

NOVAC

THE NEWSLETTER OF THE NORTHERN VIRGINIA ASTRONOMY CLUB

Issue Number 49

Volume 13

September/October 1993

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UPCOMING NOVAC EVENTS

Club Observing Dates

September 9, 10, 17, 18
 October 8, 9, 15, 16

Monthly Meetings

September 15
 October 20

NOVAC Board of Directors

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Editor's Note

by Thomas S. Parry

This has been a spectacular summer of observing for me! Of course I spent most of it away on vacation; a week in upstate New York and three weeks in the Rocky Mountain West under some of the clearest, cleanest skies I've seen in years. While in Utah, I joined the Salt Lake City Astronomical Society (SLAS) in an all-night *Perseid Meteor Vigil* August 11-12. The observing site, located approximately 30 miles east of the city at an altitude of 6,000 feet, boasted unobstructed horizons and pristine black skies.

Because the predicted *Perseid Storm* was so widely publicized, people flocked in hordes to the site in hopes of getting a glimpse of the meteors. Several Salt Lake City television and radio stations set up remote links at the site and interviewed anyone they could. Roads leading to the site were bumper-to-bumper headlights as individuals came and left throughout the night. Many SLAS members set up telescopes including an eight-inch f/15 classic refractor on a massive equatorial mount. All told there were some 50 telescopes set up by 10:00 P.M. and still others arrived and set up after midnight. It was the largest public star party I had ever

attended and I later learned that it was the second largest in Utah history after Halley's Comet!

In spite of the great sky conditions and crowds of people, the *Perseid* storm never materialized. I counted between 35 and 40 meteors over a three-hour period of time

planetary observation. At one point late in the evening I counted over 25 people in line waiting to see through the big eight-inch refractor. That night was some experience!

Closer to home, NOVAC members gathered at Crockett Park for a *Perseid vigil* of their own on August 11. Jon-Stewart Taylor summarizes the results of their observations and experiences in this issue.

In addition to our regular columns, this month's newsletter features two articles from NOVAC members interested in pursuing careers in Astronomy and Space Science. Both traveled to Southern California earlier this year on a prearranged familiarization tour of the California Institute of Technology (Caltech), JPL, Griffith Observatory and Mt. Wilson. Scott Driggs, a recent graduate of the Thomas Jefferson High School for Science and Technology will attend Caltech this Fall. His article, *A JPL Weekend*, describes Caltech and JPL facilities and the feelings he had as he met with top scientists and learned of the incredible projects underway there.

Leah Foechterle will be a senior this year at the Andover Academy in Massachusetts and also has her sights set on Caltech. Her article, *Memories of Mt. Wilson*, describes the Mt. Wilson telescopes, a meeting with

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from 9:00 - midnight. Many were bright fireballs that left impressive trails. The fact that the skies were so clear and there were so many telescopes present provided a nice diversion in the way of deep sky and

Observatory Director Robert Jastrow and includes information on the new *Telescopes in Education* Program soon to be made available to teachers and amateurs.

Readers should note that due to space limitations and inclusion of the Annual NOVAC Membership Directory in this issue of the Newsletter, Robert Bunge's column *Reflections in the Eyepiece* will not appear. *Reflections* will return in the November/December issue with the first in a series of installments on light pollution.

**The 11th Annual
Northern Virginia
Telescope Meet,
NOVAC's biggest
annual event, is slated
for Saturday
September 18, 1993
beginning at
3:00 P.M. at C.M.
Crockett Park.**

***See details in
this Issue!***

Finally, Fall is coming and that means clearer skies and better observing conditions for our area. I hope we can all get out over the next couple of months and have some great observing sessions at Crockett Park.

September and October General Membership Meetings

The September General Membership Meeting will feature John Huggins from the U.S. Naval Observatory who will present a program on Optical Interferometry. John is currently building an optical interferometer for the U.S. Naval Observatory site at Flagstaff Arizona. Our speaker for the October meeting is John Wallin, Professor of Astronomy at George Mason University. We hope you will be able to join us for these programs. **The monthly General**

Membership Meetings of the Northern Virginia Astronomy Club are held the third Wednesday of every month at 7:30 P.M. at the Arlington County Planetarium, 1426 N. Quincy Street, Arlington, VA. Admission is free and open to the public. Call the NOVAC hotline (703) 256-8359 for upcoming events, special announcements, or to leave a message for additional information.

The 1993 Northern Virginia Telescope Meet

The annual Northern Virginia Telescope Meet is scheduled for Saturday, September 18 at C.M. Crockett Park in Midland Virginia. Rain date is September 25. The event is scheduled to begin at 3:00 P.M. on Saturday and talks will begin at 8:00 P.M. Over 40 telescopes will be set up on display and used for evening observing. Plan now to attend NOVAC's biggest event of the year. For additional program details, see Myron Wasiuta's *President's Column* in this issue. For directions to Crockett Park, see *NOVAC Notices* in this issue.

President's Column

by Myron Wasiuta

By the time you read this column, NVTM 1993 will be just under two weeks away! Thanks to many of you, plans are nearly finalized. Bob Summerfield, a member of the Delaware Valley Amateur Astronomers will be our featured guest speaker. In addition to his talk, Bob will be bringing his 20" dobsonian, and hopes to display live CCD video images of the moon taken thru a C8. He will also be setting up an extensive vendor display so this might be a good opportunity for you to see some neat astronomical stuff.

Other attractions will include our now famous 1000 yard solar system model as well as a beautiful 39 gram fragment of the Gibeon meteorite. This was generously donated to NOVAC by Robert Haag, and is ours to use as we see fit. It has a high nickel-iron content and readily shows the cross-hatched pattern of metal crystals called the Widmastatten pattern. In addition, we will have hot dogs, snacks, and refreshments for sale. Portable restroom facilities will be available and the talks will be held at the amphitheater as last year. We will have several short constellation programs at night and several

other projects and presentations by individual NOVAC members.

Overall, it should be a fun evening. It all starts 3:00 P.M. Saturday, Sept. 18 at C.M. Crockett Park in Midland Virginia. Talks are expected to begin around 8:00 P.M. Directions to Crockett Park are found in the *NOVAC Notices* section of this newsletter or call Steve Bodner at 703-243-1722. He also will have last minute information concerning the raindate, which is the following Saturday, Sept. 25. Hope to see you all out there for NVTM 93!

Highlights of July and August NOVAC General Membership Meetings

by Bob L'Hommedieu

General Meeting July 21, 1993

Myron Wasiuta called the meeting to order at 7:50 P.M. Twenty-five members and guests attended at the Arlington County Planetarium.

Old Business:

1. Volunteers are needed to help out in making preparations for and to assist during the annual Northern Virginia Telescope Meet. Members are also invited to speak. The featured speaker at this year's meet will be Bob Summerfield. For more information or to volunteer your assistance, please call Myron Wasiuta.

