

The Spectrum

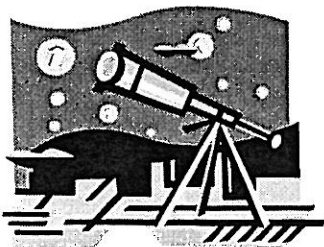
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Late Winter Edition

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Saturn Thoughts by Alan Friedman

If we took a poll on the crowd favorites on public night at Beaver Meadow, I would bet that Saturn would appear at the top of the list. A first glimpse of the ringed planet on a good night fulfills all the expectations of what a view through an astronomical telescope should deliver, showing in real time the details etched in our memory from countless printed images of Saturn. And sometimes even more. How many of you were launched into this hobby from your first eyepiece view of Saturn. I was.

And I am still a devoted fan. On any night that it is up – I will point the telescope to Saturn before looking at anything else. A steady view of Saturn continues to take my breath away. But also, the appearance of Saturn's delicate features offers a good indicator of the quality of seeing to be expected that night and the projects that can be attempted. So it was on a recent night that a quick view of Saturn led me to this small bit of research. Just as I was reveling in mild April temps and my first night out in shirtsleeves for 2002, I noticed, (with a little sadness) that Saturn's 2001-2002 apparition was drawing to a close. Only 30 degrees above the western horizon, my 4" refractor could not produce an image stable enough to deliver the feature that I consult most often for seeing conditions, Cassini's division between the A and B rings.

Cassini's Division (CD) has been visible in any scope that I have owned – on rare occasion with my first, a 90mm Meade spotting scope and more dependably on up. If the air is steady and Saturn is high enough in the sky with the rings open to us, the division is relatively easy in a well made telescope of 3 inch aperture and larger. On a night of good seeing, the division can be traced completely around the rings to its disappearance behind the disk. Italian astronomer Giovanni Cassini is credited with being the first to see the division in 1675 during his tenure as expatriate director of the Paris Observatory. The routine visibility of the CD (which is not as easy for the first time public night observer at Beaver Meadow) might suggest a larger feature than it really is. Voyager showed the CD's width to be 4800 km (a gap which would easily pass our moon) in a ring system that is remarkably thin with respect to its expanse - the A ring extending out to a diameter of 275,000 km (more than 21 earth diameters) yet only one kilometer thick! But from

earth, the CD subtends an angular width of only .77 arc seconds – at Dawes limit of resolution for a 6" instrument. Its contrast is owed to the high albedo of the A and B rings which, though mostly of empty space, are filled with ice particles that collectively reflect more light than the disk of the planet.

When we are treated to a crisp image of Saturn at the eyepiece, we have to marvel at the optical performance of our modern amateur telescopes. Saturn's disk and ring system combined stretch out in apparent width to only 44 arc seconds at closest opposition – less than the apparent width of Jupiter. The disk of Saturn never exceeds 20 arc seconds. Cassini's division would span three quarters of an arc second if the rings were seen face on – which of course they never are because they tip open to us at a maximum of 29 degrees. Most of the CD appears foreshortened and thus narrower. Saturn's tiny size in a telescope is always a big surprise to the first time looker ("That is not real!") an observation wonderfully brought home when the planet is occulted by the moon – a disk more than 40 times larger as seen from earth.

William Dawes, a talented planetary observer from Britain, would probably have been the first to point out that the resolution calculation that bears his name predicts the behavior of an optical system when viewing point sources of light like stars – not planets. Anyone who has tried to split a binary pair near the limit for their telescope's aperture knows how difficult it is to achieve Dawes' limit in practice. But fine planetary detail can be glimpsed well below this limit. Here the design of the optical system, the quality of its construction, the skill of the observer and the steadiness of the seeing have as much to do with the detail that can be seen as does the aperture of the instrument. A high quality 4" unobstructed optical system will routinely resolve contrasty details smaller than one arc second on the moon and planets.

In December of 1850, William Dawes was one of the first to observe the dusky C (or crepe) ring and the tiny Encke Division (ED) using a 6.3" refractor working at magnifications of 282X and 425X. The ED is named for Johann Encke – an astronomer who probably never saw it. What Encke actually observed was a broad, (Saturn Continued on page 3)

Nomination for Officers

The election of officers for the Buffalo Astronomical Association will take place at the June business meeting. Alan Friedman, Carl Milazzo and I are considering nominations for President, Vice-President, Secretary and Treasurer at this time. We will present a slate of candidates at the May meeting, preferably two for each position. Everyone wishing to submit their names as candidates should contact one of us. Additional nominations can be made from the floor in May. Write in candidates can be made at the June election.

These terms are for two years starting September 1, 2002. Newly elected members will be invited to Board meetings between the time of their election and the time they assume their position. Duties of the various officers are given in the bylaws.

