NOVAC

THE NEWSLETTER OF THE NORTHERN VIRGINIA ASTRONOMY CLUB

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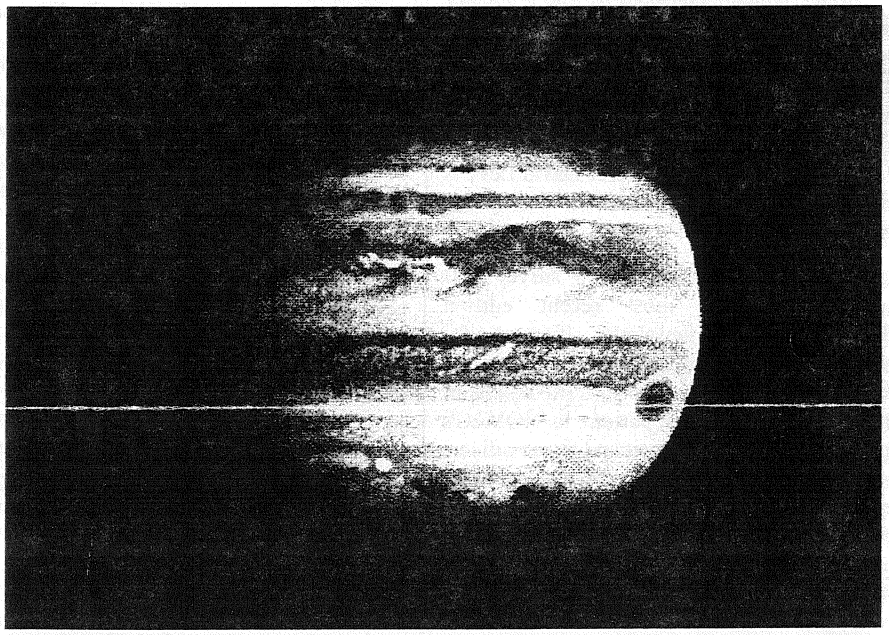
Inside this issue:

Boom! Boom! Boom! The Great Comet Crash



Editor's Note

by Thomas S. Parry

Boom! Boom! Boom! That's the way it was in July as Comet Shoemaker-Levy 9 collided with Jupiter. The great comet crash of '94 will surely be remembered as the media event that far exceeded public expectations. I have to confess I was skeptical that very much would be visible with ground-based telescopes given Jupiter's enormous size, dynamic atmosphere and uncertainty regarding the size of the cometary fragments. I figured it would be equivalent to throwing a pebble into a large pond. Boy was I wrong! I had no difficulty seeing the black impact spots through my 80mm refractor. The view through my 14.5-inch reflector was nothing less than awesome!

NOVAC members had a great opportunity to participate in Jupiter Watch at the U.S. Naval Observatory on July 21. Sponsored by the Planetary Society, Jupiter Watch afforded the public many opportunities to view the impacts through the 26-inch and 12-inch refractors as well as a large number of amateur telescopes set up by members of NOVAC and National Capital Astronomers. Thanks to all who participated in the event.

Responses to the NOVAC survey have been tremendous! Thanks to all who responded for taking the time to express your opinions and views. The data will be invaluable for future planning. To date I have received responses from 70 members. If you have not yet completed a survey, there is still time to fill it out and get it in. We need everyone's input for NOVAC's future. A portion of the October meeting program will be devoted

to a presentation of the survey findings and thoughts about NOVAC's future. Also, look for a summary of the findings in the November/December issue of the newsletter.

I think we would all agree this has been the cloudiest, wettest summer in many years. Although many of us are suffering severe photon-deprivation, relief is on the way. With fall just around the corner and the Northern Virginia Telescope Meet fast approaching on September 10, we anticipate superb observing conditions and a great turnout. See everyone at the meet. □

Highlights of July and August General Membership Meetings

by Marta Krause, Secretary

General Meeting July 20, 1994

Bob L'Hommedieu called the meeting to order at 7:30 PM. Thirty-four members and guests attended at the Arlington County Planetarium.

Announcements

1. Jupiter Watch, sponsored by The Planetary Society, is scheduled July 21 (tomorrow evening) at the U.S. Naval Observatory, 3450 Massachusetts Avenue in Washington, D.C. More than 50 amateur telescopes, including 23 from NOVAC, will be set up for observing at the event. Comet co-discoverer David Levy is expected to give a presentation during the evening.

2. The NOVAC membership survey was mailed with the most recent edition (July/August) of the newsletter. If anyone has not yet completed and returned their postage-paid club survey, please do so! The results of this survey are very important to NOVAC's future, and will help current and future officers plan club activities. Tom Parry reported that approximately 20 newsletters were damaged by the U.S. Postal Service and returned to him incomplete or torn up. If you did not get a survey with a newsletter or vice versa or nothing at all, please contact Tom. Currently, 20% of the surveys have been returned. The information provided by respondents is excellent but many more responses are needed. Survey results will be discussed at an upcoming meeting and published in the newsletter.

3. The 12th annual Northern Virginia Telescope Meet is slated to begin at dusk on September 10 at Crockett Park. This year it will be our fortune to have all nine planets visible sometime during the night of our telescope meet. The meet is free of charge and open to the public. Astronomy clubs and planetariums in four surrounding states have received invitations. All NOVAC members are encouraged to attend and bring their telescopes!

4. The annual Stellafane Convention, sponsored by the Springfield Telescope Makers, will convene on Breezy Hill outside of Springfield, Vermont on August 5 and 6. Stellafane is the nation's oldest and largest convention of amateur telescope makers and attracts amateurs from throughout the nation and the world.

5. Gary Kwolek, Park Manager at C. M. Crockett Park called recently to discuss NOVAC's use of the Park. His concerns included:
a) If you wish to use Crockett Park on other than a scheduled observing night, **you must obtain permission from one of the Park staff first**. It is not sufficient to leave a message; **you MUST speak personally with Park staff**. Recently, someone from NOVAC went to the Park on a non-scheduled evening without calling first.
b) Lock the Park gate AT ALL TIMES -- even when you are in the Park. This is necessary to maintain security and monitor unauthorized entry.
c) Unescorted guests have been a problem recently. They must arrive before dark, stay with club members, and leave with club members. THERE ARE NO EXCEPTIONS! Failure to observe the terms in NOVAC's park usage agreement jeopardize NOVAC's continued use of the Park as an observing site. The observing site rules are printed in every NOVAC newsletter. Review them frequently. Please do your part to observe these rules and ensure NOVAC's future access to Crockett Park.

6. Jerry Wolczanski requested help from members with telescopes for a) an evening of observing with a Boy Scout troop in Manassas on July 30, and b) solar viewing at the Flying Circus Hot Air Balloon festival in Bealton, Virginia on August 20. For the Bealton event, you must have a solar filter for your telescope. Those who arrive with a telescope will receive a free pass to the festival. Bealton is approximately 10 miles from Warrenton out Route 29 in the direction of Charlottesville. Anyone wishing to help out at either of these events should contact Jerry.

