

NOVAC

The Newsletter of the Northern Virginia Astronomy Club

Issue Number 33

Volume 11

January/February, 1991

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- Before 8 PM!!
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The star is not extinguished when it sets
Upon the dull horizon; it but goes
To shine in other skies, then reappear
In ours, as fresh as when it first arose.
- *Horatius Bonar, Life After Death*

Board of Directors:
Brent Archinal
Al Boldt
Kevin Jones
Don Larson
George Uhl

Attention NOVAC Members !

Renew Your 1991 Membership Dues!
If the expiration date and the amount on the cover page of the newsletter are highlighted in red, the Treasurer must have your dues before 2/28/91 in order for you to receive the March/April newsletter!! See NOVAC Tidbits article on page 3 for further details.

Programs At NOVAC Meetings by Brent Archinal

After some excellent programs in November and December, NOVAC will begin the new decade right with some more programs that should be of great interest to area amateur astronomers.

Our November meeting saw the usual excellent summary by Blaine Korcel of the 1990 Northern Virginia Telescope Meet. Blaine showed his "instant" slides that he took at the meet and had even presented there, and these were supplemented by a few slides from Brent Archinal. All told, Blaine really captured the flavor of the Meet - it was just like you were there! (But that's no excuse to miss next year's Meet and wait for Blaine's summary again!)

In December, Blaine had planned to show his video of September's occultation of Jupiter by the Moon, but was unable to attend. Instead, we were treated to a surprise showing of the

also be our main speaker at the **January 16 meeting** of NOVAC. Tom's topic will be "Photometry", discussing how the relative and absolute brightness (and to some extent colors) of astronomical objects can be measured. Tom is the assistant director of the Arlington Planetarium, having recently joined the staff there. In the past he has done astronomical photometry work with none other than Doug Hall of Dyer Observatory at Vanderbilt University. Dr. Hall is very well known for his involvement in making the "connection" between amateurs and professionals, even to the extent that amateur observations are now a much sought after commodity. Tom will be discussing the basics of photometry, and also will be describing what amateur astronomers can do in general in this field - one where amateurs

Arlington Planetarium's current show on the "Christmas Star" by Kevin Jones. Thanks to Kevin, and to Steve Smith and Tom Willmitch of the Arlington Planetarium for letting us see the show, and as always, extra thanks for letting us continue to use the planetarium to meet in the first place!

Speaking of Tom Willmitch, he will

can truly make a real contribution to science. In any case, if you've ever had any interest in doing photometry, or for that matter in doing real science as an amateur astronomer, or you're just interested in what the subject of photometry is all about, then you must try to make this meeting. Who knows? If enough NOVAC members or others are interested, we might eventually be

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able to get some real observations made and obtain some worthwhile results ourselves.

"Mirror Making" will be the topic of the **February 20 meeting of NOVAC**, with our hosts being the eminent opticians Herschel Payne and Gerry Wolczanski of our own club! Herschel and Gerry have between them completed several very fine telescope mirrors and telescopes and will be imparting some of their knowledge to us on the fine art of mirror making. Members will recall that Herschel already gave an excellent presentation to us last July on several of the telescopes he assembled. In any case, their mirrors, grinding equipment, polishing equipment, and test stands will all be on display, and they'll give us the rundown of how a mirror is made from start to finish. They have also asked that you bring in any mirrors that you are currently working on, or were working on or have completed in the past. Not only will this allow everyone to see various sizes of mirrors and the condition of mirrors in various stages of completion, but this is the time to pick up some hints and ideas on how to complete that long unfinished mirror (like my 6" f/8 last worked on in 1974?!!). As with January's talk on Photometry, we mostly would like to get this sort of information out and presented to interested persons, but if there is a great deal of interest, perhaps some further informal or even regular meetings or "classes" might be held on the subject of mirror or telescope making.

These regular meetings of the Northern Virginia Astronomy Club are currently held the third Wednesday of each month at 7:30 PM, at the Arlington County Planetarium, 1426 N. Quincy Street, Arlington, VA 22201. Admission is free and open to the public. Call the NOVAC hotline (703-256-8395) for schedule changes, cancelation, or leave a message to obtain further information.

