

# **The Atlanta Astronomy Club**

## **Charlie Elliot Chapter**

### **Observing 101**

# Observing 101 - May

- Astro Events
- Featured Objects
- Target List
- Observing Techniques

# Astro Events

## Tonight:

- Sunset at 8:32 PM
- Venus sets at 10:57 PM
- Moon sets at 10:36 PM

# Astro Events

## Tonight:

- Mars transits at 7:31 PM
- Saturn transits at 9:59 PM
- Jupiter rises at 3:54 AM

# Astro Events

## This month's events ...

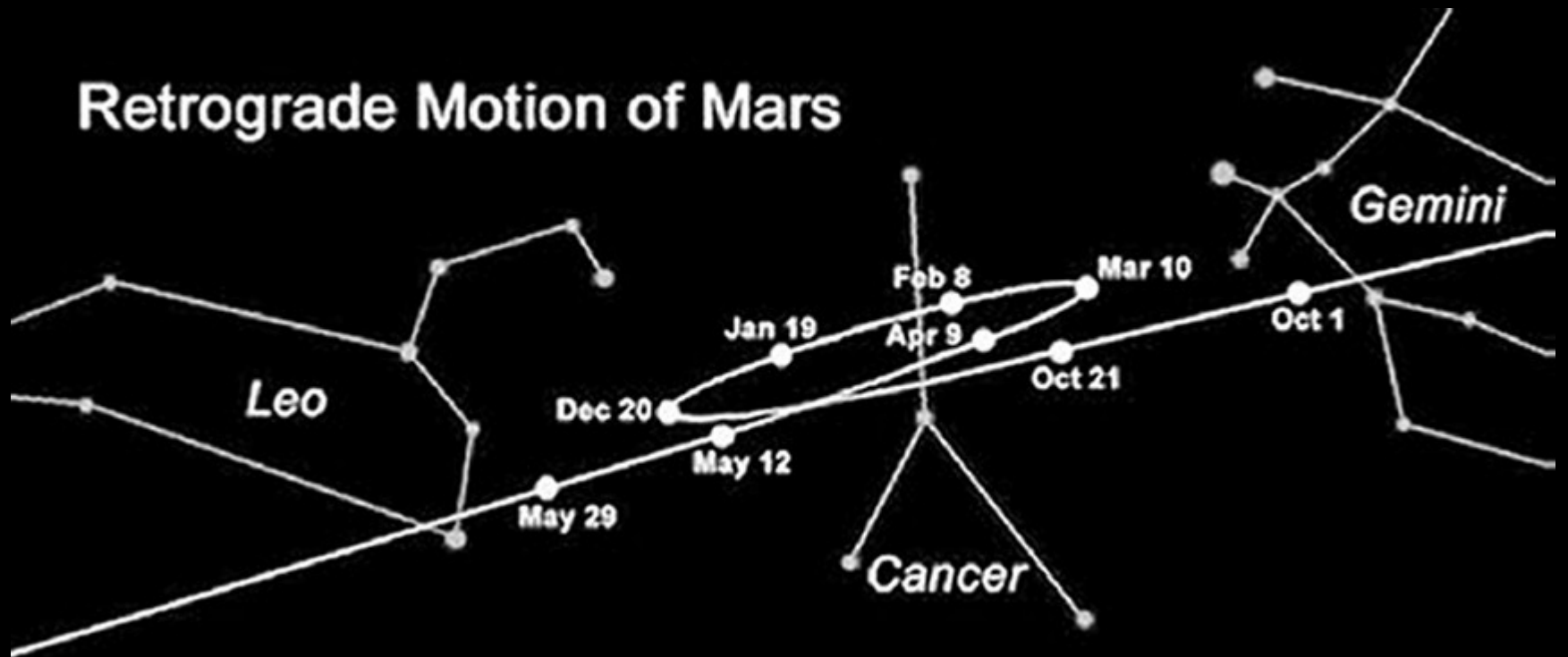
- Tonight & tomorrow - Crescent moon near Venus
- May 20 - 1st Qtr Moon
- May 27 - Full Moon

