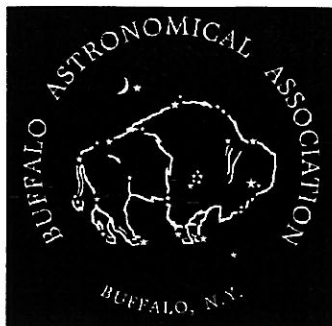


THE SPECTRUM

Volume 2 Issue 3

Early Fall Edition

September/October 2000



INSIDE:

Astronomical Facts

Astronomical Quotes

**Observing Our Nearest
Neighbors (part 3)**

BAA Annals

Spy & Tell

Mount Wilson Tour

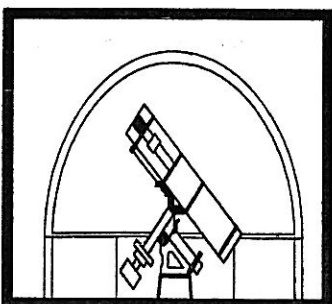
**BAA Board of Directors
Meeting**

**Radio Communication Fol-
low-Up**

BAA Calendar Update

Last Issue Puzzle Keys

Telescope For Sale !



President's Column

Daniel Marcus

Board Meetings will continue to be held on the 1st Thursday of even months, unless there is a need to convene due to time constraints. I will publish the regular Board Meeting dates in the President's Column. Other meetings will be announced, if possible, at the regular membership meeting. Board Meetings will start at 7:30pm and end very promptly at 9:30pm. If you wish to get an item on the Board's itinerary, please submit it to me 2 weeks before the Board Meeting. That way I can inform the Board so they can research the subject in advance.

Speakers Committee will be meeting on Wednesday, September 20, 2000 at Niagara Systems and Software at 7:30pm. If you have input for them, you contact Jack Mack, Joe & Bev Orzechowski, Steve Oross, or Carl Milazzo.

March Dinner Meeting will again be chaired by Bud Abate. It was suggested that after several years (successful years I might add) of being held north of Buffalo, that he look into finding a restaurant located either centrally, or in the South Towns.

Events to come:

Saturday November 18, we would like to hold a Telescope Clinic at the Buffalo Museum of Science. I am looking for someone to organize the clinic.

Saturday, May 5, 2001 Astronomy Day. The Board recommends that we have it at Beaver Meadow Observatory this year since we should have access to the extra space in the new visitors center, and we have all this neat stuff like the Astrovid, and the LX200. Again I am looking for someone to organize Astronomy Day.

It's Membership Renewal Time !!!

If you see a bright yellow label next to the address label on this issue of the Spectrum, we have not received your dues for year 2000-2001. Please remember that your dues are due September 1st! Renew on time and you'll be carrying our spiffy

new membership cards and sporting our new BAA name tags at the September meeting. Also, magazine subscriptions are expected to increase - we cannot guarantee the old rates to those renewing their membership after September 1st.

NOMINATION FOR BOARD POSITION

With Dan's election we are left with a vacancy on the Board of Directors. An election for the one year portion remaining in that term will be held at the September general meeting. Anyone wishing to be a candidate should contact either Carl Milazzo or myself

Rowland A. Rupp Nominating Committee

BAA OFFICERS

President — Daniel Marcus
phone 773-5015

Vice President — Dr Jack Mack
phone 632-6210

Secretary — Joe Orzechowski
phone 632-7091

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phone 632-7091

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vacant Sept Election

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**SPECTRUM
SUBMISSIONS**

Submissions wanted for publica-
tion in the Spectrum!!!!

Send to:

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MS Word or Wordperfect ok
scanning available

**DEADLINE FOR NOV/DEC
ISSUE IS NOV 15**

**BAA Board of Directors Meeting
August 3, 2000**

Treasurer's Report – Normal expenses for BMO telephone and May/June SPECTRUM publication and mailing costs were incurred. About \$400 out of the \$450 previously authorized was spent for materials required for installation of the three telescope piers at the BMO.

Grant Committee - Approximately \$75 in grant funds remains to be spent for a reflux focuser; approximately \$1,500.00 matching funds remains to be spent for previously authorized items. The committee is investigating scientific grants that may be available at the state/federal level.

Nominations Committee - Thus far only one candidate is running for the at-large board position vacated by President-elect Dan Marcus.

