the Skyscraper

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March 2011

Amateur Astronomical Society of Rhode Island ★ 47 Peeptoad Road ★ North Scituate, Rhode Island 02857 ★ www.theSkyscrapers.org

Seagrave Memorial Observatory is open to the public

weather permitting

Saturdays:
7-9pm through March 12th
8-10pm beginning March 19th

Beginning March 19, Seagrave Observatory will be open, weather permitting, from 8:00-10:00pm. Please note that the observatory may be inaccessible for several weeks following a winter storm. See web site for updates.

North Scituate Community Center

All of our winter meetings (Dec-Mar) are held at the Community Center. From Seagrave Observatory, the Community Center is the first building on the right side going south on Rt. 116 after the intersection of Rt. 6 Bypass (also Rt. 101) and Rt. 116. Parking is across the street.

In this issue…

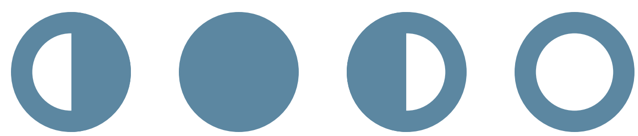
March Meeting with Savvas Koushiappas

Friday, March 4, 7:30pm at North Scituate Community Center

The launch of the Fermi Gamma-ray Space Telescope (FGST) in 2008 opened a new window to the high-energy Universe. The FGST is a gamma-ray telescope that surveys the whole sky every 3 hours, and has the highest angular resolution and sensitivity than any past gamma-ray telescope. I will present a sample of exciting new results that emerged in the first 2.5 years of operation and briefly discuss FGST-related work at Brown University.

Professor Koushiappas works in the interface of particle astrophysics and cosmology. He is interested in the structure and distribution of dark matter in the Universe, as well as astrophysical processes that can help identify the particle nature of it. He joined Brown University in the summer of 2008. Before that he was a postdoctoral researcher in the Theoretical Division at Los Alamos National Laboratory, and prior to that he was a postdoctoral researcher in the Department of Physics at ETH-Zurich (Swiss Federal Institute of Technology).

Phases of the Moon



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Other notable events: Eaaaa The Moon is 3° east of Venus on the 1st. The Moon is near the Pleiades on the 10th. Juno is at opposition on the 12th. Daylight Saving Time begins on the 13th. Mercury is 2° north of Jupiter on the 15th. Equinox is on the 20th. Uranus is in conjunction with the Sun on the 21st. Mercury is at greatest eastern elongation on the 22nd. Venus is 0.5° east of Neptune on the 27th.

President's Message

Tom Thibault

I'm sure all of you are feeling as I do, enough with the Snow. This winter has been one storm after the other and as I write to all of you, forecasts are calling for the possibility of a couple more in the near future. I'm not sure what has gotten Old Man Winter's dander up, but let's hope he decides to calm down and give us a break. Hopefully, he and Punxsutawney Phil are good buds. Phil has predicted an early spring and possibly can persuade the Old Man to have mercy on us all.

Dave Huestis and Craig Cortis were our featured speakers at the February meeting, and both provided interesting presentations. Dave's "You Can Slooh" focused on the ability for anyone for a minimal fee can capture astronomical pictures in their home from remote telescopes at observatories associated with Project Slooh. Craig's "Where the Southern Cross Rises" was an overview of the recent trip Jim Hendrickson and Craig made to the Big Cypress area in the Everglades, Florida. It highlighted the fact that many southern hemisphere astronomical targets are accessible to those who may

visit the area. Hey Jim, what was that noise, a gator?

Our portion of the business meeting included Bob Forgiel presenting certificates of appreciation from the Night Sky Network for public outreach participation. Recipients included Dave Huestis, Jim Brenek, Jim Crawford, Jim Hendrickson, Glenn Jackson, Tom Barbish, John Leonelli, John Kocur, Bing Kubaska, Bob Forgiel, and yours truly. Thanks to all of you for your efforts in sharing the wonders of the night sky with the public. Let me also extend a special thanks to Roger Forsythe and his efforts with the Night Sky Network and insuring Skyscrapers is recognized for its on-going Public Outreach Programs.

Lastly, at the February Meeting I announced the appointment of Linda Bergemann to head the Election Committee and Ed Haskell the Nomination Committee for our upcoming April Elections. Ed has recruited both Dave Huestis and Steve Siok to assist him in soliciting and selecting nominees. It is Ed Haskell's intention to announce the selected candidates nominated by the committee for this year's elections at the March Meeting.

If you have an interest in increasing your contributions to the continued traditions of Skyscrapers, please contact Ed Haskell, Dave Huestis, or Steve Siok to be considered for a position this year.

Clear Skies

Francine Jackson's Sky Notes

In Like a Lion... Out Like a Lamb

We have many indicators that the month of March marks a change of season. The first was last month, with the appearance of Punxsutawney Phil, the forecasting groundhog. Although some really put a lot of stock into his predictions, the real story is that Phil's day is actually in the middle of the season of winter, one of the year's cross quarter days. Therefore, whether he sees his shadow or not, there is still about six weeks worth of winter, but, it does signal the beginning of the thought of springtime.

In the sky, we are also seeing the constellation marked as the "sign of spring." We've all heard the old adage that the season of spring, the month of March, comes, "in like a lion..." Rising out of the eastern horizon is Leo, the Lion, the scourge of the tiny village of Nemea. Apparently, this lion was so big, every step down of his paw would crush a house. Hercules was charged with getting rid of this beast. His way of doing so was not very nice to any cat lovers, but suffice it to say he did kill the lion, then swung him into the sky so the Nemean residents would know they didn't have to worry anymore.

Leo rises head first out of the eastern horizon this time of year. You can easily see

The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are usually held on the first Friday of the month. Public observing is usually held every Saturday night at Seagrave Memorial Observatory, weather permitting.

Directions
Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions
Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **March 11** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

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this, by looking for a backwards question mark, with a rather bright dot. The circular part is his beautiful head and mane, while the brighter dot star, located where his front paws should be, marks his heart - our ancestors weren't very well-versed in anatomy. This star's name is very easy to remember. If we recall that one name for a lion is the King of Beasts, his heart star translates to "King," Regulus. Notice the root word Rex.