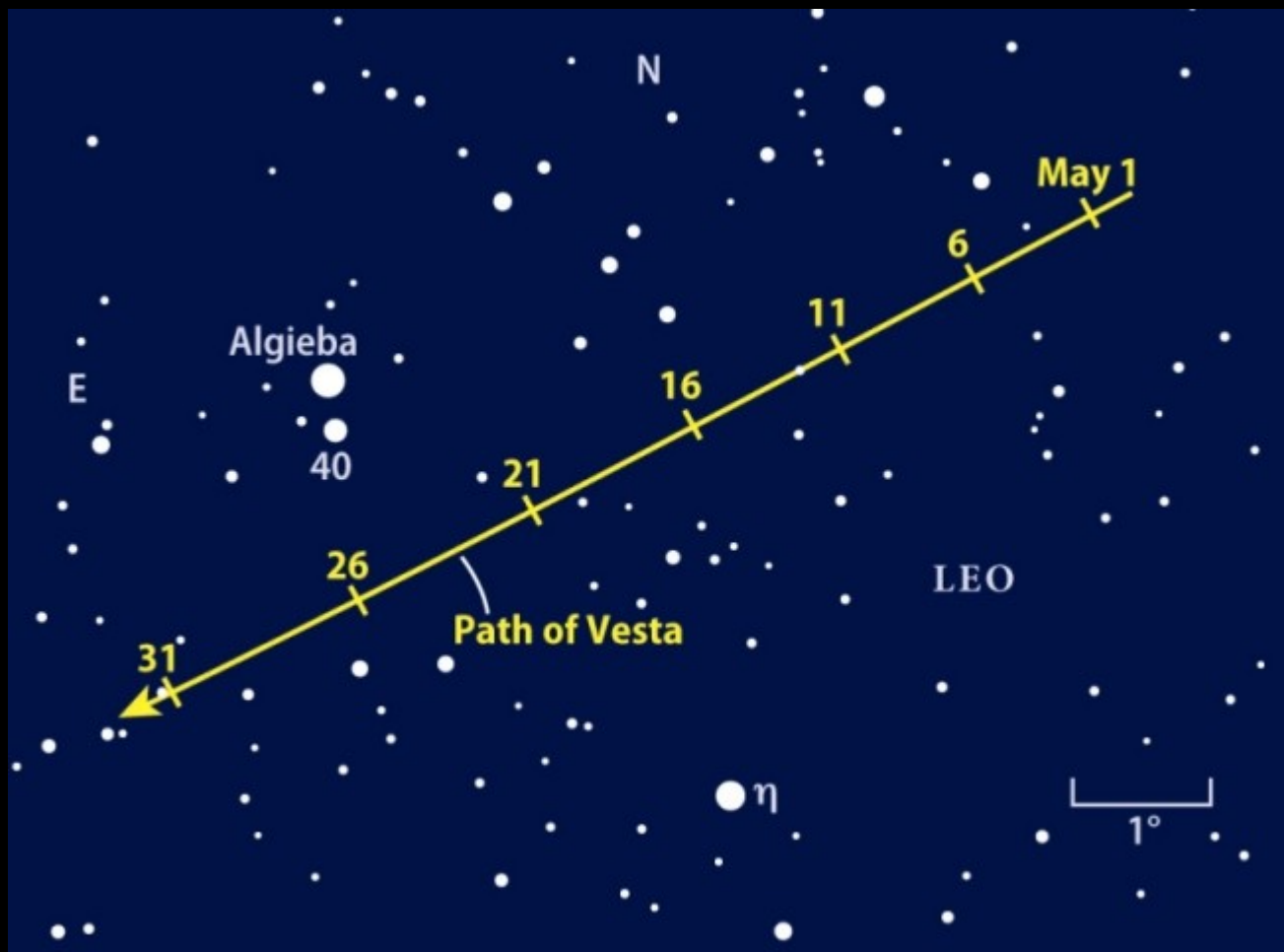
# Astro Events

## Next month's events ...

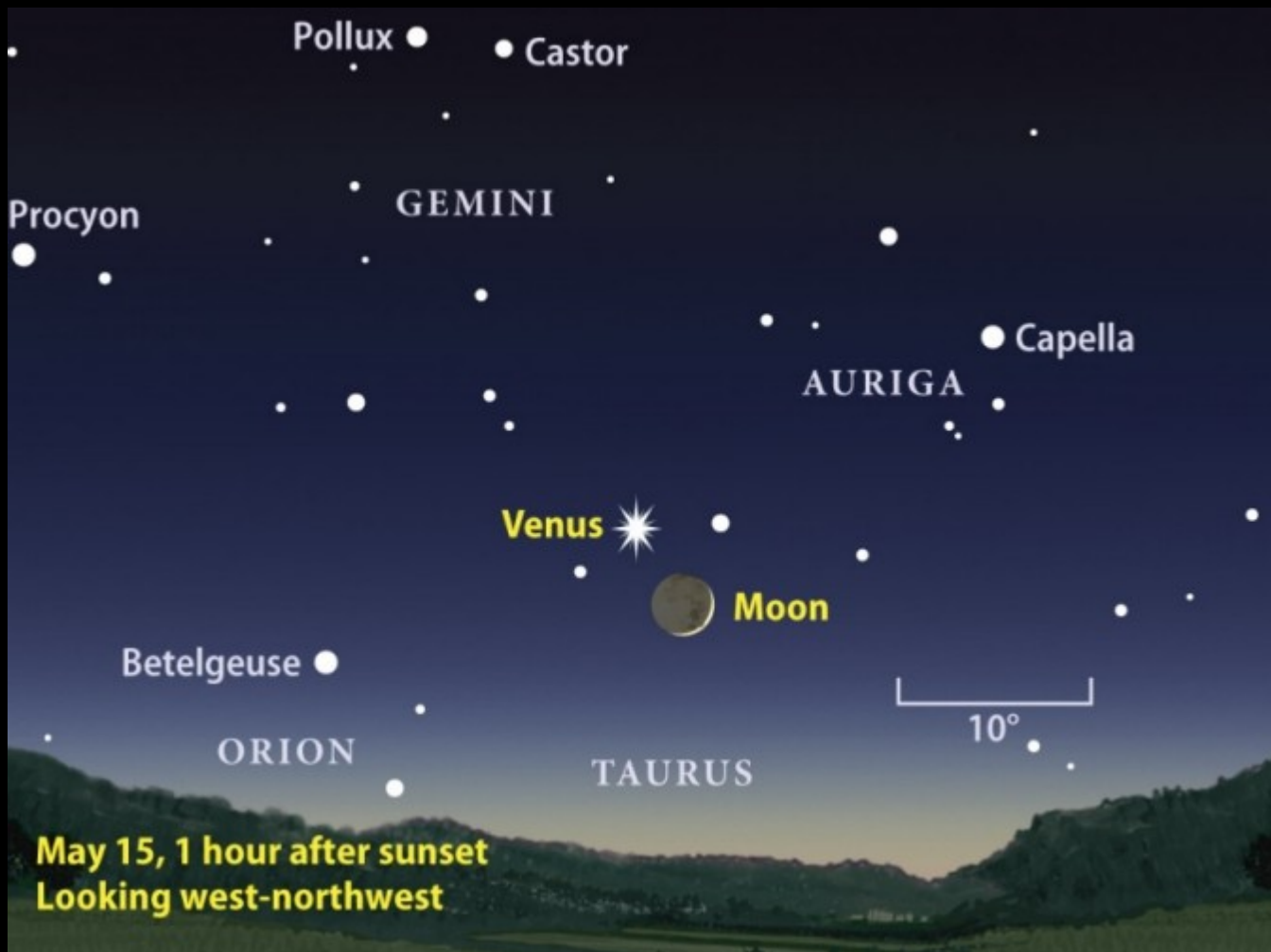
- June 4 - 3rd Qtr Moon
- June 6 - Mars near Regulus  
& Uranus near Jupiter
- June 12 - New Moon
- June 15 - Next CE Meeting