Speakers Committee - Next meeting is scheduled for September 20, 2000 at Dr. Jack Mack's home. The primary goal will be to identify candidate speakers for the March dinner meeting.

Education Committee - Education Program chair Rowland Rupp is soliciting volunteers to continue the program at its current level. Assistance is required to contact schools and schedule talks. A meeting of those interested in helping to manage the program is scheduled for August 17, 2000 at NSSI.

Membership Committee - Membership co-chair Alan Friedman presented examples of the new laminated membership cards to be issued for 2000/2001. Each card is decorated with an astronomical image taken by a club member.

Old Business – The Museum Representative and College of Fellows positions on the BAA Board were discussed. Potential by law changes were discussed. Further discussions were deferred until the newly elected Board convenes in October.

New Business – Tim McIntyre volunteered to be SPECTRUM editor for the coming year. Neil Dennis and Mark Swiderski volunteered to be Observatory co-directors for the coming year. Board approval is anticipated when the newly elected Board convenes.

President-elect Dan Marcus proposed that the BAA hold another Telescope Clinic at the Museum of Science and volunteered to contact Marilou Bebak to discuss tentative dates of Saturday, November 11, Friday November 17, or both days.

Bill Aquino presented a written, tentative schedule for BAA activities. Observa-

MEETINGS 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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tory co-director Mark Swiderski cancelled BMO Public Night September 1, 2001 since it falls on Labor Day weekend.

President-elect Dan Marcus requested that the President's discretionary fund be cancelled as of his term beginning September 1, 2000 since he felt no need for it. A motion was so made, seconded and passed unanimously.

A suggestion that the BAA maintain a central location for all club assets outside of the BMO was made. Such assets are currently at various member's homes and offices, and include archives, old equipment, financial records, banners, slide collections, etc., some of which are rarely accessed but must be available. The Board agreed to consider various places.

Respectfully submitted, Joe Orzechowski, Secretary-elect.

ASTRONOMICAL FACTS

by Bill Smith

The Earth is closer to the sun during North American winter.

It takes sunlight 8 and 1/3rd minutes to reach earth.

The sun rotates on it's axis about once a month.

Our moon is moving away from the Earth at about 3 centimeters/year.

If you could fly across our galaxy at the speed of light, it would take 100,000 years to make the trip.

Lunar meteoric bombardment is still going on, although slowly: over a next 50,000,000 years, 3 inches of lunar soil should be added to the surface.

Between solar and lunar eclipses, a year will have between 2 and 7, unfortunately they don't always occur near home!

Although closest to the Sun, Mercury is not the hottest planet because its thin atmosphere is incapable of retaining heat. Venus is hotter due to its thick atmosphere's greenhouse effect.

Mercury can be described as a huge metal ball dipped in mud as its iron-nickel core is almost 80% of the planet's diameter.

On Venus the day, rotation on its axis, (243 Earth days), is longer than the year, its journey around the Sun, (225 Earth days).

The measurement of light-years can be thought of as time.

Rigel in Orion is 910 light-years away. When we see Rigel, it is the way it was at the time of the Norman conquest.

Mars's moons, Phobos and Deimos (Fear and Panic), orbit Mars east to west and west to east respectively so they would appear to cross the sky in opposite directions. Also, Phobos could be seen rising and setting 3 times a night!

Asteroids are so numerous, perhaps a million, and so faint that astronomer Walter Baade once called them "the vermin of the skies".

The sum total of all the asteroids between Mars and Jupiter is about 1/2000th the mass of the Earth., favoring the theory that they are chunks of matter that never coalesced into a planet (not a planet broken up).

On Jupiter the winds blow the belts of clouds in alternating directions, whereas on Saturn the winds all flow east except around the poles.

The Great White Spot of Saturn has a cycle close to Saturn's 29.46 year orbit -- close enough to make some astronomers think it may be an aftereffect of summer on Saturn when the Northern Hemisphere is most tilted toward the Sun.

Right now the universe is expanding at a rate such that every 4 seconds a volume equal to the Milky Way is added.

Ashen light: Just as the "dark side" of the Moon can be dimly seen from the reflected glow of Earth, so can (more rarely) the dark part of Venus may seem to be slightly illuminated and is called ashen light. It is caused by interaction of atomic particles with solar radiation as is our auroras.