Following the head and mane will be a triangle of stars, his back legs. If you draw a line from one of the head stars to his legs, you can actually see this constellation shape. And no, Leo has no tail; in fact, the stars that are often seen as the tuft is another constellation, Coma Berenices, Berenice's hair. This queen so loved her king that she promised if he would come back from war alive, she would sacrifice her hair to the gods. He did; she did. Although it isn't very bright, this set of stars can still be seen in city skies.

The best star to connect the two parts of Leo's body is Algeiba, Gamma Leonis. Through even a small telescope, this star breaks into two, of almost the same brightness. Because of this, some people have nicknamed this double "the headlights."

Although Leo is rather easy to find by its shape, if you are having problems looking for it, there is a great marker. The Big Dipper, part of the Big Bear - Ursa Major - that can be seen in all types of skies, sits directly above the lion. Therefore, all you have to do after finding the Big Dipper is to pretend that it's been in the sky so long that the bottom's starting to rot out, and, if so, where will the water inside it go? Right on to Leo's back. So, if you can't see Leo, find the Big Dipper, turn it into the Big Dripper, and watch the water drip right onto the lion's back.

Going back to our old adage, it ends with, "...and out like a lamb." And what is that? Aries, the Ram, famous in astrological circles. A story for another time.

Alpha (α) Geminorum (Castor)

Glenn Chaple's

Sky Object of the Month

Are you looking for something new and different to add to your late winter/early spring star party repertoire – a cosmic showpiece guaranteed to elicit a gasp of surprise and wonder from anyone who peers into your telescope? I suggest the double star alpha (α) Geminorum, better know as Castor. One glance at these sparkling magnitude 2.0 and 2.9 diamonds and it's easy to understand why William Herschel's son, John, considered Castor the finest double star in the northern sky.

Castor's duplicity was discovered by the English astronomers Bradley and Pound in 1718, although evidence exists that it may have been observed by Cassini forty years earlier. Based on his own observations and those of other astronomers in previous decades, William Herschel announced in 1803 that Castor was, in fact, a true binary system and not a chance alignment of widely separated stars. Castor A (the brighter component) and Castor B (the companion) have yet to undergo a complete orbit since their discovery, but calculations point towards an orbital period of 467 years.

At the time of its discovery, Castor was an easily-resolved pair separated by a comfortable 4 arc-seconds. Throughout the 19th century and early decades of the 20th, it remained a readily accessible small-scope target. But as the pair approached periastron (the point in a binary orbit when the stars are closest together), they became harder and harder to split. By the mid-1960s, Castor had dropped off the backyard astronomer's radar. Since then, however, Castor A and B have rapidly separated. Today, the two are nearly 5 arc-seconds apart – once again an easy split for the smallest of telescopes.

The sight of this binary pair is so spellbinding that the observer may fail to notice a 9th magnitude companion 73 arc-seconds away. Though distant both in angular and physical separation (100 billion miles), Castor C is nonetheless gravitationally bound to the main pair, orbiting them in a period that probably exceeds 10,000 years.

There's more! Spectroscopic studies reveal that each of Castor's components is a tight binary pair. Castor A and B are both comprised of almost identical A-type main sequence stars with orbital periods of 9.2 days and 2.9 days, respectively. C is also a binary twin set, this time made up of low-mass red dwarfs locked in a 19.5-hour orbit. What the unaided eye sees as a single star is actually a triplet of twins!

Besides its value as a "wow" object, there's another good reason for adding Castor to your star party repertoire. Bright double stars aren't as adversely affected by haze or light-polluted skies as are deep-sky objects like nebulae and galaxies. Can't get out to your dark-sky observing site in the country? No problem! Castor is waiting for you.

Your comments on this column are welcome. E-mail me at gchaple@hotmail.com

Castor: (L) April 7, 1976 and (R) April 18, 2008. South is up.
(Observations made by the author, using a 3-inch f/10 reflecting telescope)

Astronomical Potpourri in March

Dave Huestis

I began writing this column on Groundhog Day, February 2, 2011. The *Inner Circle* organizers in Punxsutawney, Pennsylvania, wrestled Phil out of his temporary cozy burrow at 7:25 am at Gobbler's Knob to forecast the return of spring. Though this famous groundhog did not see his shadow, supposedly indicating an early spring, astronomically speaking winter will last until the vernal equinox on March 20 at 7:21 pm. Though I do not believe in Phil's folklore-ish abilities, I do hope his prognostication proves true for southern New England. Because at this time I've got over 40 inches of snow in my front yard.

The local observatories have been closed not only due to the adverse weather conditions on an open night, but also due to the amount of snow and ice making the grounds inaccessible. This observing deprivation could possibly result in a new definition for March Madness!

We can only hope that March winds will be calm with clear skies and almost snow-free grounds. Then all stargazers will once again be able to enjoy the beauty of the heavens. March skies will present several astronomical events of interest.

For those of you who travel east to work before sunrise have had a very bright companion on your travels in recent months… Venus. You must have noticed that as time has passed Venus has been moving closer to the eastern horizon. Each day it will rise a little earlier. By month's end it will be very low above the eastern horizon around one hour before sunrise. Very soon thereafter it will be too close to the Sun to be seen and will move into the evening sky after sunset in April. Then it will be your traveling companion as you drive home.

Also in March you should notice brilliant Jupiter moving closer towards the western horizon after sunset as the month progresses. While we'll lose sight of it by April, Jupiter will share the western sky with some other celestial bodies before it disappears. About one-half hour after sunset on March 6, a very thin crescent Moon will be located to the upper right of Jupiter. It should be a very beautiful sky scene, and I'd encourage you to take an image of it.

During the next couple of weeks Mercury will rise high enough above the western horizon to be easily observed. However, you'll need an unobstructed view. Mercury will first appear to the lower right of Jupiter within a half hour after sunset around the 10th. Each night it will rise higher into the sky, moving ever closer to Jupiter. They are closest on the 14/15th. Mercury will continue to climb past Jupiter, while Jupiter itself will be moving closer to the horizon.

If you have a telescope you can watch Mercury go through phases like our Moon. Because of its orbit about the Sun and our observing position here on the Earth, the image size of Mercury will increase and the phase of illumination will decrease.