Officer's Reports

Vice President Ron Ferris announced the program for the August meeting. Brent Archinal will speak about the research behind his book *The Non-Existent Star Clusters of the RNGC*, and Tom Parry will speak about the *Telescopes in Education* program sponsored by the Jet Propulsion Laboratory and the Mt. Wilson Institute.

Treasurer Brenda Jones requested that anyone able to help with car pooling to Crockett Park please contact her. Currently, two individuals, one in Washington, D.C. and one in the Springfield area, are interested in obtaining rides to Crockett Park on observing nights. In addition, Brenda brought copies of some images of Jupiter taken July 19 provided by her son Kevin Jones through is summer intern work at the Space Telescope Science Institute.

New Business

1. NOVAC has signed a formal agreement with the Northern Virginia Regional Park Authority to use property known as the Savage Farm as an observing site. The property is west of Leesburg off Route 601. The property is not yet ready for use due to hazards that must be remedied. The site's availability will be announced as soon as it is ready.

Observing Report

The observing report was given by Jeff Stetekluh, who reminded us that the peak of the Perseid meteor shower is expected August 11 and 12. Bill Burton offered information about the timing of upcoming impacts of Comet Shoemaker-Levy 9 on Jupiter. The NOVAC BBS has a schedule of upcoming impacts

Member Presentations

1. Fred Holmes announced that he has a supply of color filters available for free. If you are interested, please contact Fred.

2. Bob Sandy displayed a selection of slides he had recently taken, including views of Mercury and Venus in May.

The three-part main program was given by NOVAC members Al Schumann, Bill Burton, and Sandy Sanders. Al Schumann presented a highly entertaining multi-media (video/slide show) he made of an "expedition" to observe the May 10, 1994 annular eclipse. Al also held a garden produce giveaway. Bill Burton presented a video made using a hand-held video camera that included footage of the moon, a lunar eclipse, the solar eclipse in May, and the Savage Farm property. Anyone interested in information about observing

using a hand-held video camera should contact Bill. Finally, Sandy Sanders presented slides of a model solar system set up in Peoria, Illinois and neighboring towns

General Meeting August 17, 1994

Bob L'Hommedieu called the meeting to order at 7:30 PM. Twenty-five members and guests attended at the Arlington County Planetarium.

Announcements

1. The 12th annual Northern Virginia Telescope Meet will be held September 10 at Crockett Park. The meet will begin at dusk. This in one of NOVAC's biggest opportunities to work with the public and to have fun. Volunteers are needed for parking direction and for the information table. Volunteers are asked to sign up in thirty-minute slots for both tasks. Please contact Brenda Jones to sign up.

This year, all nine planets in our solar system will be visible on the night of the Meet. To encourage planetary observation, NOVAC will be giving out two observing certificates. Individuals who observe eight planets (all but Pluto) will receive the NOVAC Planetary Award. The NOVAC Clyde Tombaugh Award is available to those who successfully observe all nine planets. Everyone is encouraged to find the planets themselves!

2. Member responses to the NOVAC Survey have been excellent with over 60 surveys returned. There are many, however, who haven't returned their surveys. We need to hear from everyone. If you have not yet filled out a survey, please contact Tom Parry to do so.

3. Another reminder that the gate at Crockett Park is to be locked AT ALL TIMES. We cannot remind everyone emphatically enough! Lock it behind you when you come in and lock it behind you when you leave.

4. Work is still in progress to prepare the Savage Farm property for use as an observing site. Details on use of the site will be forthcoming when it is ready.

5. Kevin Jones was awarded two Astronomical League certificates for observing the Messier objects. The Binocular Messier Certificate was awarded for observing 50 or more objects using only binoculars. Kevin's certificate is numbered 162. The Telescopic Messier Certificate is for observing 70 or more Messier objects using a telescope. Congratulations to Kevin on his accomplishments.

6. Jerry Wolczanski won an award for craftsmanship in the telescope making competition at the Stellafane Convention. Jerry built a 5-inch reflector using a modified Springfield design for use by observers in wheelchairs. Jerry said that he was interviewed by Sky and Telescope so keep an eye out for an article or photo of Jerry and his telescope.

Officer's Reports

Secretary Marta Krause received materials advertising a CCD camera system made in France. Myron Wasiuta currently has these materials and has said that the system is a very nice one. Anyone interested should contact Myron.

Treasurer Brenda Jones requested that members sign up to help with the Telescope Meet on September 10. NOVAC needs to borrow a card table to serve as the information table. Brenda also asked for volunteers with telescopes and solar filters to help with observing at the annual Children's Festival to be held at Crockett Park on September 24, 11:00 AM to 4:00 PM.

President Bob L'Hommedieu reminded all NOVAC members that the club picnic is October 1 at Crockett Park beginning at 4:00 PM.

The Observing Report was given by Jeff Stetekluh

Member Presentations

1. Bob Shuler displayed and discussed an equatorial mount he made using a kitchen timer, a 16-inch record, and a few pieces of teflon. Anyone interested in making such a mount should contact Bob.

2. Bob Ridgeley and Myron Wasiuta circulated images of the Shoemaker-Levy 9 impact zones on Jupiter they had taken.

3. Al Schumann donated some astronomy books and a potential observing stool to the club. NOVAC thanks Al for his generosity.

4. Jerry Wolczanski reminded members that the August 20 Flying Circus Balloon Festival still needs members with telescopes and solar filters. Individuals with telescopes get a free pass to the festival. Anyone interested should contact Jerry.

5. Bill Burton presented a frequency graph showing the number of Perseid meteors observed in the course of one night from his observing site in Colorado during the recent shower. Bill logged 299 meteors. (The graph appears in this issue of the newsletter).

The two-part program was given by NOVAC members Tom Parry and Brent Archinal. Tom presented an introduction to the *Telescopes in Education* program sponsored by the Jet Propulsion Laboratory/Mount Wilson Institute. He showed a video produced by JPL that describes and illustrates how high school and college students use modem links to access and control the 24-inch telescope at Mt. Wilson. Students may control the telescope remotely, image distant objects and download the imagery to their own PCs for processing at a later time. Thomas Jefferson High School here in Virginia has served as a beta test site for the program, which is now fully operational. An article about the program appeared in a recent issue of *Sky and Telescope* and the program is available to amateur astronomers. To learn more about the necessary hardware and software, the costs, and the contact persons, call Tom.

Brent Archinal spoke about the research he did behind his book *The Non-Existent Star Clusters of the RNGC*. Brent's presentation included a review of the history of observing and of the efforts behind the development of the catalogues of non-stellar objects, including the work of Charles Messier and William and John Herschel. Anyone interested in Brent's research or his book should contact him. □

President's Column
By Bob L'Hommedieu

This summer has been quite a unique time for amateur astronomers. The excitement over the Shoemaker-Levi crash into Jupiter and the excellent opportunities to view the results on the planet's surface have been very interesting for everyone. Interest in astronomy among the general public is also quite high right now.

This year's Northern Virginia Telescope Meet should be very successful. The event will be held September 10th at Crockett Park. We expect a large number of people to come out to see what amateur astronomy is all about. This year all the planets will be visible on the night of the Meet and NOVAC is giving out awards to people who view at least seven planets (other than Earth). A few volunteers are needed to help with the event. If you can volunteer, please call Brenda Jones.