Last year we had the embarrassing predicament of failing to have a quorum at the business meeting, so no official business could be conducted, including the election. Let's do better this time; this is your club, after all. Rowland A. Rupp 839-1842

BAA OFFICERS

President—Daniel Marcus
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ROBOTIC SCOPE PROJECT

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**Vice Presidents Letter** Dr. Jack Mack

This month's message is a vice-president's one, since Dan's change of jobs includes a massive change in his workday and training until further notice. We all owe him thanks for his service as president.

The elections in June are for club officers: Pres., V.P., Sec. Tres. Rowland Rupp and Alan Friedman will run the elections. If you answer the phone this month, you may be asked to run for office.

The Observatory directors are looking for Public Night support for the coming season. This is a fun and much-appreciated club activity.

Meeting Notice by Carl Milazzo

A panel of experts from our club, Bill Aquino, Larry Carlino, Carl Milazzo, and Bill Smith, will be our speakers for May 10 2002. They will be speaking on the subject of, the many reasons and ways of keeping an Astronomical log-book. What information to include and ways to organize it.

The June 14 meeting will be a full length video, all about Auroras. Both meetings will be held at 7:30 pm, in the Science Building, room .213 on the Buffalo State College campus, 1300 Elmwood Ave.

Observatory News by Bill Aquino**Observatory News**

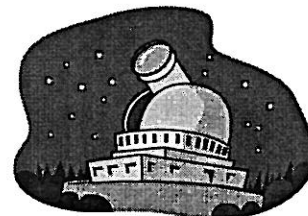
Well the weather has finally broken and activity is picking up out at the observatory. There has been a steady increase in club members signing into the logbook on clear nights. I hope everyone got a chance to see comet Ikeya-Zhang. Official club activity has also begun with our first public night behind us now. The public night season at BMO began on April 6th this year and there was actually decent weather for a change. We had a friendly public crowd in attendance and they were treated to observing under clear skies (early) as well as a lecture/slide show. The annual volunteers "Thank-You" dinner was held by the Audubon Society at the Nature Center on April 3rd and three BAA members were invited to attend (Alan Freidman, Neil Dennis, and Bill Aquino). The BAA representatives gave a short talk after the dinner regarding the BAA and our activities then all were invited over for a tour of the observatory. The Audubon volunteers are a great group of people and it was an honor to be invited to their function.

Volunteers Needed

We are still looking for volunteer speakers for the 2002 Public Night season. If you are interested in volunteering please contact Bill Aquino at 731-9366. There are currently nine confirmed speakers and many remaining dates to choose from. Dates are selected on a first-come first-serve basis, so if you are interested in a particular weekend, sign-up early. You can pick any "available" date from the list below that is convenient for you.

April 6 - Bill Aquino
April 20 - Bill Aquino
May 4 - Tom Bakowski

May 18 - available
June 1 - Alan Freidman
June 15 - available
July 6 - Ed Cersani
July 20 - available
August 3 - Bob Titran
August 17 - available
Sept 7 - Bob Titran
Sept 21 - Roland Rupp
Oct 5 - Frank Chalupka
Oct 19 - available

**Special Thanks**

Need to be extended to the public night volunteers as well as a friend of the observatory. It is generous donations of both time and resources that make BMO such a dynamic facility.

April 6th Public Night Volunteers included Dennis Hohman, Tom Bakowski, Gary Flagg, Neil Dennis, Bill Aquino, and Alan Freidman. Thanks for helping out with this important club activity.

Eric Aquino a friend of the BAA has donated a slightly used toolbox to replace our old worn out one. This is a nice multi-drawer Craftsman model that provides a lot of additional storage space as well as much better organization for the clubs tools.

BAA Web Site

Tom Bemus and Bill Smith put together a club web site at:
<http://members.aol.com/BuffAstro/>

**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.

(Saturn Continued from page 1)

low contrast feature in the middle of the A ring now referred to as Encke's Minima by amateur astronomers. I have glimpsed it visually in good seeing with my 5" refractor and recorded a hint of it on CCD in one successful Saturn image (see the photo pages from the electronic Spectrum for Jan/Feb.) The Encke Division is in another league of difficulty entirely. Sketched by a number of 19th century observers this tiny gap at the outer edge of the A ring is only 325 kilometers wide. At one fifteenth the width of the CD, the ED weighs in at a lean twentieth of an arc second! For a wonderful discussion of the Encke Minima and Encke Division visit <http://home.fiam.net/erici/cncke.html>.