For example, on March 8 it will be 90 percent illuminated and by the 22nd will be just under 50 percent lit. Its apparent size will continue to grow as it approaches the Earth, and the phase will shrink. Unfortunately it will then be moving closer to the western horizon each night, making it more difficult to observe. It becomes a 25 percent lit crescent on the 27th. Try to catch a glimpse of Mercury, even if it is just with binoculars, for this is the hellish world's best appearance all year.

Don't forget that most of the United States switches over to Eastern Daylight Time (EDT) or Daylight Saving Time (DST) on Sunday, March 13. That's when we set the clocks ahead one hour at 2:00 am. While this action is not astronomical in nature, it does affect observers of astronomical events.

Astronomers use Coordinated Universal Time (UTC), also known as Greenwich Mean Time (GMT), as a standard. And most astronomical almanacs provide UTC when announcing the date and time of an event. It is up to the observer to convert for the local time zone. We are in the Eastern time zone, so when EST is in effect, UTC is ahead of us by five hours. During DST that difference is only four hours. If you forget to convert you will most likely miss an event.

As briefly mentioned earlier, an important event occurs on Sunday, March 20 at 7:21 pm – the vernal equinox or the beginning of spring. Because of the Earth's tilt upon its axis as it orbits the Sun, our life-giving star appears to move north or south in our sky throughout the year. During the Northern Hemisphere winter the Sun moves across the southern sky in a low arc. After the winter solstice on December 20/21, the Sun appears to move north. When it crosses the celestial equator (an imaginary line in the sky representing the extension of the Earth's equator into space) on its way north, this is called the vernal equinox. Day and night are of equal length. It will continue its apparent journey northward in our sky until the summer solstice on or about June 20/21. The Sun will then be at its highest point in our sky.

And finally, Saturn rises about 8:20 pm during the beginning of March. It is easily accessible to folks with a good eastern horizon an hour or two later. However, if you can wait until April (when hopefully all the snow will be gone), this beautiful ringed-planet will rise earlier so you can observe it earlier. Besides, I'll provide a Saturn observing guide in next month's column.

Don't forget that Seagrave Memorial Observatory (http:/www.theskyscrapers.org) on Peeptoad Road in North Scituate is open every clear Saturday night for public viewing, provided the skies are clear and the property is accessible. With the change to DST during March, the open hours will change after March 13 from 7:00-9:00 pm to 8:00-10:00 pm. In addition, Ladd Observatory (http://www.brown.edu/Departments/Physics/Ladd/) in Providence is open every clear Tuesday night, weather permitting as well. Ladd's hours of operation will also change from 7:00-9:00 pm to 8:00-10:00 pm after DST is implemented. Please check their respective websites for any cancellation notices before venturing out for a visit.

Keep your eyes to the skies.

NASA's Space Place

Thank Goodness the Sun is Single

By Trudy E. Bell

It's a good thing the Sun is single. According to new research, Sun-like stars in close double-star systems "can be okay for a few billion years—but then they go bad," says Jeremy Drake of the Harvard-Smithsonian Astrophysical Observatory in Cambridge, Mass.

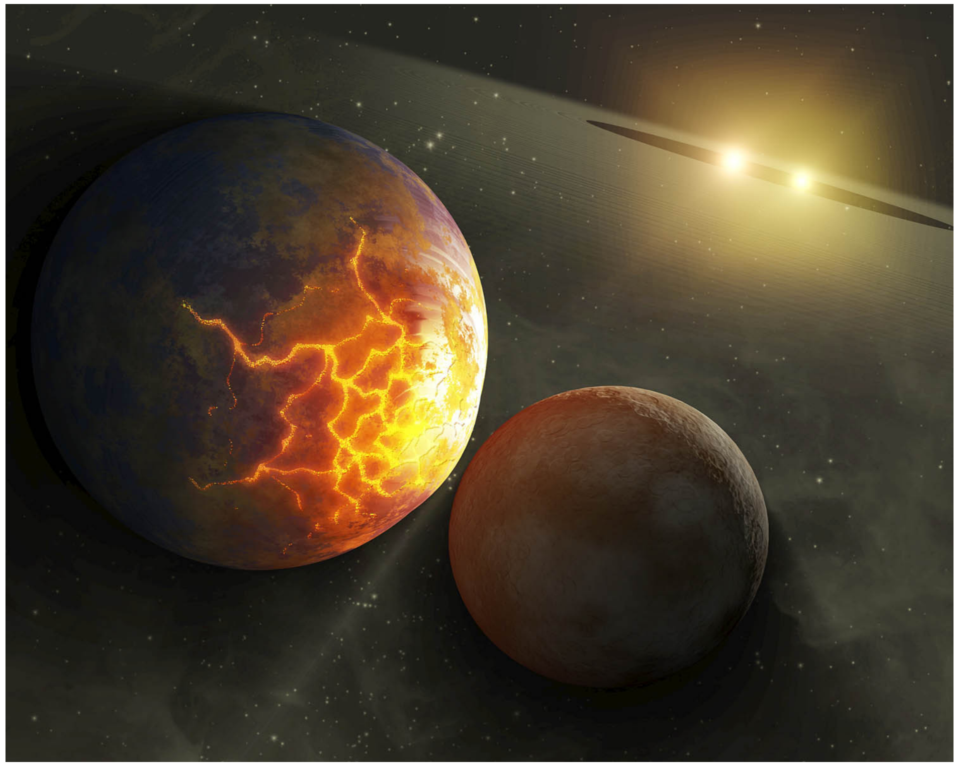
How bad? According to data from NASA's Spitzer Space Telescope, close binary stars can destroy their planets along with any life. Drake and four colleagues reported the results in the September 10, 2010, issue of *The Astrophysical Journal Letters.*

Our Sun, about 864,000 miles across, rotates on its axis once in 24.5 days. "Three billion years ago, roughly when bacteria evolved on Earth, the Sun rotated in only 5 days," explains Drake. Its rotation rate has been gradually slowing because the solar wind gets tangled up in the solar magnetic field, and acts as a brake.

