A S T R O N O M Y

# Rochester Skies

*Astronomy Day Outreach ✶ Planetarium Planning ✶ Tips for Beginners*

Rochester Astronomy Club Newsletter Issue #3 Summer '06

Just past the 2006 summer solstice, the RAC has had plenty of fun and excitement. With our Astronomy Day Outreach (pg 2), the Planetarium Open House (pg 14), the RAC web page proceeding nicely (next newsletter), and our Dynascope refurbishing project getting underway (spring newsletter), this year is already one for the books. The best part is, THERE'S STILL HALF A YEAR LEFT! With all hopes that you'll be part of the festivities and your observing nights be fluorite apochromatic crystal clear.

RAC
Rochester Astronomy Club

Come Experience the Universe

**Astronomy Day** **Page 2**

*Success is an understatement! The RAC's first Astronomy day event was a two day extravaganza. Weather, members and the people of Rochester came together for unforgetable astronomy fun. The bad news? We'll have to top it next year.*

### *Quotes from Rochester Kindergartners:*

"Is there an end to space?"
"How did IT (the universe) happen?"
"What are people for?"
"Why would you make the world?"
"Why is earth so small?"
"How did God and Jesus make themselves?"
"How far is it to the sun?"
"Can you tie my shoe?"

## Contents



If you have questions, comments or material for the Rochester Skies newsletter, please contact our lead editor at macastronomer@mac.com

# Astronomy Day '06

with the Rochester Astronomy Club

Astronomy Day '06 will be long remembered by all who witnessed it. The teamwork that helped make it a success was as much a thing of beauty as the celestial objects that were on display.

An important ingredient, which couldn't have been done without, was luck. Clouds tortured the days before the event, and subsequent days weren't much better. Somehow the blessing of two glorious evenings graced the event. The timing was perfect.

*'My favorite impression of our Astronomy Day outreach was seeing lots of kids, perhaps having their first look in a telescope.*

*I was walking past the Kahler Hotel after parking my truck for the Peace Plaza event and saw about 7 kids sitting outside the hotel on benches. I told them that if they wanted to look through telescopes they should go over to the Peace Plaza. They did show up, with a parent, who said her son had a telescope. What are the odds at any time of finding anyone under 10 years of age on a downtown street on a Friday evening who had a telescope?*

*I loved it.'*

*—R Bomgaars*


*Rochester Peace Plaza, May 5th 2006*
*Left; Dave Bailey and son Bobbie Right; Jay McLaren and Don Schlosnagle*

The evening preceding Astronomy day brought a nicely paced audience. Sign-age and availability of scopes was spot on. Interested people chatted with and questioned club members while the Moon and Saturn dazzled. Comfortable temperatures and the Peace Plaza location framed the club's goals as if carefully planned out by a museum curator. The celestial bodies were easy to view and light provided by the location allowed the astronomically curious to see everything that was going on.

*'The best moment of the night for me came, after guiding student after student through star maps to show them "what the R.A. and Dec. of Orion is", when one expressed an interest in understanding what Right Ascension and Declination really were and how they applied to our glimpse into the night sky.'*

*—Scott Regener*

*'Get outdoors, see the sky, learn a few things you never knew.'…' The weather was great, the skies were clear, there was a variety of different sized scopes, and friendly, knowledgeable, amateur astronomers to be great guides to exploring the nighttime sky!'*

*—Brandon Wyman*

*'The two nights were more successful than I could have imagined. Besides clear skies and mild temps, the major thanks goes to the efforts of our publicity "team." Also, Larry's notification of the science teachers prompted them to encourage attendance by their students: clearly the major portion of our attendees. We may well have smaller numbers at subsequent events if school is out. I was also surprised/pleased by the favorable response of both the print and broadcast media.*

*Key for all this was the large number of club participants – just seeing all those scopes had to quicken the pulse! The hospitality/info table was also important: we may need to think of ways to make this easier to identify in the dark (without ruining dark adaptation). The handout materials were great…that sort of thing will be important at any future event.*

*When an event like this is accomplished, the community benefits and the schools benefit but – perhaps most of all – the club and its members benefit. Having folks lining up at a scope to see things they've never seen before reminds us all of the excitement we felt when first gazing at the night sky.'*

*—Mark Callahan*


*May 6th Display tables at Bamber Elementary School*

Upwards of a hundred people attended the first night, although it was difficult to keep count as they came and went. Randy Hemann, RAC president had the brilliant idea to host this as a two-day event and many that attended the first night also returned for the second.

Most of the advertising focused on May 6, the main attraction. Rebecca Bomgaars led the advertising campaign with the help of Amanda Lee. A television news appearance by our unshakable club president, newspaper coverage and fliers brought around 250 stargazers. Lines of people formed early and they lasted for hours. The Bamber Elementary School Astronomy Day event was more successful than any had imagined.

The Moon was a popular target followed up by Saturn and Jupiter. Other targets were also observed throughout the night. Around ten scopes were available and each one got its share of eyeballs.

Kids from the Rochester schools were working on astronomy assignments as families of all ages made the rounds. Many visitors came and went but a few intrigued individuals stayed even later, asking questions and talking about astronomy facts.

Volumes would have to be written to say enough about the RAC members who gave of themselves before, during and after the event. Every individual proved themselves stellar!

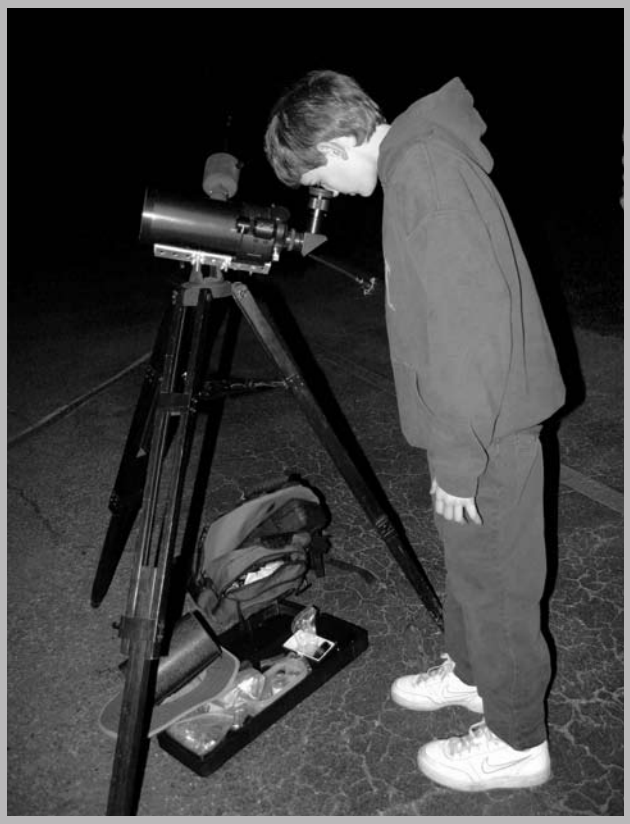
RAC

*'My adrenaline was pumping faster and faster as more curious on-lookers arrived at Peace Plaza on May 5th! I think that was very rewarding to see the same people who stopped at Peace Plaza also come to Bamber Valley the following night. Way to go fellow Rochester Astronomy Club Members!!! I feel as though both public viewings were a huge success for us!*

