

The Spectrum



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Further Reflections On Refraction

Rowland A. Rupp

I submitted an article for the January/February 2005 *Spectrum* about the lengthy delay between the first use of spectacles in the late thirteenth century and the invention of the telescope in the early seventeenth century. A number of people, most of them BAA members, had ideas that explained this peculiarity, some of them mildly facetious, that I presented in the May/June issue.

Since then I found a book, *Seeing and Believing*, by Richard Panek that deals with the use of the telescope in astronomy from its earliest days to the present. (No! This is not the Richard Panek who taught astronomy at Niagara County Community College, and who also was my teaching mentor, though for a moment I thought it might be.)

(continued on page 5)

RASC Members Discover "FMOs" in 2005*

Denis Grey, Toronto

[from www.RASC.ca] RASC members Michael Soschat of Halifax (2005 TV51), Kevin Fetter of Kingston (2005 XZ7), Ed Majden of Victoria (2004 MV2 and 2005 NX55) all helped to discover FMOs in 2005. **FMO** is an acronym for "**Fast Moving Object**" and applies to Aten, Apollo and Amor types of asteroids and other relatively nearby (<0.2 AU) solar system objects (comets and asteroids).

FMOs and **VFMOs (Very Fast Moving Objects)** are so named because these objects move very fast across the sky compared to typical asteroids, leaving long trails even in relatively short exposures. The University of Arizona's FMO Spacewatch Project conducts a survey using a 0.9m Kitt Peak telescope with a mosaic CCD system.

Spacewatch attempted to create an efficient FMO trail detection algorithm, but the best detection software could only find relatively bright trails while the visual examination of images were able to detect fainter trails below the detection threshold of the software as well as to eliminate edge-on galaxies in the same fields (which look much like FMOs). As a result it has been the approach of Spacewatch to continue to identify FMOs by visual inspection of image data rather than making further attempts at developing software for the purpose as is the case with other types of asteroid surveys. As part of this process, the Spacewatch web site regularly distributes image data to participants who receive co-discoverer credit for their contributions when they identify FMOs.

RASC members who are interested in participating in this public program can find out how to become a Spacewatch member and **participate in the search for FMOs** through the **Spacewatch website**.

* reprinted from the Regulus newsletter of the Royal Astronomical Society of Canada, January 2006

Moon Observer's Guide

Book Review*

Kevin Kell

I was a lucky door prize recipient at the Centre's Annual Awards Banquet back in November and what I won was a book. My current reading stack is about 45 titles tall but this one caught my eye more than the others and climbed up the priority ladder to achieve the prestigious position of bathroom reading. Once achieving this position, a book is as good as read.

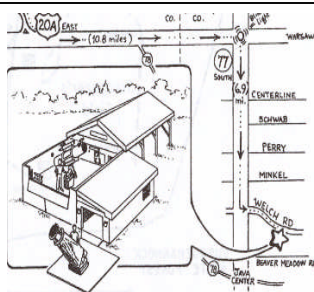
The Moon Observer's Guide by Peter Grego (Firefly Books 2004) is a great companion to anyone interested in Lunar Observing, along with the Virtual Moon Atlas software, Rukl's Moon Atlas, and the Isabel Williamson Lunar Observing program. A small introductory section up front starts with, "Why Observe the Moon?" followed with some basic background of what features are and what equipment you can use.

The middle section is the best part, a lunar day by day guide to features that are available. An example from Day Three: "The whole of Mare Crisium is now visible, and the earthshine remains visible with the naked eye, faintly illuminating the dark side of the Moon."

Lastly are guides to recording observations and glossaries and references. Recording your observations includes all manner of photography and drawings. There are exposure tables, tips for digital cameras and video cameras and more.

The book is printed in China and retails for \$14.95. Definitely recommended for any observer's library. You may not be a lunar observer now, but odds are you will be and when you do, you will want this book.

