

The Spectrum

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Are you going to have a Bissextile Year? By Gunthar Lang

At the risk of dashing any aroused fantasies, the answer is: not this year. But you will have one next year, so don't despair. What on Earth (and it's only on Earth) is a "bissextile year"? Today we refer to it by the far more mundane term "leap year". Where did the more evocative term "bissextile" come from? Well, for a start, "bis" means two, and "sext", means six.

In the distant days of Julius Caesar it was known that the length of the tropical year (that is, the interval between the time when the sun arrives at successive vernal equinoxes) is nearly a quarter of a day longer than the 365 days normally ascribed to a year. Neglecting to account for this discrepancy would result, over time, in an accumulative error between the calendar and the occurrence of the seasons. In response to this predicament, Julius declared that every four years, an extra day, an "intercalary day", should be added to remedy this awkward arrangement imposed by nature.

While in the process of adjusting the calendar, Julius declared the year would henceforth start on January 1, and also renamed the Roman month Quintilis, July in his own honor. That's not as uniquely imperious as you might think; we can thank his successor, Augustus, for converting Sextilis to August. Augustus went a step further; he added a 31st day to August. Previously Sextilis had but 30 days, so to obviate playing second fiddle to Julius, whose month already had 31 days; Augustus tacked on an extra one. He took this extra day from February, forever leaving that month with a paucity of days.

So how did the ancient Romans implement this adjustment? Not the way we do today. Every four years they introduced a second February 23rd, hence the "bis". February 23rd occurs six days before the calends of March, which is, in our terminology, the first day of March, thereby introducing the "sext" term. Oddly enough, another reference said February 24 was the repeated day, but how does one reconcile that with six days before the calends of March, unless it was before Augustus swiped that day from February? Either way we have since altered the correction process by having only one February 23rd and one February 24th, bissextile year or not, but every four years we insert February 29th, the intercalary day.

By 1582 it was clear that this modification was somewhat too ambitious. The tropical year was actually a bit more than eleven minutes less than a quarter of a day longer than 365 days, so that by this time the seasons and hence, religious holidays attached to them, were occurring about ten days earlier than they were supposed to. Pope Gregory XIII introduced adjustments to the calendar recognized by most, though not by all, institutions today. First, he dropped ten days from the calendar of 1582;

October 4 of that year was followed by October 15. (This loss peeved a number of people, especially those not inclined toward Roman Catholicism). Next, he declared that years divisible by 100 (eg. 1700) were not to be leap years, unless they were also divisible by 400 (eg. 2000). It wasn't really the Pope's plan. It was proposed by Luigi Lilio for the Pope's consideration.

The Gregorian year is about 26 seconds longer than the tropical year, so after a bit more than thirty centuries we will find ourselves once again out of synchronization with the seasons by a whole day. The fact that, thanks to the moon, Earth's rotation is slowing down compounds the problem. Suitable correction can be then made by some new emperor or Pope. Consider yourselves lucky. At least you didn't miss out on a bissextile year three years ago. Your successors in 2100 will have to contend with fully eight years without one. Pity!

Leonid Chase by Tom Bakowski

I left my house at 5:30 pm on 11-18 and drove (I-90 to I-79 to Rt250 to I-64). 479 miles later (2:46am), I ended up 20 miles east of Charlottesville, Virginia (90 miles east of Richmond) on a scenic overlook off of I-64. The overlook provided great horizons north to the southwest, but a mountain blocked the west. The full moon conveniently set behind the mountain to the west at 5:05 am just before the peak began. Up until 50 miles before the intersection of I-81 and I-64 (West Virginia/Virginia border), the skies were completely overcast. Coming down from the tortuous Rt250 up and over the entire Appalachians I saw the edge of the clouds. I continued heading east until I reached the overlook destination. The skies remained crystal clear until sunrise. Some data I observed from the shower: 3am-4am- 1 meteor per 5-10 minutes * 4am-5am- 2-3 meteors per 1 min * 5am-6:15am- 20-35 meteors per 1 min.....There was a steady increase in activity. It seemed to me that they were pretty accurate at predicting the peak to be around 5:30am. Almost all the meteors were very quick and appeared, to my eyes, as green. Similar to last year's shower most of the meteors came in bunches, 3 or 4 at once. The brightest one I observed was -2 Mag and left the longest of the trails, 20*. This year's shower was definitely not as intense as last year's, but still put on a good show that ended quickly when the sun came up. This scenic overlook generated quite a crowd of local people. I also shot up a roll of film with my wide angle lens and tracking mount during the shower. On the return trip home, instead of winding through the Appalachian Mountains on Rt 250 I decided to go North on I-81 to Hagerstown, then west on I-70/I-68 to I-79 then up to I-90- a total round trip of 1052 miles! A long road trip, but definitely worth it since I'll be dead next time another Leonid shower returns.