2. George Mason University has made progress on their plans to build an observatory. They plan to use University land in southern Fairfax County as a site for the observatory. The University would like NOVAC to provide help with student labs and public observing programs. In return the University will allow NOVAC members to use the observatory and its facilities. Plans are still in the formative stages and it may be months or even years before this project becomes a reality. Myron will serve as NOVAC liaison to the University and keep us informed of progress.

New Business:

1. Crockett Park will hold its annual Children's Fair in August and would like NOVAC to participate. Anyone interested should call Myron for more information and the date.

2. There will be a Perseid meteor shower party at Crockett Park on the night of August 11-12. There may be a spectacular meteor storm that night and Crockett Park would be a good place to watch this once-in-a-lifetime event.

3. Myron lead a discussion on the possibility of finding an observing site darker than Crockett Park and asked members to form a group to look into the possibility of locating such a site. The content of future General Membership meetings was also discussed.

Bob L'Hommedieu gave the observing report and Myron Wasiuta presented the program in which he gave a narrated slide presentation of his visit to Hidden Hollow Observatory in Ohio.

General Meeting August 18, 1993

Myron Wasiuta called the meeting to order at 7:30 PM. Thirty-three members and guests attended at the Arlington County Planetarium.

Old Business:

1. The Northern Virginia Telescope Meet will be held September 18, 1993 with a rain date of September 25, 1993. As time draws close, volunteers are needed to pull off this annual event. NOVAC has sent out notices to all clubs in the region as well as local newspapers, planetariums and some radio stations. Myron Wasiuta will coordinate the event this year and plans are falling into place. Volunteer help is needed in the following areas:

- A. Registration - 6 volunteers
- B. Parking - 4 volunteers
- C. Concessions - 4 volunteers
- D. Clean up - 2 volunteers
- E. Security - 1-2 volunteers

If you would be willing to help work on the Meet, please call Myron. A decision on the weather will be made by 6 PM Friday September 17. If the weather looks questionable call the NOVAC hotline or Steve Bodner at home to see if the event will be moved to the rain date.

New Business:

1. Crockett Park will be holding a Children's fair soon and would like NOVAC to provide items for a **discovery box**. Myron has written to a meteorite dealer for the loan of a sample we could use. Members are asked to help by donating an item to place in the discovery box.

2. This coming Friday (Aug 20, 1993) there will be a series of astronomy programs on the Discovery Channel.

3. The 1993 Perseid meteor shower was a good one with a lot of bright bolides. Members gave observing reports from various locations throughout the East Coast. As far as we know there was no storm this year anywhere on the globe.

4. Bob L'Hommedieu showed the new club

telescope. This is the second telescope to be made available for use by NOVAC members. It is a 6-inch f5 reflector on a dobsonian mount. The instrument will be ready to loan to members as soon as we find some eyepieces to use with it. There will be a deposit required to use the scope but the deposit will be returned in full when the scope is returned. Members will be able to check out the scope for 30 days at a time. Call Bob L'Hommedieu for more information.

Fred Holmes gave the observing report. Myron Wasiuta presented the program featuring a video about the mysterious Marfa Lights. These lights have been seen for at least 150 years near Marfa, Texas and are a subject of controversy.

Perseid Watch at Crockett Park

by Jon Stewart-Taylor

On the evening of August 11th and the (early) morning of the 12th, NOVAC and C. M. Crockett park sponsored a Perseid Meteor shower watch. Due to predictions of a possible meteor storm and lots of media attention, there was widespread interest. In spite of the unpromising weather, a large crowd showed up at the park. An informal survey taken around 9:00 turned up about 50 NOVAC members (and families) and about 30 non-NOVAC members. Of the non-NOVAC members, about half were simply locals who thought of the park when they were looking for dark sky. The rest were about evenly divided between people who had heard Bob Ryan on Channel 4, been invited by NOVAC members, or asked at the local telescope shop. Our celebrity guest was WMAL radio's Charley Warren, invited by Brenda Jones (he apparently discussed the session briefly during his broadcast the next day).

The cloud cover waxed and waned all night, sometimes allowing good views of the sky and sometimes making Vega an averted-vision object. We saw many bright meteors leave long trails despite the clouds. The meteors peaked at about ten per hour around 11:00 then diminished rapidly to one or two per hour by 1:00 A.M. on the 12th. Conditions were sufficiently bad that we were unable to see many faint meteors. Around 2:00 A.M. the clouds rolled in solid and everyone left the park by 3:00 A.M. Because of the frequent clouds, we were unable to collect data for the International Meteor Organization as planned.

As reports come drifting in over the

Internet, it seems that much of Europe had the same sort of problems we did. Zenithal Hourly Rates (ZHR) estimates ranged from 30 to 200. Several parts of the US were more fortunate, with some observers at dark sites on the West Coast reporting ZHRs of up to 300; not a storm, but still very impressive.

Here at Crockett, the weather was disappointing, but because of the many very bright meteors (and the good company) it was a very enjoyable evening. NOVAC extends special thanks to Gary Kwolek and staff for providing the site. Newly revised calculations indicate that next year's shower will be at least as good and may even produce the meteor storm that was expected this time. The moon will be around first quarter, so observing conditions should be favorable (depending on the weather, of course). Lets do it again next year!

Sky Sweep for September/October 1993: Reflections on Summer Observations

by Kevin Jones

Rather than present the usual telescopic tour in this issue's Sky Sweep, I would like to share some of my summer observations. I spent my first year at college without my telescope (eight-inch SCTs take a lot of room in cramped dorms!) or dark skies so I enjoyed a summer of carefree observing. As I write this, I'm back at school having again left my telescope and access to dark skies behind.

Were you able to see any meteors during the eagerly anticipated and much-hyped Perseid meteor shower of 1993? Skies weren't the best on August 11 but parts of Northern Virginia were blessed with clear skies most of the evening. From the somewhat light-polluted and partly-cloudy skies of Crockett Park I counted thirty-seven meteors (all but four of which were Perseids) over a three-hour period from 9:00 p.m. to midnight. About half of the Perseids were bright (roughly magnitude zero or brighter) and left lingering glowing trains of ionized gas in their wakes. Three nights later, from the darker and cloud-free skies of Stellafane near Springfield, Vermont, I still counted eleven Perseids over three hours between 10:00 p.m. and 1:00 a.m. Nearly half of these were bright and left trains.

Many of my non-astronomer friends reported that they were impressed by the number of bright *shooting stars* they were able to see within the light-polluted confines of large cities. None expressed disappointment that the predicted hundreds of meteors per hour didn't materialize.

If you feel somewhat disappointed because a Perseid storm did not materialize this year, have faith--the experts are saying we may have an even better chance for a storm next year!

On another subject, I sketched a couple of starfields near the zenith from Crockett Park on July 23rd, an unusually clear night for Northern Virginia summer, in an attempt to determine the limiting magnitude at the zenith. The faintest star I was able to see with certainty was magnitude 5.58, making the limiting magnitude around 5.5. I was surprised to find the limiting magnitude that dim. I've watched the skies over Crockett grow brighter and brighter the last several years and I had pretty much stopped thinking of the skies as *dark*. Determining limiting magnitude has changed my low opinion of these skies.