* reprinted from the Regulus newsletter of the Royal Astronomical Society of Canada, January 2006



BAA Observatory (BMO)

BAA Officials

BAA OFFICERS

President – Peter Proulx
731-2808
Vice President – Ted Bistany
885-0003
Secretary – Joe Orzechowski
632-7091
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OBSERVATORY DIRECTORS

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Alan Friedman 881-4310

ROBOTIC SCOPE PROJECT

Bill Aquino

STAR PARTIES

Bill Smith

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Distributor 625-8343

Labels -- Alan Friedman
Columns -- Edith Geiger
Peter Proulx
Rowland Rupp
Paul Tabor

Bill Aquino
Articles -- various authors

BAA Web Site

www.buffaloastronomy.com

BAA Hot Line / Voice Mail Box

716-629-3098

Location /Time Of Meetings

BAA meetings are held on the **2nd Friday of the month** from **September to June** in the **New Science Building on Buffalo State College Campus**. Meetings start at **7:30 P.M.**, in the first floor auditorium near the entrance. See above web site for a map of the location. **Non-members are encouraged to attend.**

Spectrum Deadline

Articles for the next Spectrum will be due by: **April 16, 2005**

Managers Of BAA Computer Sites

BAA Web Site

Timothy Finucane

YAHOO E-Mail Group*

Dennis Hohman

Mike O'Connor

* members only

President's Message

Peter Proulx

Ever wish for snow?

This has been a great winter, weather wise, but lousy for us Amateur Astronomers. Weather is one of those things that most folks take for granted: see the forecast, decide how to dress for the day, and wait for the warm sunny days of spring and summer. For those of us involved with this hobby, the weather becomes more than a passing interest. Decidedly this year something strange has happened. Whether we blame this on global warming, or just an unusual winter, one thing is for sure we aren't getting much Astronomy in! At our February meeting, it was the first time that I can remember that there weren't any observation reports!

There are some interesting theories on why so many cloudy nights this year, some scientific and other -- although less than scientific -- have to make you wonder:

1. Global warming -- NOAA Satellite and Information Services states: "There are several studies that suggest regional cloudiness, perhaps especially in the thick precipitating clouds, has increased over the 20th century."
2. Since Lake Erie hasn't frozen over, any air that moves over the lake is moistened and as it rises it will form clouds.
3. I "insert your name here" bought a new scope this year and the day it arrived, it got cloudy!

I personally would like to blame the clouds on #2. With our balmy winter temps this year, bite my tongue, but maybe I miss the snow. I would rather suffer a little "Lake Effect" snow instead of this steady "Lake Effect" CLOUDS!

If you want to fall deeper into a depression try this site: <http://www.cityrating.com/cityweather.asp?city=Buffalo>. You will be treated to a history of our weather, where you will find that we have an average of 208 cloudy days per year and only 54 clear days per year! Then look at Tucson, AZ -- 81 cloudy days and 193 clear days! Enough said!

Ok -- for those still with me -- we will have some sunshine coming our way in the form of a couple great guest speakers for the months of March and April. On March 11th, 2006 the BAA will have our annual dinner banquet. We are very pleased to announce that our Keynote speaker this year will be Jack Newton. Jack is a veteran astro-photographer that needs little introduction. Jack's talk is titled "Splendors of the Universe". The talk will be an illustrated "tour" of the wonders of space, through the eyes of a veteran astro-photographer. In addition to night time objects, Jack will show stunning images of solar prominences, aurora borealis, and other beautiful splendors of the universe reflecting pictures he has taken all over the world. Jack will also be holding a free seminar on image processing, the same day at Romanello's Restaurant South, 5793 South Park Avenue Hamburg, NY at 1:00pm. Please get your reservations in for dinner, ASAP!

Our April meeting will feature Dr. Will Kinney from UB. His talk is titled: The Soul of a New Universe. Will is a dynamic speaker and always does a tremendous job.

Four hundred years ago, precision observations, by astronomers Tycho Brahe and Galileo Galilei, made possible a profound new understanding of the structure of the cosmos. The earth was dethroned from its position at the center of the universe and sent hurtling through space at fantastic velocity. This set the stage for the theorist Isaac Newton to replace Aristotle's laws of motion with a new physics based on a powerful principle invented by Galileo: relativity. Today, precision cosmological measurements are creating a similar revolution in our understanding of the "Big Bang" universe. The Big Bang that astronomers have revealed is nothing like what they expected to find; most of the universe is unaccounted for, locked up in mysterious "dark" components. To explain these astonishing measurements, cosmological theorists are arriving at a radical conclusion: our universe is perhaps only one among multitudes in an eternally dynamic multiverse, in which even the laws of physics are not fixed.

Hope to see you at the dinner meeting. In the meantime, clear skies! (We can always wish. Can't we?)