But some sun-like stars occur in close pairs only a few million miles apart. That's only about five times the diameter of each star—so close the stars are gravitationally distorted. They are actually elongated toward each other. They also interact tidally, keeping just one face toward the other, as the Moon does toward Earth.

Such a close binary is "a built-in time bomb," Drake declares. The continuous loss of mass from the two stars via solar wind carries away some of the double-star system's angular momentum, causing the two stars to spiral inward toward each other, orbiting faster and faster as the distance shrinks. When each star's rotation period on its axis is the same as its orbital period around the other, the pair effectively rotates as a single body in just 3 or 4 days.

Then, watch out! Such fast spinning intensifies the magnetic dynamo inside each star. The stars "generate bigger, stronger 'star spots' 5 to 10 percent the size of the star—so big they can be detected from Earth," Drake says. "The stars also interact magnetically very violently, shooting out monster flares."



Planetary collisions such as shown in this artist's rendering could be quite common in binary star systems where the stars are very close.

Worst of all, the decreasing distance between the two stars "changes the gravitational resonances of the planetary system," Drake continued, destabilizing the orbits of any planets circling the pair. Planets may so strongly perturbed they are sent into collision paths. As they repeatedly slam into each other, they shatter into red-hot asteroid-sized bodies, killing any life. In as short as a century, the repeated collisions pulverize the planets into a ring of warm dust.

The infrared glow from this pulverized debris is what Spitzer has seen in some self-destructing star systems. Drake and his colleagues now want to examine a much bigger sample of binaries to see just how bad double star systems really are.

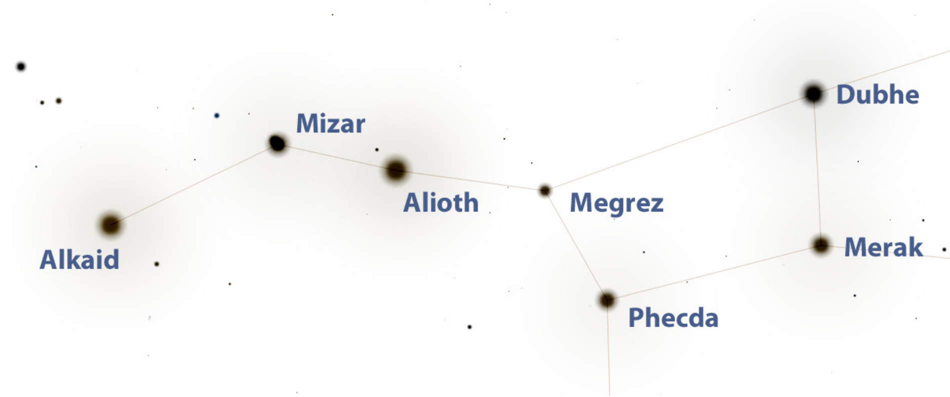
They're already sure of one thing: "We're glad the Sun is single!"

Read more about these findings at the NASA Spitzer site at www.spitzer.caltech.edu/news/1182-ssc2010-07-Pulverized-Planet-Dust-May-Lie-Around-Double-Stars . For kids, the Spitzer Concentration game shows a big collection of memorable (if you're good at the game) images from the Spitzer Space Telescope. Visit spaceplace.nasa.gov/en/kids/spitzer/concentration/.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Getting to Know The Big Dipper

Jim Hendrickson



	Mass (x solar)	Luminosity (x solar)	Spectral Type	Distance (ly)
Alkaid	7.6	3000	B3V SB	101
Mizar	2.4	30	A2	78
Alioth	3	108	A0p	81
Megrez	2.2	20	A3V	81
Phecda	2.7	724	A0	84
Merak	3	69	A1	79
Dubhe	4	300	F7Vcomp	124

With the arrival of spring in the northern hemisphere comes the culmination of the northern sky's most recognized asterism, the Big Dipper. This familiar group of seven stars is notable for having a clear resemblance to its namesake (it is easy to imagine it forming the shape of a large spoon), but how much do you really know about the Big Dipper?

Finding north using the Big Dipper

No matter what the season, the Big Dipper provides us with valuable information to help us orient ourselves here on Earth. First and most significant, the Big Dipper can tell us where north is. Since the Big Dipper is a circumpolar asterism (from our latitude of about 42° north), all of its stars are visible regardless of the time of night or time of year, assuming you have a clear northern horizon. Once you have located the Big Dipper, look at the two outermost stars of the "bowl" of the dipper asterism, opposite of the handle. If you imagine a line connecting these two stars, and extend that line up and beyond the open end of the bowl, the next star you will encounter (just over five times the height of the bowl away) will be Polaris, the North Star. Since Polaris is always within one degree of the north celestial pole (the point in the sky towards which the Earth's north pole points), finding Polaris is a fairly accurate indicator of true north. Due to the orientation of these two end stars in the bowl of the Bid Dipper pointing towards Polaris, they are often referred to as the "pointer" stars. There is a common misconception that Polaris, the North Star is the brightest star in the sky. People often mistake Sirius, or even a planet for the North Star. This is simply not true, and has never been the case. What makes the North Star unique is its seemingly stationary position almost exactly in the north. In fact, Polaris, at magnitude 1.97, is only about the 45th brightest star in the sky, and is in fact outshone by three of the stars the Big Dipper.