Building a "Pocket Scope"

by Michael S. Walker

At the 1989 Northern Virginia Telescope Meet, I had the privilege of looking through a 20 inch reflecting telescope. The views of the Veil and Ring Nebulas were so impressive that I decided to replace my 4 inch refractor with a large aperture open tube Dobsonian telescope. I read Geoff Chester's review of the Sky Designs 14.5 inch Scope and decided on the 14.5 size for all the reasons that he mentioned: a) ease of transport; b) easy and fast to set up and break down; c) requires only a small storage space; and d) largest scope available that would not require a ladder.

I called several companies that sell large telescopes and asked them to send brochures. I found that each company had several good features on their scopes, but no one had all the features that I wanted. For example, Obsession Telescopes use high quality Baltic Birch Plywood in their mirror boxes and use quick-disconnect pressure clamps (which are tightened by knobs) to hold the truss tubes in place, but they don't make a 14.5 inch scope. Also, Sky Designs has the 14.5 inch size which requires no ladder, but they use nuts and bolts to hold the truss tubes in place.

Then I received the June 1990 issue of Sky & Telescope. In the "Gleanings for ATMs" article on page 665 they described what they called a "Pocket Scope" which was a homebuilt scope that contained just about all the features that I wanted. The Pocket Scope in the article had an f-5.5 focal ratio which I could shorten to f-4.5 by building it myself. The truss tubes, pressure clamps, and removable focuser were bought from Techtron Telescopes, which sell this type of telescope in an f-5 focal ratio for about \$2325. The mirror cell and 2.6" diagonal holder are from Kenneth Novak, and the mirrors from Galaxy

Optics. I also got a 4' x 8' sheet of 3/4" thick Baltic Birch plywood from Dale Lumber in Fairfax, VA. The cost was about \$1000 for the optics and \$700 for everything else bringing the total to \$1700. I was told that the mirror would take about 4 months to complete, which would give me time to work on the rest of the scope.

Because all the parts of the scope nest together for storage, its best to start by building the innermost parts first and work outward. I started with the eyepiece section (headpiece) which has an inside diameter of 16 inches and an outside diameter of 17 3/4 inches. The headpiece is lined with a 1mm thick plastic called Sintra which is also excellent for dew shields (I have some leftover pieces if anyone is interested). The entire assembly fits inside the mirror box which is 18" square on the inside. All the wood parts were sanded and coated with clear polyurethane except the inside of the mirror box which was painted with flat black epoxy spray paint. The woodworking and assembly of all the parts took about three months of part-time work and then one month of full-time waiting for the optics. When the mirror and diagonal arrived I spent about a week getting the scope ready for "first light" which happened to be at the 1990 Northern Virginia Telescope Meet (NVTM).

Upon arrival at the NVTM, I began setting up which took between 5 and 10 minutes, part of which was spent talking to interested bystanders. Collimation needed only a minor adjustment. The tube assembly proved to be stiff, giving the telescope a solid feel, even though the truss tubes are only 7/8" in diameter. After sundown, I spent time looking at Saturn with the scope covered with an off axis mask made from Sintra. The mask cut down on the brightness and brought out some nice detail. I spent most of the evening showing M13 and M57 to lines of visitors. M13 shows beautiful depth and the view only gets better with higher

power. At 30 power, M31 and its two companions could easily be seen in the same field of view, and the Double Cluster filled the eyepiece.

Transport of the scope is easy. I just strap the nested assembly (about 100 pounds, I think) to a hand truck and pull it along. I load it in the car one piece at a time so I don't have to lift the entire weight at once.

Just over a year ago, I thought I would never have the skill it takes to build a quality telescope. Looking back, I see that all it takes is learning as much as you can before starting, working slowly step by step on each part, and checking twice before drilling each hole! If anyone has questions about the scope you can call me in the evenings at (703) 425-2846.