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**BAA Web Site**

Tom Bemus and Bill Smith put together a club web site at :

<http://members.aol.com/BufAstro/>

**Meetings**

BAA meetings are held on the 2nd Friday of the month from September to June in the New Science Building on the Buffalo State College Campus. Meetings start at 7:30 pm and all members and guest are encouraged to attend.

Spectrum Deadline

Articles for the next Spectrum will be due by:
 February 14th 2003

Upcoming Meetings

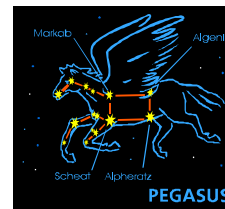
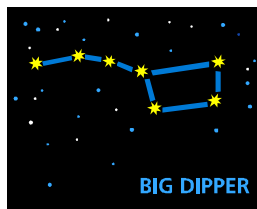
January 10 “Care and feeding of a telescope” – Panel discussion and demonstrations.

February 14 (Valentine’s Day) – An update from the Robotic Observatory at Beaver Meadow Observatory.

College of Fellows Meeting

The annual College of Fellows meeting is planned for 7:30 PM, Thursday, January 30 at my home, 132 Burroughs Drive. I'll try to contact each member as a reminder a week or two before. If you have conflict with the time, please let me know at 839-1842.

Rowland A. Rupp

**MEETING CANCELLATION POLICY**

If, for any reason, (most likely snow or ice storms), there might be cause for cancellation of the meetings of the B.A.A., tune your radio to either WBEN (930) or WGR (550). Also if Buffalo State College has been closed due to inclement weather, so will the meeting of the B.A.A be cancelled.

BEAVER MEADOW TELEPHONE

The telephone at Beaver Meadow, 716-457-3104, is for emergency use only at no cost. Local calls may be placed for a small charge - see the collection box by the phone. This

phone cannot make long distance calls.

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Observatory News by Bill Aquino

2003 Public Night Season

We have put together the public night schedule for the 2003 season. The schedule will be the same as usual with public nights being held at the observatory on the first and third Saturdays of each month between April and October. All public night activities begin at sundown and last at least two hours or more depending on the night's weather conditions.

2003 Public Nights schedule;

April 5 and 19
 May 3 and 17
 June 7 and 21
 July 5 and 19
 August 2 and 16
 September 6 and 20
 October 4 and 18

2003 Public Night Speakers

Now that we have the public night schedule its time to start recruiting "guest" speakers from within the ranks of the membership. This is a most rewarding experience for both the speaker and the audience and I encourage everyone in the club to give it a try at least once. If anyone is interested in speaking this year please contact Bill Aquino at 731-9366 or Paul Tabor at 434-7148. We can also both be reached via the egroups. This opportunity is restricted to club members only in order to provide an opportunity for the public to interact with the membership. Talks can be on any subject of your choosing but astronomical or at least scientific subjects are encouraged. A wide range of prepackaged slide sets and AV equipment is available for your use.

New Observatory Co-Director

After many years of generous volunteering of both his time and considerable talent, Neil Dennis has decided to take a well-deserved break as observatory co-director. Paul Tabor has volunteered to step in as the new co-director. Neil's contributions to BMO over the years have been considerable and they are deeply appreciated. Many of the physical improvements to the facility that we now enjoy so much are the direct result of Neil's hard work and ingenuity. Neil deserves a sincere THANK YOU from the club for giving so much of himself to our organization and helping to build and operate an observatory we can all be proud of.