What time is it? The Big Dipper can tell

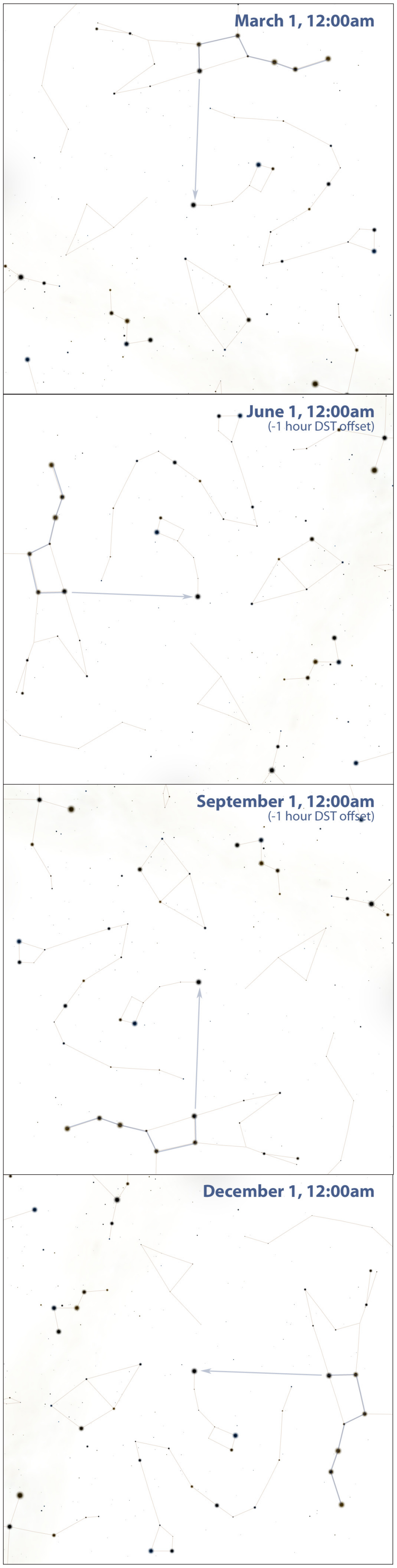
Now that you know where north is, you can use the orientation of the Big Dipper in relation to Polaris to determine the approximate time. Because the Big Dipper is circumpolar, it never rises or sets, but rather rotates around the north celestial pole, marked roughly by the position of Polaris. If you watch the position of the Big Dipper through the course of the night, or observe it at the same time on a number of successive nights, you will notice that it rotates around the pole, counter-clockwise, or bowl-first. The Big Dipper, as with the entire sky, will make one complete revolution about the pole once per sidereal day. The sidereal day is approximately four minutes shorter than the 24-hour solar day we are more familiar with. For simplicity, we can assume a full 24-hour period when observing on a single night, but remember that the Big Dipper will be in the same position in the sky approximately four minutes earlier each successive night.

When using the Big Dipper to tell time, it is easy to imagine the pointer stars as the hour hand of a one-handed clock, but instead of making two revolutions per day as our clocks do, it makes a single revolution. The pointer stars will appear opposite of their observed position 12 hours earlier or 12 hours later; will appear to make one quarter turn every six hours, traverse 45° of arc in three hours, and so on.

With this in mind, it is helpful to establish a reference position. Luckily, the timing works out so that the pointer stars are aligned nearly on the meridian at midnight on March 1st. You can imagine that on noon on March 1st, the pointer stars will be aligned directly below Polaris. Since we can approximate one complete revolution in 24 hours, it is easy to visualize the position of the pointer stars at any given hour once you have an initial reference position.

Due to the four minute difference between the sidereal day and the solar day, the pointers will have rotated slightly further to the west at the same hour on each successive night, making a complete revolution over the course of the year. Therefore, each successive month, at the same time, the pointers will be approximately 1/12 of the way around the pole. Since the pointers are oriented close to the meridian at midnight on March 1st, they will be opposite, or directly below Polaris one-half year later, on September 1st. They will be oriented to the left (or at the 9 o'clock position) on June 1st, and to the right (3 o'clock position) on December 1st. Note that 1 hour of time represents the same angular movement of the pointers as one-half month when viewed at the same time.

Now, simply knowing the date and having an unobstructed view of the Big Dipper, you will be able to determine the



The orientation of the Big Dipper can be used to tell time throughout the year.

approximate time. Don't forget to factor in Daylight Saving Time, which will cause the pointers to be "behind" by an hour, or 15 degrees of angle.

The closest star cluster

Now that the Big Dipper has told us what direction is north and what time it is, let's learn a little about its stars. While we often refer to the parts of the Big Dipper by their representative names (the handle, the bowl, and the pointers), did you know that all seven stars in the Big Dipper have names?

Starting from the end star of the handle and moving along to the back, bottom, and front of the bowl, the stars are named Alkaid, Mizar, Alioth, Megrez, Phecda, Merak, and Dubhe. All of the above stars, with the exception of the two extreme ends (Alkaid and Dubhe) are members of what is known as the Ursa Major Moving Group. These stars were most likely formed in the same nebula and are all traveling through the galaxy together. This makes the Big Dipper the closest star cluster to us.

Taking a tour

When visiting the Big Dipper with a telescope, a great starting point is Mizar, the middle, or "bend" star in the handle. This has always been my favorite place to start because Mizar & Alcor were the first objects after the Moon that I learned to find with my first telescope. That's right, Mizar is not a lone star, but accompanied by slightly dimmer star to the northeast. Known in ancient times as the horse and rider, Mizar and Alcor are both spectral type A stars, so there will not be any notable color contrast, but the close proximity of the two bright stars in a low power eyepiece makes for a pleasing view. Just a bit to the south of the midpoint of the imaginary line connecting Mizar and Alcor lies a 7th magnitude star makes the view a little more interesting. But it doesn't end there. Mizar itself is a double star, with a 4th magnitude companion 14 arcseconds away, which is an easy split even in small telescopes.