5 YEARS AGO - Mike O'Conner and Bill Aquino jointly wrote an article for *The Spectrum* on "Observing Occultations from Beaver Meadow Observatory". Since they intended their observations to be scientifically useful for refining orbits, they needed to determine their geographic location within thirty feet and make event timings accurate to hundredths of a second. Alan Friedman wrote about observing the emergence of Ganymede from behind Jupiter, and accompanied it with a series of his photographs depicting the event. Another sequence of photographs was submitted by Tom Bakowski showing the December 25, 2000 partial solar eclipse.

The BAA was raising funds to supply eclipse viewing glasses for observers in the path of the June 21, 2001 total solar eclipse seen from Angola and Zambia. Jim Lehmann provided the motivation for this effort. Bill Smith and Carol Lorenc announced their all-night Messier marathon would be held on March 24. A digital camera class was scheduled at BMO. Tom Dey spoke about his Dobsonian telescope and home-made observatory at our March dinner meeting at Warren's in North Tonawanda. Our speaker for April was not identified.

10 YEARS AGO - In April 1996, Richard Jones, a new BAA member, spoke on "Astronomy on the Internet". The identity of the March dinner speaker wasn't given, but for once I know who it was -- it was I. My topic was astronomical hoaxes, and the site was Ilio DiPaolo's. Comet Hyakutake made *The Spectrum's* headline as it approached its best viewing on March 8. John Marino wrote about a plan to send a spacecraft to comet Wild-2, where it would gather up some material and return to Earth in distant January 2006. It did! Bev Orzechowski was the subject of Edith Geiger's profile of BAA members. Husband Joe was stirring up enthusiasm for writing articles for *The Spectrum* by offering a list of possible topics, mostly dealing with observing. (We still need articles, so why not break down and write one?) Carl Milazzo suggested some ways to seek out dark observing sites, provided you're willing to travel like an "urban nomad". A favorable review of *Edwin Rubble -Mariner of the Nebulae* by Gale E. Christianson was given by Rowland Rupp.

15 YEARS AGO - Computers and how to use them was the topic at our March 1991 meeting. MS DOS and Apple DOS machines were to be available for some hands-on experience. Dave Sepulveda organized the event. Joe Cardin spoke in April on the serviceable orbital observatories he was working on at Moog. Ed Lindberg reported on the equatorial telescope mount donated by Bell Aerospace and on a six-inch reflector donated by Conrad Stolarski. Members of the Instrument Section were occupied with readying these acquisitions for BMO. Ed reminisced about some of the activities undertaken by the Instrument Section, which he headed since the late 1950's. Darwin Christy wrote about ancient constellations: Tardiest Solitarius and Noctua.

25 YEARS AGO - "Various astronomical topics" was the description given for the four speakers who were to present short talks at our March 1981 meeting. They were: Darwin Christy, Kurt Mancuso, Fred Price and Rowland Rupp. Dr. David Meisel from Geneseo State talked about "Comets and Meteors" at the April meeting. This was his specialty -- he was head of the American Meteor Society. BAA member Paul Young wrote the first installment of a two part article on how to build sundials. It included an impressive array of diagrams. "Venus" was the subject of a summation by James Machowski, highlighting what was then known about our nearest neighboring planet, just after the Russian visits there. Edith Geiger chose Miro Catipovic for her member profile.

35 YEARS AGO - Fred Price's "Water and Life on the Moon" was to be the topic at our March 1971 meeting. I wonder what he said. Also, we were to view the BAA's second astrophotography exhibit at the museum, our regular meeting site in the past. In April we heard from Ralph Dakin. An optical expert from Bausch and Lomb, he spoke on "Gratings in Astronomy". Kurt Erland finished his tongue-in-cheek interview with Eratosthenes on how he figured out the circumference of Earth in the third century BC. Warren Steinberg reported on a well-attended meeting of the Instrument Section where mirrors by Thad Czerhiejewski and Gil Gagne were tested. Both were described as old-time members. What would that make them now? (Speaking of Warren, I met him just a couple of weeks ago. He hopes to resume his enthusiasm for astronomy.) Ernst Both edited the text from Wilhelm Beer and Johann Heinrich Madler's observations of the favorable opposition of Mars in September 1830. Fred West reported on the New York Astronomical Corporation meeting. The group was dedicated to furthering interest and research in astronomy in New York state. Bob Burdick wrote on how to determine the radius of curvature of a mirror by rolling a steel ball on it and timing how long it took to reach the opposite side.