Robotic Scope – Internet Link Project Update

The project has been moving along but much still needs to be done. The latest activity on the project is as follows:

FUNDRAISING

Our fundraising efforts are going well so far and we should have sufficient funds available at this point to reach our first goal of a "Phase One" (manually operated) system. Once we have the manually operated system in place and working well we can better estimate what will be needed to reach "Phase Two" (semi robotic operation) then finally "Phase Three" (fully robotic operation). Financial reports for the project are made at the general meetings. As of the last report we have raised a total of 8,831.05 dollars to support the project. Funds have been collected from the following sources: Membership contributions 36%, Allocations by the BAA Board of Directors 37%, and Corporate contributions 27%.

INTERNET LINK

Considerable progress has been made on the satellite Internet link to Beaver Meadow. The Nature Center Building is now on-line via the satellite and our friends at the Nature Center along with the many children who visit there are enjoying the benefits of fast Internet access. A "mirrored" server is being provided by UB and this equipment will be installed at both the Meadow and the University. The mirrored server and satellite link will allow data from the robotic scope to be seamlessly transferred from the meadow into the city where it will be easily accessible by club members and UB students. A webpage is being setup that will allow the data to be archived and retrieved.

ROBOTIC ENCLOSURE

The enclosure for the robotic telescope system has been constructed but we still have a few details to work out. We have setup a web page containing photos of the construction process taken over the past several months. Check it out at:

<http://www.premcom.net/Astro/Robotic.htm>

At this point we have installed a temporary "flip open" roof. This roof will allow us to continue on with the installation, checkout, and testing of the telescope. After much careful consideration a "split-roof" design was chosen for the automated roof but because of the complexity of the design, and the fact that we are designing and building it from scratch, it was determined that it would be easier to build it in the city at our workshops. We will install it in place of the temporary roof once we have it constructed and tested. The next major step is to install the pier offset-plate (this places the scope in the exact center of the enclosure) and install the telescope. Careful polar alignment of the telescope will then follow.

ROBOTIC HARDWARE

We have placed the order for the camera, an SBIG STX-9E and we expect delivery sometime around mid January. We are researching focusing equipment now and hopefully will reach a design decision shortly. Focusing a CCD camera on an SCT turns out to be quite a challenge especially when you are trying to do it without human intervention.



BAA Annuals by Rowland A. Rupp

5 YEARS AGO - "Fireworks", literally, was our topic for January 1998. A new member, Jim Wornick, a professional pyrotechnist, enthusiastically told us about his hobby/business. Some thought the topic was inappropriate for an astronomy club meeting; the rest of us enjoyed it. After all, it does involve lights in the nighttime sky. Darwin Christy's April talk was on objects that don't light up the sky at all - micrometeorites; they just settle down through it.

Neil Dennis wrote an article on the history of Mars observation and exploration. He started his article speculating that we might set foot on the red planet in the "next several years". One wonders how long "several years" will turn out to be. An article by Leslie Martin, "If You Were an Egyptian..." highlighted some of the astronomical lore discovered by those ancient people three or four millennia ago. Bill Aquino reported on his observation of a minimum brightness for Algol (Beta Persei). An informal Perseus group including Bill, Don Knecht and Dennis Hohman was busily studying that constellation in the fall and winter of 1997-1998. Bill Smith and Carol Lorenc scheduled their annual Messier Marathon for February 28th.

10 YEARS AGO - In January, Tom Bemus spoke on the activities of Jamestown's 3 Marshall Martz astronomy club. Tom was president of the Martz club at the time. We had a "round-table" discussion on observing techniques and experiences at our meeting in February. Tom Nigrelli and, President Bill Smith announced that the 20-inch Obsession telescope had been ordered. Tom had actively risen initial funding for the new instrument.

Darwin Christy wrote an article for *The Spectrum* about the coming conjunction of Uranus and Neptune on January 26, an event not to be repeated until the 23rd century. An article that must have been extracted from a past *Spectrum*, on the role played by gravity in the formation and destruction of stars was written by former BAA member Bill Parker. Dave Fliss was the subject of Edith Geiger's "BAA Profile".