Johannes Kepler mis-decoded an anagram from Galileo about Venus's phases as "A red spot shows clearly that Jupiter rotates". While wrong about the anagram he was right about the red spot which wasn't seen until 22 years after Galileo died!

In 1675 a Danish astronomer, Olaus Roemer, noticed that eclipses by Jupiter of its moons were off -- when Earth was closer to Jupiter the eclipses were early, when Earth was farther from Jupiter the eclipses were a bit tardy. This led him to believe that light did not have infinite velocity -- a heretical thought! Roemer showed that light does have a finite speed and that the farther away an object is the longer the light takes to reach us.

Jupiter has many moons, they are named after Jupiter's lovers, his children, his nurse and even a platonic friend (Sinope). Strangely Jupiter's wife is nowhere near the planet but rather in the asteroid belt by either her Roman name, Juno, or her Greek name, Hera!

On Jupiter the winds blow the belts of clouds in alternating directions, whereas on Saturn the winds all flow east except around the poles.

ASTRONOMICAL QUOTES

by Bill Smith

Carl Zwanzig: "Duct tape is like the Force. It has a light side, a dark side, and it holds the universe together...."

Douglas Adams: "There is a theory which states that if ever anybody discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened."

Albert Einstein: "Only two things are infinite, the universe and human stupidity, and I'm not sure about the former."

Unknown: "Astronomers say the universe is finite, which is a comforting thought for those people who can't remember where they leave things."

Edward P. Tryon: "In answer to the question of why it happened, I offer the modest proposal that our Universe is simply one of those things which happen from time to time."

John Andrew Holmes: "It is well to remember that the entire universe, with one trifling exception, is composed of others."

Max Frisch: "Technology is a way of organizing the universe so that man doesn't have to experience it."

Kilgore Trout: "The universe is a big place, perhaps the biggest."

Woody Allen: "I'm astounded by people who want to 'know' the universe when it's hard enough to find your way around Chinatown."

Douglas Adams: "In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move."

William J. Broad: "The crux... is that the vast majority of the mass of the universe seems to be missing."

Rich Cook: "Programming today is a race between software engineers striving to build bigger and better idiot-proof programs, and the Universe trying to produce bigger and better idiots. So far, the Universe is winning."

Fred Hoyle: "There is a coherent plan in the universe, though I don't know what it's a plan for."

Ray Bradbury: "We are an impossibility in an impossible universe."

Christopher Morley: "My theology, briefly, is that the universe was dictated but not signed."

Edward Chilton: "I'm worried that the universe will soon need replacing. It's not holding a charge."

Calvin and Hobbes (Bill Watterson): "The surest sign that intelligent life exists elsewhere in the universe is that it has never tried to contact us."

My eyes are full of star-dust. - **Edmond Rostrand, Cyrano de Bergerac, Act 3**

Nothing is too wonderful too be true. - **Michael Faraday**

The Sun, with all the planets revolving around it and

depending on it, can still ripen a bunch of grapes as though it had nothing else in the universe to do. - **Galileo**

Of the Pleiades: **Tennyson** described them as "a swarm of fireflies tangled in a silver braid".

"If a grain of salt were to accurately represent a typical star, then the separate grains should be thousands of feet apart; a numerically and dimensionally precise model of the Galaxy would require 10,000 boxes of salt scattered in a flat circle larger than the cross-section of the Earth." **Chet Raymo in The Soul of the Night**

"Beautiful! ... magnificent desolation!" **Buzz Aldrin, July 20, 1969 (on seeing the Moon's surface)**

"Let's get this straight once and for all: is that a face up there or is it a rabbit, and if it's a face, then why doesn't it take control and say, 'Who made this mess, who's responsible?'" **Stephen Dobyns, "Missed Chances" on the Moon's appearance**

"Then at last I saw it, little Mercury, a pinprick of light, a mote of dust in the gathering day." **Chet Raymo**

On Mercury a 17th century writer wrote, "a squirting lacquey of the sun, who seldom shows his face in these parts, as if he were in debt."

"Provide ship or sails adapted to the heavenly breezes, and there will be some who will not fear even that void So, for those who will come shortly to attempt this journey, let us establish the astronomy : **Galileo**

"you of Jupiter, I of the Moon." **Johannes Kepler, in an open letter to Galileo**

Describing Jupiter's moon Io's surface of patchy sulfur dioxide snow and blotches of red, orange, yellow and black, scientist Bradford A. Smith said, "I've seen better looking pizzas."