*Thanks Randy for meeting with the News Crew, I think that really helped us too!'*

*—Amanda Lee*

*Left; Attendee at Kirk Severson's 90mm Maksutov Cassagrain*
*Right; Mike Currie next to his 10" dob*



# Rochester Moments

*Since moving to Rochester in 1995, my wife and I have accumulated a long list of magical memories that we have come to recall simply as "Rochester moments." Having lived in Los Angeles, we had developed a jaded attitude about community life- just surviving without car theft, drive-by shootings and police surveillance helicopters brought joyful thanksgiving for us urban dwellers. When we moved to Rochester we suddenly realized that there was more to community life than just survival. We realized that we needn't be suspicious of every stranger, and that sometimes things that were too good to be true were still true. Discovering an unexpected walking path in our neighborhood and spending a sunny afternoon releasing monarch butterflies at Quarry Hill Nature Center were just two early examples. There have been many since. Some of these experiences give me a faint taste of what heaven will be like. After 11 years I thought we had pretty much used up all our "Rochester moments." Not quite. We got an invitation a few weeks ago to meet at the local school as dusk settled and twinkling stars came out. Assembling there in the parking lot were neighbors and friends...the little kids from next door who weren't so little any more...the new church acquaintance and those familiar faces from work. It was a quiet neighborhood gathering like an old-fashioned ice cream social that my grandparents might have enjoyed. But it was different. There in the dusk were a dozen telescopes of every description, each with a proud amateur owner eager to share a bit of eternity with novices who had never before seen with their own eyes the moons of Jupiter or the seas of the moon. Patient lines formed as we took our turns looking skyward. Mouths hung open in quiet disbelief. Junior High School students flitted from scope to scope, filling out worksheets and asking questions like "is this a refractor?" and "what's the magnification?" We were amazed that as we gazed at lunar craters, we could watch the moon slide slowly along in the eyepiece- could it be that the earth is turning that fast? There was no cost, no hidden catch, no secret commercial motivation. This was a group of kind people sharing their love of galaxies and planetary wanderers with a midwest neighborhood on a warm spring evening. This was another "Rochester moment." For me, the most profound aspect of the evening came through the eyes and words of my 7th grade daughter. She turned to me after silently gazing at a brightly-ringed Saturn hanging in the dark sky. Her eyes were wide. "When I look at that lonely planet out there in space- it SCARES me" she said in a hushed voice. That's how astronomy should be.*

**"...sometimes things that were too good to be true were still true."**

*Thank you Rochester Astronomy Club!*

*Jim, Laura, Elizabeth and Christina Maher*

*'My daughter, Amanda Lee, invited me to the RAC event, fueling my interest and excitement to view night sky objects with the benefit of member's shared equipment. Though we had often discussed the Club and the generosity with which it was shared with the public, I was amazed at the numbers of telescopes and binoculars and members who turned out in an effort to share this awesome facet of our world! I saw members showing from young children to the elderly, giving tidbits of information on the level of each ones' understanding, pointing out specifics on the moonscape that the inexperienced would never guess at; the light on the twin peaks and seeing them change out from the shadows; seeing the different moons of Saturn and naming them, as well as how the rings could be distinguished from each other. And to think that all of this is available to view, even in the heart of downtown!!*

*Everyone was welcomed and offered an opportunity to peak an interest as they peeked outside our daily world. I was one of the outsiders that night, and I applaud everyone's efforts, and would certainly feel you could call the evening a huge success!! Kudos to RAC!'*

*—Mary Lee*

*See you April 21st, 2007 for the next Astronomy Day!*

RAC

Rochester Astronomy Club

**The fourth of July is around the corner. You'll be in view of Silver Lake, waiting for dark to view the annual celebration of United States independence, just like thousands of other people. Imagine all those people lining up to look through your telescope!**

**Join the RAC as we display the Moon and Jupiter at Silver Lake Park on the 4th of July. The Moon will peak before 8:00 and by 9:00 Jupiter will be viewable to all.**

**People are needed to make this a success and much planning needs to be done. The person who may sit next to you at the next RAC meeting might find out about us at this outreach. Will you be there to tell them about us?**

## 4th of July RAC Outreach

# The RAC wants YOU

The RAC wants to thank you for attending meetings, star parties and outreach events. We try to make them as enjoyable and educational as possible. We just want to ask, how would you like to share in the RAC efforts? Please read through and consider these possibilities. I guarantee you will learn even more being part of the Rochester Astronomy Club while you experience it.


## *Give a Talk*

Is there a subject that peaks your interest? If you're an expert on the subject you are half done, but you don't have to be an expert to give a talk. Start by doing some research and compile the information. Build a presentation with this information and let Mark Callahan know that you are interested in giving a talk. You will be scheduled with plenty of time to prepare. It's as much fun giving a presentation as it is to sit back and watch them. The process will make you more knowledgeable and also help retain the information better.

## *Write an article*

If you are not one to stand up in front of people, there is another option: write an article for the newsletter or webpage. Take as long as necessary to get your article just the way you want it. If you need help with graphics or proofing, contact Duane Deal and he'll assist you. You'll become part of the historical pages of the RAC!

## *Web info*

Would you like to gather information for the web site? We have many tasks that need to be accomplished before our web page is complete. At the moment we are planning an on-line dictionary with pronunciation, sky atlas with objects divided into novice, amateur and veteran while stating necessary equipment and sky requirements for finding these objects. Other web tools will be added as we go. There will be a lot to do for a long time. One day we'll have a knowledge-packed complete astronomy web page and you will have been an important part of it.