(Minutes of the February BAA Meeting ... continued from page 4)

Dr. Jack Mack displayed an e-mail that he sent to the Dean of Buffalo State College regarding the notice from the college's Events Coordinator that the BAA would be charged \$100 when any audio-visual equipment in the meeting room is used and Dr. Mack (a faculty member) is not present to provide access to the equipment. In his e-mail Dr. Mack presented the Dean with some alternatives to the current situation that would reduce the financial burden on the BAA.

The main speaker was member Mike O'Connor who gave a presentation describing the Puckett Observatory Supernova Search (POSS) program. Mike, one of 28 POSS team members, gave a brief primer on supernovae and then proceeded to describe the process by which images are collected and analyzed by members in their search for extragalactic supernovae. Mike's dedication and perseverance recently paid off and he is now credited as co-discoverer of supernova SN200Set.

Minutes of the January BAA Meeting

Joseph Orzechowski,, Secretary

The January meeting was held on January 6, 2006 (the first Friday of the month) so that the meeting would coincide with the planetarium program at the Williamsville Space Lab facility run by member Mark Percy. There were about 42 BAA members and planetarium visitors in attendance. The meeting began in the planetarium where a show titled "The Stargazer" was presented. This was followed by a JPL DVD about the Stardust mission.

After the planetarium program, members and visitors moved to a large classroom where president Peter Proulx opened the meeting of the BAA at approximately 8:35pm. For the benefit of visitors present at the meeting, Peter gave a brief rundown of the BAA and its observatory facilities and described the advantages of membership. Secretary Joe Orzechowski read the Minutes of the December meeting and Treasurer Bev Orzechowski indicated that there was no account activity during the month of December .

Membership Director Alan Friedman offered membership applications and literature to those visitors interested in learning a little more about the BAA and/or joining. Alan also talked briefly about the benefits of membership.

Alan Friedman announced that a special event will be held at the Buffalo Museum of Science on April 1, 2006 when the Moon will be passing through the Pleiades open cluster shortly after sunset.

Bill Aquino announced that there was no significant activity at the observatories. He informed everyone that the combination at the Beaver Meadow Observatory had been changed and those members certified to have access to BMO should be sure to get the new combination before driving down. Bill also provided a brief update on the status of the robotic scope.

Tom Bakowski provided an observation report on a new comet that will be moving into the northern hemisphere around the end of March or beginning of April.

The speaker at this year's March Dinner Meeting will be Jack Newton and the title of his presentation will be "Splendors of the Universe". To accommodate Mr. Newton's schedule the meeting is scheduled for Saturday March 11, 2006 rather than the traditional second Friday of the month. Janice Gardner, who is coordinating the event with the restaurant, announced that the dinner meeting will be held at the Romanello's South restaurant in Hamburg. She also described the four menu items that will be available.

In response to some questions regarding the Remmick Observatory in Lockport, Paul Tabor provided a description of the facility and activities held there over the past summer. He also discussed various issues that arose during the launch of this new public nights facility and how they were resolved.

Minutes of the February BAA Meeting

Joseph Orzechowski,, Secretary

The meeting was held on February 10, 2006. President Peter Proulx opened the meeting at 7:40pm. There were approximately 35 members, guests and visitors in attendance.

Secretary Joe Orzechowski read the minutes of the January meeting. A treasurer's report was given by Bev Orzechowski. Expenditures included \$600 for the December meeting's Holiday party, \$375 for Jack Newton's airfare to come to Buffalo and speak at the March meeting, and \$50 in support of the Clear Sky Clock website.

Bill Aquino announced that there was no significant activity at the observatories during the past month. The public night schedule for BMO has been established for the coming season and as usual public nights will fall on the first and third Saturdays of each month from April to October. Public nights at the Remmick Observatory in Lockport are tentatively scheduled for the second and fourth Saturdays of each month from May to September. Bill Aquino also informed us that the new roof for the robot scope observatory has been completed. It will be transported to BMO and installed near the beginning of the public night season, probably around the first public night in April.

Membership Director Alan Friedman announced that two new members joined the BAA as a result of the January meeting held at the Williamsville Space Lab.

Spectrum editor Gus Cenken informed everyone that the deadline for submission to the March/ April issue is February 16.

Bob Hughes reported that recent observations of the Sun showed little or no activity .The Sun's disk has been mostly free of sunspots, consistent with an approaching solar minimum.