# Retrograde Motion of Mars









# Featured Objects

Saturn

Its Rings

The Moons

# Featured Object

## Saturn - The Gas Giant

- Orbital period - 29.46 years
- Satellites - 61 with secure orbits
- Equatorial radius - 60,268 km
- Volume - 763 Earths
- Mass - 95 Earths
- Mean density - .687 g/cc

# Featured Object

## Saturn - The Gas Giant

- Composed mostly of hydrogen
- Small core of rock and ice
- Thick layer of metallic hydrogen
- Wind speeds can reach 1,800 km/h
- Strong magnetic field

# Featured Object

## Saturn - The Ring World

- Magical ring disappearing trick!
- Galileo's "Ears"
- Hevelius' "Crescents"
- Huygens' rings
- Cassini's division
- Maxwell's particles

# Featured Object

## Saturn - The Moons

- Huygens' Titan
- Cassini's moons
- Herschel's moons

# Target List

## Saturn's Moons

Des	Name	Mag
S1	Mimas	12.1
S2	Enceladus	11.7
S3	Tethys	10.3
S4	Dione	10.4
S5	Rhea	9.7
S6	Titan	9.4
S7	Hyperion	14.2
S8	Iapetus	10.2 - 11.9

# Observing Techniques

## Filters for viewing Saturn

Clouds	#11	Yellow-Green	
	#12	Yellow	
	#25	Red	*
Belts	#15	Deep Yellow	*
	#21	Orange	
	#23A	Light Red	
	#58	Green	*
	#80A	Medium Blue	*
Cassini Division	#11	Yellow-Green	



# Web Links

- IAU Minor Planet Center  
[www.minorplanetcenter.org](http://www.minorplanetcenter.org)
- NASA - Equinox  
[saturn.jpl.nasa.gov/](http://saturn.jpl.nasa.gov/)
- NASA - JPL Solar System  
[www.jpl.nasa.gov/solar-system/](http://www.jpl.nasa.gov/solar-system/)
- Julius Benton's Saturn Book  
[www.springer.com](http://www.springer.com)
- Orion Filters  
[www.telescope.com](http://www.telescope.com)
- Lumicon Filters  
[www.lumicon.com](http://www.lumicon.com)

**Farewell!**

**Clear Skies!**



**The Atlanta  
Astronomy Club**

**Charlie Elliot  
Chapter**

**Observing 101**

## Observing 101 - May

- Astro Events
- Featured Objects
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Welcome to Observing 101 for May 2010

Astro events

Featured objects

Target list

Observing techniques

# Astro Events

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# Astro Events

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Mars transits at 7:31 PM

Saturn transits at 9:59 PM

Jupiter rises at 3:54 AM (for all you early birds out there)



# Astro Events

This month's events ...

- Tonight & tomorrow - Crescent moon near Venus
- May 20 - 1st Qtr Moon
- May 27 - Full Moon

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Some events for the next few weeks ...

Tonight & tomorrow - Crescent moon near Venus

May 20 - 1st Qtr Moon

May 27 - Full Moon

# Astro Events

## Next month's events ...

- June 4 - 3rd Qtr Moon
- June 6 - Mars near Regulus  
& Uranus near Jupiter
- June 12 - New Moon
- June 15 - Next CE Meeting