Consider these logistics. At the focal plane of my 4" f5.8 refractor, the lunar disk measures 5.5 mm across. Saturn's disk would create a spot about 1/20th of a millimeter -55 microns - in width. And the CD, if visible, would measure a tiny 2.3 microns at it's widest point on the ansae, or about half the width of a red blood cell! This is why you have to enlarge it with enough magnification at the eyepiece to (or by barlow projection for imaging) see it. Next time Saturn is well placed for viewing, check out the minimum magnification you require in your scope to discern the CD. For me, it is about 50-60X.

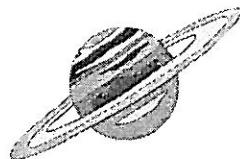
At prime focus of this optical system, the ED would be virus sized - .15 microns. Recently I listened in on an egroupp discussion where some experienced observers related their successes and failures hunting for the ED. A

few claimed to have seen it during moments of excellent seeing with 6 and 7 inch instruments working at 600-700X. Given the magnifications required to resolve the CD these numbers seem about right. The only problem is coming up with a night where the seeing allows your telescope to be used to advantage at these magnifications.

Don't own the right instrument or a condo in Florida? No problem, there is still a game plan:

- Head to a star party with warm steady skies
- Find a high quality refractor (6-9") or maksutov (7-10") or planetary optimized newtonian with a small central obstruction that is pointed at Saturn
- Get in line, wait your turn and take a long careful look
- Repeat A to C on a regular basis.

Someday I hope to bag it!



Public Night Experiences*by Carl Milazzo

One night in October 1972, I was conducting a public night inside the dome observatory of the University of Buffalo. Housed in the dome is a 10 inch Cassegrain and a 5 inch f5 refractor, both on the same equatorial mount. Most nights, 100 to 300 people would be in line for a look through the telescope. After about three hours, I saw and heard someone with a white cane, as they tapped their way into the observatory. At first I was wondering, "Why would a blind person be coming to the observatory? Or could it be a joker?" It turned out to be a young woman who was losing her sight in less than a year, and had never looked through a telescope before. So I showed her Saturn, but her eyesight wasn't good enough for her to see its rings. It looked like a faint blur to her. Then I tried the full moon. As soon as she got to the eyepiece, she "oohed" and "ahed" and said, "This is absolutely beautiful!"

It was public night at Beaver Meadow, in August 1978, about 10:30 PM. I went out into the parking lot to get something from my vehicle. On my way back to the observatory I approached a group of visitors walking along the grassy path. One of the visitors was carrying a full bag of popcorn. I was wearing a dark coat, and that person thought that I was a bear coming straight towards him. He started to shake so hard that half the bag of popcorn went flying out of the bag!

February 17, 1979, I was doing public night at Beaver Meadow, which turned out to be the coldest ever: minus 25 degrees F. by midnight, and minus 35 by dawn. And the public came that night, even one by snowmobile. Some others stopped in for a look through the scope, and saw the Orion nebula, and latter went on their owl prow. Latter that night, large crystals of frost started to cover everything, including the optics. So it was time to get the hair dryer out, but its electrical cord was stiff like a metal coat hanger, and could snap. But after running it for a minute, it became flexible, and it cleared up the optics. The skies that night were so clear, that I could see the Gegenschein in Leo.

There was a total eclipse of the moon on July 6 1982, and I volunteered

to help out with the public at the Buffalo Museum of Science. Mid- totality wasn't until about 3 am, yet over a hundred adults came out. Then suddenly, the voices of young children were heard, as they came up the stairs with their parents to the rooftop observatory and stayed until dawn.

Buffalo State had had a dome observatory back in September 1984, on the campus near the Science building. It housed a 16 inch Cassegrain, which was the largest 'scope in the area at that time open to the public. I encouraged a student passing by to look through the telescope. He looked at it and said that his grandfather once let him look through a really large telescope. His grandfather was a professional astronomer named Bart Bok, and the 'scope was the 90 inch on top of Kitt Peak in Arizona.

In September 1994, I wasn't planning on doing a public night - just photography of the constellations and the Milky Way with a windmill and Amish farmhouse in the background. But the Amish family was curious as to what I was doing. I explained, and then they asked many questions. They wanted to see my photographs, and for me to point out the different constellations. They told me that they made a pinhole camera to see the solar eclipse earlier that year from their backyard. Then I explained to them about light pollution and how I don't like the glare from barn lights. They understood and agreed, too.

April 2001, I went to Wilson Harbor to photograph the night fishermen during late twilight with the planets and evening stars in the background. About a dozen fishermen started asking me a million questions about astronomy for over an hour. So then I pointed out the constellations and orbiting satellites.

Some of these experiences show why John Dobson has been so successful for over 40 years with his sidewalk astronomy, all over this country, both urban and rural. All kinds of people are interested in observational astronomy to this very day.