Peter Proulx announced that the Astronomy Day Organizing Committee was still deciding on a date and location for this year's event. Also members who wished to volunteer to help out during the event should contact Pat Lannon, Mark Percy or Dennis Hohman. Peter also announced that the 76th anniversary of the discovery of the planet Pluto will be celebrated at Buffalo State College on February 18,2006 at 4pm. The event is titled Pluto -History and Fate of the Ninth Planet. Admission is \$5.

Everyone was reminded that the March dinner meeting will be held on Saturday March 11, 2006 (rather than the usual meeting date which falls on the Friday before). The meeting will be capped off by Jack Newton's presentation titled "Splendors of the Universe". The meeting will be held at Romanello's South restaurant. Dinner invitations were emailed to members where possible and were also available at the meeting. An invitation to attend this dinner was also sent to other area astronomy clubs. Jack Newton will be giving a special workshop on astrophotography and image processing on the afternoon before the dinner. This workshop will be held at Romanello's restaurant from 1pm to 3pm.

It was announced that **elections for the four officers of the BAA will be held in June** and that **candidates are being sought**. Members interested in running for one of these positions should contact a member of the Board of Directors.

Alan Friedman once again demonstrated his expertise in imaging solar system objects. His 20 image mosaic of the lunar crater Plato and the nearby Alpine Valley was selected to be the Astronomy Picture of the Day on Saturday February 11, 2006. (continued on page 3)

BAA Beaver Meadows and Lkpt Remmick Observatory News

Bill Aquino and Paul Tabor

The winter months will be over soon and public night activities will resume at the clubs observatories. At Beaver Meadow Observatory public nights will once again be held on the first and third Saturdays from April through October. This year marks the 30th consecutive year of our clubs public service at the Beaver Meadow Nature Center. This is quite an accomplishment for a volunteer not-for-profit organization and something we should all be proud of. As of this writing we are still waiting for approval from the Lockport Board of Education to run our public night season at the Remmick Observatory this summer. If we do receive approval (Paul is confident we will) then public nights at Remmick Observatory will be on the 2nd and 4th Saturdays from May through September. As soon as Paul finds out one way or the other he will pass the word.

Keep in mind that once public season starts we will be looking for volunteers to help out with observing and lecturing. The yearly combination change was completed at BMO this past January and all checked-out members were contacted by phone and given the new combination for this upcoming year.

A brief update on the BMO Robot Project. A new roll-off roof was completed just before Christmas, thanks to a lot of help from a large group of club volunteers (**Dan Marcus, Scott Smith, Dennis Hohman, Ted Bistany, Frank Chalupka, Jeff Gardner, Chris Mullin and Bill Aquino**, I think that's everybody? If I forgot to mention someone please let me know for the next issue). The new roof will be installed this spring. Exact dates to be determined.

Special Thanks

We need to extend a special THANK YOU to two club members for some recent donations. **Pat Lannon** has donated a pair of really comfortable office chairs and a replacement computer monitor for BMO. **Rich Fusani** recently donated some very nice books to the clubs library including; The Cambridge Dictionary of Astronomy, Adobe Photoshop 7.0 Classroom in a Book, Star Ware 3r Edition, and The Backyard Astronomers Guide. These titles are all currently available for borrowing at BMO.

(Further Reflections On Refraction ... continued from page 1)

Panek briefly wrote about the history of the development of the telescope, noting that thick chunks of glass placed over written material were used as magnifiers in the middle of the thirteenth century, prior to the invention of spectacles. He also commented that Giambattista della Porta may have actually constructed a telescope in the last quarter of the sixteenth century but, because its magnifying power was so feeble, had failed to appreciate its value. In the preceding centuries it was occasionally conjectured that the right combination of lenses might produce an instrument with enormous magnification, but apparently nobody tried doing it. When della Porta was asked to comment on Galileo's instrument of 1609 he declared it a hoax, perhaps because it had low magnification and so fell short of past expectations, as had his own instrument, if there was one.

According to the author, early eye glasses were made of convex lenses that enabled farsighted people to see up close, but concave lenses that benefitted the nearsighted weren't used until the end of the sixteenth century, just before the invention of the telescope. While it's true that the first telescopes used a convex objective and a concave eyepiece, telescopes with convex eyepieces work just as well -that is, if you don't mind seeing the world upside down. Why didn't someone put two convex lenses together and discover their magnifying power long before? Panek seems satisfied that the lack of concave lenses explains the delay in the invention.