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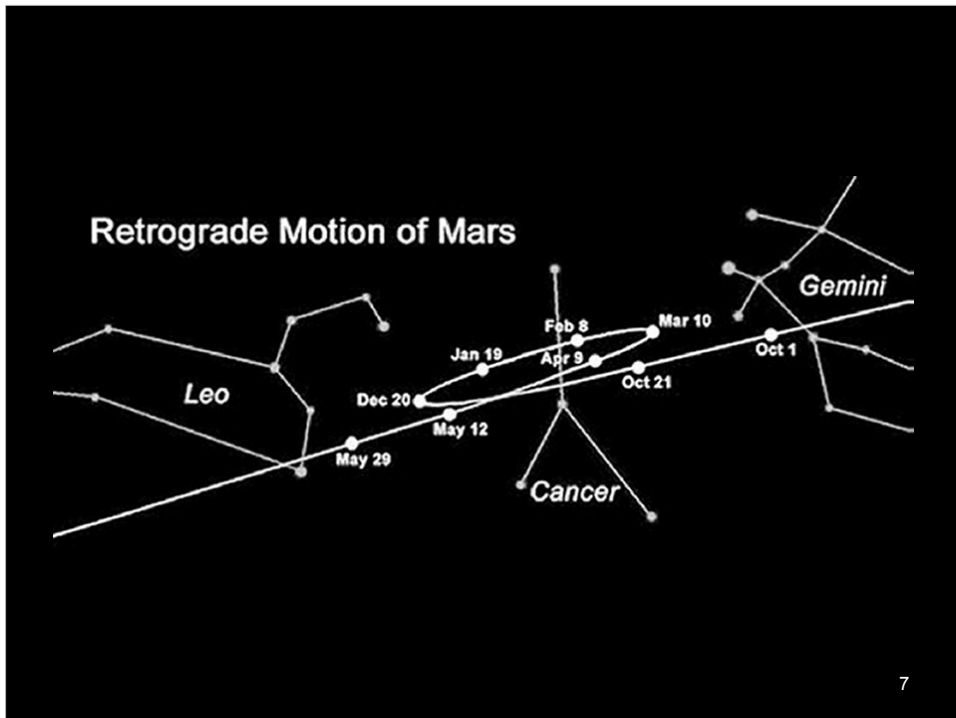
Some events for next month ...

June 4 - 3rd Qtr Moon

June 6 - Mars near Regulus & Uranus near Jupiter

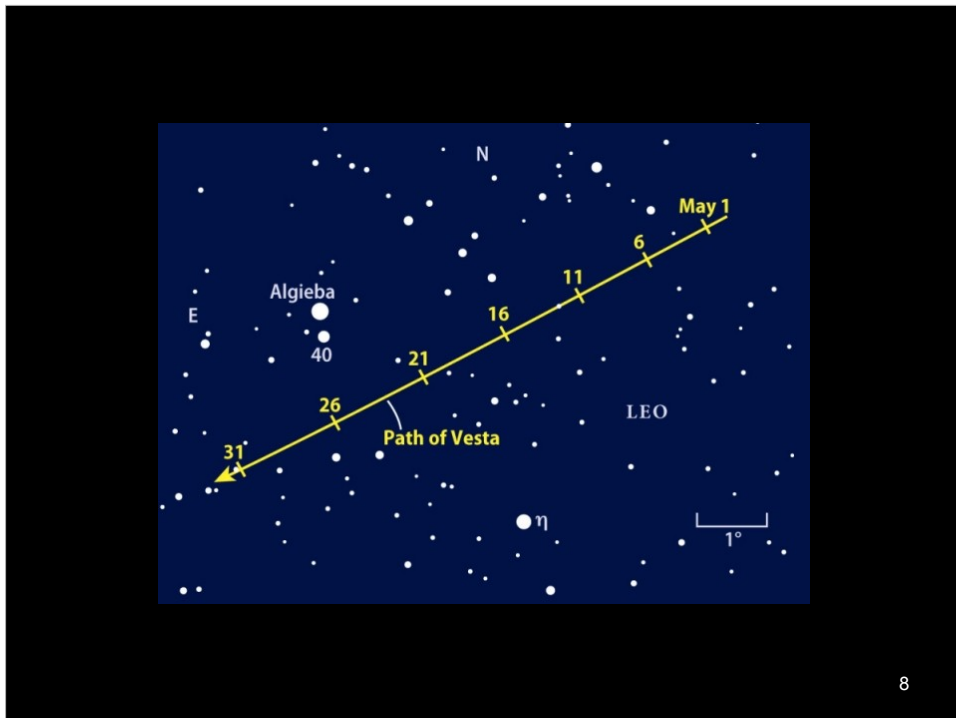
June 12 - New Moon

June 15 - Next CE Meeting



Here's the look at the retrograde motion of Mars, from now through early June.