NOVAC is also planning a club picnic this year at Crockett Park on October 1st. This is a regular observing night. The club will be renting the picnic pavilion at the Park. Members are asked to bring a picnic dinner for themselves and a dessert to share with others. Crockett Park is a great place to take the family for an outing. This activity should be a fun way for our members to get to know each other and also provide a way for families to enjoy astronomy together. The picnic will start around 4:00 pm.

Club Elections are coming up later this year and nominations will soon be open. Any member is eligible to run for any office and if you have a desire to serve NOVAC by holding office, please let an officer or trustee know. □

Sky Sweep for September/October 1994

by Kevin Jones

Early autumn evenings are an ideal time to view some of the Messier objects located just to the west of the summer Milky Way. Summer haze is less of a problem and this part of the sky is placed conveniently high in the west. M-39 is an open cluster in northern Cygnus, located just under ten degrees to the east-northeast of Deneb. This cluster is half a degree in apparent size and contains a loose sprinkling of stars. It shines at between fifth and sixth magnitudes and is visible to the naked eye on dark nights. The large size and low number of stars in M-39 make binoculars the ideal instrument with which to observe it. In the narrower fields of telescopes, the overall impression of the cluster is lost. M-39 is located less than a thousand light years from the Solar System.

Near Gamma Cygni, the central star in the *Northern Cross* asterism of Cygnus is M-29, another open cluster. M-29 lies about two degrees south of Gamma Cygni. This is another star-poor, fairly unimpressive cluster located in the plane of our Milky Way galaxy. Much smaller than M-39, M-29 is only seven arcminutes across, and shows little detail in binoculars. It is best to use a telescope to view this cluster well. The main stars of M-29 are arranged in a tiny dipper shape, similar to that of the Pleiades. The shape has always vaguely reminded me of the Great Square of Pegasus and Andromeda. M-29 glows at seventh magnitude and is thought to be about seven thousand light years distant.

The Dumbbell Nebula, M-27, is found to the south of Cygnus in the constellation Vulpecula. This nebula is a *planetary* nebula; a shell of tenuous gases resulting from a star's explosion as it went nova. These gases are excited by the radiation emitted from the remnant central star causing them to glow by fluorescence. The term planetary nebula is due to the planet-like appearance of such objects. The Dumbbell is about the same angular size as M-29 (eight by four arcminutes), which is large enough to be seen as nonstellar in binoculars. The Dumbbell is an eighth-magnitude distinctly greenish object.

About four degrees to the south of M-27 is M-71, a globular cluster in the tiny constellation of Sagitta, the arrow. M-71 is similar in size to M-29 and the Dumbbell Nebula, being a tenth of a degree in diameter. Through a telescope, it is a round fuzzy seventh-magnitude blur, difficult to resolve into individual stars. At under ten thousand light years away, M-71 is one of the closest globular clusters to the Solar System.

Three degrees to the northeast of Enif (Epsilon Pegasi), the nose of Pegasus, another globular cluster can be found. This cluster is M-15, a pretty globular cluster around ten arcminutes in diameter, slightly larger than M-71. M-15 is located forty thousand light years from our Solar System. Interestingly, M-15 is the only globular cluster that has been found to contain a planetary nebula. This planetary is beyond the reach of most amateur telescopes. Shining dimly at fourteenth magnitude, it is virtually stellar in appearance.

Yet another globular cluster is located fourteen degrees due south of M-15. This cluster is M-2 in Aquarius, an even showier cluster than M-15. Visible at seventh magnitude, M-2 is just over ten arcminutes across and has a bright concentration of stars at its core. It is located in a fairly star-poor field and is easily swept up in binoculars or finderscopes.

The last two Messier objects I'll discuss in this month's column are M-72 and M-73. Found just over ten degrees to the southwest of M-2, these objects are separated by two degrees along an east-west line. M-72 is an unimpressive globular cluster shining at tenth magnitude and only two arcminutes in diameter. This cluster is difficult to locate with certainty in a pair of binoculars without the help of a good star atlas. Even through a telescope, M-72 is not particularly spectacular. It is thought to be located sixty thousand light years away. M-73 is a group of three or four stars listed in some deep sky catalogs as an open cluster and in others an asterism. These few tenth-magnitude stars are not thought to constitute an actual star cluster; they seem to be a chance line-of-sight alignment of stars. Three of the four brightest of M-73's stars form an equilateral triangle no more than two arcminutes per side. The fourth star lies just outside one of the triangle's corners.

Enjoy observing these early autumn Messier objects, and keep working towards Messier or Binocular Messier Certificates by keeping brief notes of your observations. Clear skies! □

Its not too late!

Its not too late!

If you have not yet filled out the NOVAC survey, its not too late to get it in. We need everyone's input, even if you don't take part regularly in club activities. We would like to have all completed surveys by September 15.

Announcing
The 12th Annual
Northern Virginia
Telescope Meet

September 10, 1994
Sunset

C. M. Crockett Park,
Midland, Virginia

Come out and see the heavens! Star clouds, planets, asteroids, galaxies, clusters, nebulae, and maybe a comet or two will be seen!

Telescopes on Display

For more information, call
703-256-8359 or 703-281-9049

Sky Calendar for September/October 1994

Compiled by Thomas S. Parry

(Times and dates are Eastern Time. Observations begin at dusk)

September

1 Saturn at opposition, 1 p.m.
Observing at Parsells Field

2 **Observing at C. M. Crockett Park**

3 **Observing at C. M. Crockett Park**

5 New Moon

8 Venus at aphelion
The Moon at perigee (226,892 miles from Earth).
The Moon passes 2° N. of Venus (Eve)

9 The Moon passes 1.4° S. of Jupiter (PM)
Observing at C. M. Crockett Park
Observing at Parsells Field

10 **Northern Virginia Telescope Meet '94 at C. M. Crockett Park**

12 First Quarter Moon

15 Mercury at aphelion

18 Moon passes 7° N. of Saturn (during day)

19 Full Moon

21 **NOVAC Monthly Membership Meeting at Arlington Planetarium**
Mercury passes 0.1° S. of Spica

23 Autumnal equinox at 2:19 a.m.
First day of autumn

24 The Moon at apogee (251,808 miles from Earth).
Mars passes 6° S. of Pollux (during day)

26 Mercury reaches greatest eastern elongation (26°)

27 Last Quarter Moon
Venus is at greatest brilliancy (magnitude -4.6)

30 **Observing at C. M. Crockett Park**
Observing at Parsells Field

October

1 **NOVAC Family Picnic (Crockett Park)**
Observing at C. M. Crockett Park
Uranus stationary

2 Neptune stationary

4 New Moon

6 The Moon at perigee (223,845 miles from Earth).
The Moon passes 3° N. of Mercury (during day)

7 **Observing at C. M. Crockett Park**
Observing at Parsells Field
The Moon passes 7° N. of Venus (during day)
The Moon passes 0.7° S. of Jupiter (during day)

8 **Observing at C. M. Crockett Park**
Draconid meteor shower peaks

11 First Quarter Moon
The Moon passes 4° N. of Neptune (Eve)
The Moon passes 5° N. of Uranus (Eve)

15 The Moon passes 7° N. of Saturn (during day)

19 Full Moon
NOVAC Monthly Membership Meeting at Arlington Planetarium

21 Mercury at inferior conjunction
The Moon at apogee (252,338 miles from Earth).

22 Orionid meteor shower peaks
Observing at Parsells Field

27 Last Quarter Moon

28 The Moon passes 7° S. of Mars (during day)
Observing at C. M. Crockett Park
Observing at Parsells Field

29 **Observing at C. M. Crockett Park**

Upcoming NOVAC Meeting Programs

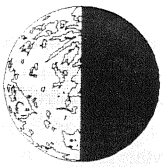
September 21 at 7:30 PM: The September program will feature Tom Parry who will report on the 1994 Stellafane Convention held August 5-7 on Breezy Hill near Springfield, Vermont. Slides and Video of original telescope designs and mirror making workshops will be shown.