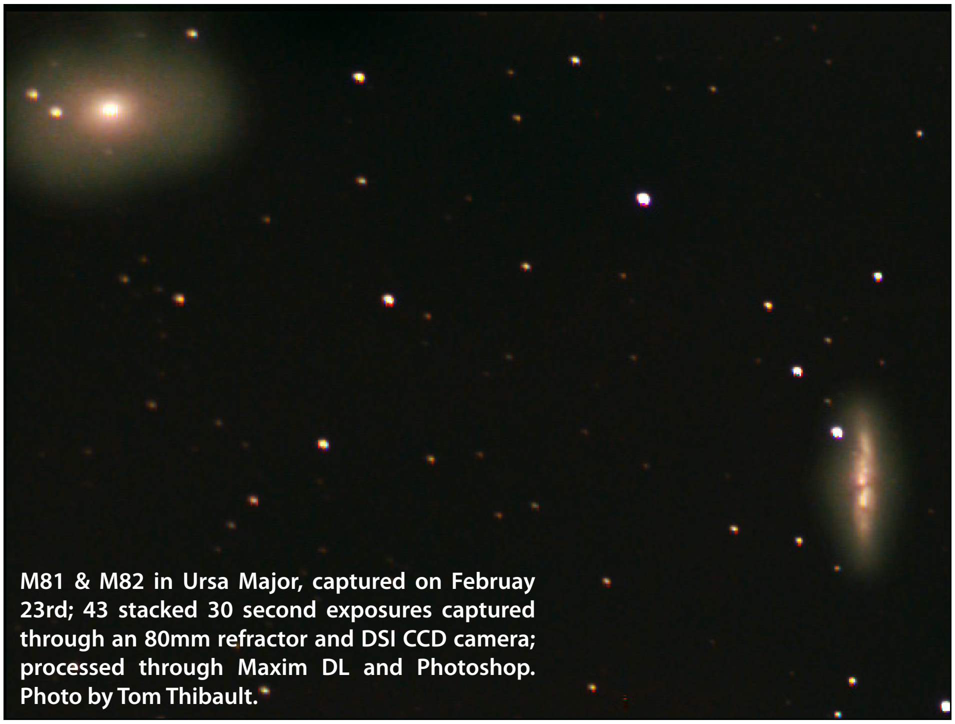
Once you've savored the view of Mizar and Alcor and you're ready to travel to a distant galaxy, move your scope from Mizar, through Alcor, and continue along that line about eight times the Mizar-Alcor distance until you reach a 6th magnitude star. This is the first star along a shallow zigzag of four similar magnitude, similarly spaced stars that I call the "Mizar-M101 line." Once you reach this star, move your scope in a line roughly parallel to the inner portion of the handle of the Big Dipper, but moving away from the Dipper's bowl. Through a low power eyepiece, the shallow zigzag of the Mizar-M101 line will be unmistakable. You shouldn't get lost here, but if you do, just back-track to Mizar and Alcor and try again. Once you reach the fourth star in the line, stop, and continue in the same direction you moved when you first left Mizar and Alcor, and for approximately the same distance. If you don't see a large, diffuse glow in your eyepiece, try moving your eye around the field slowly to see if you can pick it up using averted vision. This is the face-on spiral galaxy M101, sometimes called the Pinwheel galaxy. Face-on galaxies are a little tricky to spot because we are looking at them from over one of their poles, so light from the "disk" of the galaxy is spread over the maximum possible area. For best results, use the lowest magnification available. If sky conditions permit, you may even be able to spot it in an 8x50mm finder.

Another spiral galaxy that presents itself as nearly face on to the inhabitants of the Milky Way is somewhat more well known and not too far away (from the perspective of a terrestrial star-gazer). This galaxy lies just across the Dipper's handle from M101 and is easy to hop to from Alkaid, the very end of the Dipper's handle. From Alkaid, you'll want to move the telescope about two degrees to the southwest until you come across a 5th magnitude star known as 24 Canes Venaticorum. From this star, make a 120-degree turn back towards the southeast and travel about the same distance as from Alkaid to 24 CVn. You should find your gaze moving just past a pair of 7th magnitude stars a little less than a degree apart and oriented approximately perpendicular to the vector you arrived from. Nudge the scope just a bit further to the southeast and you should spot not one, but two fuzzy patches of light. This is the double nucleus of the Whirlpool Galaxy, or Messier 51 and NGC 5195. This is one of the most observed and photographed galaxies in the northern sky and once you realize how easy it is to find, you will find yourself taking the brief trip from the end of the Big Dipper's handle whenever the opportunity presents itself.

Our next star hop brings us to the opposite end of the Big Dipper's handle, that is the star that joins the handle to the bowl, Megrez. This star hop takes us to what is perhaps the least observed Messier object and certainly the most peculiar, as it is the only double star in Messier's list of 110 objects. From Megrez, move north-north-west in a line parallel to the back side of the bowl. About 1.5 degrees away you should spot a 6th magnitude star. Keep moving in the same direction about 1/3 of a degree and you will spot a nice, identical pair of 10th magnitude stars. This is Messier 40.

Beginning from the southernmost "pointer" star Merak, or the bottom-front star in the Dipper's bowl, we can find two Messier objects on a single trip. On this trek we not only encounter another spiral galaxy, but also the second and final Messier in our adventure that lies within our own Milky Way galaxy (the double star M40 being the other one). I tend to start this star hop by moving to the object furthest away from my guide star Merak first, then move inward to spot the other. From Merak, move the scope to the southeast two degrees, about 1/4 of the way from Merak to Phecda along the bottom of the Dipper's bowl, but deviating from that line by approximately 20 degrees of angle below the bowl. Through low power you should spot a trio of stars that appears to me as a greatly enlarged version of the Trapezium in Orion missing one of its stars. The trick here is to imagine where that fourth star would be, and that is where you should spot M97, the Owl Nebula. You may need to use averted vision on this one since the Owl has a fairly low surface brightness. If you don't immediately see another fuzzy spot in the eyepiece while viewing M97, move the telescope back towards Merak about 1/3 of the way, and a nudge northward. This is the galaxy M108.

The next star hop is a bit more tricky, but the effort pays off by showcasing what I believe to be one of the finest views in the northern sky. For this star hop, it helps to have a Telrad or red dot finder, because you're going to aim your scope at an area of sky based on widely-spaced naked-eye guide stars rather than hopping off from one of them. To start, draw an imaginary diagonal line through the bowl of the Big Dipper from the lower back (Phecda) to the upper front (Dubhe). Now extend this line out the same distance as the diagonal through the bowl, but slanted slightly to the north, deviating from the original diagonal line by about 5 degrees of angle. If you point your telescope at this seemingly indistinct patch of sky, you should find the contrasting galaxy pair M81 & M82, once referred to as Bode's Nebulae. M81 is a bright, textbook-perfect spiral galaxy and M82 is an edge-on irregular galaxy noted for its highly energetic star-forming characteristic, giving it another nickname, the Starburst Galaxy. Using just enough magnification to frame the galaxies with some surrounding sky, the view is unforgettable. I like to view the pair using a 9mm Nagler eyepiece in my Pronto, which shows just over 1.5 degrees of sky at 53x.