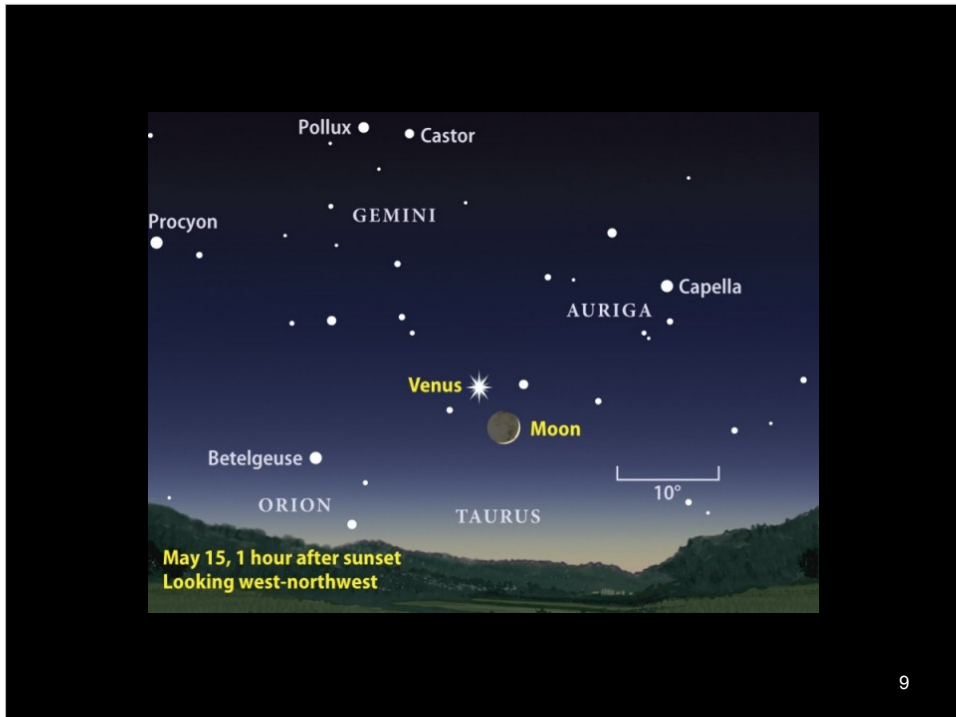
Mars is now back in Leo, approaching Regulus for a June 6 conjunction



Asteroid Vesta is working its way through Leo. Vesta glows around magnitude 7.5, so it remains well within reach through a small telescope from the suburbs. It's an easy star-hop north of 1st-magnitude Regulus, but it lies even closer to 2nd-magnitude Algieba.

You can get the ephemeris from the IAU Minor Planet Center at Harvard if you need the precise coordinates.

This graphic is also from Astronomy magazine.



Venus is up nice and high in the sky, slowly climbing to its highest point around the June solstice.

Tonight it's up at 27 degrees at sunset with a 2 day old crescent moon nearby

This is another graphic from Astronomy magazine.

## Featured Objects

Saturn  
Its Rings  
The Moons

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Since Saturn is such a prominent object right now, I wanted to spend some time there tonight. I also wanted to examine some of the more interesting things about the system that prove useful to know when you're out in the field doing astronomy outreach.

So, we'll have a closer look at some statistics on the planet, its rings and its major moons

## Featured Object

### Saturn - The Gas Giant

- Orbital period - 29.46 years
- Satellites - 61 with secure orbits
- Equatorial radius - 60,268 km
- Volume - 763 Earths
- Mass - 95 Earths
- Mean density - .687 g/cc

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Now lets look at some of the features of the globe of the planet ...