Membership Corner

The BAA enters May with 131 members. You can keep in touch with BAA friends with the membership directory - available for the first time in electronic form. There are numerous advantages to an electronic directory. Most valuably, it can be updated and reposted frequently during the year as new members join and data changes, keeping it current and saving the club money at the same time.

The directory is available to you in several ways. A current copy will be kept in the files section of the BAA egroupp. This copy will be updated as needed and will contain a separate archive section with useful club reference info. (If you are a BAA member with access to a computer - you should be on the egroupp! This is our most powerful tool for sharing up to the minute news on astronomi-

cal topics. Visit http://groups.yahoo.com/group/buffalo_astro_assoc for more info.) You can always download the latest version here. Alternatively, we can email a copy to you if you have provided us with your email address. And we will have some printed copies at the May and June meetings for those of you without access to a computer.

Remember that we elect new officers at the June meeting. We hope to see you there and at summer star parties.

Alan Friedman/ alanfgag@aol.com
Tristan Dilapo/ dilapo@localnet.com

Star Parties

Spring is finally here and it's time to think about getting out and observing. Star parties are a great opportunity to get out and meet other club members while sharing the fun astronomy has to offer. All club members are welcome to host their own star party. Star parties can be anything from a serious dark site observing get together, or the opposite extreme of a full moon barbecue. Club members can have them at Beaver Meadow, their homes, cottages, parks, campgrounds or any place they desire. Club rules indicate star parties must be held only on Earth. If anybody is interested, there are still many open dates this summer. Check your BAA calendar for the moon phases and any public night conflicts.

Contact Janice and Jeff Gardner at 639-0866 or MMDAWG@AOL.COM

Current star party schedule:

2002 Informal CSSP weekends (<http://members.aol.com/CherrySpSP/>)
4/12-13, 5/11-12, 6/8-9, 7/4-6, 7/12-13, 8/9-10, 10/5-6, 11/1-2

stars-n-parks @ CSSP (http://members.aol.com/CherrySpSP/2002_schedule.htm)

4/6, 4/13, 5/4, 5/11, 6/8, 6/15, 7/6, 7/13, 8/3, 8/10, 8/31, 10/5

Northeast Astronomical Forum (<http://www.rocklandastronomy.com/neaf.htm>)
5/18-19

Laurel Highlands Star Cruise (SE of Pittsburgh in WV) (<http://www.lhstarcruise.org/>)
6/5-9

6/22 Rowland & Irene Rupp Star Party Cottage # 316 Martin Lots @ Lime Lake, N.Y. (H) 839-1842

Party starts at 1:00pm. See map in Spectrum for directions.

Astroblast 2002 (Oil City, PA) (<http://www.oras.org/astrbldst.htm>)
8/1-6

Black Forest Star Party (CSSP) (<http://www.bfsp.org/starparty/>)
9/6-8

CKSP 2003 (Cedar Key, FL) (<http://members.aol.com/bemusabord/cedarkey.html>)
2/23-3/1, 2003

