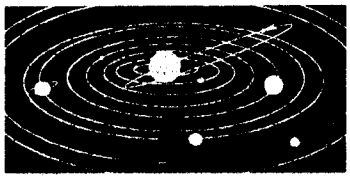
THE FLINT RIVER OBSERVER



Vol. 2, No. 10 **FLINT RIVER ASTRONOMY CLUB** **December, 1998**

Officers: President, Larry Higgins; 1st Vice President/newsletter editor, Bill Warren, 229-6108 -- or, if you prefer e-mail: warren1212@mindspring.com; 2nd Vice President/Secretary-Treasurer, Ken Walburn (P. O. Box 1179, McDonough, GA 30253 / 954-9442; AlCor, Neal Wellons, and Web Site Coordinator, Cody Wellons (946-5039); Librarian, Keith Cox (227-8171); Observing Chairman, Steven "Smitty" Smith (583-2200); Telephone/Hospitality Committee Chairman: Dan Pillatzki (707-0270). Club mailing address: 1212 Everee Inn Road, Griffin, GA 30224. All of these phone numbers have 770 area code prefixes. FRAC web page address: http://welcome.to/frac.

Please notify **Bill Warren** promptly if you have a change of address.

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Club Calendar. Tues., Dec. 1: Observing for Cowan Road Elementary School (Griffin), at the school at dark; **Thurs., Dec. 10:** FRAC meeting (Beaverbrook, 7:30); **Fri., Dec. 11:** Beaverbrook "First Light"/ FRAC joint observing (Beaverbrook [*not* Fair Oaks Farm], at dark) **Fri.-Sat., Dec. 18-19:** deep-sky observings (Cox Field, at dark).

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Vice President's Message. I'm sorry if you missed our November club meeting, especially if you're a newcomer to our club and/or stargazing: we covered the basic organizational, search and observing skills and techniques necessary to improve at stargazing.

Learning to navigate the night sky can be difficult. While this learning process requires practice and patience, it can be speeded up by hands-on guidance and observation.

Initially, searches may be guided by oral directions (e.g., "Point the center circle of the Telrad at the two stars at the S end of the parallelogram that forms *Lyra*; **M57** -- Ring Nebula -- should be in the center of your field of view."). Eventually, however, observers must learn to formulate their own search strategies in translating locations on star charts into locations in the sky; in doing so, they soon leave the "beginner" category to become intermediate-level stargazers -- normally, when they have found, say, 30-50 of the Messiers on their own (e.g., **Katie Moore, Mike Stuart** and **Dan Pillatzki**). They remain at that level while improving their skills at the telescope until their search for faint fuzzies can no longer be satisfied by using elementary star charts.

Any atlas worth buying will show the location of all of the Messiers -- but not all of the Herschels, Double Stars, Urban or Binocular Deep-Sky objects appear on the beginner-oriented sky maps. (Indeed, three of the latter targets don't even appear in *Sky Atlas 2000.*) But by the time you need more advanced star charts, you'll have the skills to handle them with little difficulty.

Still...The members of our club who are progressing most rapidly are those who are studying their targets, formulating plans for tracking them down, getting out and observing at every opportunity, and practicing the skills that will help them improve. As in everything else in life, you get out of an activity only as much as you put into it.

My talk at the November meeting explained how to advance from the status of beginner to become an advanced observer through planning, preparation, use of search strategies,

observing techniques and using star charts. The latter topic, "Using Star Maps to Find What You're Looking For," will be the subject of our January meeting. I hope you'll plan to attend.

The more I watch meteor showers, the more they remind me of fishing: sitting around for hours on end, doing mostly nothing and waiting for something -- *anything!!* -- to happen. And when there's action of any sort, invariably it's less than I was hoping for.

Was it worth it for me to get up at 4 a.m. on Nov. 18th to watch the Leonids "Meteor Storm"? Well, *yes*, it was, because after 45 minutes in which I saw exactly one Leonid meteor and one sporadic meteor via averted vision (which is the way I see most meteors), I got out my telescope and found 5 of the 9 remaining targets on my AL Double Star list. (I have since found the rest of them.) One of them, the principal star of the double "54 Lynx" (sic), is the most vividly colorful star I've ever seen; its rich, mustard-yellow hue is incomparable and unforgettable, and something that I will not soon forget.

-Bill Warren

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Last Month's Meetings/Activities. We had 10 in attendance at our club meeting on **Nov. 12th.** Our BB/FRAC joint observing the next night was clouded out, but on **Tues., Dec. 17th, Neal Wellons** and yr. indefatigable reporter managed to get in an observing for a crowd of at least 100 children and parents of Cotton Indian Elem. School in Stockbridge.