"My aim is to show that the heavenly machine is not a kind of divine, live being, but a kind of clockwork." **Johannes Kepler**

"Saturn's rings ... The tourism of the future will take place there." **Tullio Regge**

"Look to the heavens, and learn from them how one should really honor the master. The stars in their courses extol Newton's laws -- in silence eternal." **Albert Einstein**

"The universe begins to look more like a great thought than a great machine." - **Sir James Jeans**

SPY and TELL

by Edith Geiger

In the July/August issue of the Museum's Collections & Events, **Ernst Both**, in the President's Corner, introduced the five new members elected to the Board of Managers, including our **Gerry Rising** (Dr. Gerald Rising). To many of our members, Gerry is known for his interest in astronomy and nature, and for his very fine Nature Watch column in the Buffalo News. Through Ernst's report in the Museum's Collections, we find more amazing facts about this remarkable gentleman. He received his MS degree in mathematics from Notre Dame, and his Ph.D in mathematics education from New York University. Since 1966, he has been on the faculty of the University of Buffalo, and at present is part of the Gifted Math Program. Dr. Rising is a noted author or co-author of 20 or more texts on mathematics and mathematics education, and is also known for his 150 or so papers in various journals; state, national and international. He is Bookmarks columnist for Artvoice, and since 1966, this dynamic man has also found time to serve as a volunteer in the Entomology Department at the Museum.

The names of three of our members were mentioned in the spring issue of *Amateur Astronomy* 2000. **Kenneth Schlum** and a picture of his homemade 22.5" telescope appeared on the cover. Ken also gave a talk at Stellafane '99, and was one of the highlights of the convention. The two other members mentioned from Stellafane '99 were **Carl Milazzo**, who gave a talk on "Buffalo, Nocturnal Earth and Sky," discussing taking photos of auroras and constellations using Earth-based scenery, and **Tom Bemus**, who gave a talk on RFT's (rich-field telescopes).

I received some very interesting information in the mail about **Alan Friedman and his family**, which I'm sure you will enjoy reading: 'Alan Friedman, BAA membership co-director, observes most frequently from his backyard in downtown Buffalo and enjoys stargazing with his wife Donna Massimo and children, Sophie and Lily. Alan and Donna are the owners of Great Arrow Graphics, a nationally recognized publisher of hand silk screened greeting cards. Great Arrow is frequent nominee for the greeting

card industry's coveted "Louie Awards" for product excellence, and this year won nine of their ten nominations! Alan just moved the studios for Great Arrow to larger quarters in the Tri-Main Center on Main Street in Buffalo. Donna is a costume designer and manager of the costume shop at the Center for the Arts at the University of Buffalo. Her designs have graced various Western NY stages, including Studio Arena and Shakespeare in Delaware Park and will be seen this fall in productions at the Kavinoky Theatre. Sophie and Lily attend Bennett Park Montessori, a Buffalo Public Schools magnet program on Clinton Street. When school events are held at night, they like to help their Dad set up his 4" refractor in the school playground and watch their classmates ooh and aah at their first view of Saturn's rings through a telescope."

Congratulations on the many achievements of this very talented family!

Gary Flagg finds enjoyment in fly fishing and computer graphics. From 1960-64, he was a member of the Air Force in instrument repair and worked on jet aircraft 105, many serving in Vietnam. He used to restore Mustangs like the 64 1/2 to 1970. He also built race cars and was a drag racer. Gary is a musician and used to have a Rock and Roll band in which he played guitar. They played at Fanny's Restaurant on Sheridan Drive in Amherst. Recently, Gary joined the NRA.

Besides astronomy, **Anthony Canney** likes a good game of golf. He works for the Federal Government in the Department for Veteran Affairs.

Irene Rupp will be heading to Salt Lake City at the end of October for a visit to the Mormon Library in her continuing research on the family genealogy.

On July 28 and 29th, the 65th annual Stellafane convention was held in Springfield Vermont. Four of our members were in attendance: **Tom Bakowski**, **Bob Chapman**, **Carl Milazzo** and **Ken Schlum**. Carl gave a talk on wide field astrophotography and also paid tribute to young Tom Bakowski for his deep sky observations and for his part on the GRB team.