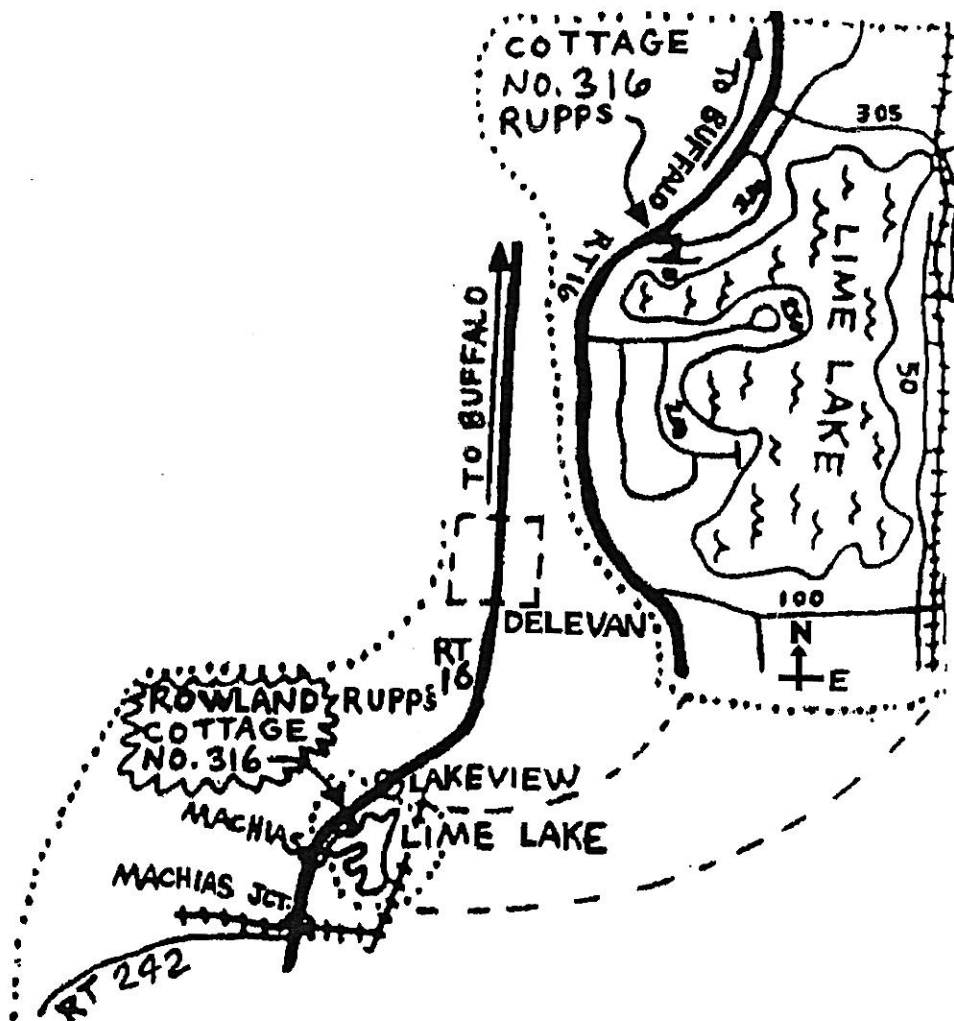
Lime Lake Star Party

Rowland & Irene Rupp
316 Martin Lots, Lime Lake
353-4636
(Buffalo 839-1842)

Saturday, June 22, 2002
1:00p.m. - ?

Bring a dish to pass

The Rupps will provide
Soft drinks, beer, hot dogs
& hamburgers



College of Fellows Award[®] by Rowland A. Rupp

This year the College of Fellows did not make an achievement award, but did elect Beverly Orzechowski as a new member. Beverly met two basic criteria for membership: ten year membership in the BAA and an officer (Treasurer) for two terms. She was cited for her contributions to the BAA including: writing, submitting and monitoring grants, particularly the recent education grant from the Community Foundation for Greater Buffalo, assistance in editing THE SPECTRUM, service on the BAA's speaker committee, arranging special club events and making numerous mailings for the club often at her own expense.

Currently, active members in the College of Fellows are: Marilou Bebak, Larry Carlino, Darwin Christy, Edith Geiger, Bob Hughes, Steve Kramer, Jack Mack, Dan Marcus, Beverly Orzechowski, Rowland Rupp, Lynn Sigurdson and Bill Smith.

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

Some of you may know this, but for those who don't, I've started putting together an electronic version of *The Spectrum*. The last three 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 Board felt that producing fewer paper copies had several benefits.

- 1) Saving the Club a good deal of money. A good portion of the BAA dues go towards producing *The Spectrum*. The electronic version doesn't really cost us anything to produce. The money saved would be used to help fund other BAA projects (such as the robotic scope project).
- 2) Saving a few trees.
- 3) Enhanced features that can't be added to the printed version. If you've looked at some of the current electronic issues, you've probably noticed the members' picture section. For those who haven't, it is a collection of astrophotos taken by various club members. It is similar to what is done in *Sky &*

Telescope magazine. This something that isn't practical in the printed version, since we are restricted by the number of pages and the quality of the photocopier.

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.

The next issue of *The Spectrum* will be a limited printed run. 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>. This is a temporary web site so look for a much prettier web site in the very near future. Hopefully the new web site will be available by the time you read this. 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

Gravity and Research on Astronomical Tides by Allen C. Goodrich

An examination of United States Coast and Geodetic Survey Tidal Data, which was gathered by extensive measurements over long periods of time, was compared with astronomical data showing the phases of the moon at corresponding times for many years. This correlation of the two sets of data revealed a very interesting fact, in a manner that had never before been mentioned in the literature. It is invariably and exactly the lowest tide that exists directly under the full and new moons at deep ocean ports.

This was a very interesting discovery because current physics, based on the gravitational theory, discussed in the following U.S. Gov. documents: <http://co-ops.nos.noaa.gov/restles1.html> and <http://space.jpl.nasa.gov> would lead one to believe that, except for many possible reasons, the highest tides tend to be under the full and new moons. The dictionary and encyclopedia as well as physics texts predict this with pictures of the earth and oceans bulging on the side facing the full moon. Of course it never happens as the gravitational theory predicts, and many reasons are given for the discrepancies.