January/February Sky Sweep

by Kevin Jones

This month's article will concentrate on what is perhaps the most obscure constellation easily visible from 40 degrees north latitude - Monoceros. Monoceros translates into English as "unicorn," but if you can create a unicorn out of the loose assemblage of stars between Canis Major, Canis Minor, and Orion, then you've got quite a vivid imagination! The constellation was invented by Hevelius in 1690, who also gave us such celestial wonders as Camelopardalis, Lacerta, Leo Minor, Lynx, and Sextans. With only two stars glowing at above fourth-magnitude, it's no wonder that Monoceros is so often overlooked.

Monoceros makes up for its dearth of bright stars, however, by being filled with many beautiful and fascinating star clusters and nebulae. The sixth-magnitude open cluster M50 lies about one-third of the way along a line from Sirius to Procyon. It contains roughly 150 stars and is a beautiful sight in binoculars and low-power telescopes.

The photographically beautiful Rosette Nebula is located approximately midway between Castor's Foot in Gemini and Sirius. The star cluster involved in the nebula is NGC 2244, which is composed of six prominent sixth-magnitude stars and a smattering of fainter ones. NGC 2237, 2238, 2239, and 2246 make up the nebulosity encircling the cluster, which can be just glimpsed through a rich-field telescope or giant binoculars on a very dark and transparent night. The nebulosity has a peculiar central "hole," apparently free of gas and dust, centered on the cluster. It is not clear just how this hole formed, but theories state that all the nebulous material in that area may have gone into the formation of the cluster. It is also possible that the young stars which make up the cluster have swept away the gas in their vicinity with their strong "stellar winds."

NGC 2264, several degrees to the northeast, may be physically associated with the Rosette Nebula complex. NGC 2264 is a very complex object in its own right, containing the "Christmas Tree Cluster" (a loose open cluster of 20 bright stars and many fainter ones) embedded within a nebulous area which includes the dark "Cone Nebula." This nebulosity is invisible in telescopes, but is very well revealed on long-exposure photographs. The stars contained in the NGC 2264 complex are among the youngest known, and star formation continues in the area even as we speak.

The final and perhaps most mysterious object I will touch on in Monoceros is NGC 2261, "Hubble's Variable Nebula." It is comet-shaped, with the variable star R Monocerotis located where the nucleus of the comet would be. The shape of the nebula is easily visible in modest telescopes using high power. In 1916, the nebula was found to change perceptibly in brightness and shape over periods of as short as a few nights! This prompted an in-

depth investigation of NGC 2261. The presently accepted reason for the nebula's variations is that large clouds of protoplanetary material orbit R Monocerotis and occasionally block the light from the star which illuminates the nebula. So that in effect, the variations in Hubble's Variable Nebula are shadows cast on it by dark clouds orbiting R Monocerotis.

This concludes your whirlwind tour of Monoceros. Next time you're out observing, take the time to peek at some of these glorious objects laying in the seemingly drab area of sky between Canis Major and Minor. Clear skies and happy observing!

NOVAC Tibits

by Bob Ridgley

Please remember to check the upper right hand corner of the address label on this newsletter. It shows when your membership expires and indicates the amount of your dues through 12/91. If your membership expires between 1/91 and 12/91, please consider sending NOVAC a check now. This will help NOVAC budget it's resources for the remainder of the year. If the expiration date and the amount are highlighted in red I must have your dues before 2/28/91 in order for you to receive the March/April newsletter. Dues are \$18.00 per year. Please make you checks payable to NOVAC and send them to:

NOVAC
c/o Bob Ridgley
1316 S. Buchanan Street
Arlington, Virginia 22204-3410

New Members:

Myron E. Wasiuta
Paul R. Gibson
John W. Godbey
Gary Turnbaugh
Jack Greenblat
David Lytle
Ronald E. Ferris

Robert B. McCaw
 Terry Davis
 Leonard Lipton
 Robert A. Meyer
 Timothy K. Murray
 Alexander L White
 Guy W. Moore

Membership Statistics:

Active..... 107
 Past Due..... 8
 Complementary....13

Total.....128

Treasury: \$1,252.61

It's That Time Again!

by Al & Lynn Schumann

We've gotten off easily so far. At the time of this writing, November and December have been acting more like April or March with barely a hard freeze. However, the cold is going to get here, probably with a fury, so we do not want to get caught off guard. With that in mind, here are a few of the old, trite cold weather reminders -- and a number of other considerations.