On crisp autumn evenings when Pegasus is high overhead, an interesting way to determine the darkness of the night sky is to count the number of stars visible to the naked eye inside the Great Square of Pegasus. Being a fairly star-poor region of sky, no stars will appear inside the square in marginal skies. With fully dark-adapted eyes and averted vision, about six stars should be visible under 5.5 magnitude skies (comparable to a dark night at Crockett Park). A dozen more stars may be seen inside the Great Square under pristinely dark 6.5 magnitude skies. Counting the number of stars in the Square from time to

time throughout an observing session is a good way to keep in tune with how sky conditions are changing.

Another of my summer observing experiences included globular clusters. Prior to this summer, I thought- *if you've seen one globular, you've seen 'em all*. They can look very much alike through the eyepiece but I discovered that they really don't. Although they are the same basic shape, globulars come in all sizes, brightnesses and resolutions. When comparing globular clusters, make sure to note the magnification being used. It's easy to make a small globular appear larger by increasing the magnification, but doing so without thinking makes the observer lose perspective on the true sizes of the objects. Comparing several globulars without changing eyepieces is a good way to make size differences more obvious. Globulars M28 and M22 near the top of the *Teapot* asterism of Sagittarius show a marked contrast in size.

Another feature to note while observing globular clusters is surface brightness. Surface brightness combined with size can indicate the preferred type of instrument for viewing a given globular. M4, for example, is very large with a fairly low surface brightness. It is easily seen in a pair of binoculars. M80 appears smaller than M4 and has a higher surface brightness. M80 is too small to be seen as anything other than a star in binoculars but it is easier to find than M4 in my eight-inch Schmidt-Cassegrain owing to the higher surface brightness.

The ability to resolve globulars into stars varies significantly. Some, like M22, are easily resolved in small telescopes and reveal hundreds of stars sprinkled around the edges of the core. Others require larger telescopes

Sky Calendar September/October 1993

Compiled by Thomas S. Parry

September

1	Full Moon
7	Mars 0.9 degrees from Jupiter
9	Last Quarter Moon 4 degrees S. of Pleiades
14	Venus 6 degrees N. of crescent Moon (morning)
16	Mars 2 degrees N. of Spica (evening) New Moon
17	Mercury 5 degrees N. of crescent Moon Uranus 1.1 degree S. of Neptune. (Both planets appear about 1 degree apart all month) Jupiter 5 degrees N. of crescent Moon (evening)
18	Mars 4 degrees N. of crescent Moon (evening)
21	Venus 0.4 degrees N. of Regulus (morning)
22	First Quarter Moon
23	Autumnal equinox (First day of autumn)
24	Neptune 3 degrees S. of gibbous Moon Uranus 4 degrees S. of gibbous Moon Mercury 2 degrees S. of Jupiter (evening)
26	Mercury 1.1 degrees N. of Spica (evening)
27	Saturn 7 degrees S. of gibbous Moon Uranus Stationary
28	Uranus 1.1 degree S. of Neptune (evening)
30	Neptune stationary Full Moon (Harvest Moon) Moon at apogee--Most distant Full Moon of 1993

October

6	Mercury 2 degrees S. of Mars (evening)
8	Last Quarter Moon
14	Venus 7 degrees N. of crescent Moon (morning) Mercury at greatest eastern elongation (evening and poor visibility)
15	New Moon
16	Mars 1.7 degrees N. of crescent Moon (evening)
17	Mercury 1.7 degrees S. of crescent Moon (evening)
18	Jupiter in conjunction with the Sun
21	Neptune 3 degrees S. of First Quarter Moon Uranus 4 degrees S. of First Quarter Moon Orionid Meteor Shower
22	First Quarter Moon Asteroid 1 Ceres at opposition (rises at sunset)
24	Saturn 7 degrees S. of gibbous Moon
28	Mercury 2 degrees S. of Mars (evening of 27th) Saturn stationary
30	Full Moon (Hunter's Moon)
31	Last day of Daylight Savings Time

to resolve. Many globulars are simply too small and faint to resolve with amateur equipment. Of the easily resolved globulars, some seem to have chains of stars radiating outward from the core while others have more unusual arrangements of stars. Careful observation of M4 reveals a central bar of stars bisecting the cluster.

Hopefully these few points concerning globular clusters will enhance your observations of these objects. Take time this fall while it is still warm to view summer's spectacular globulars.

A JPL Weekend

by Scott Driggs

What luck! No math for a complete week! Monday and Tuesday, March 15 and 16, Thomas Jefferson High School for Science and Technology was snowed out, along with the rest of Fairfax County Public Schools, due to the prayers of many pious students the night before. On Wednesday, March 17, 1993 I left school early because I had more than enough, and was on my way to accompany my grandparents to sunny Southern California, where I was to spend Thursday, Friday, and the rest of the weekend.

Arriving home, I finished making plans for things I would do while I was in California. Finally my grandparents and I piled into the van and set off for the airport. My grandfather, one of the first physicists to join the Jet Propulsion Laboratory (JPL) staff in the agency's early years, was going to California to attend a special reunion of scientists and colleagues who first worked for JPL. Located in Pasadena, JPL is a NASA center and division of the California Institute of Technology (Caltech) responsible for unmanned exploration of the Solar System and beyond.

I was a tag along, and was there to learn more about JPL and Caltech (where I will be attending school in the fall). My grandfather was instrumental in establishing a space science laboratory at the Thomas Jefferson High School and arranged for two other Jefferson students and two Jefferson teachers to travel out to JPL and Caltech to learn more about what is going on in the cutting edge of Astronomy and Robotics. Another tag-along was Leah Foechterle, a junior from the totally awesome Andover

Academy in Massachusetts, gung-ho future Caltech student and complete astronomy buff. (I need to start to get used to the California vocabulary, so please excuse words like buff, complete, total, gung-ho...) And so, this assemblage of Astronomy, Robotics, and other *buff's* set off into the sunset on a Boeing 737 for the adventure of a lifetime.

Enough of the historic glamorization. It was not quite that dramatic, but I was still excited. We were scheduled to meet some of the top people in Astronomy and Robotics. Despite my excitement, sleep came easily and I was bright and awake for our tour of JPL the next day. We watched a multimedia presentation in the Von Karman Auditorium entitled *Welcome to Outer Space*. This presentation outlined JPL's key accomplishments over the years including missions to the moon before men went there and missions to Mars, Venus and all of the other planets (excluding Pluto). Included were the Mariners with flyby's to the inner planets, the Viking spacecraft that landed on Mars and the Voyager missions that flew by the outer four gas giants. The presentation also described some future missions including Galileo. Galileo will arrive at Jupiter later this decade, remain for two years and make extensive images of the Jovian satellites, gas clouds, and other in-depth measurements. A future mission to the planet Pluto is also planned later this decade.