October 19 at 7:30 PM: Dr. Drake Deming, Director of the Planetary Systems Branch at the NASA Goddard Space Flight Center, will present "The Great Comet/Jupiter Crash." Also, Tom Parry will present results of the 1994 NOVAC membership Survey.

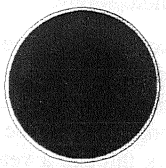
Monthly NOVAC General Membership Meetings are held the **third Wednesday of every month at 7:30 PM** at the Arlington County Planetarium, 1426 N. Quincy Street, Arlington, VA. Admission is free and open to the public. Call the NOVAC hotline (703) 256-8359 for upcoming events, special announcements or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

Lunar Phases for September and October 1994

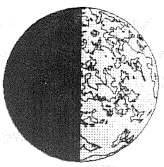
Last Quarter
September 27
October 27



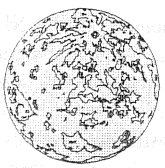
New Moon
September 5
October 4



First Quarter
September 12
October 11



Full Moon
September 19
October 19



What is Deep Sky Observing?

by Alan Goldstein, The National Deep Sky Observers Society

Astronomy lets a person see the universe first hand and provides a veritable plethora of opportunities for amateur observation. One can watch the diurnal motions of the sun, moon and planets or concentrate on the wonders of the universe beyond. This "universe beyond" is the realm of deep sky observers. Deep Sky observing can be visually stimulating and challenging. You can push your eyes to the limits of the universe.

Deep Sky targets include anything located beyond the edge of our Solar System. Stars, gaseous nebulae, clusters and galaxies create an endless tapestry of beauty and wonder awaiting discovery by the observer with the right equipment. Although today's light pollution makes seeing the starry night sky more challenging than ever, a trip to the country will still reveal a celestial glory that cannot be duplicated in a planetarium.

Everyone has seen a star. Who has seen a stellar nursery or watched a star in its death throes? Many people are not aware that stars display different colors. These colors are subtle and require practice to be seen well. Telescopes can bring out star colors more vividly. They can also show that some stars are actually two, three or even four stars together! Many stars travel around the Milky Way in tandem systems much like the moon and Earth orbit one another. Some vary in brightness, changing intensity (magnitude) on a daily, weekly, or yearly time scale. These are called variable stars.

Stars are created out of vast clouds of dust and gas called nebulae. These clouds are scattered throughout the Milky Way. One of the brightest is the Great Nebula in Orion, visible to the naked eye as a fuzzy patch below the hunter's belt on cold winter evenings. In thousands of years, the Orion Nebula will gradually fade and give way to a sparkling aggregation of stars called an open cluster. Such clusters abound in the night sky. Among the brightest are the Hyades and Pleiades (Seven Sisters) in Taurus and the Beehive cluster in Cancer.

The most spectacular balls of stars are the globular clusters. These tightly bound masses contain hundreds of thousands of stars and observers need telescopes of considerable size to resolve them. In binoculars, they resemble "fuzzy" stars.

On dark, clear summer or mid-winter nights when the gentle light of the Milky Way arches across the sky, we are looking at a mixture of stars, clusters, bright gas clouds and dark dust clouds sprinkled with nearby stars. We are seeing the light from several of the spiral arms of our galaxy.

Autumn and spring skies, although devoid of the Milky Way, are filled with the faint light of distant galaxies. Many are like our own and reside at astronomical distances. Their light takes millions to hundreds of millions of years to reach us. The Andromeda Galaxy is the most distant object seen with the naked eye. Its light takes over two million years to reach us!

There are many other objects to see - stellar associations, quasars and the like. Observing the deep sky can be the start of a lifelong quest to understand what the universe is all about and how we on Earth fit in. □

The National Deep Sky Observers Society

The National Deep Sky Observers Society (NDSOS) was established in 1976 with the goals to serve as a: (1) clearinghouse for deep sky observers and (2) medium to allow people with similar interests to correspond with one another.

The first goal is met through our quarterly publications *Betelgeuse* and *The Practical Observer*. *Betelgeuse* allows members to get their observations printed in a timely manner and distributed nationally and internationally to fellow observers. This journal features short articles on observing, Society business, and challenging observing targets. *The Practical Observer* provides in-depth stories and practical techniques on deep sky observing and astrophotography.

The second goal of the NDSOS is achieved when members correspond with other deep sky observers through the annual membership directory or the Global Astronomy Network. Do you use E-mail? We have set up an E-mail network through a veteran observer in Maryland. Do you need information about a cryptically numbered planetary nebula, galaxy or other obscure deep sky object? Our Data Coordinator can help.

Membership in the NDSOS is only $20 per year. To join, you may request a sample copy of *Betelgeuse* or to get more information about our group, contact Alan Goldstein. NDSOS National Coordinator, 1607 Washington Blvd., Louisville, KY 40242-3539 or call (502) 426-4399 between 6:00 - 9:00 PM (eastern time) weekday evenings. □

A Late Night Surprise

by Al Schumann

The NOVAC Astronomy Day star party at Crockett Park on 16 April 1994 was a winner in every respect. There were club members galore, a plethora of telescopes and scads of visitors. We had clear, transparent skies, cool temperatures, and some nifty things to look at, such as a supernova in M-51, Comet McNaught-Russell, and a late night surprise. Of course in the early going we did have to contend with hundreds of flashlights, a campfire, Coleman lanterns, and the first quarter moon. Also, there might have been a bit more wind than we really needed. I found that out when the telescope was yanked out of my hand a couple of times. The only grim part of the evening came as we watched Al Boldt's car go out on the hook. I spoke with Al a few days later and he said he was lucky. The problem was a fairly inexpensive linkage cable twixt the shifter and the tranny.

All too often I forget what an attraction the moon is to people who have never looked through a telescope before. The moon actually turned out to be the biggest treat for the many visitors who stopped by to take a look. The Oh's and Ah's and the comments about the craters were invigorating and I made yet another promise to myself to spend more time studying the moon. There was at least one science teacher on hand with a group of students. Had a lot of fun with them, first with the moon and later with a cross section of deep sky objects. They really liked M-3, the globular cluster in Canes Venatici, so we came back to that a few times in between peeks at other things. We looked at the beehive and M-35 as examples of open clusters, M-81/82/51 for galaxies, and a very washed out Orion Nebula. It was good sport.