Let's take it from the top. Most body heat escapes from the head. Set fashion aside and wear something which will preserve that precious body heat. A navy watch cap or a trooper's hat (with ear flaps) is ideal. A ski mask isn't a bad idea either. To cover up the old bod, use layers of clothing rather than a single heavy outer garment. From the hide out, we go for regular underwear, two piece long johns, flannel shirt and sturdy trousers, sweat shirt with hood, down vest and finally a coat. Now and then, I'll pass up the vest/coat combo in favor of a set of insulated coveralls. Lynn is partial to her calf length shearling coat.

Unless you are into the electric sock routine the feet are always going to be cold. Wear a couple pairs of socks (light next to the skin heavy wool outside) and real boots to cover the

ankles; no tennies. Like the feet, fingers will always be numb from the cold. Might as well get used to it or find another hobby.

The body burns up calories like crazy when it is cold. Therefore, make sure you have a hearty lunch to stoke up the inner furnace. Similarly, you need some hot beverages to warm the gizzard and keep up the fluid level. Dehydration is serious and often overlooked in cold weather.

So much for man. Don't forget the equipment. Cold weather saps battery power, so stick a couple new batteries in your Telrad and flashlights. For those with rechargeable power packs, make sure they have a full charge before going out to each observing session.

Finally, let us not forget the vehicle. If the coolant is more than two years old it starts losing its effectiveness. Drain the cooling system, check all hoses, tighten the hose clamps and refill the radiator and overflow tank with a fresh one-to-one mixture of anti-freeze and water.

If you have a way of checking the vehicle battery do so. Today, many batteries are "low maintenance" or "no maintenance" affairs, so you don't always know when it's gonna croak. Make sure you have a set of jumper cables in the trunk. If the battery dies at 2 am at Crockett Park, those jumper cables will be worth their weight in gold.

When Herschel Payne was a boy, some European dude passed a law making it mandatory for air pressure to decrease as temperature goes down. It's a real nuisance law, and what it means to you is check your tires weekly. Under inflation is the most common cause of tire failure, so be sure to keep them pumped up, especially after a dramatic drop in temperature. Also, properly inflated tires save gas.

Speaking of gas, moisture can condense in your vehicle gas tank. Unwanted moisture has been known to freeze in fuel lines or cause carburetor icing; either of which can bring the vehicle to a painful, whimpering halt. There are any number of products on the market to counteract the problem, so it's a good idea to add a can to a full tank of gas now and then during winter.

See you out there. We'll be the ones sticking our frozen fingers into a cup of hot coffee.

More Blues for a Red Planet Lover

by George Uhl

Below is a sketch of Mars I did back in September of 1988 during the last great opposition. The reason I don't have one from this past November's opposition is because the mount of my Celestron SP-C8 was in the shop for repairs. From the end of October until mid-December I was without a telescope and so I missed the last good Mars opposition until the next century! I don't want to complain too loudly because I did get a good look at it on December 14 when it showed a 16" disk. Too bad I didn't sketch it, though. As Mars fades in brightness and dwindles into a little speck until the next century, I can sit back in satisfaction knowing that my mount works right.



Jupiter is Back*by Al & Lynn Schumann*

Yes, friends, that big old gas bag has returned to the night sky for viewing at a decent hour. Fact is, it will be at opposition on the night of January 28/29, so we have some splendid winter-time viewing to look forward to. Observers have reported that the South Equatorial Belt (SBB) is starting a comeback while the Great Red Spot (GRS) is starting to fade (FADE).

Be that as it may, this year we have an extra added bonus which is brought to all NOVAC members ABSOLUTELY FREE OF CHARGE!! Every six years the Earth and Sun are aligned with the equatorial plane of Jupiter. As a consequence, we have an opportunity to see a great many occultation and eclipse actions among the four Galilean moons. In fact, *ASTRONOMY* magazine states there will be 346 -- count 'em -- 346 mutual events taking place between Nov 13, 1990 and April 12, 1992. With numbers like that, there should be something for everybody.