Darwin also wrote a book review for *The Guide Book for Sight Seeing of Constellations* written by S. Nakano and Darwin's meteoric collaborator, S. Morikubo. The good news was it cost only \$15.00; the bad news is that it was written in Japanese. Rowland Rupp wrote a review of Harold W. G. Allen's *The Eternal Universe*, a book that revises a good share of the physics learned over the last four or five centuries.

15 YEARS AGO - Our speaker for January 1988 was Rowland Rupp, speaking on one of his favorite topics, "Extraterrestrial Intelligence". Another BAA member with a favorite topic spoke in February - Darwin Christy on "Micrometeorites".

We had a *Spectrum* packed with material. A charming article by Walter Whyman entitled "The Third Planet" relates how a Martian might report on his observations of Earth. Al Kolodziejczak gave "Advice to a New Member". Jack Empson announced his intention, to form a BAA computer section. We had observation reports on Kellogg Observatory (Museum of Science) by Marylou Bebak, observations of Jupiter by Gary Kielich, another on nearly the same subject by David Bull and a series of observations by Carl Milazzo. Ed Lindberg wrote an "Instrument Report" on black and white printing, while Darwin Christy wrote on the 19th century German astronomer Johann Heinrich von Madler.

25 YEARS AGO - In January 1978 we heard from three members. Jack Mack's topic was on the possibility of Martian glaciers; Paul Schenk spoke on lunar crater ejecta; Walt Whyman's topic was to be a surprise. Back in those days we occasionally had a program here several members gave diverse short talks.

There was a *Spectrum* article on the largest asteroid, Ceres, written anonymously. A "Sky Test" of the Celestron 8-inch reflector was written by L.M.C. L.M.C. can only be Larry Carlino, our inveterate telescope evaluator. He liked it pretty well, although he questioned if it was worth the cost. The life and times of Darwin Christy, the BAA's president then, was reviewed in Edith Geiger's "BAA Profile". Phil Cizdziel took us through the math required to determine the sun's apparent magnitude when viewed from Mercury (-28.8) to when viewed from the Virgo cluster (35.0). Two superb astrophotos by Tom Dessert, the Great Nebula in Orion (M42) and the Andromeda Galaxy (M31), graced *The Spectrum*.

35 YEARS AGO - Ray Manners spoke on "A New Theory of the Solar System" at our January 1968 meeting. I wonder what it was! In February we heard our own Fred Price talk on "The Possibility of Water and Life on the Moon". At this point it looks fairly, well for the former, not so hot for the latter.

The *Spectrum* for January had an article by Kurt Erland on the newly dedicated Chilean observatory, Cerro Tololo. Dick Zygmunt reviewed James Muirden's book *Stars and Planets*. He liked it. "Life in a Globular Cluster" by Darwin Christy appeared in the February issue giving us a view of these objects both from the inside and the outside. Kurt Erland offered a preview of Jupiter's coming 1968 apparition.

50+ YEARS AGO - The name of the Amateur Telescope Makers and Observers (ATMOs) of Buffalo was changed to Buffalo Astronomical Association as of October 1, 1952. The rationale behind the change, prompted largely by Dr. F. Shirley Jones, was that there is more to astronomy than building telescopes and peering through them.

Frisbees in Space by Dr Tony Phillips

When Pete Rossoni was a kid he loved to throw Frisbees. Most kids do-it's pure fun. But in Pete's case it was serious business. He didn't know it, but he was practicing for his future career in space exploration.

Grown-up Pete Rossoni is now an engineer at NASA's Goddard Space Flight Center. His main project there is figuring out how to hurl spacecraft into orbit Frisbee-style.

The spacecraft are small-about the size of birthday cakes. "This wouldn't work with big satellites or heavy space ships like the shuttle," notes Rossoni. But a cake-sized "nanosatellite" is just right.

Nanosatellites, nanosats for short, are an exciting new idea in space exploration. Ordinary satellites tend to be heavy and expensive to launch. The cost alone is a deterrent to space research. Nanosats, on the other hand, can travel on a budget. For example, a Delta 4 rocket delivering a communications satellite to orbit could also carry a few nanosats piggyback-style with little extra effort or expense.

"Once the nanosats reach space, however, they have to separate from their ride," says Rossoni. And that's where Frisbee tossing comes in.