Radio Communication Follow-up

by Carl Klingenschmitt and Rowland Rupp

The April 2000 and May/June 2000 issues of *THE SPECTRUM* carried our two-part article, "Could Somebody Be Listening?". In it we analyzed some of the claims made by SETI enthusiasts who contend that electromagnetic signals generated here on Earth could announce our presence to a technical civilization similar to our own in the farther reaches of the Milky Way galaxy. Our calculations strongly indicated that only stars relatively nearby could detect our signals, and then, only with the best techniques and a huge share of good luck. Conversely, expectations of detecting alien signals with our SETI installations are similarly dismal.

One always likes to see confirmation of an assertion that runs contrary to general opinion. To our delight we found it in the July 2000 issue of *Scientific American*, in an article written by George W. Swenson, professor emeritus of electrical engineering and astronomy at the University of Illinois. This article, with the somewhat misleading title "Intergalactically Speaking", dealt with many of the

BAA ANNALS

by Rowland A. Rupp

5 YEARS AGO - Terry Farrell took us for a guided tour of the constellations under the clear skies of the Ferguson Planetarium at Buffalo State to start the 1995/1996 season. Terry spiced up his tour with astronomical mythologies and legends from various societies. In October 1995, Rodney Pratt recalled his experiences as project manager for ECHO 1, NASA's first communication satellite.

Terry was our President then, and in his "President's Message" expressed disappointment at the meager 15% response he received from the membership survey he had recently sent out. He noted that more talks from our own speakers were requested, and that both the observatory and THE SPECTRUM received very favorable ratings. Speaking of THE SPECTRUM, Bill Smith, assisted by Bev Orzechowski, edited the first issue published since Darwin Christy retired from his sixteen year stint as editor.

Bob Hughes, Gene Witkowski and Steve Kramer were inducted into the College of Fellows. Bob received the honor for a wide range of service to the BAA over many years, Gene for his accomplishments in astrophotography and Steve for his research in the Rittenhouse Orrery and the Antikythera Mechanism.

Carl Milazzo wrote an article on "The Best Season for Observing". Unfortunately, he concludes the best season is winter. Brr! An article on Gene Witkowski's accomplishments in capturing lunar images with security cameras appears, but no author is given. Finally, there was an article "A New Theory of Black Holes". I don't want to insinuate the article lacked sincerity, since it did explain the mechanism whereby socks disappear in the laundry. The author - Gunther C. Wang.

10 YEARS AGO - In September 1990 we heard from Rick Albrecht on "Four Giant Steps of George Hale". Albrecht, an astronomer from Rochester, had toured observatories, such as Yerkes, Mt. Wilson and Mt. Palomar, where Hale was instrumental in their establishment. In October, Peter Jedicke from London, Ontario, offered us "Recipes for a Star", a talk on the lighter side of stellar evolution and astrophysics.

The new season saw Bruce Newman take over from Diane Borowski as Membership Chairman and John Yerger take over publicity. An article written in 1967 by former member Ray

Manners for the Northeast Region of the Astronomical League meeting, which the BAA hosted, appeared in THE SPECTRUM. Its title explains its contents: "Visual Meteor Observation for Amateurs. Ed Lindberg's "Instrument Notes" recalled some of NASA's goofs like the Challenger disaster and the Hubble trouble. He suggested a lack of pride in workmanship may have contributed to the fiascos.

15 YEARS AGO - The following data are taken from the "September - August 1985" SPECTRUM. That's what it says! Darwin must have been counting backwards. Dr. David Meiss of Geneseo State College spoke on Halley's Comet for the September meeting. No speaker was scheduled for the next month, but another presentation on the soon to arrive comet was anticipated.

Six new members of the College of Fellows were inducted. They were: Ken Biggie, Larry Carlino, Darwin Christy, Ken Kimble, Jack Mack and Rowland Rupp. Their achievements include holding office, extensive service to the association and expertise in several aspects of astronomy. Detailed descriptions of their contributions are given in THE SPECTRUM.

Ed Lindberg wrote an article in which he covered several astronomical theories that might explain the demise of the dinosaurs some 65 million years ago. From "Spy & Tell - BAA member Miro Catipovik had just donated the 20-inch Cassegrain telescope he had meticulously constructed to the University of Buffalo.