Orbital period - 29.46 years

Satellites - 61 with secure orbits, over 200 observed, with many of these embedded in the ring system

Equatorial radius - 60,268 km, 9.45 Earths

Volume - 763 Earths

Mass - 95 Earths

Mean density - .687 g/cc (water is 1.0 & Earth's is 5.5)

## Featured Object

### Saturn - The Gas Giant

- Composed mostly of hydrogen
- Small core of rock and ice
- Thick layer of metallic hydrogen
- Wind speeds can reach 1,800 km/h
- Strong magnetic field

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As for its composition,

Saturn is composed mostly of hydrogen, with small proportions of helium and trace elements.

The interior consists of a small core of rock and ice, surrounded by a thick layer of metallic hydrogen and a gaseous outer layer.

The outer atmosphere is generally bland in appearance, with wind speeds on Saturn can reach 1,800 km/h.

Saturn has a planetary magnetic field intermediate in strength between that of Earth and the more powerful field around Jupiter.

(Metallic hydrogen is a state of hydrogen which results when it is sufficiently compressed; it has significant electrical properties and is closely linked to Saturn's magnetic field.)



## Featured Object

### Saturn - The Ring World

- Magical ring disappearing trick!
- Galileo's "Ears"
- Hevelius' "Crescents"
- Huygens' rings
- Cassini's division
- Maxwell's particles

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Saturn's rings were a mystery at the beginning of the telescope era.

In 1610, Galileo was the first to observe Saturn but his instrument was only about 18 power so he saw what appeared to be "ears" on either side of the planet's sphere. In 1612, when he viewed the planet again, the rings were edge-on to Earth so he witnessed the "ears" disappearing. When he looked again in 1616, they were back. Others viewing the planet were also mystified as the same thing happened in 1626 and 1642. (29.5 year orbit, 13.75y & 15.75y)

Hevelius, in 1656, proposed that Saturn's body was ellipsoid with two attached crescents.

However, Huygens, also in 1656, proposed a flat thin ring which he thought was solid. At least the geometry was right.

In 1675, Cassini discovered the gap that bears his name using a very long refractor at the Paris Observatory.

It was almost two hundred years later that Maxwell, in 1858, published his treatise that proved the rings was made of small particles.

## Featured Object

### Saturn - The Moons

- Huygens' Titan
- Cassini's moons
- Herschel's moons

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Now lets look at some more moon stuff from Saturn:

Huygens' discovered Titan using his tubeless 50 x refractor, also known as an air telescope in 1655.

Cassini discovered four additional moons: Iapetus, Rhea, Tethys, and Dione in 1671 - 1684.

Herschel discovered two more moons, Mimas and Enceladus in 1789

# Target List

## Saturn's Moons

Des	Name	Mag
S1	Mimas	12.1
S2	Enceladus	11.7
S3	Tethys	10.3
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S5	Rhea	9.7
S6	Titan	9.4
S7	Hyperion	14.2
S8	Iapetus	10.2 - 11.9

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Here's a chart of Saturn's moons listed by their designation, which corresponds to the increasing orbital radius

Each is also listed with the apparent magnitude of each. Titan is the brightest and usually the first to appear in twilight, depending on its position.

Note that Iapetus has a range caused by the light-dark coloration of the surface. This results from a thin layer of dark organic compounds that have settled on the leading edge of the moon and ices that have settled on the trailing edge.

# Observing Techniques

## Filters for viewing Saturn

Clouds	#11	Yellow-Green	
	#12	Yellow	
	#25	Red	*
Belts	#15	Deep Yellow	*
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	#58	Green	*
	#80A	Medium Blue	*
Cassini Division	#11	Yellow-Green	

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Here's a chart of features of Saturn and suggested filters that will enhance that type of object at the eyepiece.

Each filter is listed with the Wratten number and the color of each. Those with an asterisk at the end are filters included in a typical "Planetary Filter" set, like the one from Orion for about \$50. Burgess Optical has a 12 filter set for \$80. (Orion also has the round filter cases to hold single filters or two or four.)