No discrepancies were found in the occurrence of exactly the lowest tide directly under the full and new moons, at deep ocean ports. One must admit that this is beyond question one of the most important discoveries of

modern physics research. It indicates that a change must be made in the theory of gravitation. One can no longer assume that a force between the moon and the water of the earth's oceans, is causing the ocean tides. The force of gravity must be an illusion caused by some other, more basic, reason. What would this be? If the total energy (kinetic and potential) of the universe is assumed to be a constant, from this fundamental equation, many interesting things follow. If the rest of the universe is expanding (potential energy decreasing) relative to masses, the masses must be shrinking (increasing in kinetic energy) (gravitation) relative to the rest of the universe.

See the FUNDAMENTAL EQUATION OF THE UNIVERSE.

See

<http://ourworld.cs.com/gravitymechanic2/myhomepage/prufile.html>

See

<http://ourworld.cs.com/gravitymechanic2/myhomepage/business.html>

A new theory of gravitation is given, which predicted, stimulated the above research, and is consistent with the new findings.

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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BAA Annuals by Rowland A. Rupp

5 YEARS AGO - We had no speaker at our May 1997 meeting - it was devoted to checking out one another's pictures of Comet Hale-Bopp. Several of our members made the news, either TV, or *The Buffalo News*, thanks to their observations, expertise or photos of the comet. They were Tom Bemus, Jack Mack, Carl Milazzo, Tristan DiLapo, Dan Marcus and Frank Chalupka.

I don't know who spoke in June, except that it was a member of Canada's North York club who talked about the Starfest convention. Tom Bemus submitted *The Spectrum's* lone observation report. There was an obituary in *The Spectrum*. Fortunately it wasn't for a member; it was for Clyde Tombaugh the venerable observer who discovered Pluto sixty-seven years earlier.

10 YEARS AGO - Our May dinner meeting for 1992 was held at the Lord Amherst. Bill Smith and Dan Marcus gave us a travelogue of their adventures photographing Comet Halley from Australia in 1986, a project sponsored by a Museum of Science grant. For June we had another Royal Astronomical Society of Canada speaker. Charlie Fassel's topic was "Niagara Centre at Work, Eh!". (By the way, I do know how to spell "center", it's just that Canadians don't.)

Ed Lindberg wrote an article for *The Spectrum* that chronicled the origins of the Niagara Frontier Council of Amateur Astronomical Associations, the NFAAA, during early 1968. Ed was one of the founders along with the BAA's Ron Clippinger and Dick Zygmunt. Other clubs were invited to attend the first meeting which was held at the Museum on April 26, 1968. Twelve clubs were represented, ranging from Toronto to Erie to Syracuse.

Darwin Christy wrote about two American astronomers of the late nineteenth and early twentieth centuries. They were father and son - Charles and Eric Doolittle. Bill Smith reported on his Messier marathon for 1992 in which he, Joe Drabek, Dan and Melissa Marcus and Tom Bemus bagged 100 out of the 108 in a single night. Rowland Rupp reported observing the "green flash" of the setting sun from an airplane at 30,000 feet. Fred Price commented on the proposed new 20-inch telescope, encouraging users to record

their observations in a log book at the observatory. The obituary for Lillian von Gerichten noted her long time BAA membership.

15 YEARS AGO - Our 1987 dinner meeting was held in Moot Hall on the Buffalo State campus. Fred Price helped organize it. Dr. James Orgren from Buffalo State's Geophysical Sciences Department spoke on topics related to the history of astronomy. John Stull from the Physics Department at Alfred University was the speaker in June, but *The Spectrum* doesn't tell his topic. Dave Williams had recently been appointed Observatory Director.

Jim Dow was the subject of Edith Geiger's *Profile*. Jim was in high school in 1946 when he helped organize the BAA following World War II. The two predecessor astronomy clubs affiliated with the Museum suspended activities for the duration until they were combined into the Amateur Telescope Makers and Observers club, thanks largely to Jim. Fifty years ago, in 1952, its name was changed to Buffalo Astronomical Association.

There were lots of observing reports. Fred Price wrote on his observations of Jupiter, Carl Milazzo reported many observations of deep sky objects, as did Richard Jakiel, and Adrienne Morris reported on a lunar grazing occultation she viewed with Carl, the DiLapos and Bob Hughes. Ed Lindberg reported that the Instrument Section tested Gary Kielich's 6-inch, f/8 Criterion mirror and found it to have a spherical figure making it unsatisfactory at high power. That's depressing because I have a Criterion 6-inch. (I like the optics anyway!)