Around 10:30 the last of the scouts turned in for the night and most of the visitors had left. The moon was lower in the sky, so it was time to sweep around the deep sky. Leo and the Big Dipper were the primary areas, and it was fun looking for the little NGC galaxies. The wind was still gusting a good bit, and at times it took both hands on the telescope to keep it from flying off target. When the campfire died

down we had a good look at Comet McNaught-Russell. The comet had moved a lot over the course of the previous week and was streaking in a northerly direction through Auriga. For the life of me I couldn't make out any trace of a tail; it just seemed to be a bit brighter on one side than the other. Tail or not it was nice to watch.

Long about midnight just about everyone had packed it in and left. Then came the surprise. Brent Archinal came up to a couple of us and said he thought there was an aurora in the northern sky. Up towards Warrenton there is usually a faint bit of sky glow, but this glow was GREEN! Sure enough, after a moment or so we saw spikes shooting upwards from the horizon. They would shimmer a bit and fade away only to reappear somewhere else. At times there were only a few; moments later there might be dozens of spikes. Good sized patches of greenish glow would brighten noticeably for awhile, fade, and brighten in another spot; they were playing hide-and-seek around a couple big trees in the distance. It looked as if the display spanned about 30 degrees in azimuth. As for elevation, it went from the ground up to about 15 or maybe 20 degrees. Since it hugged the ground, we could not see the bottom of the curtain. I have no idea how long the show lasted, but all of a sudden it just faded away. My first aurora! Never would have noticed it had it not been pointed out. Thanks a million, Brent.

After the aurora I had nothing specific in mind and just went for targets of opportunity. Despite the wind it was a sensational night! Hercules came up, and you can't leave without taking a look at M-13 and its smaller sibling M-92. Then the Ring was visible, etc., etc. You know what I mean. Finally, as Brent Archinal and Brenda Jones were taking down the NOVAC banner, I called it quits. Home at 3 a.m. What a great night. □

The 1994 Perseids From Colorado

by Bill Burton

Every other year my family and I go to Colorado in August for vacation, and this year we planned it to coincide with the dark of the moon and the Perseid meteor shower. Expected to peak on the night of August 11-12, we hoped to see many meteors resulting from the train of debris left over from Comet Swift-Tuttle. This year was promising because the comet crossed Earth's orbit just two years ago and the young moon would set not long after nightfall making for a dark night.

Perseid Night found us at the Wanrow family cabin in Jamestown, a former mining settlement nestled in a canyon in the Front Range near Boulder, at an elevation of 8000 feet. The creek that formed Jamestown Canyon splits just above town and a manmade butte consisting of level mine tailings on bedrock rises above the fork. Trees can't grow on the tailings and so the butte makes an ideal viewing platform with a surprisingly open view and unobstructed horizon.

My thirty-year-old niece and a friend came up from Boulder and we scrambled to the top of the butte with flashlights and warm bedding around 10:30 PM local time. At first the clouds, left over from the daily afternoon thunderstorms, covered about 50% of the sky. We saw a few meteors, then at 10:44 came the "big one!" A bluish-white fireball, with a brightness greater than magnitude -5 streaked through a patch of clear sky low in the northwest. Our shouts echoed off the distant hills!

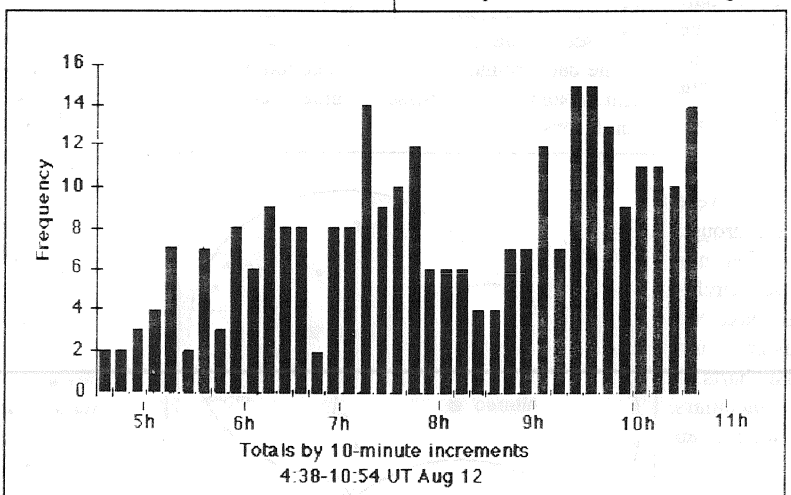


Figure 1

The show was not over, however, for the meteor had left a persistent, glowing greenish-white train! For the first time in my life I was able to study a meteor trail with binoculars, watching it get slowly swept by high-altitude winds. The leading end of the train was bulbous, probably representing the explosive flash that ended the brilliant streak. Were we in for a repeat of the fireball show of 1993?

As the skies steadily cleared and limiting magnitude reached 6.5 by midnight, it became apparent that this was more of a classic Perseid shower with a predominance of fast, faint meteors. Radially recumbent in our sleeping bags, my companions and I not only counted each meteor but noted its time, in an attempt to contribute to the *Perseid Clustering Project* described in the August issue of *Sky and Telescope*. At 2:00 AM, my companions left and I continued on my own. I aimed the red flashlight at my watch with my teeth and tried not to look away too much as I wrote in my notebook (I don't think I missed many).

My niece, an able statistician, later worked up the data, which seem to show considerable minute-by-minute variation in rate and a correlation of greater clustering of meteors with higher frequency. Figure 1 illustrates a frequency histogram of count totals in ten-minute increments over the entire night of August 11/12. The data display a double peak--the first one coming between 07:00 and 08:00 UT and the second between 09:00 and 11:00 (or later) UT , with a significant lull between 08:00 and 09:00 UT. After 09:00 UT the rate picked up and bursts of two or three meteors per minute were not uncommon. A fireball at 09:24 left a train that lasted 30 seconds (the second longest I've seen). As the radiant in Perseus rose high over my head, the meteor trails became short and squat because they were headed towards me.

This six-and-a-half hour meteor watch was probably the longest time I have spent stargazing in one night. As the hours passed and I watched the Milky Way slowly swing off to the west, the faint glow of dawn began to fill the east. As I rose and headed down the hill under the rapidly brightening sky, I realized I had seen over 300 meteors and they were still falling! Interestingly, IAU Circular 6052 reports that observers along the Nevada-California border observed a meteor peak right at the end of my observing session, around 11:00 UT, with several fireballs, followed by a sharp dropoff soon thereafter.

As I crossed the bridge over the creek to our cabin, I turned around for one last daylight look, just in time to see another fireball blaze across the pale blue sky. Adios, and see you in two years, I thought. □

The Recreational Astronomer: A Summer Starhop for Binoculars

by Jon Stewart-Taylor

Welcome back to the Recreational Astronomer. In this column we will design another simple star hop for binoculars in constellations favorably placed in late spring and early fall. We will find double stars, open and globular clusters, and the planetary nebula known as the Dumbbell.