Check the Orion site for a PDF file with details on using each filter in their kits. Also check the Lumicon web site for a more extensive list of filters and more detailed spec sheets on all kinds of filters.

## Web Links

- IAU Minor Planet Center  
[www.minorplanetcenter.org](http://www.minorplanetcenter.org)
- NASA - Equinox  
[saturn.jpl.nasa.gov/](http://saturn.jpl.nasa.gov/)
- NASA - JPL Solar System  
[www.jpl.nasa.gov/solar-system/](http://www.jpl.nasa.gov/solar-system/)
- Julius Benton's Saturn Book  
[www.springer.com](http://www.springer.com)
- Orion Filters  
[www.telescope.com](http://www.telescope.com)
- Lumicon Filters  
[www.lumicon.com](http://www.lumicon.com)

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Here are this month's web links:

- NASA Cassini Equinox Mission
- NASA JPL Solar System site
- Julius Benton's Saturn book (content on the Springer site and also online in part using Google Books)
- Orion Telescopes (planetary filters)
- Lumicon (planetary filters)

# Farewell!

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This is the last of my Observing 101 presentations, at least for now!

It has been my pleasure to step in for this last few months although the circumstances behind Jon's departure still leaves a void with all of us.

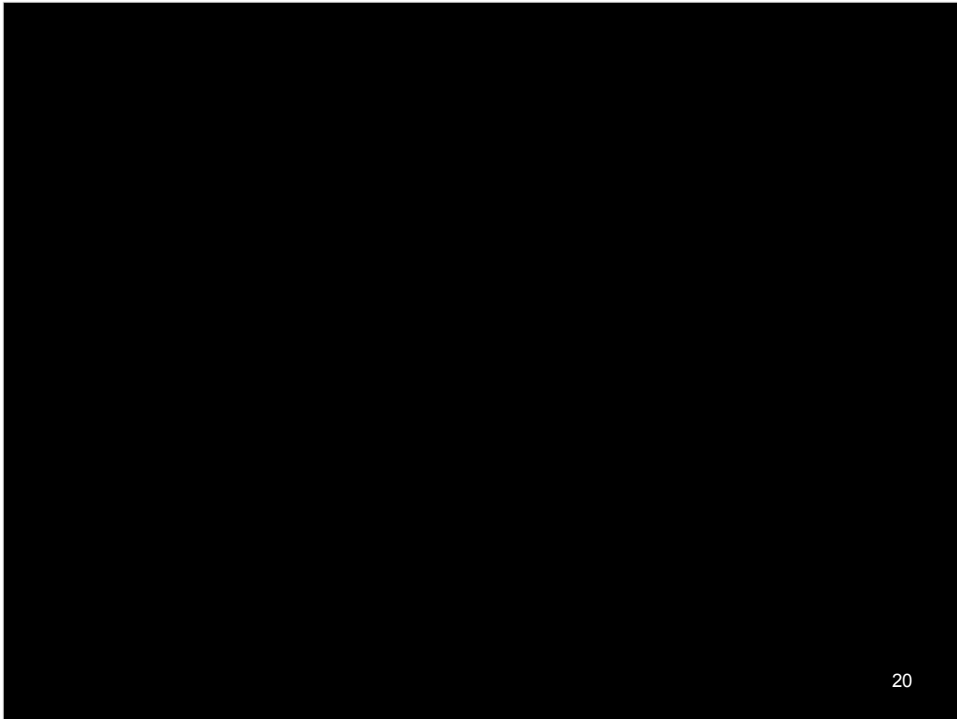
Yet the mission of our Chapter goes on and Jon would not have wanted any of us to stop on his account. His legacy still lives on in this part of the monthly program and it has been my honor to once again play a part.

I can now confidently hand over the program to \_\_\_\_\_. I wish them all the best and I will continue to be of service in maintaining the archived material and helping to prepare future presentations if needed.

**Clear Skies!**

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Clear skies, all.



Here's a blank slide!