25 YEARS AGO - Jim Orgren was also our speaker in May twenty-five years ago. His topic was "History of Planetariums on the Niagara Frontier". There was no mention of a talk for June. The only topic on the agenda besides voting was a request for suggestions for bylaw changes that were then in work. Larry Carlino was planning a 10-week astronomy course to be given at the Beaver Meadow Environmental Education Center. Bob Kirchgessner wrote a far ranging essay on "Where is Everybody? One Man's View of Space Intelligence" I think he was for it, but it takes careful reading to be sure. This *Spectrum* contained some fine astrophotos by Tom Dessert including M51,

Spy and Tell by Edith L. Geiger

Some of our members had the pleasure of attending the Cedar Key Star Party in Florida, February 8-16. Tom Bemus organized the trip which was enjoyed by Jeff and Janice Gardner, Peter Proulx, Alan Friedman, Tom and Kats, and Joe O'Hara, a friend of Tom's from the Oil City Astronomy Club. There were public nights where our members helped educate the observers. When there was time off from astronomical activities, there were side trips, and Jeff and Janice visited Manatee Spring State Park.

The Gardners presented their 8 year old nephew from Alford, N.Y. with his first telescope, with directions to go with it. A wonderful Easter gift! Jeff and Janice went to Arizona, May 3rd, where they enjoyed 8 days of astronomy. They had an RV (recreational vehicle) at their disposal.

The Messier Marathon was held at Bill Smith's over the March 16th weekend. About 75 Messier objects were seen, plus Comet Ikeya Zhang. The sky was clear until the clouds rolled in about 2:30 in the morning. The following members participated: Tom Bakowski, Alan Friedman, Tom Bemus, Mark Reville, Gary Flagg, Jeff Gardner, Carl Milazzo, and Bill Smith.

Carl Klingenschmitt is a knowledgeable gentleman with a delightful sense of humor. He is a member of the Town Board for the Town of Newstead. He is also an electrical engineer, and is a consultant to a company in Boston, Mass. His interest in the heavens includes the possibility of UFO's from beyond. Carl discusses this subject on occasions with individuals and small groups. His wife, Sue Fay, retired last year as vocal music teacher at Amherst Junior High School. On April 6th she took a 90 member select choir from 17 different school districts in Erie County to an International Children's Choir Festival in Toronto.

Dennis Hohman purchased some used 20-100mm binoculars and tripod. He is almost finished with his dome observatory. With such equipment, he will probably find a comet which will carry his name.

Ed McDonald, who became a BAA member in '99, works for the Teamsters Union. He is busy at home remodeling the basement, and putting in a family recreation room. His son, Brian, works at Opportunities Unlimited in Niagara Falls, where he has many jobs. Daughter Gail is a sophomore at Can-

isius.

Hannah Sigurdson won two gold medals in figure skating in February at Leisure Rink in West Seneca. This summer, Hannah and her brother, Ryan, will be enjoying baseball.

Jack P. Mack, son of Jack and Jayne Mack, was a student president in high school, and graduated from Williamsville South last year at the same time as his mother, Jayne, retired from Williamsville South after teaching English for 32 years. Jack is spending his last year as a teenager, and is in his first year as a college student at Case Western Reserve University in Cleveland. He is enrolled as a double major, taking psychology and music. He is a member of the Speakeasy acappella (unaccompanied) group of 8 young men, and is their second bass, and does the vocal percussion when they imitate musical instruments. The Beatles' number, "Help", is included in their repertoire. They gave a concert at the University on April 12th, which was enjoyed by Jack and Jayne and his sister, Alice, who were in attendance. After 'Sept. 11', the group recorded the Star-Spangled Banner on a cassette, and mailed it to every sports team in the area. As a result, the Speakeasys will perform at a hockey game in the fall, and a Cleveland Indians game in the spring. As a music major, Jack has to attend a rehearsal at 8:30 in the morning, 5 days a week. He takes a voice lesson every week, and is studying music theory 5 days a week. He has a strong interest in his psychology course, and hopes to become a therapist.

Alice Mack is working in New York City. In the near future, she hopes to finish her Masters in medieval literature, at NYU.

The Mack's home on Hunters Lane in Williamsville has been the site of many star parties and board meetings over the past years. It now glistens in the light of day with its new silver vinyl siding. It's easy to find as it's one of a kind. Those who have been to their home will certainly remember the unusual doorknob which was a challenge to manipulate. Jack thought of it as an intelligence test for those guests who entered their house. It also helped make their house burglar proof. But alas, the siding crew put in a new door and a new doorknob. What a pity! The old "specialty of the house" doorknob will be greatly missed.

What's So Hard About That?

by Gunther C. Wang

Sometimes I read about some astronomy fact or issue and wonder why it seems so hard, or why someone got it wrong when the solution appears so obvious to me. Modesty forces me to conclude there must be something wrong with my simplistic conclusions and someone with greater comprehension can show me where I erred. Perhaps the problem is more complex than I thought. A case in point has been raised by Leslie Martin's articles on ancient astronomy, particularly on the difficulty of determining the angular size of the sun.