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Membership Renewals Due in December: Tom & Katie Moore. (Incidentally, at last report Tom had logged 67 of the Lunar Club items.)

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December Meetings/Activities. Our observing for Cowan Road Elem. School (Griffin) on **Tues., Dec. 1st,** will be held behind the school. To get there from Hwy. 19/41, turn west at the traffic light at McIntosh Road -- that's a right turn if you're coming from Hampton, or a left turn if you're driving north from Griffin -- and go 1 mile to Cowan Road. Turn right, and the school is about .3 mi. on the left.

Our plans for a Christmas party, discussed briefly at the Nov. meeting, fell flatter than one of my wife's cakes, so we'll have our club meeting at Beaverbrook as usual, at 7:30 on **Thurs., Dec. 10th.** Our speaker, "**Saratoga Smitty" Smith** (a.k.a. "Nanook of the North") will give us a timely show-and-tell demonstration of how to keep warm in wintertime observing. Afterward, we'll have Christmasey refreshments, and maybe **Ken Walburn** will lead us in singing "Grandma Got Run Over By A Reindeer."

Our joint BB/FRAC observing will be held behind the school on **Fri., Dec. 10th**. Refer to last month's *Observer* for directions on getting there.

For anyone who is interested, we WILL hold our regular Cox Field observings on **Fri.-Sat., Dec. 18th-19th**. I won't be there, alas, but that shouldn't stop you from going out and having a good time unless you consider *me* to be the life of the party. The new Moon will be on the **18th**, so conditions should be good for bagging your Winter Messiers if the sky cooperates.

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The Sky in December. Jupiter (in *Aquarius*) and **Saturn** (in *Pisces*) still rule the night sky. **Mars** and **Mercury** can be seen as morning stars, Mars in *Virgo* and Mercury rising at about 5 a.m. on **Dec. 26th.** The crescent Moon will be 6° above Mercury on **Dec. 16th.** Both Mars and **Venus** will rise and grow brighter in the months to come.

The *Geminids Meteor Shower* peaks on the night of **Dec. 13th-14th.** This shower, generally somewhat brighter than the summer Perseids, is one of the more productive annual displays, with a maximum of about 60-80 meteors per hour. (Or 1-2 per hour, if you're observing with me.)

If you've never seen it, let me show you **NGC 2169**, the open cluster in *Orion* that forms a cute little "37" asterism. And while we're at it, let me show you the two Christmas trees, **NGC 2264** in *Monoceros* and **NGC 2362**, clustered around the star Tau CMa. (And then, to return the favor, perhaps you'll show them to someone else.)

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An Addendum to the *Seasonal Star Charts*

article by

Steven "Saratoga Smitty" Smith

(Editor's Note: Seasonal Star Charts, *published by Hubbard Scientific Co. and distributed by Celestron [under the title* Celestron Star Maps], *the Nature Company and most major bookstores, is a popular beginners' observing aid that combines a "glow in the dark" planisphere with eight charts of the night sky, two for each season. The 23-pp. resource measures 11" x 14" in size, and its charts include stars up to magnitude 6.5.)*

First and foremost, please understand that this is not an attempt to degrade or pick apart this book. I am neither a literary critic nor a professional astronomer. I am an amateur astronomer with a love of the night sky and a big wish that all of humanity could see and understand where we are in the universe. Only then can one comprehend how small we are and how grand the Cosmos. When asked by a new astronomer what atlas would be a good one to start with, the SEASONAL STAR CHARTS (hereafter referred to as SSC) is the one I recommend.

I own a half dozen or so different star atlases and have seen many others. Most beginning astronomers want an easy-to-read, detailed and informative atlas, and the SSC has all of this. Its thick, plastic-coated pages allow you to use it when it is covered in moisture from dew; this feature alone makes its $18-$20 price tag a real bargain.

Still, the SSC contains flaws that its users should be aware of. For example, it lists coordinates for the position of stars and objects in the year 1950. If we were navigating the starship Enterprise at warp factor 8 through deep space this would be a major concern; since we are not, we need not be overly concerned with the changing positions of the objects and stars plotted in the SSC. Their positions just haven't moved that much in the past 48 years. In a low-power eyepiece field of view the objects will still be there even if we use these 1950 coordinates in the year 2050.

Beyond that, magnitudes, or brightnesses, of many of the Messier objects are not listed in SSC. The magnitudes listed herein are accurate, but may differ slightly from one source to another.

Other problems are addressed below. (My additions/corrections are contained within parentheses and italicized.)

