicted, no time was saved.

17 Nov Leonid meteors. Active 6 to 23 Nov. ZHR 15? Extremely fast meteors, 71 km/s, come at us nearly head on, often bright, 50-70% leave persistent trains. The radiant, in Leo's head near the sickle, rises about 11 PM and is highest at 6:00AM. Associated with comet 55P/Temple-Tuttle. The Full Moon on the 14th will obscure most meteors.

Closest lunar perigee 356,511 KM (553,749 Miles)

DECEMBER

- ☾ First Quarter Wed 7th 1:03
- Full (Cold Long Nights) Thu 24th 16:06
- ☾ Last Quarter Tue 20th 17:56
- New Moon Thu 29th 3:53

Mercury	well placed in evening twilight up to the 23 rd
Venus:	bright high in the W sky after sunset
Mars:	visible in early evening and sets before 10PM
Jupiter:	rises in E near 2 AM high in the SSE near dawn
Saturn:	too close to the Sun to be visible this month. In conjunction with the Sun on the 10 th
Uranus:	Well placed in the evening sky, setting after midnight
Neptune:	in western evening sky, setting in late evening. The angle of the ecliptic favors our northern latitudes

Earliest sunset at 4:11 PM PST in the Tri Cities.

Winter Solstice.

Shortest day of the year. Winter arrives in the Tri Cities at 10:44; the Sun appearing to travel along the ecliptic reaches its farthest point south of the celestial equator. Tri Cities get 8 hr and 36 minutes of daylight. Sun rises at 7:37 AM and sets at 4:13 PM PST.

Thursday the 8th The Dark Days of Winter Begin

2016 Challenges

Feb Sat 27

Old crescent Moon 23 hours before new Moon in the W

Challenge 1

Mar 27 Sat Old crescent Moon 23 hours before new Moon in the W.

Challenge 2 just before sunrise

Mon May 9

Transit of Mercury visible in all of North America. Except for after Sun rise in the west for 61/2 hrs starting about 7:12. Mercury has an apparent diameter that ranges from ~10" to ~13" **Challenge 3**

Sun June 11th Jupiter visible daylight 4° to right of Moon.

Challenge 4 just before Sunset

Sun July 10 Spot Arcturus unaided before Sunset this week **Challenge 5**

Wed August 31 Old crescent Moon 20 hrs before new in the W just before sunrise

Challenge 6