Rossoni has designed a device that can fling a nanosat off the back of its host rocket. "It's a lot like throwing a Frisbee," he explains. "The basic mechanics are the same. You need to impart the spin and release it cleanly-all in about a tenth of a second." (The spinning motion is important because it allows the science magnetometer to measure the surrounding field and lets

sunlight to play across all of the nanosat's solar panels.)

The ST5 nanosats are designed to study Earth's magnetosphere-a magnetic bubble that surrounds our planet and protects us from the solar wind. But their primary goal, notes Rossoni, is to test the technology of miniature satellites.

"We haven't done anything like this before," says Rossoni. Soon, however, the concept will be tested. A trio of nanosats is slated for launch in 2004 on the back of a rocket yet to be determined. The name of the mission, which is managed by JPL's New Millennium Program, is Space Technology 5 (ST5).

Can groups of nanosats maintain formation as they fly through space? Will their internal systems-miniaturized versions of full-sized satellite components-satisfy the demands of both the harsh space environment and critical science measurements? Is Frisbee-tossing as much fun in orbit as it is on Earth?

ST5 will provide the answers. Read about ST5 at <http://nmp.nasa.gov/st5>. Budding young astronomers can learn more at http://spaceplace.nasa.gov/st5/st5_tortillas1.htm

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Vixen ED 130SS Refractor OTA by Lawrence Carlino

VIXEN ED 130SS REFRACTOR OTA

by Lawrence Carlino

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The proliferation of high-quality apochromatic refractors in the past decade has given aficionados an unprecedented choice of fine optical systems, especially in the popular 70 to 110 millimeter range. Unfortunately, for those wishing to upgrade to something a bit larger and more capable, few options are available. The Borg 125 ED is a reasonable alternative, price and quality-wise, but the magnificent Astro-Physics 130mm triplet sports a 4-year waiting list, and the superb Takahashi FS 128 fluorite doublet and new 130mm "Ortho-Apochromatic" triplet are pricey, of fairly long f/ratio, and heavy enough to require a beefy mount that detracts from easy portability.

The re-emergence of the Vixen marquee in the US market has happily changed this scenario. Under the aegis of TeleVue, Vixen products are now available through about a dozen US and Canadian dealers. Their top-of-the-line offering is the ED 130SS, a 5.1" doublet sold either as an optical tube assembly or coupled to the Vixen Great Polaris DX equatorial mount. This instrument had previously been offered by Orion Telescopes and Binoculars under their own brand name, and as Orion terminated the relationship with Vixen, a few of the remaining units were cleared out. Being a hopeless refractor "junkie," I simply had to have one.

FIRST IMPRESSIONS

The ED 130 optical tube arrived in perfect condition, with only the packing carton displaying a bit of insignificant damage (FedEx generally seems to have a good track record in this regard). The tube immediately impressed me with its smooth, glossy white finish. The standard tube clamp rings, focuser, and fittings are finished in a light gray-green metallic. Darker and glossier than Takahashi's, but quite attractive. A carrying strap links the top-side 1/4-20 threaded holes in the tube rings, and the ubiquitous Vixen dovetail bracket ties the bottom together for easy attachment to a variety of mounts. I removed the carrying strap in order to accommodate a camera mount or guide scope. The 7x50 finder provided mounts to the focuser with a dovetail. This finder, by the way, is one of the best 50mm units I've encountered in 40 years of observing: razor sharp imaging, minimal false color, thin crosshairs, and only slight image degradation at the edge of the field. Not quite a Takahashi, but pretty close.

The entire tube assembly weighs in at a svelte 12.6 pounds, light enough to allow adequate support for visual observing with a 3-second damping time on a Great Polaris mount. The total weight of this configuration allows the entire unit to be carried in and out with reasonable ease - a real plus. Something like a GP-DX or Losmandy GM 8 would probably be advisable for astrophotography or ccd imaging. Tube length with the thread-on dewcap is 38" and can be reduced to 32" with the cap removed and the focuser at full-in travel, with another 4.5" subtraction if the focuser is unthreaded and removed. The diameter of the tube is 140mm.