## *Events*

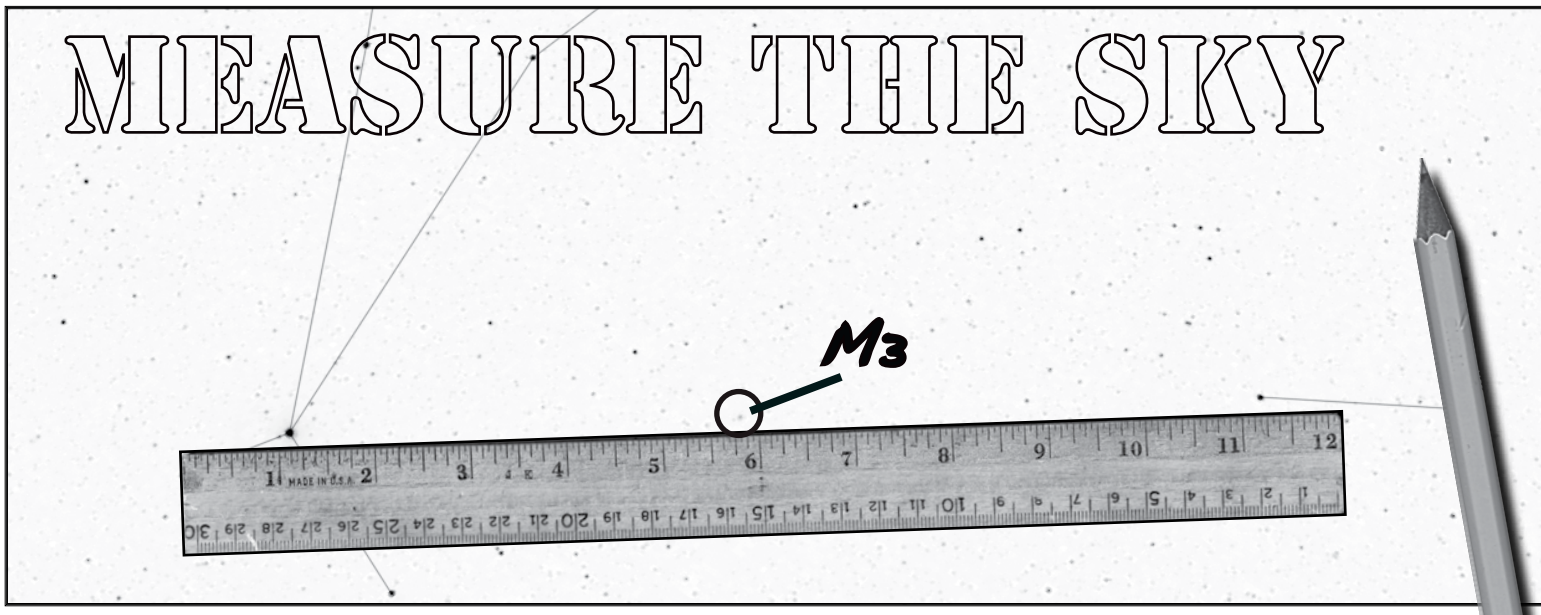
When the Astronomy Club puts on an event, we need help getting and keeping it together. Every *Star Party* needs publicity and leadership. *Outreach* events are a group effort and there is a lot to do before, during and after. Let Randy Hemann know if this is where you want to help. Your help is appreciated and you'll find it very rewarding.

## *Donate*

Do you have more money than time? We're open to your help too. At the moment, we are not setup to allow tax-deductible donations, but we do have financial needs. Outreach items need to be purchased as well as acquiring items for our library. We also have many current obligations that require funding. Being a RAC donator is as important as any of the jobs above. If you'd like to join our contributors, contact our treasurer Rebecca Bomgaars.

Don't feel obligated to do any of these things. We are happy with the many members we have and want to continue to serve you. But if you want to jump in and help, we're eager to let you.

# MEASURE THE SKY




Measuring the sky may seem daunting at first. Don't worry; remembering a few pointers makes it easy. Soon you'll see that the most important pointers are the ones on your hand—your fingers!

The largest increment of angular measurement is the *degree*. The sky looks like an all-encompassing globe containing 360 degrees (360°). Smaller increments include arc minutes and arc seconds. One arc minute (1′) is 1/60 of a degree, while one arc second (1″) is 1/60th of an arc minute or 1/3600 of a degree. An arc second is equal to a dime 2.3 miles away! That precision will not be required for this article's purposes.

You don't need to run out and buy a ruler to measure the sky. You already have one, your hand! Held out at arm's length, your hand can measure several different distances in the sky. In order for this to work, hold your arm all the way out. Extend your little finger. It covers 1° of sky, the primary increment of measurement.

## THE MOON

Begin by testing the Moon illusion, where the Moon looks larger when closer to the horizon. The next time you see a HUGE Moon on the horizon, measure it. The Moon is only half of a degree; therefore, half the width of your little finger, or about the width of your little fingernail. After the Moon soars up and "shrinks" to its usual visual appearance, verify its size. What an incredible illusion!

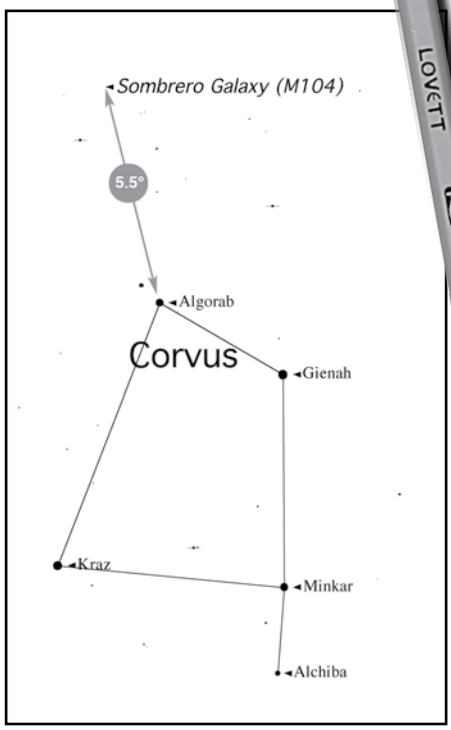
Next, your first three fingers held together at arm's length measure 5°. The width of the little dipper's bowl is about 5°, the same as the depth of the big dipper's.

## M104

The constellation Corvus (KOR-vus —The Crow) points the way to M104, the Sombrero Galaxy, just 5.5° from the corner star that's doing the pointing.