Following the presentation, we received a tour of the incredible JPL facilities. They include dozens of labs that specialize in everything from micro-technology studies to cometary observation. In addition they have two huge spacecraft assembly facilities. We saw each of them. One of the rooms had a number of white-coated technicians with gloves and face masks on. They looked like doctors about to perform surgery on some poor unsuspecting satellite. The device they were operating on was the X-Band Synthetic Aperture Radar, which is going to be operated from the shuttle bay in a few months. The other assembly facility is one of the cleanest rooms in the world. It has a huge air filtering unit that continually creates a dust-free flow of air in which the satellites rest. Contained in this room were the glasses of the Hubble Space Telescope. JPL had designed the original wide-range planetary

camera that was placed in the Hubble and recently redesigned it to compensate for the present mirror flaw. It will be installed in the Hubble next year.

Following an extensive tour of the JPL facilities, I had the privilege of meeting with William Kaiser, head of JPL's Microtechnology Department. At Thomas Jefferson, I did a senior research project in which I created a Scanning Tunneling Microscope. Bill Kaiser is an expert in this field and I was able to spend some quality time with him in which he explained the theory, background and suggested circuits for me to try in my research. Other members of our band met with Giulio Varsi, head of the Robotics Department at JPL and Nick Gautier who gave an overview of JPL Space Science. The Space Science part of our group also met with Art Vaughn who designed the corrective optics for the Hubble Space Telescope.

We then traveled to Caltech and met with Dr. Carol Snow, Director of Admissions, and her assistant Gerrit Choi. They treated us to lunch at Caltech's Atheneum—as many good colleges do in order to impress potential students. Caltech is an impressive institution with some of the best facilities and faculty in the world. This is what attracted me to come to Caltech.

Caltech also attracts many famous scientists to its small campus. During our lunch, my friend Leah Foechterle almost choked on her food! As she raised her finger and pointed in the general direction of the other side of the Atheneum, her face appeared almost ghostly white and she was unable to utter any sound. Then everyone at the table turned their heads. Stephen Hawking was being escorted to his seat, two tables away from ours! It was so incredible to see the brilliant man that Leah and I so revered! We even had the pleasure of hearing him speak. Though natural speech it was not, Stephen Hawking uses a computer to speak for him. He does this by squeezing a device he holds in his hand. The number of squeezes he gives is converted to speech by the computer and is then run through a voice synthesis program. This communication process is slow because Hawking suffers from Amyotrophic Lateral Sclerosis (ALS), commonly known as Lou Gehrig's disease or motor neuron syndrome. We felt like going up and introducing ourselves as loyal subjects but we decided we did not want to

exhaust the observer. Not knowing what to do we simply watched excitedly from a distance.

Following our exciting lunch, we toured Caltech and met with some of the faculty. We also saw the IRAS satellite center whose job is to decipher all of the infrared information that was obtained from the IRAS satellite during its one-year lifetime. So much information was gleaned from space that it will take at least 20 years to analyze all of the data. We then split up and met with different people. The robotics teacher and student went to see the robotic snake that Caltech was working on and the rest of us met with a neurobiologist who explained how they were using high-speed CCD's to capture neuron firings.

That evening we went to the Griffith Park Observatory. Featured in the movie *The Rocketeer*, Griffith Observatory is very unique. It has a gigantic planetarium that seats a few hundred people. The show is spectacular and well worth the cost of admission. I urge any of you who might find yourself in the area to make the Griffith Observatory part of your plans. They also put on a good laser show to rock music in the same planetarium. I warn you though, the music is LOUD and it is Led Zeplin. Other than that it is a cool show!

After the two shows, we looked through the observatory's 12-inch Zeiss refractor at the Orion Nebula. Due to all the light pollution in the Los Angeles area and color aberrations in the instrument itself, the image was not great.

The following day, we returned to JPL where we met with a number of project designers and scientists. They described the *Towards Other Planetary Systems* (TOPS) program. TOPS is developing satellites to determine whether neighboring stars have planets around them. One of the satellites will specifically study the gravitational pull of planets on the Stars. Using an array of four one-foot aperture mirrors, two will point toward a distant star with negligible proper motion (the referent) for navigational purposes. The other two mirrors will be directed toward a nearby star with large proper motion (the target) at an angle of 90 degrees from the referent. This "target" star will be the object of study. The position of the target star relative to the background stars will be studied over a period of several

years to detect whether it shows a "wobble" in space. The presence of Jupiter- or Saturn-sized planets will cause a gravitational tug in their orbit about the star resulting in a wobble effect as seen in space. This same phenomenon occurs with the sun. Due to the tidal effects of the planets in our Solar System, the sun "wobbles" as much as one solar diameter.

We also learned more about the planned mission to Pluto. The current plan is to launch two 500 million dollar flyby's near the end of the decade. This program will probably get congressional approval due to the simple plan and low cost. For a billion dollars we will have a peek at Pluto. JPL is currently deciding what sensors and instruments to send on the two spacecraft.

That afternoon, my Grandparents, Leah and I broke off of the group and went to Balboa Island. There we spent time with some of my grandparent's friends from the early times of JPL. Together at White Sands Proving Grounds, this group of scientists built the first U.S. Rockets and designed the first guided ballistic missile. My grandfather, who was a brand new physics graduate from Caltech, designed the telemetry system on that missile. It was so incredible to hear all of the tales that these people told, of the golden years, when a whole new field was having its groundbreaking. I had the pleasure of meeting many of these people and learning of their lives and what they had learned about space.

For the conclusion of this thrilling epic, please see Leah Foechterle's article *Memories of Mt. Wilson* that follows.

During my first year at Caltech, I will continue to keep in touch with NOVAC and would like to submit future articles about some of the exciting things that will happen while I am a student at Caltech and JPL.

Memories of Mt. Wilson

by Leah Foechterle

Saturday afternoon (March 20), the day after meeting with pioneering scientists and alumni from JPL's early years, we set off for the famed Mt. Wilson Observatory via JPL where our group met Gil Clark, JPL scientist and program director of the *Telescopes in Education*¹ (TIE) program.

From JPL, Gil led us up to the observatory along snake-like roads that cling to the sides of the mountains. Arriving shortly before sunset, a volunteer showed us the grounds and instruments of the observatory accompanied by an oral history.

We first visited the 150 ft. solar observatory tower. The scientists at the tower showed us several photographs; the first was a photo showing the silhouette of an airplane framed in the middle of the sun's disc. The second was a picture of Albert Einstein at the eyepiece of the 100" telescope. While I looked at the photo with a dropped jaw, the scientist reached into a drawer and pulled out the same eyepiece that was in the photograph—the very eyepiece through which Einstein had looked. The final highlight at the solar tower was signing the guest book then turning back a page and seeing the "signature" and fingerprint of Stephen Hawking from his visit to the observatory.