Even through modest back yard telescopes we'll be able to see two moons merge into one point of light. Shadows of the merging moons will also be visible on the surface of Jupiter.

Get out there and give Jupiter a look. But hey...don't forget NOVAC's fabulous 21 MegaHertz Jupiter radio telescope antenna. It's primed and ready to go for anyone having a portable short wave radio that has a compatible band. To check it out, give us a call at (703) 971-3257.

(ed. note. Al instructed me to include the Schedule of Mutual Events from ASTRONOMY magazine. Unfortunately, the schedule didn't scan well enough because it used blue ink, which image scanners don't like (in B&W mode at least). Sorry folks. By the way Al, didn't Santa Claus bring you a SW Radio this year?)

NOVAC Executive Committee Meeting

The next Executive Committee Meeting of NOVAC will be held Thursday evening, January 10, at 7:30 PM, at the home of Al Schumann. Once again, this promises to be an important meeting, as several significant items will be discussed. First, a full slate of officers and board members will have to be worked out for 1991. Secondly, real planning of NVTM'91 needs to begin in earnest so that we can really be ready by next Fall. George Uhl has agreed to be the chairperson for NVTM, and the date has tentatively been selected as October 4-5; however no planning beyond this has yet taken place. So if you're interested in helping out with NVTM'91, please show up at this meeting or let one of the officers or board members know of your interest. Finally, we will be continuing our discussion of how to obtain non-profit corporation status for NOVAC. The primary order of business now is to get Articles of Incorporation written and the Constitution rewritten.

The Schumann's reside at 6121 Rivanna Drive, Springfield, VA 22150, phone 703-971-3257.

See you at the meeting!

November NOVAC Meeting Minutes

The meeting was called to order at 7:35PM, Wednesday, November 21, 1990 with Blaine Korcel presiding. The minutes of the previous meeting were accepted as printed in the newsletter.

OLD BUSINESS:

1. Blaine Korcel gave a recap of the October 19/20 NVTM. He mentioned that NOVAC T-shirts and hats are still available, and that all proceeds go into the treasury.

NEW BUSINESS:

1. George Uhl announced that December 26 is the deadline for articles in the next newsletter.
2. Brenda Jones gave a recap of events at the Arlington Outdoor Lab program on November 10.
3. Blaine Korcel noted that the club answering machine broke down and needed to be replaced. The membership authorized an expenditure of up to \$150.00 for a new machine.
4. Fred Altman gave a brief talk on the availability of astronomy related computer programs.
5. George Uhl reminded the membership that elections for a new board of directors will be coming up soon. He asked everyone to consider nominations.
6. Herschel Payne suggested that we organize a swap meet.
7. George Uhl volunteered to serve as coordinator for the 1991 telescope meet. October 4 and 5 have been selected as the best dates for the event.
8. Tom Willmitch repeated his request for orders of the RCAS observers handbook for 1991. Based on the number of people signed up so far, the price is \$9.50. Tom also announced the upcoming schedule of events at the planetarium.
9. Gerald Wolczanski and Herschel Payne offered to give a show and tell program on mirror making at a future meeting.
10. Bill Burton mentioned the McManus article in the Weekend section of the Washington Post.
11. Brent Archinal summarized the activities at the first meeting of the Loudon Astronomy Society. He noted that their next outing will be held on

December 8. Directions were provided for anyone interested in participating.

12. Kevin Jones stated he will run the planetarium Star of Bethlehem program at the December 19 meeting.

13. Al Schumann noted that the Smithsonian had donated a collection of Fred Whipple's writings to the club.

The formal portion of the meeting was adjourned at 8:25pm at which time Blaine and Brent gave a slide show of pictures taken at the telescope meet.

Respectfully submitted,
Al Schumann, Secretary

December NOVAC Meeting Minutes

The meeting was called to order at 7:35PM, Wednesday, December 19, 1990, with Al Schumann presiding.

The minutes of the previous meeting were read and accepted.

OLD BUSINESS: None.