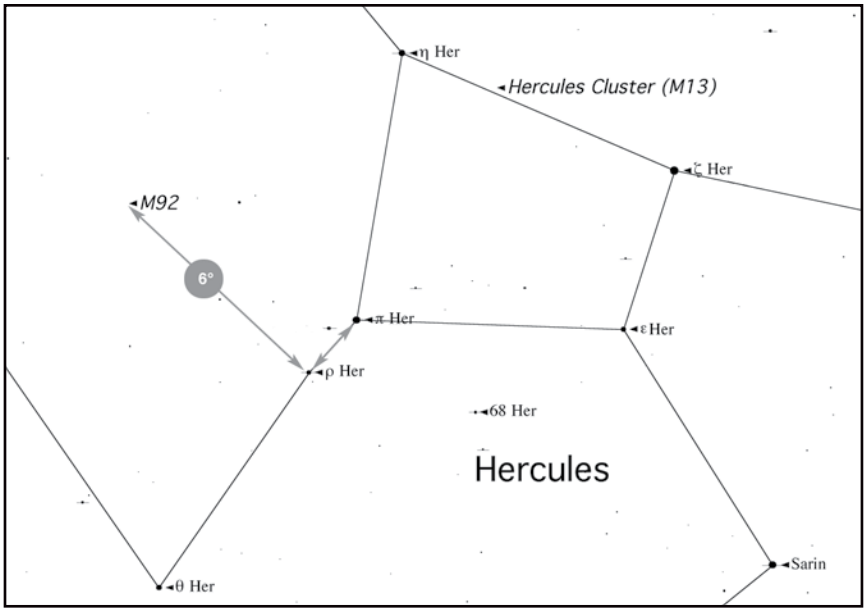
## M92 & M13

Need help finding M92? Locate the keystone asterism at the center of Hercules. One of the corners has another star very near it (about 1.75°). Imagine a capital letter "L".




The base of the L is the 1.75° line connecting these two stars. The long line perpendicular to the base extends from the dimmer star and completes the L. Follow this line out 6° (the first 3 fingers plus your little finger, 5+1=6°). At that point you are right on top of the tightly packed globular cluster M92!

This L will also help you locate another great glob. If you extend the base of the L 6° into the opposite keystone line, you'll be very near M13, the Hercules Cluster.



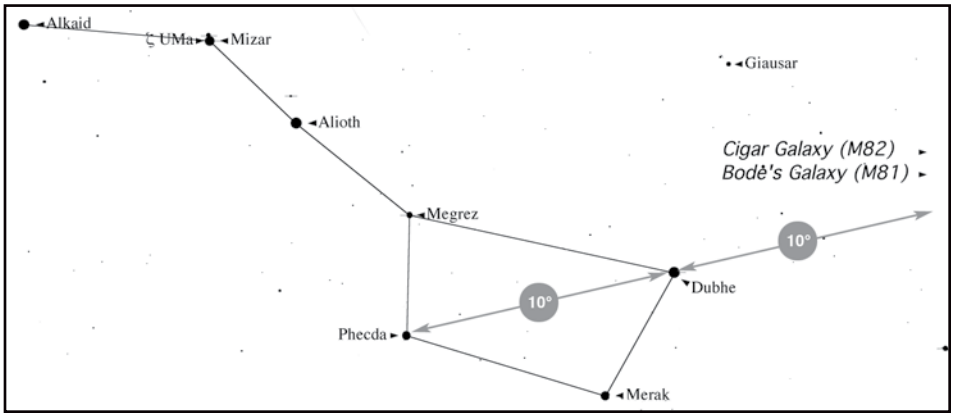

## M81 & M82

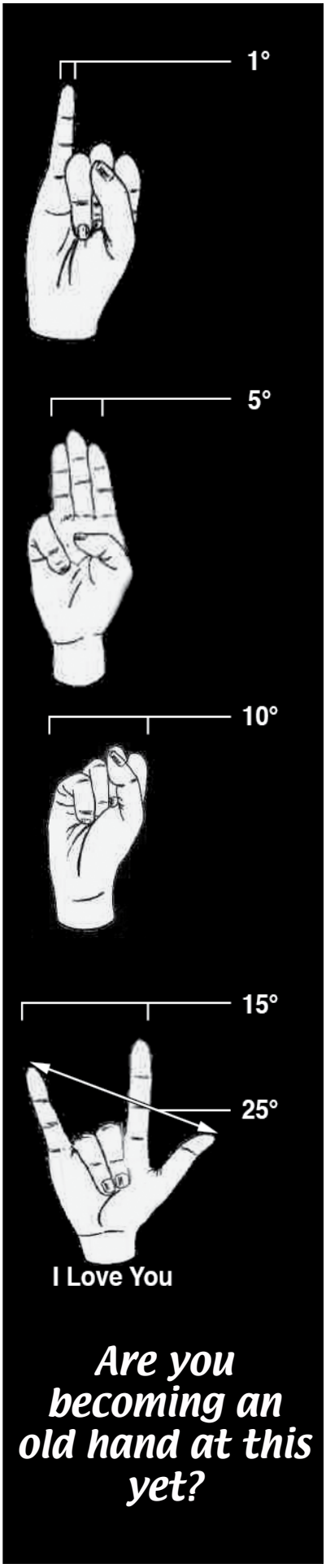
Remember that time you carried out all your equipment and sat at your scope just as the clouds rolled in? While you were shaking your fist at the sky, you were measuring 10°.

It's time to shake your fist at the big dipper. Measure from the star at the bottom of the bowl, on the handle side of the big dipper, to the opposite bowl star (where you'd sip your soup). This line is 10°. Extend this line another 10° and you're just under M81 and M82. A pair of perfect 10s on anybody's Messier list!

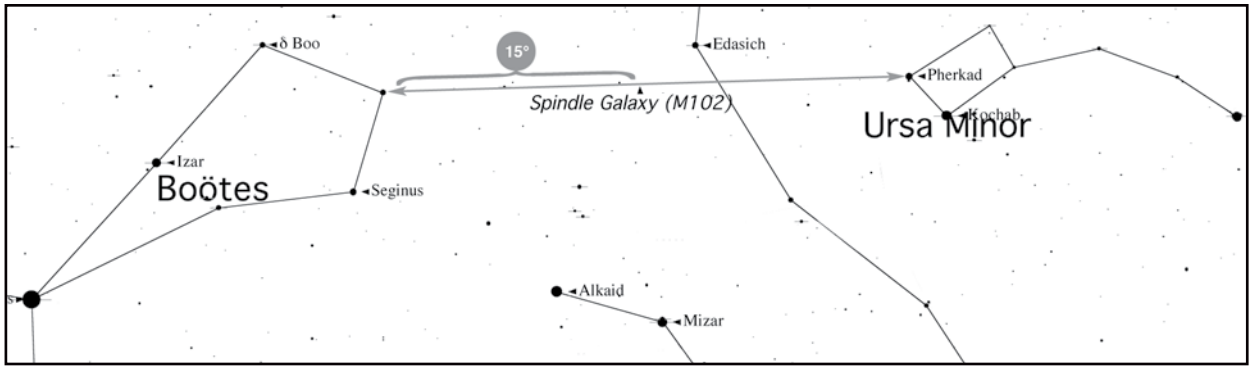
## M102

You'll reach 15° as you stretch your index and little finger out as far as you can. Do this while extending your thumb is sign language for "I love you". If you love edge on galaxies, measuring 15° will help you find M102, the Spindle Galaxy. Just remember, it's the separation between the index finger and little finger that make 15° (not the thumb). Given that your skies are dark enough to see M102 at apparent magnitude 10, you can see the kite asterism of Bootes (boh-OH-teez — The Herdsman). Nekkar is the 3.4 magnitude star forming the top of the kite. Arcturus is the bottom (the handle of the big dipper "arcs to Arcturus"). Now visualize a line from Nekkar to Pherkad (the farthest star from Polaris in the Little Dipper). Measure out 15° along this line, starting from Nekkar and you'll find the little spindle of an edge on galaxy. Yep, that's M102!