Our guide then took us to a horizontal solar observatory known as the Snow Observatory. The Snow Observatory is slated for renovation and eventual student and amateur use. We then visited the 24-inch reflector. This instrument is also being renovated and earmarked for student and amateur use. To get a feel for the possibilities and potential of the instrument for serious student and amateur research, Gil Clark reports: "*I will have the 24-inch at prime focus (f/3.5) rather than f/16 due to the size of the CCD chip that I am using. I had to temporarily change the telescope focal point from cassagrain to newtonian to accommodate the CCD camera. In six months I hope to have at least one large (1024x1024) CCD camera and then I will revert to f/16 on the 24 inch. I will then use the small CCD camera on the 10-inch f/6.3 SCT piggybacked on the 24-inch telescope. Soon you will be able to connect to the telescope via modem, designate your target, collect the images, integrate them, and download the final image.*"

We continued the tour on to the visitor center where we met with Mt. Wilson Observatory Director Bob Jastrow for a brief review of astronomy. You know, the standard "*let's learn a little bit about astronomy before we go see the scope!*" type of presentation (slides too). Then came the cool part! We were off to conquer the 100-inch Hooker Reflector—the pride and joy of the Observatory. Entering the great

dome, it appeared dark, smelled musty and you could see piles of old parts, machinery, and tools in corners covered with tarps and thick layers of dust. We then climbed a long set of stairs to the telescope. I walked over to the end of the telescope and placed my hand on it as if to capture some of the history, discovery, and energy stored in the classical instrument.

To my surprise, I learned the mirror was fabricated of green wine bottle glass (a form of plate glass). It was made in France and shipped to the United States in three segments that were later fit together at the observatory. Several times, for various reasons, the mirror had to be remade delaying the construction of the telescope several years.

We then went up a shorter set of stairs to the observation floor. From there you could see and feel the spaciousness and authority of the dome. The dome resembled a gothic cathedral with ladders and supports ribbing the half-sphere reminding me of flying buttresses. Then something caught my attention. It was Edwin Hubble's chair! I had read about it and seen pictures of it. I could hardly believe I was looking at it!

I then walked around to the other side of the dome and saw the original control board for the telescope, a clock, lots of buttons and a couple of knobs. Jastrow then led us to a machine room beneath the telescope. The room housed turn-of-the-century knife switches, authentic Edison light bulbs, and the main gear of the motor (hand cut by a French student). Seeing, touching and feeling the 100-inch reflector was an experience that left me in awe -- and hungry.

We ate dinner at a picnic area on the edge of the mountain over-looking Pasadena. Dusk crept up on us slowly. Finally, as darkness settled in, we took out a couple pairs of binoculars to observe the Orion Nebula in the twilight.

Once it was dark, we went to do some real observing with the Observatory's 6-inch refractor. At first, we had a technician with us who was supposed to handle the telescope and be sure that we wouldn't break it. He began with M42 in Orion, catching the nebula just before it disappeared below the horizon. He then asked us if there was anything we wanted to see. I proposed the Beehive cluster M44.

The technician didn't know of the Beehive or where to find it. So, Gil pulled out his Power Book and loaded a star chart program called Epoch 2000. We looked up the Beehive cluster, found the R.A. and Dec. coordinates and pointed the telescope using the setting circles.

We eventually gained the confidence of our technician as he left the dome and didn't return until we left. While he was gone the other three students and I were in complete and total control of the telescope. We observed globular cluster M3, double star Mizar and Alcor, and Jupiter. The seeing was pretty good but there was still quite a bit of light from Los Angeles far below. The atmosphere, however, was more calm than I have ever seen. (To put these observations into context, I do most of my observing at my high school in northern Massachusetts with a 6-inch refractor, almost an exact replica of the one at Mt. Wilson.)

It was an incredible experience to be on top of Mt. Wilson, "America's Observatory, built at the turn of the century in the Golden Age of Astronomy. I felt as though I had been transported back in time to the early 1900's. I was walking on the same ground as Edwin Hubble, Albert Einstein, Harlow Shapley, Walter Baade and many others who made substantial contributions to Astronomy, often using the instruments at the Observatory. I touched the same telescopes they used and I saw the same stars they saw. I could imagine, when it was quiet enough, that I could hear the conversations of the great astronomers. I could hear their pencils scratching against paper as they rushed with excitement to write down their discoveries and I could hear their sighs as the sun rose above the horizon ending another night of observing.

At the observatory atop Mt. Wilson, time stands still.

Author Note: The Thomas Jefferson High School for Science and Technology was selected as one of two schools in the country to be a pilot participant in the *Telescopes in Education* (TIE) Program. JPL scientist and TIE program director Gil Clark said TIE, "will allow teachers to log onto a massive database and request educational materials. They will identify the grade and subject-matter area and the database will provide a list of lessons for

that grade and subject. The teacher can then designate which lessons are required and the system will download lesson plans, lesson materials, questions and answers and the appropriate images."

The Recreational Astronomer #4: Star Hopping

by Jon Stewart-Taylor

Welcome back to the Recreational Astronomer. This column is intended mainly for beginning and intermediate astronomers, but I hope it will of interest to everyone who needs to navigate through the skies to find things.

Hide and Seek

One of the most difficult things for beginners (and sometimes intermediate astronomers) is finding their way to objects of interest. The sky is so large and most celestial objects so small that finding objects clearly marked on star charts can be frustrating. Two basic ways to find things are 1) using setting circles and 2) star hopping. Because setting circles require aligning the mount correctly and knowing the coordinates of the object, many prefer star hopping as a quicker and easier method to locate celestial objects.

Celestial Hopscotch

Star hopping is the process of navigating your way from one celestial landmark to another. It requires no knowledge of coordinates and the basic ideas apply to telescopic, binocular, or naked eye observing. As you hop, you'll often find other beautiful and interesting objects. Another by-product of star-hopping is that you'll gain a thorough familiarity with the sky.

There are two key points to know. The first is all directions are based on north being towards the north celestial pole and south away from it. Therefore, Cassiopeia, therefore, is south of Polaris regardless of whether it is *above* or *below* it in the sky. East and west are to the left and right of you when you're facing south, even if you don't happen to be facing south.

Second, you need a way to tell how far apart things are. For this we'll use angular measure in degrees. Unfortunately the sky isn't marked with a scale the way maps are,

so we'll have to make our own. One of the simplest things we can use for a ruler is our hand. For most people, a fingertip at arm's length projected against the sky subtends about one degree. The palm of the hand subtends about five degrees, a palm plus a thumb about ten, and a hand with thumb and fingers spread as widely as possible (a "handspan") is about 15 degrees. People's hands do vary in size so check your own hand against the sky. The Big Dipper makes an excellent calibrator- see *Backyard Astronomy* for details.

What to pack for the trip

You need a map to choose your destination and landmarks. There are different types of maps for different uses. Whether you star hop using a telescope, binoculars, or your eyes, there are some characteristics to keep in mind. Your map needs a scale in degrees so you can use your rulers. Maps need to be legible in red light so you should avoid those featuring color-coded objects since anything printed in red ink will be invisible.