*On Page 6, no magnitude is given for M91 in Coma Berenices, which is described in the text as "probably a comet." *(M91, mag. 10.2, is a spiral galaxy generally considered to be NGC 4548.)*

*On Page 8, no magnitudes are given for M48 or M68. *(M48 is mag. 5, M68 mag. 8.2.)*

*On Page 9, M48 is incorrectly listed in the text as being in Virgo. *(It should be listed as M49. The rest of the information is correct, as are the locations of both M48 [in Hydra] and M49 [in Virgo] in the chart above the text.)*

*Also on Page 9, no magnitude is given for M104, the "Sombrero Galaxy." *(Its magnitude is 8.3.)*

*On Page 10, the information for M102 in *Draco* is essentially correct but needs explanation. *(M102 was a duplicate observation of M101, and a mistake by Messier. The galaxy plotted here and accepted by the Astronomical League as M102 is NGC 5866.)*

On Page 12, no magnitudes are given for M8, M17, M20, M25, M54 and M55. *(Their mags. are: M8, mag. 6; M17, mag. 7; M20, mag. 8; M25, mag. 4.6; M54, mag. 7.7; and M55, mag. 7.0.)* Also, no magnitude is given for M7 in *Scorpius. (M7 is mag. 3.3.)*

On Page 13, the chart above and to the right of the Sagittarius Teapot is confusing due to the WINTER SOLSTICE label and plot (a circled dot). *(M8, "Lagoon Nebula," and its plot* [+], *and M21 and its plot* [*star-shaped dots*] *are correct -- but the plot for M20, "Trifid Nebula," is the + above the WINTER SOLSTICE plot.)*

On Page 14, no magnitude is given for M56 in Lyra. *(The mag. of M56 is 8.2.)*

On the star charts on Page 15, two stars are labeled as Alpha -- α -- Cassiopeiae. *The star in the middle peak of Cassiopeia is Gamma, or* γ *, Cassiopeia. The five stars in Cassiopeia's "Bent W" asterism are labeled correctly on the chart on Page 19.)*

On Page 21, no magnitudes are given for M42, M43 or M78 in *Orion. (M42 is mag. 4, M43 is mag. 9, and M78 is mag. 8.)*

On Page 22, no magnitude is given for M47 in *Puppis. (M47 is mag. 4.4.)*

I have compiled this information to make the SSC more accurate and easier to use for new astronomers. If you happen to find other mistakes or omissions, please contact me and I will add them. Also, please feel free to make copies of this and share the information with others who have the *Seasonal Star Charts* or *Celestron Sky Maps.*

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(Editor's Final Note: Okay, Smitty, here are three to get you started. First, the absence of an author's name or address for the publisher means that you can't write to them to alert them to the problems you've outlined. Second, the constellation boundaries are printed in red ink that vanishes under the beam of a red light. And third, I question the colors given for some of the double stars -- e.g., "White-Violet-Gray" for the multiple star Theta [θ] Vir *on Page 9; "Greenish White-Green for the double star* Zeta [ζ] CrB *on Page 10; and "Yellow-Purple" for the double stars* 67 *and* 70 Oph *on Page. 12. An older version of SSC had some stars listed as magenta- or champagne-colored.*

Still, I agree with you, Smitty: with all its flaws, most of which are minor in terms of what beginners need, SSC is the best of its kind available on the market today. I still use my copy frequently, especially in determining the location and shape of constellations, and stars within them as well, that I'm not familiar with. [*Done much star-hopping in* Vela *or* Pyxis *lately?*]*)*

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Meteorites From Earth: The Tale of Tektites

article by Richard Jakiel

An angry false dawn looms over the southwestern sky. Moments earlier, a flash brighter than a thousand suns illuminated the Cretaceous landscape as an asteroid the size of Manhattan Island slammed into a shallow sea. The blast has the strength of 250 billion Hiroshima atomic bombs, temporarily ripping a hole in the atmosphere and gouging out an immense crater. Even a thousand miles away, the ground shakes with such violent intensity that the entire surface undulates like a wave-swept ocean. The sky erupts with heaven-borne fire, as blobs of partially molten rock strike and ignite the vegetation below. A massive firestorm now sweeps across the wrecked plain, killing the earthquake survivors. It is the death of one age and the birth of another.