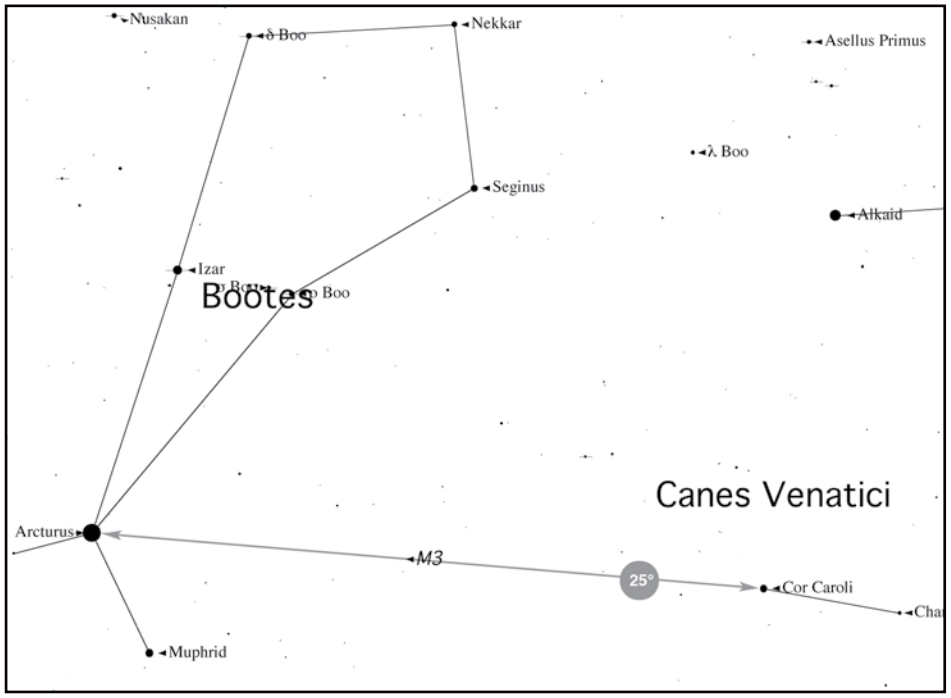


# M3

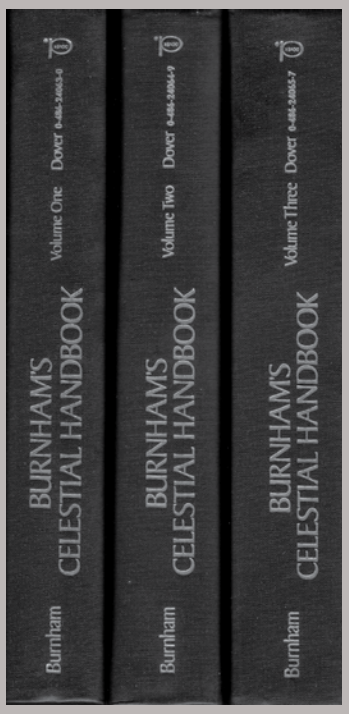



Look at that "I love you" sign again, except this time use the distance between the little finger and the tip of your thumb. That's 25° of I love you! Use this measurement to spy out M3. Canes Venatici, (KAH-nez ve-NAT-eh-see — The Hunting Dogs), is a lonely constellation in an urban sky. Many will only see its brightest star Cor Caroli (KOR Kah-ROH-lee) about 15° under the big dipper's handle. Cor Caroli is easy to verify, as it's an easy to split double with 20″ separation. It lies 25° from Arcturus. If you follow the line from Cor Caroli to Arcturus, you'll bisect the globular cluster M3. This messier object is nearly right in the middle of this 25° distance, slightly closer to Arcturus.




There are many more objects to try your hand at. Keep star hopping with your digits and in no time you'll know the sky like the back of your hand. RAC

—*Duane Deal*




## BURNHAM'S CELESTIAL HANDBOOK

A REVIEW BY DEAN JOHNSON

"The stars are pretty, but they all look the same to me."

That quote came to me from my lovely wife, Betty. Deeply wounding though it was, she had a point. When we look at the sky, we need to know two things. Where to look and what we're looking at. There are numerous sky atlases available, I have used the Peterson Field Guide to the Stars and Planets for my Messier search, and have since upgraded to the Sky Atlas 2000, Deluxe Edition, for my double star search. That gives me the where. But the what I'm looking at is enclosed in the incomparable three volume set of Burnham's Celestial Handbook (BCH).

Its author, Robert Burnham Jr., was a member of the Lowell Observatory in Flagstaff, Arizona, and spent his life compiling extensive notes on everything he looked at, eventually putting it all together in the BCH.

It begins with a six page introduction, a thirty one page Introduction to the Universe, a fifty-two page Fundamental Knowledge for the Observer section and a five page section entitled "How to Use This Book".

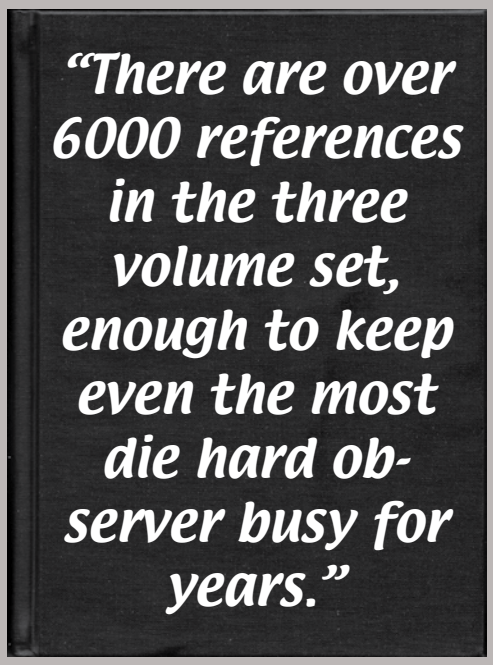
This gives even the most inexperienced beginner enough knowledge to understand 80% of the material that follows in the three volume set.