25 YEARS AGO - Ray Manners was the September speaker in 1975, but his topic was not known when THE SPECTRUM went to press. UB's Dr. Lyle Borst was scheduled to speak in October on "Problems with the Expanding Universe". Dr. Fred West contributed an article on asteroids. Naked eye nova Cygni 1975 was making news at the time, as was Comet Kobayashi-Berger-Milon.

35 YEARS AGO - Ron Clippinger was the lead-off speaker for 1965 with "Trepidation of Fixed Stars". Now what was that all about? New bylaws were up for adoption in September 1965; they included setting the membership of the Board of Directors at nine. Larry Hazel was to speak in October on variable stars, a subject in which he was recognized as an authority.

Radio cont. from page 5

same issues presented in THE SPECTRUM and drew the same pessimistic conclusions. The two analytical approaches taken, although different, resulted in agreement within one or two decibels. To quote from *Scientific American* -- "As this analysis suggests, the use of radio waves for making interstellar contact is discouraging."

George Swenson served on NASA's advisory committee for SETI for many years. In a private communication to us, subsequent to these articles, he commented that NASA chose to have a "few skeptics" on this committee; obviously he was one of them. However, he also notes that a low level of funding for this SETI effort (about the level we now have) is appropriate because of the significance to us of making such a detection, even though the likelihood of doing so is extremely poor.

Now that we have made our pessimistic claim that SETI currently is unlikely to succeed, and have received prestigious confirmation of it, we fully expect to hear that contact with aliens has been made within the next six months.

BAA WEB SIGHT

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

Contact Tom or Bill with any ideas or suggestions

OBSERVING OUR NEAREST NEIGHBORS (Part 3)

by Joe Orzechowski

This is the third in a series of articles I'm writing to recount my efforts to observe some of the Sun's nearest neighbors in space. In this issue I'll describe observations of five more proximate stars, presented in order of apparent visual magnitude. Once again, I'll also throw in some history and mention some of the other objects in the same part of the sky. I realize that most of the stars that I've mentioned in previous articles are rather difficult to find and I'm sure that my writing has not been eloquent enough to inspire you to run out and try to duplicate my observations. Let's face it, there's very little glamour in looking for and finding a pinpoint of light virtually indistinguishable from a dozen other pinpoints of light in the same field of view. But just to humor me why not give this next star a try and then, the next time you meet me, you can say that reading my articles motivated you to give nearby star observing a try. The star I am referring to is Altair in the constellation Aquila. This star is one of the corners of the Summer Triangle. Not much more needs to be said about locating or observing Altair; no scope or detailed finder chart for this one. Altair shines at mag 0.7 (twelfth brightest as seen from Earth) and, at a distance of 16.8 light years, just makes it on the list of 55 nearest star systems. It is about 1.5 times the diameter of our Sun and about 9 times as luminous. Based on an analysis of its spectral lines, its rotation period has been estimated at 6.5 HOURS (compare that to our Sun's 25+ days). Altair's equatorial bulge is no doubt significantly more pronounced than my own.

For more of a challenge go about 3 degrees north to Pi Aquilae, a mag 6 double star. Using my 4-inch refractor at 110x I only managed to elongate this tight pair. The separation is 1.4" of arc at position angle (PA) 110°. Just to make sure I'm not fooled by poor seeing or by my mind's desire to split a double, I always estimate the PA when I observe the star and then go back to a reference book to compare my estimate with the actual value. If I'm in the ballpark (or 180 degrees off if I can't tell which is the primary), I figure I really saw what I saw. My estimate for Pi Aql? My notes said 120°.

The next brightest star I observed during this round is 70 Ophiuchi. This is actually a double star system with a separation of 4" of arc at PA 150°. Their magnitudes are 4.2 and 6.0 and they lie at a distance of 16.6 light years. That puts the system 54th on the list, just ahead of Altair. At that distance the 4" separation equates to a true distance of about 23 AU, comparable to the distance between the Sun and Ura-

nus. The orbital period of the stars is 88 years.