Optically, the Vixen utilizes a doublet, air-spaced objective lens with one element being crafted from extra-low-dispersion (ED) glass. A third element, a "field flattener," is threaded into the focuser drawtube, but it can easily be removed for most visual applications as its primary use is for astrophotography. When used in the visual mode, the field lens moves the focal point inward, allowing focus to be achieved either straight-through or with a 1.25" prism star diagonal. Other configurations will not reach focus with most eyepieces; however, field curvature is completely absent as is any trace of coma. This bodes well for wide-field photographs. With the lens removed, all combinations of eyepiece and diagonal reach focus easily. The scope has a focal length of 860mm and an f/ratio of 6.6 - a nice compromise as it turns out. Additionally, a dedicated Vixen focal reducer that lowers the f/ratio to approximately 5.0 is an available option. The tube's interior is well blackened and baffled, providing a dark celestial field almost completely free from stray light.

FIRST LIGHT

As an active observer for over 40 years, I've gone through dozens of telescopes of all types, configurations, and sizes from 32mm to 28 inches in aperture. I've looked through and at hundreds more as well. Yes, this is close to psychosis, or at the very least, a severe character disorder - but it has provided a very real sense of what performs and what fails to meet expectations. As an avid planetary observer and long-term member of A.L.P.O., I've become increasingly intolerant of optics that fail to perform well.

First use of this Vixen revealed, fortunately, that it IS, by my own definition, a true apochromat in color correction; this is NOT a warmed-over achromat with an abundance of spurious color. Though Vixen does not advertise the scope as an "APO," color correction is far superior to that of a medium f/ratio achromat. The moon at powers from 45x to over 300x, either in first-quarter glory or full phase, showed no color fringing that I could detect. A reddish or yellow border was seen only under vile seeing conditions with the lunar orb low in the sky - most probably the result of differential refraction and eyepiece aberrations. Surprisingly good and very satisfying. Fellow observer and owner of an Astro-Physics Traveler, Tom Nigrelli, agreed that the Vixen is remarkably color free. Bright stars such as Arcturus, Deneb, and Altair showed no color spill at any magnification, though Vega displayed just the slightest hint of a bluish halo at 200x. The observer would have to be conscientiously searching for false color to find it. To the true perfectionist, this might fall short of totally color-free performance, and top-of-the-line APO's by AP and Takahashi are almost perfect in this regard, but the difference is small.

With the color question put to rest and no bright planets available in the evening sky, I turned to some classic double stars to evaluate the Vixen's overall optical correction and image quality. With the field flattener lens removed from the drawtube and a 2-inch Vixen-made mirror star diagonal in place (the 2-inch visual adapter is a \$40 option), I went through a battery of optical tests over a dozen clear nights with seeing and transparency ranging from semi-acceptable to wretched. (Typical Buffalo, New York, area seeing conditions allow motion-free images about once per decade.) With Epsilon Lyrae sharply defined on the finder's crosshairs, the smooth motion of the main scope's R&P focuser was immediately apparent. Not a lot of effort to focus with a very linear, progressive feel and no image shift. A knob to adjust the tension or lock down for photography is included. A nice set up, but not quite as smooth as the buttery Takahashi unit. At 66x, using a 13mm Nagler T6, the double-double was clearly resolved, so I boosted the magnification to 172x with an Orion 5mm Ul-trascopic to inspect the airy discs and diffraction rings - a good test of optical quality. The 4 tiny airy discs were hard and sharp with dead symmetrical and fairly prominent first diffraction rings, but with no hint of outer rings. Quite impressive. The tough 1.4 arc sec Pi Aquilae was easily resolved at 220x with enough space between components to fit another star. Ditto, Iota Cass; the pretty triple was beautifully defined at all powers from 96 up.

Not being an expert on "star testing" an optical system, I nevertheless racked Polaris in and out of focus to assess the overall optical quality. Inside of focus, the clean, concentric series of bright and dark rings (with the outermost circle being the brightest) looked good. There was some color here: a pale yellow green, but nothing frightening. Outside of focus didn't look as good - the concentric rings were there, as was the outermost bright ring, but with some blurring. This was somewhat similar to the intrafocal image, but not identical. Perhaps this asymmetry was the result of mild spherical aberration. Both my AP 152, f/9, Starfire and Tak FS-102 do better.