What follows is an exhaustive breakdown of all 88 constellations in the sky, taking us alphabetically from Andromeda to Vulpecula, covering the entire sky from pole to celestial pole. Are you planning on taking a trip to Australia? Don't forget to bring along your Burnham's Celestial Handbook. All the glories of the southern sky are at your fingertips, in a section on each constellation.

Each constellation begins with reference pages on double and multiple stars, variable stars and a list of star clusters, nebula and galaxies to be found within that constellation. These reference pages are followed by short texts on the principle stars in the constellations, followed by double stars, variable stars, and deep sky objects such as star clusters, nebula and galaxies. Each object is described as to its importance in the constellation along with its historical significance, culturally and astronomically, if any.

There are over 6000 references in the three volume set, enough to keep even the most die hard observer busy for years. I bring the BCH out with me every single time I go out, quote from them constantly, to the point where my favorite observing buddy Duane has expressed an interest in getting them and urged me to write an article on them.

At star parties they are especially handy when some member of the public looks in a telescope and asks some pertinent question on the object. I am a big fan of double stars and once when two lady chaperones of a girl scout troop were looking at Gamma Leonis, I quoted Burnham's by saying, "Those two stars are separated by one and a half times the diameter of our solar system." They started laughing, amazed that two so tiny points of light, so close together could be separated by such a wide distance. But those of us who know a bit about double stars know that they can be both much closer and vastly farther apart.




I like to get in a lot of telescope time. On nights when there is a lot of moonlight, I can extend my observing by picking apart a constellation. I start with the alpha star, the brightest in the constellation, and work my way through the rest of them listed in Burnham's Celestial Handbook. As I look at the stars, I sit at my telescope and switch on my red cap light to read about them. They each have their own characteristics, size, mass and age. In learning about them, they do not all look the same to me. By doing so, I deepen my knowledge of the night sky. It is a peaceful and rewarding pursuit.

Do you ever wonder about how planetary nebulas form? What Cepheid variables are and why they are so important? Our understanding of nova and supernova? White dwarf stars? All these subjects and more are discussed in the BCH by describing the most famous or best known object followed by an in depth study on those objects as a whole.

For those of us interested in getting observer certificates from the American Astronomical League, the Burnham's Celestial Handbook is priceless. I am currently trying for the Double Star award, and once I downloaded the list of 100 double or multiple stars from my computer, the first thing I did was to go through my journals and Burnham's Celestial Handbook to see how many I had observed and how many were listed in the BCH. I had seen 33 of the objects in question and Burnham's lists 56. Burnham's provides a broad base of knowledge for any observer.

There are two things I would like to see changed in Burnham's Celestial Handbook. The pictures are in black and white instead of color. I think color pictures would be more stimulating, especially for the casual reader or novice astronomers. Secondly, the years for double stars in their orbits are more pertinent to the nineteenth and twentieth centuries, and it would help observers if in a new edition of BCH they were updated to fit the twenty-first century.

The older dates and black and white pictures do, however, give the reader the feel of astronomy in an older era, when Percival Lowell was peering at the heavens and Mt. Palomar was in its heyday.

I simply love these books. On many a night they have traveled with me outside under the heavens. On other nights, especially cold winter nights, I sit in a chair in my library with a blanket and hot buttered tea to pore through my star atlases and Burnham's Celestial Handbook and try to imagine what it would be like to sit under the stars on a warm Australian night. If I ever do get there, Burnham's Celestial Handbook will be with me.

RAC

## Pssst... Hey, Buddy!

—Scott Regener

# Want to Buy a Telescope?

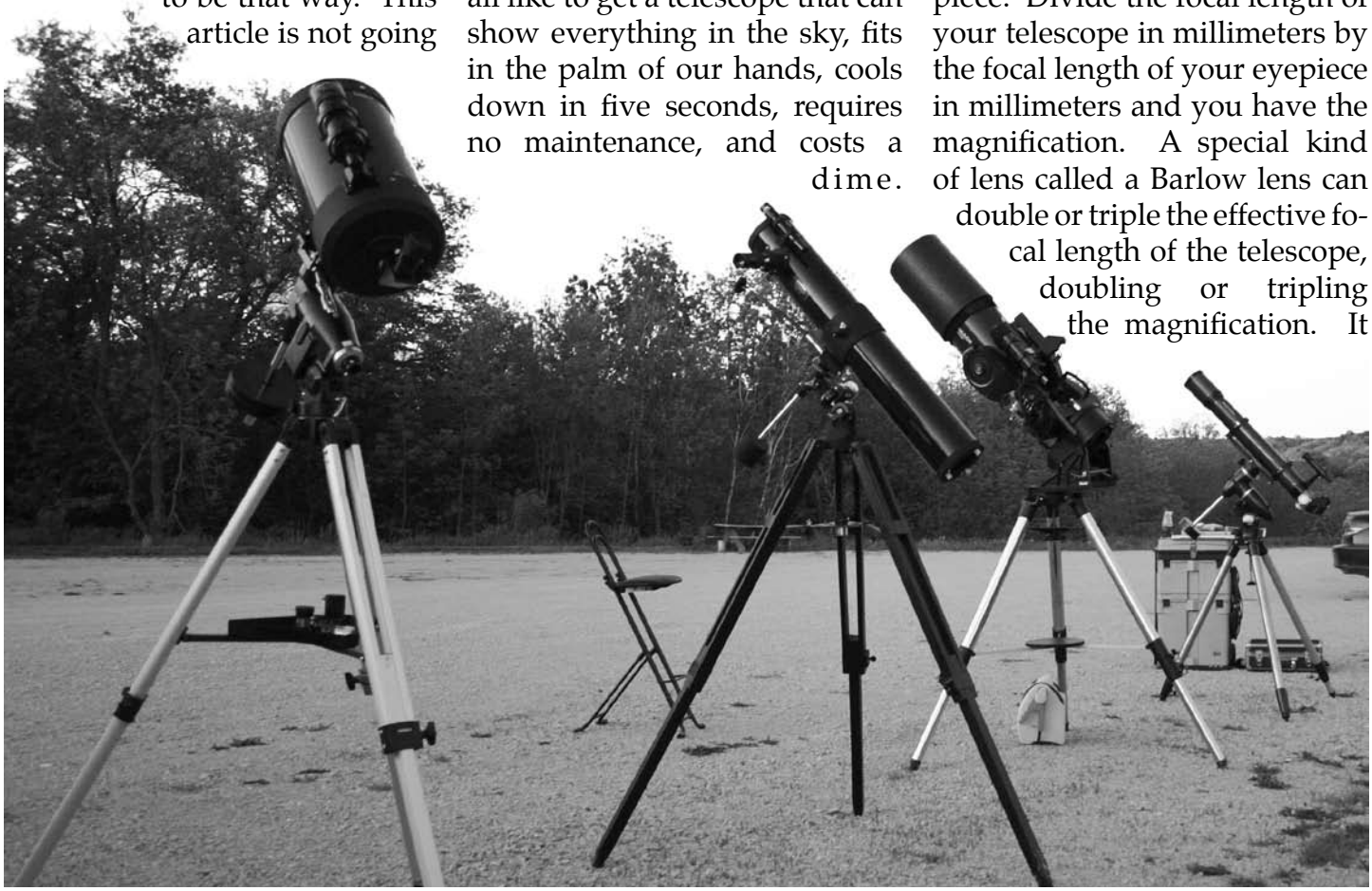
Buying a first telescope can feel a little like buying a used car. There are lots of technical details and statistics, a large variety of options, and prices that range from the cost of a tank of gas to a modest car. For every successful telescope purchase, there must be at least four failures (a statistic gleaned from my own personal experience.) Scour the Internet and there are a million different opinions about which telescope is the best, often with flame wars (heated discussions full of ad hominems). In short, there are so many choices to be made that selecting the first telescope can feel a lot like throwing a dart at a catalog. It doesn't have to be that way. This article is not going to tell you which telescope to buy, but will guide you through some of the minefields so you'll do better than firing away at that dartboard.