I easily split the pair at 80x. The stars looked yellow and orange to me. Both stars are slightly cooler and smaller than the Sun as indicated by their spectral classes, K0V and K4V (see Part 1 of the series for a discussion of spectral classes). This star system is relatively easy to find since it is visible to the unaided eye under reasonably dark skies. Start at Beta Ophiuchus and go 5° SE to three mag 4 stars that form a triangle about 2 degrees across. The easternmost star is 70 Oph. The northernmost star in the triangle is 67 Oph another double star. This one is much wider. The separation is 55" at PA 142° and the magnitudes are 4 and 9. Just 1.5° NE of Beta Oph is IC 4665, an open cluster that appears much nicer than expected for an object relegated to the Index Catalog.

So what about all those numbered stars like 70 Ophiuchi and 61 Cygni. We can thank John Flamsteed (1646 - 1719), first Astronomer Royal of England, for them. In his star catalog *Historia Coelestis Britannica*, which was published posthumously in 1725, he numbered more than 3000 stars in 54 constellations. Within each constellation the stars were numbered in order of their Right Ascension from west to east. The westernmost star in each constellation was 1. This system allowed for many more stars to be named than did the Greek letter system used in Bayer's *Uranometria* back in 1603. Examples of Bayer's star names include Gamma Virginis and Alpha Lyrae (Vega). Here's something to add to your Believe-It-Or-Not list. Flamsteed compiled an impressive set of stellar observations at the Greenwich Observatory but when people like Isaac Newton and Edmund Halley urged him to publish the observations so that they might make use of the data, Flamsteed insisted on waiting until all his observations were completed. Despite his objections 400 copies of a partial list of his observations was printed in 1712. He later managed to get hold of and burn about 300 copies. Obsessive or what?

The 15th star system in the nearest neighbor list is BD+59° 1915, another double star system. (Refer to Part 2 of this series for a discussion of stars with BD designations.) This pair has a separation of 15" of arc at position angle (PA) 170°. The stars are mag 8.9 and 9.7 and they lie 11.6 light years away from us in the constellation Draco. I could detect a slight orange tint in these stars, both of which are cool M class stars. This system is a little more difficult to find but with a little patience you might be able to do it without a chart. First you'll need to find the four stars making up

Continued page 8 "stars"

BEAVER MEADOW OBSERVATORY

The observatory is open to "checked out" members any time. Call Neil Dennis (322-7596) to get checked out. Public nights are held on the 1st and 3rd Saturday nights April through October. There is "members only" viewing after every public night. Help is always needed and appreciated for our public events. You don't need a lot of experience to help out. Stop by and be an "observer" and see just how easy it is. The "vets" will show you how.

"stars" continued from page 7

the "head" in the constellation Draco. Start with the two stars on the north side of the head. Follow that line from west to east about the same distance as the separation of these two guide stars. You should come upon a mag 5 star (39 Draconis, another one from Flamsteed's catalog). Continue for about the same distance in about the same direction (perhaps a bit to the south) to a mag 4 star. This is 47 Draconis or $\Sigma 2420$, a nice double star that's worth a look before moving on. Burnham's lists the stars as orange and blue. I saw something more like yellow and white. Now it's time to move from the finder to a low power eyepiece. From 47 Dra move west a little less than a degree. You should come across a pair of stars about 10' of arc apart arranged nearly N-S. Less than 0.5 degrees further west is the double star BD+59° 1915.

This system is also designated as $\Sigma 2398$; it is the 2398th in a list of 3112 double stars observed and measured by Friedrich Georg Wilhelm von Struve (or just F.G.W. Struve). Struve lived from 1793 to 1864 and was the first in a line of astronomy minded family members. He became professor of astronomy at the University of Dorpat (now Tartu, Estonia) in 1813 and was appointed director of the Dorpat Observatory in 1817. In 1824 he got hold of a 9.6-inch refractor and used it to do a binary star survey. His survey included 120,000 stars from the north celestial pole down to declination 15°S. He measured 3112 binary star systems which we today designate with the Σ symbol. I also read that before becoming an astronomer, Struve was a draft dodger. In 1808 he left Germany to avoid being "invited" to join Napoleon's army. He first went to Denmark and later to Russia where he ended up at Dorpat University.

Another near neighbor in Draco is the mag 9.2 star BD+68° 946. It is 14.8 light years away putting it in 36th place in the list of nearest stars. This star is another one that you may be able to find without resorting to a finder chart if you know your way around the sky a little. First, find two mag 5 stars about midway between the head of Draco and Polaris. These two stars are about a degree apart and lie within the line of stars forming the body of Draco as is sweeps from west to east between Draco's head and Polaris. These two stars are 27 Dra and 28 Dra. From here use a low power eyepiece. Just about 1/3 degree south of the northern star of the pair lies a tight pair of mag 8 stars. Just 3' of arc SW of the southern one of this fainter pair is BD+68° 946.