According to the July-August 1998 *Spectrum*, Babylonian astronomers determined the size of the sun based on how long it took for it to rise - 1/30 of an hour. For our 24 hour day that would be correct, giving a diameter of 1/2 degree, but the article notes the Babylonian hour was two of ours making the solar diameter one degree.

The most recent *Spectrum* (March-April 2002), stated that the Greek astronomer, Aristarchus, was purported to assert the sun's diameter was 1/15th of a sign of the zodiac, or two degrees. Here appears another uncertainty because a few years later Archimedes credited Aristarchus with having found the solar diameter to be 1/720th of a circle which comes out to the right answer of approximately 1/2 degree.

I decided to look further into this muddle. First I found one Greek writer, Diogenes Laertius, who claimed that Thales, who lived in the sixth century BC and is often declared the first Greek astronomer, had determined the sun's diameter "to be 1/720 part of the circle described by it". It is believed by scholars that if Thales claimed this, he obtained the information from Egyptian or Babylonian sources.

Cleomedes credited Egyptians with using a water clock to measure the time taken for the sun to rise and for the length of a full day, and found the ratio to be 1/750th, a bit small. The issue of the length of the Babylonian hour was raised, and apparently the twelve hour day was in vogue in the 16th century BC when the sun's diameter was established to be 1/30th of an hour, making it a full degree in this case.

Apparently the first mention of the sun's angular diameter by Greek writers was made by Archimedes. Since Thales lived more than three centuries earlier it is seen as odd indeed that his observation went unnoticed until Diogenes wrote about it long afterwards. Archimedes states in his *Sand-reckoner* that "Aristarchus discovered that the sun's apparent size is about one 720th part of the zodiac circle." Yet in Aristarchus's own work he claims the sun's diameter is 1/15 of a zodiacal sign, four times larger than the value credited to him by Archimedes.

Explanations for Aristarchus's excessive value are fairly ingenious, though not generally accepted. One is that he meant 1/50th, not 1/15th. That would make the sun's diameter only a bit too large. It's just that no one really believes that's what Aristarchus meant. Another is that Aristarchus chose the large value only to make a point of his method of determination. That excuse is

not widely accepted either.

Just to muddy the problem a bit more, Macrobius, a later writer, claimed that Egyptians (who some authorities think were really Greeks observing in Alexandria) obtained an apparent diameter of the sun of 1/216th of a circle, or 1 2/3 degrees. He claimed they used some sort of hemispherical dial on which one could observe where the first rays of the rising sun fell, and where they fell when the sun finally cleared the horizon. This method, sketchy as it is, may be good, but the result isn't.

So what did ancient astronomers think the sun's angular diameter really was? Was it the Babylonian value of one degree, or did they think 1/2 degree, or was it the Alexandrian astronomers' value of 1 2/3 degree? Maybe it was Aristarchus's two degrees, or 0.5 degrees, as Archimedes claimed for Aristarchus. How can so many values come about?

It seems to me that the biggest impediment is the method generally used to determine the diameter, timing the rising of the sun. If the sun rose vertically from the horizon that should work pretty well but it doesn't. The ecliptic is slanted with respect to the horizon, meaning the sun has to travel further along its daily path to clear the horizon than if it rose vertically. That would lead observers to conclude its diameter is greater than it actually is. Worse yet, the slant of the ecliptic at the horizon varies with the observer's latitude and with the season of the year too. Results would differ depending on where and when one makes the measurement. This brings me to my original premise, it seems there should be a better way.

Suppose one waited for the sun to rise just above the horizon and observed with a pole between oneself and the sun. The observer approaches or backs away from the pole until, to his best judgment, the width of the pole just covers the diameter of the sun. The angular diameter of the pole seen from this distance is now equal to the angular diameter of the sun. How does one find the angular diameter of the pole? It seems easy to me. Just measure its width and the distance between the observer and the pole and divide the former by the latter. The result is in radians. Even if the ancients didn't know how to convert radians into angles (which I doubt), they could pace off the circumference of the circle that would be created by revolving the pole around the observer and arrive at the answer that way.

This method has nothing to do with latitude or the angle of the ecliptic or, for that matter, when during the day one does it. I only mentioned sunrise because the ancient astronomers choose that time, and it's a little hard to make the measurement when the sun is higher in the sky.

So what's wrong with doing it this way? If it's right, why didn't the early astronomers use it instead of relying on timing methods? Since I find it hard to believe I've come up with a better method than a couple of millennia of smart astronomers did, I'd like to find out in a forthcoming *Spectrum* why it won't work, and work better than those methods tried in early times.

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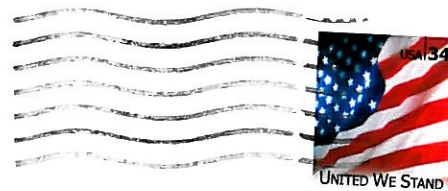
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