Just a bit upset, I tried a really nasty double: Delta Cygni. At 172x, under mediocre seeing conditions, it was not difficult to resolve. The faint, close companion was clearly visible just outside of the primary's first diffraction ring - but the ring itself was very prominent; a bit too thick for my taste and nowhere

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near as delicate as in the Tak 102 or AP 152. The poorer the seeing conditions, seemingly the thicker the ring. Yet there was little evidence of secondary or tertiary rings, and there is little doubt that the Vixen will easily resolve Dawes' limit. On double stars of 5th magnitude or fainter, the ring is not intrusive. About two years ago, I purchased a Vixen f/6.5 102ED that exhibited the same characteristic, but to a much greater extent, and I sent it back (to Orion) because the first diffraction ring rivaled Saturn's in breadth and made for a very poor image overall. Fortunately, this 130ED is much, much better, but not quite perfect either.

THE DEEP SKY

For those used to the light grasp and magnitude penetration of a 4-inch or smaller refractor, this Vixen 5.1-inch is a revelation. With about 60 percent more light gathering power than a 4-inch scope; the Vixen puts the observer in the "bigger scope" category. With a semi-rural observing site in Western New York and a naked-eye limiting magnitude of about 5.9, I managed to get some marvelous views with the Vixen. Hercules' M 13 was resolved to the core with wispy strings of individual stars easily visible at 96 and 128x. Surprisingly, M 92, M 15, M 2, M 10, and M 12 were also well resolved, something the smaller Tak 102 can't do. Armed with some A.A.V.S.O. magnitude charts and employing similar magnifications with TeleVue plossls, I made a direct "A-B" comparison with an excellent Intes 152mm Maksutov-Newtonian. The Vixen actually revealed fainter stars - about a .2 magnitude edge over the compound scope, probably because of its high-percentage light throughput, lack of a secondary obstruction, and no light-robbing reflective surfaces other than the star diagonal. Even the elusive "giraffe legs" of M 30 in Capricornus were glimpsed at high power (172x) with averted vision.

With a Lumicon OIII filter and 20mm Erfle in the drawtube, I found the Veil Nebula to be finely detailed with abundant tendrils and streaks of nebulosity. The Helix in Aquarius also showed easily and exhibited hints of detail, and M 27 elicited a gasp of delight as it displayed rich internal structure and the complete outer envelope. Dragging myself from a comfortable slumber at 4 AM, I viewed the Orion Nebula complex with a 24.5 mm Meade SWA (35x) and was thrilled with the extraordinary detail, delicate greenish coloration, and wonderful contrast against a stygian black sky background. Though certainly not in the same deep-sky league as 8-inch and larger SCT's and Newtonians, this Vixen 130 does provide excellent performance for its modest aperture.

JUDGMENT DAY - THE MOON AND PLANETS

My first planetary view with the Vixen, given the dearth of bright planets in the evening sky, was of the faint, tiny Uranus. At 200x, the distant world yielded a sharp, well-defined yellow-green disc and bore higher powers without image breakdown. Not bad at all. With a Collins I3 image intensifier in the drawtube, I managed to glimpse Oberon, but not Titania. The I3, by the way, functions admirably with this scope and pushes the limiting magnitude close to 15.

The moon, in various phases, turned out to be a very impressive sight in the Vixen. Detail was sharp, contrasty, and devoid of spurious color at all magnifications from 35x to over 300x. The image did seem to lack the wonderful "snap" of the Tak 102 and my (very fine) Borg 100 ED, but focus had a reasonably wide range, not a single, critical "sweet spot." A few days past first quarter, the delicate series of coalesced craterlets near Copernicus was nicely resolved at 96x, and the north polar region provided a spectacular "Apollo 8" lunar orbit sensation. About 10 days later, a favorable libration brought the dark floor and surrounding edges of Mare Orientale into view. All-in-all, a very competent performance - until directly compared to the Tak 102 and AP Starfire. The Tak doesn't show any more, and perhaps a bit less, but its contrast is like that of a pen-and-ink line drawing, where the Vixen's image is a touch softer.