### A 'Scope for Every Sky, Gal or Guy

The best telescope for you is the one you use the most. A telescope that sits in your garage isn't going to show you any of the wonders of the universe. It doesn't matter what size the mirror is, what you spent, or its brand name. If it doesn't get used, a telescope is wasted. Every telescope is a compromise. The telescope that works best for you may be unacceptable to someone else. We'd all like to get a telescope that can show everything in the sky, fits in the palm of our hands, cools down in five seconds, requires no maintenance, and costs a dime. Until they develop that telescope, something has to give. Don't buy a telescope just because someone else likes it. Don't buy a telescope because you read somewhere that it was perfect for a beginner. Buy a telescope because it will get used – and only you know what you need and what you can handle.

### Power Trips

"See the universe! Up to 575X magnification!" There will be plenty of boxes that advertise just how powerful a telescope is. Don't believe it for a second. Magnification is a function of two focal lengths; that of your telescope and that of your eyepiece. Divide the focal length of your telescope in millimeters by the focal length of your eyepiece in millimeters and you have the magnification. A special kind of lens called a Barlow lens can double or triple the effective focal length of the telescope, doubling or tripling the magnification. It



doesn't take long to see that if your telescope has a 700mm focal length, you can come up with some pretty incredible powers with a 3.5mm eyepiece. Add a Barlow lens to the mix and pretty soon we're talking astronomical numbers. The sad truth is that telescopes just don't work this way.

The focal length doesn't limit the magnification of your telescope. The atmosphere does. A larger primary lens or mirror (called aperture) will increase this to a point, but only to a point. The largest telescopes in the world are still limited to about 600 power. A good general rule is to take the aperture of your telescope in inches and multiply that by 50. For a 2.4" telescope (sold as 60mm), you should expect no better than 120 power on a perfect night, and only half that on an average night. Any eyepiece which yields more power than this won't focus.

### Test Drive a Ferrari, Kick the Tires of a Taurus

The worst thing you can forget to do is to go to a star party before you buy. A star party is a public gathering of astronomers and telescopes. Owners are all too happy to tell you the best and worst of their experiences. You'll get to look through many, and might even be able to test out different telescopes, moving them around and seeing for yourself what you like and dislike about each type.

After your purchase, take your new telescope to another star party to have it checked out. Experienced eyes can confirm that everything is as it should be, or spot defects that you might not notice.

### My Back! My Poor Aching Back!

As you flip through catalogs, it's easy to get "aperture fever," a condition where you lust after bigger and bigger telescopes. Unless you're planning on putting the telescope in a fixed building, however, you're going to have to move it. Depending on how much it weights, you might need two or three people just to get it out of the garage . Only you know how much weight you can lift or carry, so choose a telescope that doesn't push you beyond what you can handle. Some telescopes break down into pieces for transport, so pay attention to the heaviest component, not just total weight.

***"The worst thing you can forget to do is to go to a star party before you buy"***

If you want to bring your new pride and joy to a star party, but you just traded in your sport utility vehicle for a 2-door Spec, that big telescope you're eyeing just might not fit. Don't forget room for yourself and your passengers!

### Just $49.99 for the Telescope of Your Dreams!

Many "starter" telescopes use an inferior eyepiece size called 0.965" which refers to the diameter. These eyepieces are almost always of inferior quality and limit your real field of view. Look for a telescope that takes 1.25" or 2" eyepieces. While you can buy an adapter for the 0.965" telescope, odds are good that if they cut corners on the eyepiece holder, other important corners got cut, too. Don't expect to find a great telescope at a grocery store or camera store, either. Most of these stores rely on fancy graphics and low prices to sell their stock, not sound design and quality.

### Shake, Rattle or Roll?

The best telescope with the best lens or mirror isn't going to be fun to use if it shakes whenever you touch it. The larger the telescope and higher it is mounted, the heavier the mount needs to be to stabilize it. If a telescope shakes when you touch the focus knob, it will be very difficult to achieve a sharp focus.

### It's the Economy

A telescope can be a significant investment. Try to be reasonable in your purchase. A well-designed telescope doesn't have to cost a fortune, but the line between a quality telescope and a toy is blurred at the low end of the price scale. Keep resale value in mind, too. The online classifieds at www.astromart.com are a favorite of many for buying, selling, and price comparisons.

### Conclusion

Remember that buying a telescope isn't an end in itself. Get out there and observe, no matter what tools you have! RAC

# A POTENTIAL PLANETARIUM REVOLUTION

BY LARRY MASCOTTI

# From Bulbs to Bits

It is said that Helen Keller was once asked if there was anything worse than being blind. "Having no vision," she replied. Forty years ago members of our community envisioned a response to the national science education crisis that was exposed by the launch of Sputnik, the Mayo High School Planetarium. In the four decades since its opening 735,000 visitors have entered this gymnasium for the mind and have been engaged in seeing that the sky is not the limit, it is only the beginning.

Discussions began last fall within the district that examined revisiting and refreshing the planetarium classroom vision of four decades ago were led by school board member Fred Daly and Director of Curriculum and Instruction Randy Nelson. After attending the annual meeting of the Great Lakes Planetarium Association, Larry Mascotti recommended that a local display of the new technology viewed at the conference be arranged. An open house demonstration of the new all sky digital projection equipment was held at Mayo High School on Tuesday, June thirteenth. During the afternoon school district administration, staff, students and community members viewed the capabilities of the equipment. Twenty-three members of the club saw a more astronomical focused presentation as the program for the monthly meeting. Phil Groce representing Konica Minolta put the Mediaglobe projection system through its paces.