Getting Ready

This section is the same as the previous column: if you read that one, you may want to skip straight to the starhop, or skim this section as a review.

Before we start, you should get your charts and field-of-view gauge ready. If you have a choice of charts, choose the one that will give the closest approximation to what you will actually see. For average binoculars under typical suburban skies, an 8th magnitude chart is very good. I used Wil Tirion's *Sky Atlas 2000* while designing this hop.

Once you choose your chart, you need to make a field-of-view gauge that corresponds to your binocular's field of view for that chart. I prefer the wire-ring gauges to make it easier to draw circles on the chart. Also, make sure the chart is oriented so the stars are aligned the same way you will see them in the sky. This won't matter much while laying out the star hop, but will be very helpful while actually observing.

Charting Our Course

I'm going to describe the star hop as if we were out under the sky, but you should walk through it on your charts first at least once. You may want to actually draw the field-of-view circles on the chart as you go. This will make the stations easier to remember, and easier to find while out at night. I drew all of the charts in this article using a pair of 10x50 binoculars from my town-house front yard. North is up and East to the left.

Zeroing In

We'll start at Albireo, Beta Cygni. This star is located about half way between Vega (Alpha Lyrae) and Altair (Alpha Aquilae). It's the brightest star in its vicinity, so it's pretty easy to find (see Figure 1).

Albireo is a showcase double star for small telescopes due to its wide separation and beautiful color contrast. The two components can be split with good binoculars if they can be held steadily: not easy without a tripod or other support. I do not have good binoculars or a tripod, so I have never split the star, but on good nights I can perceive the colors of the two components.

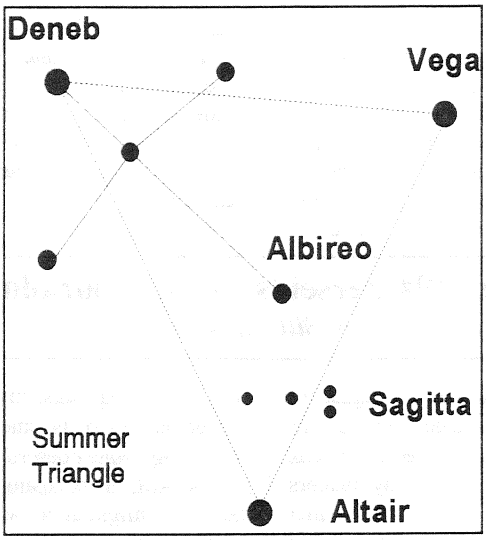


Figure 1

Slide NW about a half field. With Albireo in the SE corner of the field, a "7"-shaped asterism with the stem running east-west should be in the NW corner. Globular cluster M-56 is located just south of the bottom of the "7" (see Figure 2). M-56 does not jump out of the background on casual inspection and is dim enough that I've missed it under mediocre conditions.

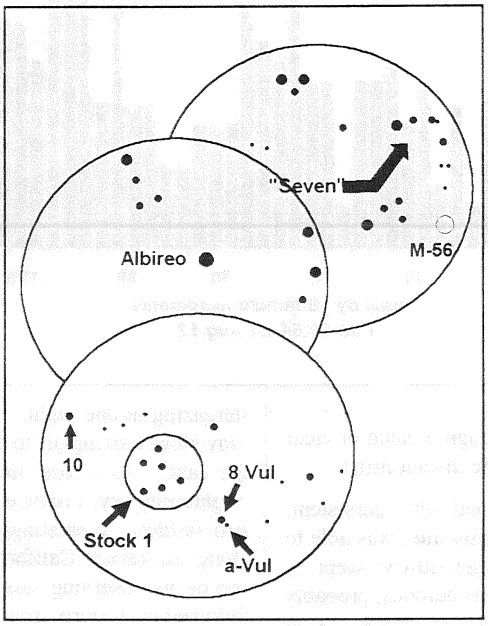


Figure 2

Go back to Albireo, then due south about 5 degrees. Alpha and 8 Vulpeculae should be centered in the field when Albireo is at the edge. This pair is what I like to call a pseudo-double: in binoculars they appear to be a normal double like any other pair but have no real relationship. They are only an optical double. Look carefully at the colors of the two stars. Although color perception varies from person to person, I perceive the brighter as red and the fainter as amber.

Located about one quarter field to the East of Alpha is a little-known (for good reason) open cluster: Stock-1. It is about one-half the distance along a line between Alpha and 10 Vulpeculae. Since it spreads over 80', some describe this cluster as best viewed through finderscopes or binoculars. It is, however, not spectacular.

The Coathanger

Our next destination is the "Coathanger," also known as Broccia's cluster or Collinder 399. This cluster is one that lives up to its name: it really does resemble an old-fashioned straight wooden coathanger. It is detectable with the unaided eye as a fuzzy patch, and occupies an area wider than the full moon.

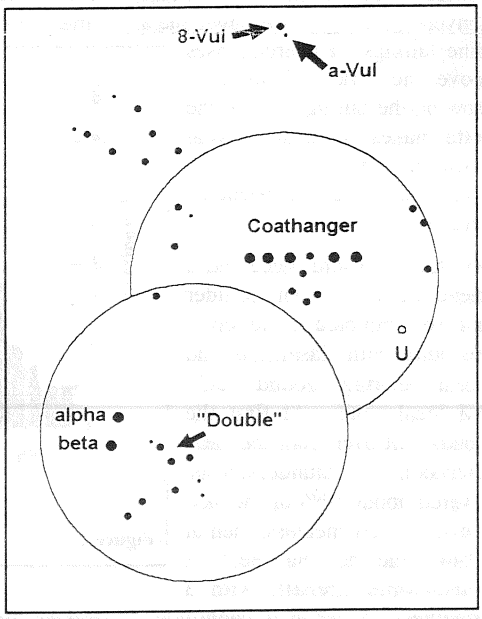


Figure 3

To find it, start at Alpha Vulpeculae, and go due South one field. The Coathanger should enter from the bottom as Alpha nears the top (see Figure 3). The ten main stars all seem to be about the same magnitude and color. About 1.5 degrees to the east of the Coathanger is U Sagittae, an eclipsing variable star with a period of about 3.4 days and a magnitude range from 6.5-9. This is an especially good variable

for watching with binoculars. It's worth checking every time you observe in its vicinity and would be a good candidate for your first variable star project.

From the Coathanger, slide one field southeast to find Alpha and Beta Sagittae. These are the *fletchings* or feathers of the arrow. There is another, much fainter, pseudo-double about one degree west-southwest of Beta.