How *deep* do you need the maps to go? Using just your eyes, a map that shows stars dimmer than 6th magnitude will probably be cluttered. Using binoculars, a 6th magnitude chart is barely deep enough, but 9th may be too deep. Using a telescope, you may need several charts including a mag-6 chart for Telrad or finder and a mag-8 or -9 for use through the eyepiece. Although a bit small, the maps in *Peterson's Field Guide to the Stars and Planets* are good. If you have darker skies than I do, one of the 6th-magnitude maps such as *Bright Star Atlas 2000* or *Edmund Mag 6* may be useful. *Sky Atlas 2000* (8th mag) is excellent for small to moderate telescopes and binoculars.

To read your charts in the dark, you'll need red light because it does the least harm to your night vision. Most peoples' eyes take about 20 minutes to fully adapt to the dark and the process starts over every time you're exposed to white light. One option is to attach red cellophane to a flashlight with tape or a rubber-band. Although inexpensive and easy, the light quality isn't the best and may still affect your night vision. Another option is to buy a *super-bright* red LED at the local electronics store (Radio Shack or equivalent) and install it in a flashlight. This is a moderately inexpensive option but you need some electrical or electronics experience. The

easiest choice is to buy a commercial observing light. These come with many options including such niceties as brightness controls and stands (there's even one that mounts on a hat!), but can be expensive.

Setting Off..

Now that you've got your rulers, charts, and light, we're ready to go hopping. We'll start with a naked-eye hop. The destination can be a minor constellation or asterism with which you are yet unfamiliar or an object such as a star cluster, galaxy, or single star. For this hop, we'll go to *Omicron Ceti* - the famous long-period variable *Mira*. Mira is in a portion of the sky devoid of bright stars and is often as much as 3 magnitudes below the naked-eye visibility limit. It won't be easy to find but the challenge will make the hop more interesting.

I'll use the abbreviations *N*, *NNE*, *NE* for north, north-north-east, north-east, etc. and *mag.* stands for magnitude. The constellation abbreviations are *Aql* for Aquila, *Peg* for Pegasus, *And* for Andromeda, *Tri* for Triangulum, *Ari* for Aries, and *Cet* for Cetus. You should probably try following along on a star chart before going out under the real sky. If you get lost at any point, don't worry- just go back to your last known landmark and try again.

Let's start our star hop toward Mira at *Altair*, the southernmost star of the Summer Triangle (the other members are Vega and Deneb). If you're not familiar with Altair, find it using a simple star map before starting- it's *alpha Aql*. Now that you've found Altair, our first stop will be *Delphinus*. It's about 12 degrees (a little less than one handspan) NE of Altair and is a beautiful diamond about two degrees (2 fingertips) across. Another star appears about 3 degrees to the S. The diamond is called *Job's Coffin*.

Our next landmark is *Enif* (Epsilon Peg) 15 degrees SE of Delphinus. It's the only bright star in the vicinity, and looks faintly red to me. About 8 degrees (one palm width) due W of Enif is *Equuleus*, a minor constellation whose brightest star is only 4th mag.. About 5 degrees NW of Enif is *M15*, a 6th mag. globular cluster. In very dark skies you may be able to see it with

averted vision but don't count on it.

Next stop is *Markab* (Alpha Peg) the southwestern star in the *Great Square* of Pegasus. It's about 20 degrees ENE of Enif (well over one handspan). Either stretch as far as you can and make the leap to Markab (like Enif, it's the only bright star in the neighborhood) or head 12 degrees due E to *Zeta Peg* (about mag. 3.5), and then about six degrees NE to Markab. About 12 degrees SSE of Markab is the *Circlet*, the southernmost of the two fishes of *Pisces*.

Approximately 15 degrees due N of Markab is *Scheat* (beta Peg) the northwestern star of the Great Square. It's a variable star ranging from 2nd to 3rd magnitude in an irregular period. Fifteen degrees NW of Scheat is *Lacerta*, another minor constellation.

About 15 degrees due E of Scheat is *Alpharatz* (Alpha And) the northeastern star of the Great Square. This is not the brightest star in Andromeda despite its designation as alpha. There is nothing particularly interesting about the immediate vicinity, but we'll use it as a convenient way-station.

Our next stop is *Mirach* (Beta And). It is about 15 degrees ENE of Alpharatz- you can either go directly or skip via 3rd mag. Delta, about eight degrees E of Alpharatz, then eight degrees more NE to Mirach. About five degrees NW of Mirach is 4th mag. *Mu And*. Continuing on the same line for another five degrees brings us to *M31*, the *Great Andromeda Galaxy*. The galaxy spans almost three degrees but because it is so diffuse it is normally visible only with averted vision as a fuzzy patch. It seems to be about half the size of the moon.

Done with M31? Return to Mirach and head SE. Fifteen degrees away on a line directly away from M31 is *Caput Trianguli* (Alpha Tri) at mag 3.5. About five degrees back the way we just came is *M33*, the *Pinwheel Galaxy in Triangulum*. Although it is almost half the size of M31, it is two magnitudes fainter and will be visible to unaided eyes only in very good conditions.

Go SSE ten degrees to *Hamal* (Alpha Ari), our only zodiac constellation. It has a pretty little triangle asterism composed of Hamal, Sheratan, and Mesarthim (Alpha, Beta, Gamma) spanning about five degrees. Little else is visible to a naked-eye observer.

Our next step is quite a reach- about 22 degrees SE to 3rd mag. *Menkar* (Alpha Cet). If your skies allow it, you can use *Mu Cet* as a stepping stone. *Mu* is a 4th mag. star 15 degrees SE from *Hamal* and about seven degrees NE of *Menkar*. We're closing in on our destination now. From *Menkar* skip five degrees due W to the only slightly dimmer *Gamma Cet*. If no star appears about a palm to the W, check to the E as you may already be at *Gamma*. From *Gamma*, go three to four degrees due S to *Delta*. *Delta* is much fainter- only about 4th mag.

From here, *Mira* is about 7 degrees SW. It varies irregularly, with a period on the order of 330 days, from 2nd mag. (sometimes making it the brightest star in the constellation) to 10th, at least 3 mag. below naked eye visibility. If you have pretty dark skies, you can get a little closer by finding a triangle of 5th mag. stars (75, 70, and 69. 75 is 2 degrees SW of *Delta*). If you see *Mira*, you're probably pretty lucky- it's below the naked-eye limit for about 2/3rds of its cycle and below the reach of binoculars for about 1/3rd. Now that you know where to find it, you can check it once or twice a month throughout the year to watch it brighten and dim.

It's been a long trip. Hopefully there have been a lot of interesting stops along the way. It's not difficult to plan similar hops all over the sky using some of the references listed below. We'll do another in a future episode of the *Recreational Astronomer*, but next time we'll use a pair of binoculars.

That's it for this time. Go do some star hopping!

Acknowledgments and References

For more information about star hopping, using hands as rulers, and so forth, look in the pamphlet *Backyard Astronomy*, available from Sky Publishing.