Planetariums have a long history as virtual reality learning environments. Developments in digital display technology are now extending the capacity of the dome ceiling classrooms beyond the self-induced limits of optical-mechanical planetarium projection systems. In essence, this innovative technology transforms the current dome into a computer display screen that is only limited by software input code. Digital display systems leverage the capacity of the human eye to gather dynamic, colorful, multi-perspective and real-time information.

***735,000 visitors have entered this gymnasium for the mind***

In its current configuration the planetarium projection system simulates only the features of the current night sky. In addition observations that require hours or months in nature to happen can be compressed into shorter time spans. A change in viewpoint is possible by adjusting the sky to reflect a change in the latitude of the observer. A limited number of auxiliary projectors displaying such natural occurrences as the northern lights are also a part of the current equipment inventory. A few electronic astronomical reference/measuring tool are capable of being projected upon the dome.

The present system represents a basic set of classroom tools. Along with Quarry Hill, the planetarium is really the elementary science language lab for the district. The language labs of the past were sufficient but with the new third generation technological advancements these classrooms have enhanced instruction far beyond the limits imposed by the equipment available in the 1960's. The impact of such an equivalent planetarium upgrade would move this classroom from the past into the future. As Dr. Richard Robb of the Biomedical Imaging Resource at the Mayo Clinic notes, "When a new technology rolls over you, you can become part of the steamroller or part of the road." Language (attaching words to ideas) is a recent invention by our species. Most humans that lived before us experienced the world. They did not codify it. Today we often learn the words than build the context for meaning, perhaps without direct experience. Evolutionarily speaking, the planetarium is more natural for the learner. Perhaps this is one reason why children like the planetarium environment so much. Educationally the planetarium allows for a concrete sensory experience first that than allows movement to abstract higher thinking skills.

Moving from a mechanical system to a digital system is a very large leap in teaching technology. The digital tool is much more versatile and its basic nature allows it to evolve as the future un-

folds. Its boundaries are not mechanical but rather mental. It supports present educational capabilities but deepens the learning by visually enriching every aspect of current basic instruction. As a point of illustration a student would experience a more realistic illusion of a sunset than is presently possible. The use of a greater variety of learner modalities would increase as vocabulary used in lessons would not only be spoken but projected upon the screen. As another example a clock could be displayed that would help students appreciate the passage of time that is required for a particular astronomical event to transpire. A digital projector has all sky capability. Instead of a day sky with a few static slide projected clouds, the entire dome could be covered by moving clouds with the new equipment. Such an experience can be likened to a view one has observing fish from the outside of an aquarium versus the view one gets from being inside the aquarium. The new dome experience would be that magnitude of change for the learner. A student response "clicker" system coupled with such equipment would make for a very interactive and individualized learning environment.

It expands the capacities of a student by leveraging the ability of a human to learn from viewing phenomena from different perspectives. Astronomy lesson often require students to change perspectives. From the earth we see the apparent motion of the sun across the sky that results from the real motion of the earth. With this technology a student could engage appropriate explanations via a "split screen" format. Current backyard views of the constellations would be expanded by virtual trips to and through the constellations. Mars would no longer be just a red dot against the starry backdrop it would become a place. Virtual flyovers and renditions of 3-d surfaces would answer any student queries far beyond current capacities. Coupled to the internet the dome could provide the most current image or simulation as an answer to any inquiry.

There are other areas of benefit as well. Community Education offerings could be expanded in number and variety. Digital communications is the currency of exchange that all institutions of educational instruction, i.e. NASA, are using. Such science language lab tools would allow this classroom to network with others as a full participant in the flow of resources that are emerging. By having the technology that would allow access to the growing library of software demonstrations and programs this classroom would no longer be isolated from the real world that lies outside its doors.

***"When a new technology rolls over you, you can become part of the steamroller or part of the road."***

**—Dr. Richard Robb**
**Mayo Clinic BIR**

The potential to transform the current planetarium lab space into a new science center and visualization lab is a topic I hope many of us will have a continuing conversation about in the days ahead. My strong desire would be that such a teaching tool would still be focused on quality student centered learning. As visual beings the large display format has the potential to stir the imagination and communicate effectively and efficiently. These are attractive classroom features. Such a transformed learning space would offer many new directions for the district to consider.

Born out of a national crisis the planetarium is still central to a current science education crisis. Minnesota is below the national average in the number of students taking science, technology, engineering, and mathematics courses. Minnesota now ranks 29th among the states in engineering degrees granted, a 13% decrease between 1995 and 2000. As Douglas Ruchkoff reminds us, "Science is not a force that corrupts our nature; it is the open-minded wonder that returns us to it…We ache to let go of our postured pretentiousness and surrender to that sensation a kid gets at Epcot Center or a planetarium…The jaw drops, the eyes widen, the mind opens."

During an episode of Star Trek: The Next Generation, an alien science minister tells Captain Picard, "When I was a child, my parents used to take me to the planetarium. I used to sit there in the dark watching the stars. It was like being in a spaceship, going to other worlds, meeting other people…I have been prepared for the realities of space travel since I was nine years old, sitting in a planetarium." Thinking about space helps us mentally rehearse for the future.

I am looking forward to working with club members in exploring options that will allow the district to leverage the unique qualities of this very special community resource. Now it is our time to build on the vision that we have inherited. Working together we will find that the Mayo High School Planetarium is still the place where students connect awe with "aha". RAC

# Rochester Skies

*Newsletter of the Rochester Astronomy Club*


## Upcoming Events

| | | |
|---|---|---|
| **4th of July Public Outreach** | **July** | **4** |
| **Club Meeting at RCTC** *Making your own telescope—Bill Davidson* | **July** | **11** |
| **Star Party at Eagle Bluff** | **July** | **21-22** * |
| *Second Chance* | **July** | **28/29** |
| **Nebraska Star Party** *Valentine, NE* | **July** | **23-28** |
| **Club Meeting at RCTC** *Solar Eclipse '06—Randy Shekeruk* | **August** | **8** |
| **Sola Fide Observatory Star Party** *Austin, MN* | **August** | **25-26** |
| **Club Meeting at RCTC** *TBA* | **September** | **12** |
| **Illinois Dark Sky Party** *Springfield, IL* | **September** | **21-24** |

*Star Parties subject to change due to weather. May occur on Saturday following the set date. There may also be alternate locations.

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