Perhaps this is a large part of the answer to the enigma I proposed. The low magnification and the inverted image may have left experimenters who stumbled onto the secret of the telescope dismayed at what appeared to be an utter lack of success. As we shall see in what follows, even in Galileo's time images formed by the primitively ground lenses were severely distorted. If low power lenses caused serious aberrations, imagine what would happen if the lens grinder attempted to increase magnification to what he may have thought was a useful level.

While reading Panek's book, I was struck by some of the problems encountered in the early use of the telescope that hadn't occurred to me before. One was philosophical. If the telescope revealed something that "wasn't there", was the thing revealed real? In our day we're accustomed to "seeing" things that "aren't there" without special devices to reveal them. Telescopes, microscopes, particle accelerators, and electronics provide us with views of the invisible. But the telescope was the first, and some were dubious about what it revealed. Some suggested Galileo and his instruments both were frauds.

Compounding the difficulty was that most telescopes, including some of Galileo's, had severe optical defects. Aberrations in these simple lenses abounded, and other makers, less skilled than Galileo, made correspondingly more defective instruments, some of which presented absurdly distorted images to the observer. Today we know what to expect from a telescope, more or less, and if we see something that suggests a poor image, we know it. Back then no one knew what to expect, so when something outlandish was seen, like stars that appeared double, the observer discredited it.

Some people, including the clergy, refused to look; others were unable to see. Why should one look since Galileo was accused of creating false images in the instrument itself, especially if the images refuted long cherished beliefs? Others just couldn't see what Galileo saw. That may sound odd, but amateur astronomers today have that same experience. How many times have you shown an object to a novice who couldn't see what you saw so clearly and described so scrupulously? It may have been at Beaver Meadow or in your backyard where you've tried to make someone see, only to get a lukewarm "I think I see it" or a plain "I can't see it, it must be me" (it probably is). Perhaps they think we're the problem -- we're the ones who see things that aren't there. That's what happened to Galileo and with a lot more justification, none of it had ever been seen before.

I empathize somewhat with those who were reluctant to see their paradigms crushed by the evidence from a peculiar new contraption. Moons of Jupiter, phases of Venus, craters defacing the Moon, spots on the sun, and stars composing the Milky Way were all new phenomena that must have been hard to swallow. Some of the recent findings in astronomy and cosmology are pretty indigestible these days.

Upcoming BAA Meetings

March 11 – Dinner Meeting, Astronomy Talk, and Image Processing Workshop

“Splendors of the Universe: an illustrated tour of the wonders of space, as seen through the eyes of a veteran astro-photographer” – Jack Newton

Jack Newton is an internationally recognized amateur astronomer and astro-imager. He has pioneered the field of amateur CCD photography, especially the development of high resolution tri-color imaging. Jack's photographs are well-known to readers of *Astronomy*, *Sky & Telescope*, and *Sky News* magazines. He is also a frequent contributor to other magazines, calendars and newspapers around globe. His work has been featured in such publications as Newsweek, the Canadian Geographic Magazine, Photo Life, and The Audubon Society Field Guide to the Night Sky. He has also authored or co-authored a number of astronomy books.

Dinner: Romanello's Restaurant South -- cash bar at 6:00/ dinner at 7:00/ program at 8:30

5793 South Park Avenue
Hamburg, NY

Directions: www.Romanellos.com

Details and reservations: www.buffaloastronomy.com (click on “BAA YAHOO Group”)

Dinner: New York Strip Steak -- \$26.00

Baked Whitefish -- \$24.00

Chicken Romanello -- \$24.00

Pasta Primavera -- \$21.00

Send reservations to: Beverly Orzechowski

Checks payable to:

125 Roycroft Blvd
Snyder, NY 14226

Buffalo Astronomical Association Inc.

Image Processing Workshop -- Jack Newton

The image processing workshop, by Jack Newton, will be held at Romanello's restaurant from 1:00 p.m. to 3:00 p.m.

Workshop attendance is free to members of the BAA. Non-members can attend only if they purchase a dinner ticket.

April 14 - “The Soul of a New Universe” -- Dr. Will Kinney

Dr. Kinney is a professor, in the physics department, at the University of Buffalo. His research interests are in the areas of inflationary cosmology, cosmic microwave background physics, the accelerating universe, and dark matter. He has written numerous papers in these areas and has received several astronomy related awards.

Buffalo Astronomical Association Newsletter

August Cenkner Jr., Editor

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