NEW BUSINESS:

1. Brent Archinal reported that the Loudoun Astronomy Club will hold another outing in January. The session will be held at a school near Middleburg. The date is as yet unknown. Call Brent at (703) 446-7466 for details.

2. It was noted that a new answering machine has been purchased and is in full operation at Blaine's house. The number is (703) 257-8359.

The meeting was adjourned at 7:45PM at which time Kevin Jones ran the Star of Bethlehem planetarium program.

Respectfully submitted
Al Schumann, Secretary

Early Winter Arlington Planetarium Schedule

Below is the schedule of upcoming programs at the Arlington Planetarium:

Monday, January 7th - "The Stars Tonight -- For January" - 7:00 pm. Join Geoff Chester of the NASM as he talks about constellations, planets, and other sky objects for the month. If weather permits, telescopes will be set up for outside observing (dress warmly!). Admission is \$2.00 for adults and \$1.00 for children 12 and under and senior citizens. Seats are available on a first-come, first-served basis.

Tuesday, January 22nd - "Astronomy for Families" - 7:00 pm. Parents and children learn about stars, constellations, the solar system, and more in this three- to six-week course offered through Arlington Adult Education. (Flexible ending date.) Fee is \$29 per family for Arlington residents and \$36 for non-residents. To register, call the Adult Education office, 703/358-6900.

Thursday, January 24th - "General Astronomy for Adults" - 7:00 pm. A survey of the sky, including constellations, planets, the Moon, galaxies, and nebulae. Registration fee same as above. Course runs three to six weeks (flexible ending date). To register, call Arlington Adult Education, 703/358-6900.

Friday, January 25th - "Teddy's Quest" - 7:30 pm. The Planetarium's winter program tells the story of a Teddy Bear, born in space, who sets out on a quest to find a friend. Along the way, he learns about constellations, how stars are formed, and all about the Moon. "TEDDY'S QUEST" WILL BE SHOWN ON FRIDAYS AND SATURDAYS AT 7:30 PM AND SUNDAYS AT 1:30 AND 3:00 THROUGH MARCH 10TH. Admission is \$2.00 for adults and \$1.00 for senior citizens and chil-

dren 12 and under (unless accompanied by a Teddy Bear). Call the planetarium office at 703/358-6070 for reservations.

Monday, February 4th - "The Stars Tonight -- for February" - 7:00 pm.

For directions or more information, call the Planetarium office at 703/358-6070.

Board of Directors Nominations

Nominations for the five (5) Board of Directors seats will be accepted during the January NOVAC general membership meeting. B.O.D. terms are for one year with no limit on the number of terms served. As a member of the B.O.D. you will participate with the club officers in the Executive Committee. The E.C. provides leadership and direction for the club during the year. Club policies and decisions are generated at the E.C. meetings subject to the approval of the majority of the club members present at the monthly NOVAC meetings. E.C. meetings are held as deemed necessary on the Thursday prior to the general membership meeting.

Please consider yourself or someone you love as a member of the B.O.D.. The club stands at a new threshold of legitimacy and growth with non-profit corporation status in the process of becoming reality. The same small group of people who've provided leadership over the past few years are burning out. Unless there is an infusion of new blood, the club could fade into obscurity, just when it is taking off. Don't let an opportunity to participate pass you by...become a B.O.D. member!!!

NOVAC 1991 Observing Schedule

This is the tentative NOVAC observing schedule for 1991. Observing nights are reserved for the Friday and Saturday nights closest to the new moon and the preceding Friday and Saturday nights (usually). Thus, weekends closest towards last quarter are favored so that evening observing will be unaffected by the moon, and to allow weekends close to first quarter to be kept free for public programs. This schedule is subject to approval by the NOVAC executive committee, any approved changes will be published in the March/April edition of the newsletter. Observing sessions are held at C.M. Crockett Park in Midland, Va. between sunset and sunrise (if you can stay up that long)!!

The Moon rise and set times come to you courtesy of the "Bob Ryan's 1991 Weatherwise Almanac" published by WRC-TV (NEWS4) Washington, DC and Giant Foods. Thanks go to Al Boldt for recommending this cheap (\$0.50) but valuable source of information.