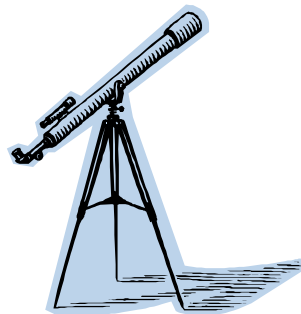
Saturn, when it finally achieved a reasonable altitude, was an impressive sight. Under average seeing conditions, the ringed planet exhibited a neat flattened disc with the Cassini division encircling the entire globe and the "B ring" showing variations in brightness. The elusive crepe ring stood out against both the planet and dark sky within the major rings. The dull polar area was fairly prominent, and the equatorial planetary belts showed a warm coloration and excellent contrast - all at magnifications ranging from 128 to 220x. This telescope does provide imaging suitable for serious planetary research as it bears power well and presents enough contrast to elicit faint, subtle detail. Nice! But I didn't find myself slapping the finderscope with a "high five" in celebration. The image with the Tak FS-102 bordered on perfection, though it was less bright and showed no more detail. The Intes 6" Mak-Newtonian was also aesthetically more pleasing, and the AP 152 easily outperformed all three scopes. When Jupiter becomes well positioned in the late fall, the ultimate test of optical quality will be available, and I'll update with an appraisal of the giant planet's appearance.

IN SUMMARY

Overall, I'm pleased with the performance of the Vixen 130 ED; it achieves a balance of optical quality, portability, capability, and price (currently \$ 4385 for the OTA) that is hard to match. With the field-flattener lens in place, the scope strikes me as a best buy for ccd imaging and astrophotography. Only the Borg 125ED is in the same category. For visual use, the Vixen rates as very good for deep-sky observing when compared to other telescopes of modest aperture, and it's no slouch in the lunar and planetary performance arena either.

Vixen quality control poses the real question here. I've been the owner of 4 Vixen-made scopes: a terrific (Celestron-badged) 102mm, f/9.8 achromat; an even better 102mm, f/9 ED; a very poor 102mm, f/6.5 ED; and the very competent 130mm ED reviewed here. It appears that there may be significant variation in quality from scope to scope, something that almost never seems to occur with Takahashi and Astro-Physics products.

To apply an educational analogy, the Vixen 130 ED is like the versatile, hard-working high school senior with a B+ average and acceptance at a good state university. But those Takahashi and Astro-Physics kids are competing for valedictorian honors and admission to Harvard or Yale. I'll use my Vixen 130 ED happily and often, but look forward to the day, four years from now, when my AP 130 EDF arrives and I'll revel in its transcendent optical quality.



Letter from the Editor (Electronic *Spectrum* Available) by Jamie Seibert

Some of you may know this, but for those who don't, I've been putting together an electronic version of *The Spectrum*. The last several editions (including this one) have been available over the internet in a "PDF" file format. There are a couple of reasons I decided to do this. First, there is a lot more that can be done with an electronic version over a printed version. Things like color pictures and member photographs are just a few things that I've added to the electronic version. The other big reason for producing an electronic version is that we would be able to cut back on the number of printed editions we produce. After several discussions with the Board and a few trial runs, it has been decided to ask members if they would like to continue to receive *The Spectrum* in the printed form or would they be happy to just receive *The Spectrum* in the electronic format. .

The printed version of *The Spectrum* won't be going away. All member submitted articles, and the regular columns will appear in both the printed and electronic version. Other than what has been mentioned above, the editions will be the same.

Anyone who would like to only receive the electronic version should send their E-Mail address to me. My E-mail address is jseibert@buffalo.edu. I will compile a list of Address and cross reference it with the current membership directory. Anyone I don't receive an E-mail address from will receive a printed version like normal. I'd like to encourage anyone with internet access to participate in this. Not only will you be saving the club some money to use in other projects, but I think you'll enjoy the extra stuff available in the electronic version. You can download this issue and the past two issues from the following web site <http://jseibert5.cit.buffalo.edu/BAASpectrum>. To open a "PDF" file, you will need a program such as Adobe Acrobat Reader. This is a free program for Windows PC and Macintosh computers. You can download this program here <http://www.adobe.com/products/acrobat/readstep2.html>. I hope to hear from many of you soon.

Jamie Seibert
The Spectrum Editor

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