Sixty-five million years later, the great Chicxulub crater lies buried in the Yucatan Peninsula. The main structure is nearly 200 miles across and evidence of its strike can be

Beginners' Star-Hops; December, 1996

By Art Russell

Here we are, once again gathered under the last cool, clear nights of the year. They say the third time's the charm, so we'll start our star-hops again in the **"Great Square of Pegasus,"** as we have for the last two months. This month's star-hops will find us covering a great bit of the sky so don't get lost as we sweep from Pegasus first to the southeast and the galaxy **M77** in the constellation Cetus. We'll then return to Pegasus to find our way to the cold beauty of the double *Gama Andromeda*, and finally constellation Perseus to the open cluster **M34** and the planetary nebula **M76**, also known as the **"Little Dumbbell"**. This month I'm also going to start telling you how many steps ***[STEP#]*** it ideally takes to find a particular object. Please let me know if you find this addition helpful. Drop me a note, make a phone call, or drop me an email if this helps. Let's get started...and by the way...***Merry Christmas!***

Star-Hop #1; M77, NGC 1068. ***[7 steps].*** This galaxy is perhaps one of the lesser known of the **Messier** objects. I suppose that is because it is located in an area of the sky relatively poor in bright stars and well deep-sky objects. Nevertheless, it is worth the effort to track down this more illusive member of **Messier's** catalogue. Once again, as with any star-hop, get as far away as possible from the lights of any city. After all, our quarry is only found under dark skies. If the sky is reasonably dark, you'll have no problem locating this galaxy; otherwise, and you'll be hard pressed to get even close. ***[1]*** First off, locate the **"Great Square of Pegasus."** ***[2]*** Once there, locate its two southern most stars, *Markab, Alpha (α) Pegasi*, at the "**Square's**" southwest apex, and *Algenib, Gamma (γ) Pegasi*, at the "**Square's**" southeast apex. ***[3]*** Imagine a line extended east from *Alpha Pegasi* and a little south of *Gamma Pegasi*. ***[4]*** Continue the line from *Gamma Pegasi* for about 2 1/2 times the distance between *Alpha* and *Gamma Pegasi*. This is a distance of a little more than 40 degrees, or about twice the distance spanned by your thumb and little finger against the night sky at arm's length. Here you may notice you are located near or within a circlet of stars comprising the northernmost stars of the constellation Cetus. Most prominent in the circlet is the star *Menkar, Alpha (α) Ceti*, that constellation's brightest star. ***[5]*** From there star-hop a little less than 5 degrees or the width of 3 fingers southwest to the star *Gamma (γ) Ceti*. ***[6]*** Then hop about 3 degrees south, or about the width of 2 fingers, to the star *Delta (δ) Ceti*. ***[7]*** From *Delta Ceti*, **M77** is only about a degree to the east-southeast, or about the width of your little finger against the night sky. Moreover, once you've centered *Delta Ceti* in the eyepiece of a telescope, you should be able to pick out the galaxy in the field of view or very nearby. Moderate sized telescopes can find **M77** once you are properly oriented, and will reveal at moderate magnifications a galaxy whose central core is tightly packed in appearance. The galaxy's halo may appear extended beyond its core. However, you probably will not be able to resolve any stars.

Star-Hop#2. ***Gamma (γ) Andromedae.*** ***[5 steps].*** This double star is generally noted as one of the show pieces of the late fall and early winter skies. At high magnification in even a small telescope, the larger of its two stars appears generally yellow-gold. The smaller companion star appears pale, but distinctly blue. This star is at the end of a long chain of dimmer stars, but can be found with patience. ***[1]*** To locate ***Gamma Andromedae***, start once again in the "**Great Square**;" but this time at the northeastern corner and the star ***Alpheratz, Alpha (α) Andromedae.*** ***[2]*** From there, extend a line to the next star, ***Delta (δ) Andromedae.*** It may help you to visualize the first two fingers of your hand forming a "V" against the sky: With the apex of your two fingers on Alpha Andromedae and forming a "V" pointing to the north east, you'll find your eastern most finger tip points out *Delta Andromedae*, and your more northernly finger tip points out the star *Pi (π) Andromedae*. ***[3]*** From *Delta Andromedae*, extend a line northeast for a distance about equal to that between *Alpha* and *Delta Andromedae*. Here you'll find the star *Beta (β) Andromedae*. ***[4]*** Once again, extend a line for about the same distance to the northeast to the next bright star, *Upsilon (υ) Andromedae*. ***[5]*** Extend an imaginary line one last time to the northeast for a distance equal to about the width of three fingers and you arrive at ***Gamma Andromeda*** and one of the more spectacular double stars!

found worldwide. Supporting the isotopic, stratigraphic and petrographic evidence, molten "splash" deposits or **tektites** have recently been found in Haiti. The term *tektite* is a derivative of the Greek word tektos, meaning "molten" or "melted." Tektites are the product of large asteroid (or comet) impacts. They are thought to be the "splash" or ejecta that is blasted into space and then re-enters the atmosphere to strike the surface. In a sense, tektites are "earth-born" meteorites! Tektites are usually greenish to black glassy objects that superficially resemble obsidian. Compositionally, tektites have lower water and alkali content than obsidian and have very distinctive surface textures.