<u>Date</u>	<u>Day</u>	<u>Moon Rise</u>	<u>Moon Set</u>	<u>Comments</u>
January 11	F	4:59 AM (Sat)	-	
12	S	5:50 AM (Sun)	-	
18	F	-	8:05 PM	
19	S	-	9:08 PM	
February 8	F	3:44 AM (Sat)	-	
9	S	4:31 AM (Sun)	-	
15	F	-	7:00 PM	
16	S	-	8:04 PM	
March 8	F	2:24 AM (Sat)	-	
9	S	3:08 AM (Sun)	-	
15	F	-	5:51 PM	
16	S	-	6:58 PM	
April 5	F	1:02 AM (Sat)	-	✓
6	S	1:42 AM (Sun)	-	EDT begins Sunday AM
12	F	-	5:39 PM	
13	S	-	6:47 PM	NOVA class
May 3	F	12:23 AM (Sat)	-	
4	S	1:14 AM (Sun)	-	
10	F	-	4:26 PM	
11	S	-	7:35 PM	NOVA cloud

April 8 - class
April 13
May 11

<u>Date</u>	<u>Day</u>	<u>Moon Rise</u>	<u>Moon Set</u>	<u>Comments</u>
June	7	F	2:25 AM (Sat)	-
	8	S	2:59 AM (Sun)	-
	14	F	-	10:49 PM Moon 2 days old
	15	S	-	11:25 PM Moon 3 days old
July	5	F	12:55 AM (Sat)	-
	6	S	1:31 AM (Sun)	-
	12	F	-	9:20 PM Moon 1 day old
	13	S	-	9:54 PM Moon 2 days old
August	2	F	11:30 PM	-
	3	S	12:08 AM (Sun)	-
	9	F	-	7:49 PM
	10	S	-	8:22 PM
September	6	F	5:41 AM (Sat)	-
	7	S	6:53 AM (Sun)	-
October	4	F	4:34 AM (Sat)	- NVTM '91
	5	S	5:44 AM (Sun)	- NVTM '91
	11	F	-	8:40 PM
	12	S	-	9:29 PM
November	1	F	2:32 AM (Sat)	-
	2	S	3:39 AM (Sun)	-
	8	F	-	6:21 PM
	9	S	-	7:13 PM
	29	F	1:31 AM (Sat)	-
	30	S	2:37 AM (Sun)	-
December	6	F	-	5:06 PM
	7	S	-	6:00 PM
	27	F	12:30 AM (Sat)	-
	28	S	1:35 AM (Sun)	-

Advertisements

For Sale, contact Jim Schaeffer at 476-5624 (home) or 281-6363 (office): CAPS, baseball type, mesh back, adjustable, NOVAC logo, \$5.95 (you pick-up), \$7.75 (UPS ship); JACKETS, nylon/satin, NOVAC logo on front & back, elastic at sleeves, neck, and bottom, very good quality, sizes S, M, L, XL, \$34.95; TELRAD finders, \$38.00.

For Sale, contact Bob Ridgley at 681-0286 (home) or 287-3441 (work): official NOVAC logo tee shirts. Available in black or white, sizes: S, M, XL, price \$9.95. All profit goes to NOVAC.

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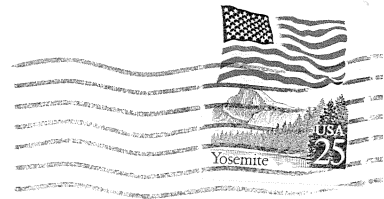
The NOVAC NEWSLETTER is published six times a year. Subscriptions are available through membership in NOVAC. Dues are \$18.00 per year. For club membership information contact Al Schumann, Secretary, 6121 Rivanna Drive, Springfield, Virginia, 22150, telephone: 703-971-3257.

More tube sources

Sunaco-Manassas - Sontube (Coulter)
Hedinger concrete molds
Builder supplies

NOVAC

The Northern Virginia Astronomy Club
5401 Danville Street
Springfield, Virginia 22151



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