Sagitta

Sagitta is a rare constellation in that you can fit practically all of it's bright stars into a single binocular field of view. From the "Fletchings," slide east until you have eta and gamma at the far east side of the field, zeta and delta at the

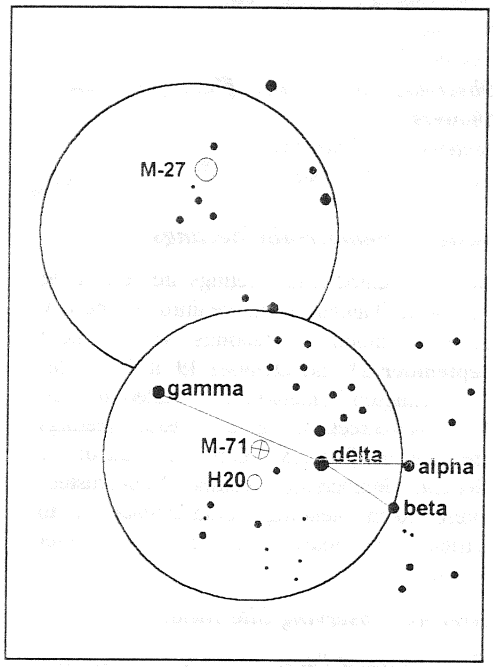


Figure 4

center, and alpha and beta at the far west side of the field. To me, all of these stars are about the same color, a light yellow (see Figure 4). Near the center of the field, delta and zeta make a triangle with 6th-magnitude 9 Sagittae. Just to the east of 9 Sagittae are two clusters. Globular cluster M-71 is northeast of 9 Sagittae, and is ranked by various authorities as 7th, 8th, or 9th magnitude. I perceive it to be about 8th magnitude. Southeast of 9 Sagittae is open cluster H20, which I see as slightly smaller and dimmer than M-71. Both of these clusters are near enough the limits of my site and binoculars that it takes pretty good observing conditions for me to spot them.

Now move the field of view east until centered on Gamma Sagittae. Gamma is actually the brightest star in Sagitta (3rd magnitude compared to alpha's 4th). If there are any of the six brightest stars in Sagitta that vary in color, it is probably Gamma. I can sometimes convince myself that it has a deeper orange tinge. What color do you see?

Gamma is just a station on the way to the jewel of our trip. Move due north until Gamma is at the south edge of the field. Just above the center of the field, beside three 7th-magnitude stars, is M-27, the Dumbbell Nebula. This is one of the largest and brightest of the planetary nebulae. While it's usually obvious with direct vision, take several minutes to observe it with averted vision from different angles. Which angle lets you see the most detail? Can you make out the dumbbell shape, or does it stay a shapeless blob? M-27 is an excellent training ground for teaching your eye to see deep-sky objects.

Summing Up

Like that discussed in the previous column, this tour and its selection of objects shows how well-suited binoculars are for beginning and intermediate astronomers. They fit in the range of instruments about half way between unaided eyes and telescopes. Similar star hops are easy to design: just pick a section of your star chart, use your references to pick interesting stops, and lay out your path with field-of-view circles.

Acknowledgments and References

For more information about star hopping, field-of-view guides and so forth, see *The Recreational Astronomer: A Spring Starhop for Binoculars*, NOVAC Newsletter, Vol 14, No. 53. May/June 1994.

Although intended for telescopes rather than binoculars, Sky and Telescope's *Backyard Astronomy* column often describes interesting starhops.

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*.

Exploring the Night Sky with Binoculars, by Patrick Moore, contains some binocular highlights for every constellation with emphasis on variable stars and stars that show colors clearly.

For detailed information about all aspects of using binoculars or telescopes, see *Burnham's Celestial Handbook*. □

NOVAC Acquires New Observing Site at 1700 Foot Elevation

NOVAC has finalized an agreement with the Northern Virginia Regional Park Authority (NVRP) to use its Savage Farm property for observing sessions. This site, located near Snicker's Gap off Route 7, is 20 miles from Leesburg and 1700 feet up in the Blue Ridge. Skies are about the same as at Crockett Park. On a mildly hazy night we estimated a limiting magnitude of 5.8 using the stars in the Little Dipper. Galaxies as faint as 9.6 were visible in 10x40 binoculars. On a similar night, an eight-inch newtonian reached galaxies of magnitude 12.9.

Directions to the Savage Farm observing site

Use some combination of Routes 7, 267 (Dulles toll road), and 28 to get to the Route 7 Leesburg bypass. Go around Leesburg on the bypass until you reach "regular" Route 7 again. From the intersection of the bypass and "regular" route 7, continue on route 7 WEST 18.5 miles to route 601, at the top of Snicker's Gap. Turn LEFT onto route 601 south and go 2.4 miles to the park entrance.

You may also take I-66 west to Route 17 North. Stay on Route 17 North until it intersects with Route 50 at Ashby Gap. Turn left onto Route 50 and go one (1.0) mile and turn right on Route 601. Continue on Route 601 (Blue Ridge Mountain Road) and go two miles past the main gate of the FEME installation. Turn right at the park entrance.

The park entrance on Route 601 is marked by a small brown and white NOVAC sign. Note that the neighbors periodically pull up the sign, so it may not be there. As you turn into the park, go straight ahead until you reach the gate, which is secured by both a keyed padlock and a combination lock. The combination is on your NOVAC observing pass. ALWAYS lock the gate behind you. The NOVAC lock MUST be locked to the keyed lock, not to the chain, to allow emergency access by the fire department. Drive to the observing area (the stone patio next to the house). There is very limited parking at the observing area itself, so please park in the parking area on the right (as you face the patio).

Observing Site Rules

The park is reserved for NOVAC use on the same nights as Crockett Park (see the NOVAC Newsletter for dates), plus all the major meteor showers. For non-scheduled observing sessions, call the park manager, Paul McCray, at (703) 729-0596 at least 24 hours in advance and leave a message with a number where you can be reached. You MAY use the site for that session UNLESS you receive a call from Mr.

McCray stating otherwise. The usual NOVAC observing site rules apply: no loud noises, alcohol, or loose dogs, and pick up after yourself. In addition, please make sure the gate is locked whenever you are in the park, and especially when you leave. We are guests of the NVRP and could have our access to this site revoked at any time if it is abused.

Special Cautions

The property has not been well maintained and there are a number of hazards. WE STRONGLY RECOMMEND THAT YOU VISIT THE SITE AT LEAST ONCE DURING DAYLIGHT BEFORE OBSERVING THERE. The entrance road is dirt/gravel and is quite steep. It is not an all weather road and can be dangerous in bad weather. The buildings are UNSAFE and should not be entered or approached. The stone wall at the patio is falling down due to erosion beneath it and should not be approached. Please stay on the patio side of the split-rail fence. The patio itself is safe. There are numerous large anthills around the property that should be avoided, since the ants will defend their homes. There are many patches of poison ivy, so in general it's best to keep to the marked/mowed areas and paths. This site has a lot of potential, but it will require some work to achieve that potential. If you'd like to contribute some time or material to the effort, or would like more information about the site, please contact Jon Stewart-Taylor at (703) 476-8949. □

Notices Notices Notices NOVAC Notices Notices Notices

NOVAC Notices and Benefits

Discounts on Sky & Telescope

As a member of NOVAC you can get a subscription to Sky & Telescope for $20.00 instead of the regular $27.00 rate. To start a new subscription or renew an established subscription, make your check out to SKY & TELESCOPE for $20. 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.

You can also order any publication directly from Sky Publishing at a 10% discount. Just mention the Club Discount Plan and that you are a member of NOVAC.