Size and Texture. Generally, tektites are fairly small objects ranging from only a few millimeters to chunks up to 20 cm (8") in diameter. Most tend to be only a centimeter or so across and weigh a few grams. Tektites can be classified into three main forms. *Splash* forms look like solidified drops of liquid material. They can appear as spheres, teardrops, dumbbells and disks. This is the most common form of tektite. *Ablated* forms are splash forms that have been modified by passage through the Earth's atmosphere. Some of these have an appearance similar to the heat shield on the Apollo space module. As a tektite falls through the atmosphere, compression heats up and melts the forward surface. Material from the heated side often flows up to form a ridge or flange. Protected in the rear is the unablated tektite surface. Some of the best examples of this form have been found in the Australasian strewn field.

The last major main form of tektite is called the *Muong Nong*-type tektites. These are chunks of tektite glass with a layered structure. They can be quite massive, the largest recovered having a mass of 12.8 kg. (28.2 lbs.). This form is found primarily in SE Asia, but others have been reported in Texas and Central Europe.

Tektites have unusual surface features. Many are pitted, have furrows or grooves, or have fine striations. Some of these features are the result of ablation and stresses as the tektite passes through the atmosphere. The fronts of ablated tektites have a smooth, almost polished surface.

Many tektites show evidence of flow structures and layering. Certain types of these structures are particular to the form of tektite. Splash forms have layering that is quite distinctive when compared to ablated and Muong Nong forms. Also present in almost all tektites are "bubble cavities." These can have samples of trapped gas. This gas has a chemical composition close to current atmospheric values, and represents air that was trapped by the molten tektite material.

Composition. In general chemical composition, tektites are similar to silica-enriched igneous and certain types of sedimentary rocks. Depending on the type of tektite, SiO_2 ranges from 64%-84%, with a mean of 73.09%. However, unlike "normal" terrestrial rocks they are extremely "dry," having far lower volatile content. Tektites bear a close resemblance to terrestrial obsidian, but their inherent dryness allows for an interesting test method. When heated by a blowpipe, the water in obsidian causes it to froth, while tektite will simply melt.

Tektites also have other structural and chemical peculiarities that set them apart from "normal" terrestrial rocks. Most have "bubble cavities" formed by gases evolving from the molten parent rock. These vesicles range from a few micrometers to up to one cm. in diameter and can be either spherical or elongate in shape. Nearly all tektites have pure silica glass particles known as *Lechatelierite*. The size and shape of these particles is highly variable and is indicative of the temperature of formation. Other tektites have nickel-iron spherules (as inclusions) typical of iron-nickel meteorites and coesite, a high pressure form of SiO_2 (quartz) often associated with impact craters.

(This is the end of Part One of this article. It will conclude in either the January or February issue of the *Observer*.)

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Star-Hop#3. M34, NGC 1039. ***[1 step].*** The star-hop to the open cluster **M34** is a natural continuation of the star-hop to *Gamma Andromedae* above. ***[1]*** From *Gamma Andromedae*, extend a line almost directly east for a distance equal to that between *Gamma* and *Upsilon Andromeda*, or about the width of 3 fingers. You'll find **M34** as a moderately bright cluster of stars. In binoculars, **M34** will appear as a moderately large open cluster with 10 stars resolved. Unresolved stars will appear as nebulosity in the cluster. In moderate sized telescopes, the prominent stars in **M34** may appear to form an "X" pattern.

Star-Hop#4. M76, NGC 651, the "Little Dumbbell". ***[6 steps].*** ***[1]*** Return for the last time to the **"Great Square"** and the star *Alpha Andromedae*. ***[2]*** Extend a line northeast to the star *Pi Andromedae*, which we found during our star-hop to *Gamma Andromedae*. ***[3]*** From *Pi Andromedae*, extend an line northeast for about the same distance between *Alpha* and *Pi Andromedae*, and we arrive at the star *Mu (μ) Andromedae*. ***[4]*** Note the apparent distance between *Mu Andromedae* and our starting point, *Alpha Andromedae*, a little less than the distance spanned between your index and little fingers against the sky. ***[5]*** Extend a line from *Mu Andromedae* to the northeast for about this distance and we arrive at the star *Phi (ϕ) Persei*. ***[6]*** From *Phi Persei*, **M76** is only about a degree, or the width of your little finger, to the north-northwest. At low power, **M76** appears as a distinct smudge. At higher powers, **M76** takes on a distinct dumbbell appearance.