M81 & M82 in Ursa Major, captured on Februay 23rd; 43 stacked 30 second exposures captured through an 80mm refractor and DSI CCD camera; processed through Maxim DL and Photoshop. Photo by Tom Thibault.

Going back to our line diagonally crossing the bowl, move in the opposite direction. Extend this line approximately 80% of the distance through the bowl beyond Phecda, and here you will find galaxy M106. This is one of the brightest galaxies in the region and should be easy to spot.

Our last star hop should be an easy one as it is a relatively short trip. Move back to Phecda and extend the line marking the bottom of the bowl back away from Merak, only about the distance of the width of the Moon. This is the barred spiral galaxy M109.

In all, the Big Dipper has pointed us to nine Messier objects, which should help guide you if you are planning on doing the Messier Marathon this year.

For some observers, Leo is a sign of Spring. For others, it is the rising of Arcturus. For me, the most prominent sign of Spring has always been the Big Dipper shining high overhead.

Skyscrapers is invited to participate in a

Messier Marathon

at Frosty Drew Observatory in Charlestown
Saturday, March 5th
Rain date: Saturday, April 2nd

How many of Charles Messier's 110 Deep Sky showpieces can you observe in a single night?

If you have observing reports or images, please submit them to jim@distantgalaxy.com

Constitution

Article I: Name

The name of this Society shall be "Skyscrapers, Inc. (Amateur Astronomical Society of Rhode Island)."

Article II: Object

The object of this Society shall be to educate the general public and membership on matters pertaining to astronomy. It shall be an educational, nonprofit organization.

Article III: Legal Status

This Society is incorporated as a non-business corporation under the laws of the State of Rhode Island.

Article IV: Membership

§1 Membership in this Society shall be of five classes: Junior, Senior, Contributing, Senior Citizen and Honorary.

§2 An applicant for junior, senior, contributing or senior citizen membership shall submit the standard form of application together with dues as specified in Article I, Section 2, of the By-Laws, shall be proposed by an existing member, and shall become a member upon receiving a favorable majority vote at a regular meeting of the Society.

§3 Junior members shall be between 13 and 17 years of age both inclusive, and upon reaching 18 years of age shall automatically become senior members without payment of additional dues for the dues year in which this occurs. Junior members shall be entitled to all the privileges of senior members except those of voting and holding office.

§4 Senior members and senior citizen members shall have the privilege of voting and holding office. Senior members must be 18 years of age or older; senior citizen members must be 65 years of age or older.

§5 Contributing members shall be senior members who pay the additional dues prescribed by the By-Laws. They shall be entitled to all the privileges of senior members.

§6 Honorary membership may be conferred upon any person for unusual and outstanding accomplishment in science. It may be conferred upon a non-member for outstanding contribution to the Society. Honorary membership is conferred by unanimous vote of those present at any Annual Meeting, the name having been proposed at a previous regular meeting of the Society. An honorary member shall have all the privileges of a senior member except those of voting and holding office. This membership shall be for life and no dues shall be required.

Article V: Officers

§1 The officers shall consist of a President, First Vice-President, Second Vice-President, Secretary and Treasurer. Their duties shall be such as are implied by their respective titles, and as prescribed by the By-Laws.

§2 The officers shall be elected by ballot at the Annual Meeting for a term of one year or until their successors are elected and take office. A majority vote shall be required to elect.

§3 No member shall hold the same office for more than two consecutive terms.

§4 Vacancies occurring in office may be filled by appointment of the President until successors are elected and take office.

Article VI: Meetings

§1 The Annual Meeting shall be held in April of each year at the call of the President. The membership shall be notified 10 days in advance thereof.

§2 Regular meetings shall be held monthly at the call of the President

§3 Special meetings may be called by the President or on a petition directed to the Executive committee and signed by any 10 members. The call shall state the pending business and no other business shall be transacted. The call shall be mailed to the membership at least 5 days in advance of the special meeting.

Article VII: Executive Committee

There shall be an Executive Committee, whose membership and powers shall be as prescribed by the By-Laws.

Article VIII: Board of Trustees

There shall be a Board of Trustees, whose membership and powers shall be as prescribed by the By-Laws.

Article IX: Amendments

The Constitution and By-Laws may be amended at any regular meeting by two-thirds (2/3) vote of all senior and contributing members present, provided said amendment has been presented in writing and read at the previous regular meeting, a notice incorporating said amendment has been mailed to the membership

Article X: Budgets and Expenditures

§1 The President and Executive Committee shall present a proposed yearly operating budget for membership approval at the annual meeting.

§2 The Executive Committee shall have the authority to approve non-recurring expenditures only if these expenditures have been given prior approval by the society, either by approval of the yearly operating budget, or by passage of a motion at any monthly meeting.

§3 The Executive Committee shall have the authority to approve any expenditure deemed necessary to protect the assets of the Society during emergency situations. When an emergency situation occurs, the Executive Committee is required to inform the Society of the nature of the emergency, the steps taken to protect the property of the Society, and the amount of money that was spent, at the next monthly meeting.

Article XI: Code Of Conduct

Any individual that violates Local, State, or Federal Law, or conducts themselves in any behavior that compromises the reputation of the Society, will be referred to a disciplinary board consisting of the Executive Committee and the Board of Trustees.

Bylaws

Article I: Fiscal Year & Dues

§1 The fiscal year shall be from April 1 through the following March 31. The dues year shall be the same as fiscal year.

§2 Dues are payable in April for the dues year then beginning. The annual dues shall be: $10.00 for Junior Members; $40.00 for Members; $50.00 for Family Members; and $10.00 for Senior Citizen Members. Persons applying for membership during the months of April through December pay the above stated annual dues for the current fiscal year (April – March). Persons applying for membership during the months of January through March pay the above stated annual dues, but their membership extends through the next fiscal year. Persons making donations over and above the foregoing amounts shall be called Contributing Members. Four distinguished categories of Contributing Members shall be designated: Sponsors ($60); Supporters ($100); Patrons ($250); and Benefactors ($500).

§3 The Secretary may, with the approval of the Executive Committee, drop from membership any member who is three months or more in arrears.

Article II: Officers

§1 The regular term of all Officers, Members-at-Large and Junior Trustee shall commence at the adjournment of the May meeting.