For information about celestial objects and maps suitable for naked-eye or binocular hops, you can try *Peterson's Field Guide to the Stars and Planets*, or Wil Tirion's *Bright Star Atlas 2000*.

For detailed information about every object of interest whether observing with eyes, binoculars, or small telescopes, try the 3-volume *Burnham's Celestial Handbook*.

Miscellaneous Musings

by Al and Lynn Schumann

There were no 60th birthday Perseids this year. What a drag. The view from the terrace was obscured by haze and high, thin clouds. The only stars visible were of the Summer Triangle, the wings of the Swan, a faint *Polaris*, and with averted imagination, *Alberio*. An hour and a half in the back yard netted a big goose egg. At 10:30 pm heavy clouds moved in to squelch our Perseid watch once and for all. We got to thinking about the ghosts of Perseids past. Far and away, our best view was in 1976. We were in the midst of a three-year NATO tour with the Allied Forces Southern Europe in Naples, Italy. We were renting a great little house well away from city lights and a couple blocks from the Mediterranean Sea. Nice dark skies. A neat feature of the house was a flat roof. It was like having a big tiled patio on the second floor. Armed with lawn chairs, we enjoyed a good view of the Perseids. Can't remember the count, but it was somewhere between 30 and 50 per hour. It was really quite a sight. We were also there during Comet Kohoutek's appearance. Weather and sky conditions were perfect but we never found it. There was so much hype surrounding that lousy comet that it probably turned off a lot of potential amateurs.

Those of you who were scared away from *Crockett Park* by the weather on August 14th missed a great night. The cloud cover was indeed ominous at the outset and neither Jeff, Mac, nor I unloaded our telescopes right away. By 9:30 PM the clouds thinned out and by the time the scopes were set up we had beautiful clear skies. The Milky Way was splendid. There was a humid haze up to about 15 degrees above the horizons, but from there up to the zenith it was fine and it stayed that way all night. Deep sky views were very satisfying. Saturn, however, looked like it was under water. Mac's brand new C-5 saw first light and that is a slick little telescope. I'll bet you can slip it under an airline seat for traveling. But the big bonus involved quite a few nice meteors including two beautiful fireballs. One of them zipped through *Cassiopeia*, the other streaked from the northeast and generally paralleled the handle of the Big Dipper. Both left eene smoke trails that persisted for a couple of seconds. Quite a sight. The wearies

started getting to us around 2:00 A.M. and we left pretty much together.

Gary Kwolek is the new chief at *Crockett Park*. Long live the King! Roger Pence moved up the chain of command and we wish him all the best. Roger was a good and understanding friend for many years. Bob, the new deputy, came over to say hello and chat a while as we waited for the clouds to move away on August 14th.

The inquisitive nature of human beings is really great! Further, the propensity of people to rise to a challenge is almost beyond belief. Sir Edmund Hillary, when asked why he climbed Mount Everest, said, "because it was there." That attitude carries over to so many other things, including astronomy and its pursuit by some of our own NOVAC members. A few years ago, Geoff Chester was invited to participate in a Venus Observing run using the NASA infrared telescope on Mauna Kea. The mission was to look for anti-solar to sub-solar wind patterns in the mesosphere and thermosphere layers in the Venusian atmosphere. Whew! After the run, Geoff spoke to the club about the particulars. I remember Geoff telling us there were no surprises; everything they found was exactly as they expected it to be. Then, why bother? Well, no one had ever checked it out before. So, in order to fill in an unproven space in the body of knowledge about Venus, somebody eventually had to make the run. Geoff and Co. had to climb the mountain because it was there.

More recently, Brent Archinal completed a monograph for publication by the Webb Society. The monograph, entitled *The nonexistent Star Clusters of the RINGC*, contains entries for 229 objects that "have been misidentified or have not been located since their discovery in the 18th and 19th centuries." Brent's catalog includes numerous notes of all reported modern observations as well as all relevant observations by William and John Herschel. This paper is the result of monumental effort and research. While reading the extensive notes I could imagine catalogs, star charts, reference works and all manner of printouts, books, letters and papers scattered all over the house. At times, JoAnne must have been ready to kill him. Why? Who cares? Brent cares, so he assembled his pitons, rope, ice axe, etc. and started climbing. In some small way we're all the better for his

work. Brent is not making any money on this, by the way. All proceeds go to the Webb Society. If you are interested in buying the final product contact Brent for details. Then, take up the challenge and go out and look for some of these obscure "nonexistent" star clusters.

There is still a good chance to see Uranus and Neptune this year. They are just about crossing the meridian when it gets dark in early September, so they are as high in the sky as they are going to get. The two planets are separated by slightly more than one degree, so if you find one, the other ain't far away. Uranus is the brighter of the two at 5.7 magnitude. That's the one to try and nail down first. In binoculars or a finderscope it will look like a bluish star. In the telescope it will take 100X or higher to resolve that star to a disk. If it still looks like a pin point with high power, you've got the wrong one. Neptune shines at 7.9 magnitude, so it is a bit more tricky to identify. Frankly, neither Uranus nor Neptune are very exciting to look at since they are quite featureless- just small blue-green circles, so the fun is in the finding. They are located a few degrees northeast of Sagittarius, around three degrees east of a small V-shaped asterism sometimes called the teaspoon.

The things in life we can't avoid are death, taxes, and TV reruns. We mention the latter because there are a couple of very worthwhile and informative astronomy programs currently running on The Learning Channel. "The Practical Guide to the Universe," narrated by Tom Selleck, is one, the other is "Amazing Space." We think the tone of both programs is just about right; they neither talk down to the audience so as to be offensive nor do they make things so complex that you feel like an idiot. We sort of approach these shows as midterm exams or yardsticks to find out just how far along we have come in grasping the fundamentals of astronomy. It is gratifying to note that we are usually a couple steps ahead of them. Keep an eye out for them on TLC. Even if the programs should run their course by the time you read this, they probably will be back as repeats.

Author correction: While reading our July/August 1993 software review on *EZ Cosmos* we let out a collective, "Oh, NO!" Page 10, line 9 should read "recreate the CONJUNCTION of Jupiter and..."

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Your NOVAC membership now entitles you to subscribe to Astronomy Magazine at the annual rate of \$16.00. That is a significant discount over the usual \$24.00 rate. A two-year subscription costs \$32.00. To start a new subscription or renew an established subscription, make your check out to KALMBACH PUBLISHING COMPANY for \$16 (one-year subscription) or \$32 (two-year subscription). Note on the check if this is a new subscription or a renewal. Send your check to Brenda Jones, 883 N. Kentucky St., Arlington VA 22205. NOTE: There are no special 10% discounts offered on publications through Kalmbach Publishing.

Club Telescope Available for Use

NOVAC makes available a six-inch (f-5) Newtonian reflector for club members to check out free of charge and use for a limited time. The scope is a Celestron model SP-C6 on a Super Polaris German equatorial mount and wood tripod. It will readily fit disassembled in any car and is easily transported and setup at remote observing

sites. The scope comes with an Orion Ultrascopic 10 mm and Meade MA 25 mm-eyepieces with 1.25 inch barrel sizes.