Discounts on Astronomy

Your NOVAC membership entitles you to subscribe to Astronomy Magazine at the annual rate of $16.00. This 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 payable to KALMBACH PUBLISHING COMPANY for $16.00 (one-year subscription) or $32.00 (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 Telescopes Available for Use

NOVAC makes available two six-inch (*f*/5) Newtonian reflectors for club members to check out free of charge and use for a limited time.

The first 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 can be set up quickly at remote observing sites. The scope comes with an Orion Ultrascopic 10mm and Meade MA 25mm eyepieces with 1.25-inch barrel sizes. To borrow this scope you will need to show your NOVAC observing pass and leave a $500.00 security deposit.

The second scope is a home-made six-inch reflector on a dobsonian mount and comes with a 25mm Kellner eyepiece. It is easy to transport to dark sky sites and easy to use. To borrow this scope you will need to show your NOVAC observing pass and leave a $250.00 security deposit. If you are interested in borrowing either of these scopes, contact Bob L'Hommedieu, NOVAC President, at (703) 978-0946. He will schedule a time for you to pick the scope up at his home. Bob resides at 4415 Eastwood, Fairfax, VA 22032.

NOTE: Checks must be made payable to NOVAC. Checks used as security deposits on telescopes ARE NOT deposited and will be returned to the originator when the scope is returned in the same condition it was checked out. The scopes may be checked out for two to four weeks at a time depending on demand.

NOVAC Library

NOVAC has established a library at the Arlington Planetarium for use by NOVAC members. Books may be checked out and returned only at the monthly meetings. Members may check out books for one month at a time. To check out books, see NOVAC librarian Linda Thomas at the monthly meeting. The NOVAC library seeks book donations to the library. If you have any astronomy books or materials you are thinking of discarding, please consider a donation to the NOVAC library. A complete list of all library holdings is available upon request.

NOVAC Observing Schedule for September/October 1994

Observing at C.M. Crockett Park
September 2, 3, 9, 10, 30
October 1, 7, 8, 28, 29

Observing at Parsells Field
September 9, 30
October 7, 28

Observing at Parsells Field for Meteor Showers
September 1 (Thursday)
October 22 (Saturday)

General Membership Meetings

General Membership Meetings are held at the Arlington Planetarium on the third Wednesday of every month. Meetings will be held **September 21** and **October 19** at 7:30 P.M. The Arlington Planetarium is located at 1426 N. Quincy Street, Arlington. Trustee Meetings are held 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.

NOVAC Observing Site Rules

C. M. 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 PARK MANAGER GARY KWOLEK. Call (703)-788-4867 early in the day on which you wish to observe. 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. During EST, you must set up on the paved cul-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 at any time due to the carelessness of one person.

Parsells Field: NOVAC members may use Parsells Field in Loudoun County as an alternative observing site ONLY ON THE NIGHTS DESIGNATED for general observing and meteor showers. Currently there are no provisions for unscheduled observation nights. You must park and set up ONLY IN THE PARKING AREA and not go onto the field itself. Please park to the left near the entrance and set up to the right away from the entrance. No loud radios, alcoholic beverages or loose pets. Do not leave trash or debris behind. We are guests of the Dulles Little League and they reserve the right to revoke our observing privileges any time due to the carelessness of one person.

Directions to NOVAC Observing Sites

C. M. 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.

Parsells Field: From the Northern Virginia area go west on the Dulles Access (Toll) Road until you reach Route 28 (last exit before Dulles Airport). Proceed north on Route 28 until you come to Route 625 (Waxpool Rd.). You may also take Route 7 (Leesburg Pike) to Route 28 and go south on 28 until you reach Route 625. Go west on Waxpool Road passing through the town of Ryan and Route 641 (Ashburn Rd.). Continuing on Route Rt. 625, Parsells Field will be on your left a short distance beyond Ryan. If you make it to Route 659 (Belmont Rd.), you've gone too far. □

Announcing

The First Annual
NOVAC Family Picnic
October 1, 1994
4:00 P.M.
C. M. Crockett Park,
Midland, Virginia

Bring your family, telescope, picnic dinner and a dessert to share with others. We will be gathering at the pavilion at the Park. Because this is a regular observing night, there will be observing beginning at dusk.

Crockett Park is a great place to take the family for an outing. Canoeing on beautiful Germantown Lake, nature hikes, and other recreational pursuits are possible in a splendid natural setting.

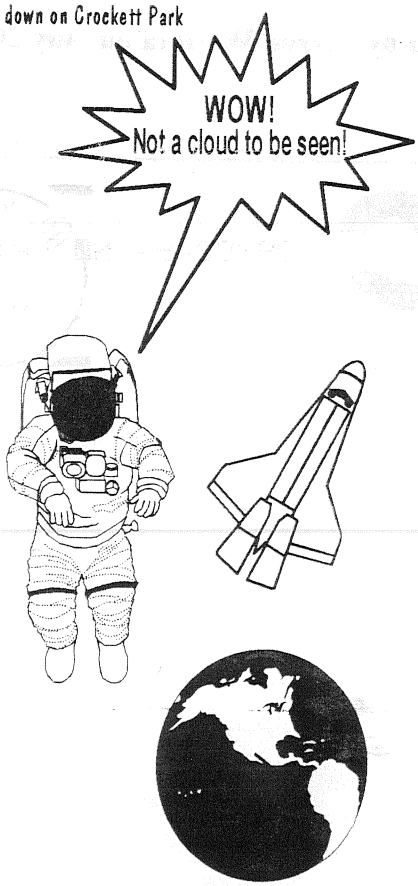
Please join us!

NOVAC Elections

Beginning in October, nominations will be open for the NOVAC elections to be held in December. Anyone interested in serving NOVAC by holding office should speak with an officer or a board member.

Nominations will be for all officer positions and two positions on the Board of Directors.

September 10, 1994
Mission Specialist J. Novac
looks down on Crockett Park



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 and Publisher. 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.

NOVAC does not knowingly accept advertising for products of inferior quality nor does it accept the responsibility for the quality of such products.

NOVAC members are invited (and ENCOURAGED!) to contribute materials of interest for publication consideration in the NOVAC Newsletter. The editors, however, reserve the right to edit all materials submitted. Ideally, materials submitted for publication consideration should be sent on 3.5" or 5.25" floppy disks in ASCII text format to the address of the editor. Other electronic formats are acceptable as well as double-spaced typed and letter-quality manuscripts. Contributors may post their article submissions to the NOVAC RBBS. Please post them as personal uploads to Tom Parry. Contact the editors for details and/or possible direct electronic file transfer.

Images

Comet Shoemaker-Levi 9 Impacts on Jupiter

Imaged by Myron Wasiuta on July 20, 1994

NOVAC

The Northern Virginia Astronomy Club
c/o Brenda Clements Jones
883 North Kentucky Street
Arlington, Virginia 22205

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NO. VA 220
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USA 29

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Bill Burton
2034 Golf Course Drive
Reston, Virginia 22091

September 10 — NVTM '94 at Crockett Park
October 1 — NOVAC Family Picnic at Crockett Park
New NOVAC Observing Site Comes Online