§2 The President may at any time appoint such additional officers, chairmen and committees as may be required. The terms of all of these (except, as appropriate, special committees) shall expire with the term of the appointing President. The President shall be, ex officio, a member of all committees.

§3 In the absence of the President the First Vice-President shall assume his duties. In the absence of both, second Vice-President shall assume the duties of the President.

§4 The President shall:

1 Preside over all regular monthly meetings and Executive Committee meetings.

2 Establish an operating budget, with the assistance of the Executive Committee, for approval by the members of the Society, per Article X of the Constitution.

3 Oversee the business and legal responsibilities of the Society.

4 Be the official spokesperson for the Society.

§5 The 1st Vice President shall:

1 Provide programs for monthly meetings.

2 Assist the President in communicating to the general public the activities of the Society.

§6 The 2nd Vice President shall:

1 Act as the Chairperson of the AstroAssembly Committee.

2 Submit a proposed operating budget for AstroAssembly to the Executive Committee prior to the Annual Meeting.

3 Have the authority to direct the Treasurer to pay any expenses associated with the operation of AstroAssembly, providing said expenses have been given prior approval by the Society, per the approved operating budget, as defined by Article X of the Constitution, or by motions approved by the members of the Society at any regular monthly meeting.

4 Submit a report of all expenses and income from AstroAssembly at the December monthly meeting.

§7 The Secretary shall:

1 Take the minutes of all meetings, regular, special, Annual and Executive.

2 Maintain an accurate, classified list of the membership of the Society.

3 Notify applicants for membership of their election or rejection, unless they were present at the meeting where this occurred.

4 If required by the President, notify all additional officers, chairmen and committees of their appointment.

5 Send all required notices to the membership.

6 In general, conduct the correspondence of the Society.

7 Have custody of the records of the Society.

§8 The Treasurer shall:

1: Pay on his/her authority any routine bills for periodic, recurring expenses as defined by the operational budget, per Article X of the Constitution.

2: Pay any other non-recurring bills that have been approved.

3: Keep an itemized account of all receipts and disbursements and submit a written report to be published in the Skyscraper newsletter, and presented at each regular monthly meeting.

4: Submit an annual report of all receipts and disbursements for the past fiscal year at the Annual Meeting. Auditors appointed by the President shall audit this report, and the report of the auditors shall be submitted at the next regular monthly meeting.

Article III: Executive Committee

§1 The Executive Committee shall consist of the President, First Vice-President, Second Vice-President, Secretary, Treasurer and two Members-at-Large.

§2 The Members-at-Large shall be elected at the Annual Meeting, and their terms shall be the same as those of the officers.

§3 The powers of the Executive Committee shall be: 1 To advise the President and assist in carrying out the duties of the office. 2 To take any action that might be taken by the Society, unless such action is reserved to the Society at Large in the Constitution or By-Laws.

§4 The Executive Committee shall meet at the call of the President or on application of any two members. The President shall be, ex officio, chairman.

§5 Any Officer, Committee Member and/or appointed Board Member upon the termination of their duties or vacancy of position shall immediately turn over all Society records, property, files, documents, policies, etc. to the presiding President for transmittal to the appropriate party.

Article IV: Board of Trustees

§1 The Board of Trustees shall consist of three Trustees, the term of each to be three years. No Trustee shall serve two consecutive terms. One Trustee shall be elected each year at the Annual Meeting. The Trustee with the longest continuous service shall be the Senior Trustee and serve as the Chairperson of the Observatory Committee. Vacancies occurring in office shall be filled by special election to be called by the President with at least 10 days notice to the membership.

§2 The Board of Trustees shall have custody of the grounds, structures and equipment belonging to the Society. They may at any time establish or amend rules for use of said grounds, structures and equipment, and establish policies for members comprising the Observatory Committee. They may at any time grant or withdraw permission to individuals to use the grounds, structures and all equipment belonging to the Society.

§3 The Board of Trustees shall be responsible to the Society. Decisions of the Board of Trustees may also be overruled by five members of the Executive Committee, all voting In the affirmative.

The Board of Trustees shall conduct an annual inventory of equipment and property belonging to the Society, and submit said inventory list to the Executive Committee prior to the Annual Meeting.

Article V: Quorum

Twelve (12) senior and contributing members shall constitute a quorum for the transaction of business at any meeting as defined in Article VI of The Constitution. At no time shall the lack of a quorum prevent those present from proceeding with the program of the day or evening.

Article VI Rules of Order

The rules contained In 'Robert's Rules Of Order, Revised' shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with the Constitution and By-Laws.

Article VII: Dissolution

Upon dissolution of the corporation, the Board of Trustees shall after paying or making provisions for the payment of all liabilities of the corporation, dispose of all of the assets of the corporation in such a manner as to comply with, or to such organization or organizations organized and operated exclusively under, Section 501(C)(3) of the Internal Revenue Code of 1954.

Horsehead and Flame Nebulae in Orion, taken on February 23 with an 80mm refractor; 56 second exposure with a Mallincam. Photo by Steve Hubbard.

Skyscrapers, Inc. Membership Renewal

Name ______________________

Address ______________________

____

City ______________________

State ____________ Zip ____________

Phone ______________________

Email ______________________

Membership Dues

		Annual Dues (*choose one category*)
Junior (13-17)	❑	*$10*
Regular	❑	*$40*
Family	❑	*$50*
Senior (65+)	❑	*$10*
Contributing (*any amount in excess of annual dues is gratefully accepted as a donation*)	❑	*$*

Magazine Subscriptions*

Members may optionally subscribe to the following publications at a significant discount from their regular subscription rates.
***Magazine subscription rates subject to change at any time.**

Astronomy	❑	*$34.00**
Sky & Telescope	❑	*$32.95** (*$10 savings*)

Total *$* __________

(Make check payable to Skyscrapers, Inc.)

Mail to:
Membership Secretary
Skyscrapers, Inc.
47 Peeptoad Road
North Scituate, RI 02857

Directions to Seagrave Memorial Observatory

From the Providence area:
Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:
Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:
Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:
Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:

• Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.

• Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:
Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

·SKYSCRAPERS INC·

47 Peeptoad Road
North Scituate, Rhode Island 02857