If you are interested in borrowing the scope, contact Steve Bodner at (703) 243-1722 (until 10:00 P.M.) or leave a message on his answering machine. He will schedule a time for you to pick the scope up at his home. Steve resides at 1557 N. Danville Street, Arlington, VA 22201. You will need to show your NOVAC observing pass and leave a \$500.00 deposit to take the scope out. Make your check payable to NOVAC. Checks ARE NOT deposited and will be returned to the originator when the scope is turned in. The scope may be checked out for two to four weeks at a time depending on demand.

1993 NOVAC Meeting & Observing Schedule

The schedule below lists the NOVAC General Membership Meeting and NOVAC Observing Schedule for the remainder of 1993. The General Membership Meetings are held at the Arlington Planetarium on the third Wednesday of every month. Trustee Meetings are held on an *as needed* basis, usually the Tuesday before the week of the General Membership Meeting. Non-Trustees interested in attending should contact a Club Officer or Board Member for further information. The NOVAC Observing Sessions are held at C.M. Crockett Park in Midland, VA.

Observing Nights

SEP	9	10	17	18
OCT	8	9	15	16
NOV	5	6	12	13
DEC	10	11	17	18

General Membership Meetings

SEP	15
OCT	20
NOV	17
DEC	15

Observing Site Rules

Crockett Park:

NOVAC members may use Crockett Park for observing on nights other than those scheduled for club observing; However, YOU MUST HAVE PRIOR APPROVAL FROM RODGER PENCE, THE PARK MANAGER. Call early in the day on which you wish to observe; the telephone number is 703-788-4867. If you reach the answering machine, leave a message saying that you are a NOVAC member and you wish to observe that night. Also, leave a telephone number where someone can reach you. If you do not receive a return call, you MAY NOT use the park. THERE ARE NO EXCEPTIONS! Use of the park is limited to NOVAC members only. Park management locks the entrance gate at sunset and you may

use the combination shown on your Observing Pass to gain access. Do not reveal it to anyone. You must lock the gate behind you after entering and please remember to lock it after you leave.

During EDT, you must set up on the large field to the left of the park entrance. During EST, you must set up on the paved col-de-sac 200 yds. past the gate.

No loud radios, alcoholic beverages or loose pets. Do not leave trash or debris behind. We are guests of the park and park management may revoke our observing privileges any time due to the carelessness of one person.

The Kilpatrick's:

NOVAC members may use Jim and Sheree Kilpatrick's property for observing on any night - BUT, YOU MUST HAVE PRIOR APPROVAL FROM THE KILPATRICKS. Call early in the day on which you wish to observe; the telephone number is 703-547-3501. If you reach the answering machine leave a message saying that you are a NOVAC member and you wish to observe that night. Also, leave a telephone number where the Kilpatricks can reach you. If you do not receive a return call, you may not use the site. THERE ARE NO EXCEPTIONS! Use of the site is limited to NOVAC members only.

No loud radios, alcoholic beverages or loose pets. Do not leave trash or debris behind. We are guests of the Kilpatricks and they reserve the right to revoke our observing privileges any time due to the carelessness of one person.

Directions to Crockett Park

From the Washington DC/Northern Virginia area, go west on I-66 to the 47-a exit. This is 234 South to Manassas. Continue on 234 for 2.8 miles then turn right on Godwin Drive at the "Po Folks" restaurant. Follow Godwin Dr. for 1.8 miles to where it merges with Rt. 28 West. Once on Route 28 continue driving for another 13.7 miles through the towns of Nokesville, Catlett and Calverton until you turn right on Rt. 643 toward Warrenton. There is a small country store (Mayhugh's) on the corner of the intersection. Go on about a mile up Rt. 643 to the Park Entrance road. Look for a small sign for C.M. Crockett Park on your right directing you to turn left. Once on the park entrance road, go one-half mile to the park gate.

Directions to The Kilpatrick's

From the Washington DC/Northern Virginia area, go west on I-66 to Route 29. Take the Route 29 South exit to Warrenton. Continue on 29 past Warrenton and Culpeper. When you pass the last exit for Culpeper, stay on Route 29 for 8 miles. At Route 631, turn left, and go 2.5 miles. At Route 630, turn right and go 1.5 miles until you come to Route 632. Turn left, go about 100 yards up the

hill. On the right there are three mailboxes. Turn right onto the driveway, go straight to the Kilpatrick's home. Let them know you have arrived and they can help you find a spot to set up.

NOVAC Newsletter is the official publication of the *Northern Virginia Astronomy Club* and is published six times per year at 12000 Vale Road, Oakton, Virginia 22124-2321, telephone (703) 758-8224, Thomas S. Parry, Editor. NOVAC Newsletter is sent to members of NOVAC as a regular membership benefit.

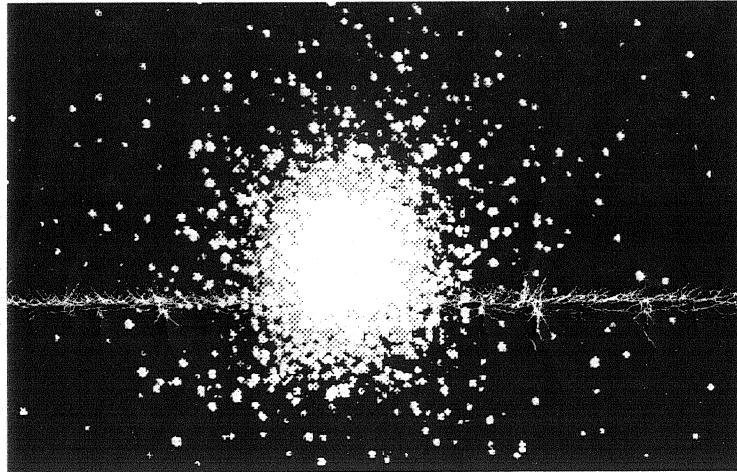
Membership in the Northern Virginia Astronomy Club is \$18.00 per year and is open to anyone interested in astronomy or the sciences. Contact Brenda Jones, Treasurer, 883 North Kentucky Street, Arlington, Virginia 22205, telephone (703) 527-7963. All notices of change of address should be sent to Brenda Jones. Please include both old and new addresses.

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Images



Globular Cluster M-13 in Hercules

"The appearance of the heavens from a point within the Hercules Cluster would be a spectacle of incomparable splendor; the heavens would be filled with uncountable numbers of blazing stars that would dwarf our own Sirius and Canopus to insignificance. Many thousands of stars ranging in brilliance between Venus and the full moon would be continually visible, so that there would be no real night at all on a planet in a globular cluster. Inhabitants of such a planet would probably know nothing of other clusters, of the galaxy, and of the other galaxies, as their view would be completely blocked by the brilliance of their own skies. To them, the Hercules Cluster would be 'the Universe.'"

Burnham's Celestial Handbook, Volume II

NOVAC

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