The most interesting object in this part of the sky is NGC 6543, the Cat's Eye Nebula, which is about 2.5 degrees SE of 27 Dra and 28 Dra. In fact, those of you who can find your way to this bright planetary can use it to help find BD+68° 946. This planetary is small and bright and there is no reason not to give this one a try. I had no problem seeing it even under the light-polluted skies of my yard near Main St. and Harlem Rd. Just be prepared to see something small (like the planet Uranus). You will definitely see some color here. The Cat's Eye was the first planetary nebula to be observed with a spectroscope. Back on August 29, 1864 Wil-

liam Huggins examined the spectrum of NGC 6543 and found emission lines. This settled the debate about whether planetary nebulae were star clusters or clouds of gas (in favor of gas, of course). Another interesting fact about NGC 6543 is that it is only about 15' of arc from the north pole of the ecliptic, the point directly above the plane of the Earth's orbit around the Sun. This makes NGC 6543 a better marker than Polaris is for the north celestial pole.

Finally, the faintest of the five stars I observed this time around is Barnard's Star. At 5.9 light years this star is second on the list of nearest neighbors; only Alpha Centauri is closer to the Sun. It is a mag 9.5 star in the constellation of Ophiuchus just 3 degrees NW of 70 Oph which I discussed earlier. Barnard's Star has the highest proper motion of any star in the list of 55 nearest. See my article in the previous issue of the Spectrum for a discussion of proper motion. Barnard's Star moves 10.36" per year in PA 356 (almost due north). This means that its position in our sky changes by the width of the full moon in about 175 years. Barnard's Star is about 4 degrees E of Beta Ophiuchus. At mag 9.5 it turned out to be easy to see but rather difficult to find. The fact that it lies within the Milky Way made it that much more of a challenge to identify. Anyone ambitious enough to try to find this one should refer to the finder charts in Vol. 2 of Burnham's on pages 1252 and 1253. (We have a copy of Burnham's at the observatory.) Don't forget to adjust for proper motion!

There you have it, a description of five more nearby stars. They ranged in distance from 5.9 light years to 16.8 light years and they ranged in brightness from mag 0.7 to mag 9.5. Coincidentally, the same two stars are used to set the limits of both the distance and the brightness ranges but not in the way that you'd expect. The faintest star (Barnard's Star) is the nearest while the brightest star (Altair) is the furthest. The heavens are full of such interesting stuff so why not pick something out and observe it or photograph it. And, if you do a little reading about what you observe, you may find out that what you saw or photographed is even more interesting than you first thought. Stay tuned for more in the November-December issue.

BAA CALENDAR

The BAA will publish and sell a handsome limited edition wall calendar this fall. Featuring a galaxy of useful astronomical dates and data and breathtaking images photographed by our own club members, this will be a must have holiday item for club members, friends and sky enthusiasts. There is still time left to submit images (we can assist with preparing your photos or digital images for the printing process.) We are also looking for volunteers for the final assembly and distribution of the calendars. Contact Bill Aquino or Alan Friedman for more information.

TOUR OF MOUNT WILSON

by Mark Swiderski

On July 14th, 2000 I had the pleasure to tour Mount Wilson Observatory in Southern California as part of a tour with Universe 2000 (An annual convention sponsored by the Astronomical Society of the Pacific). If you have seen the movie 'Deep Impact' one of the opening scenes shows an astronomer inside an observatory discovering the comet. This observatory is the Hooker Telescope (100 inch) at Mount Wilson.

According to their literature, "Mount Wilson is an observatory site like no other in the world". Poised above Los Angeles, Ca in the rugged San Gabriel Mountains, Mount Wilson is renowned for it's calm air and clear skies. Aided by the superb skies, the new technology telescopes will see marvels of the Universe in beautiful detail".

I boarded a bus in Pasadena, Ca with a camera and a heavy jacket. Although the temperature in Pasadena was 88 degrees, Mount Wilson, as I soon found out, will be 20 to 30 degrees colder in the mountains. The observatory itself is not that far from Pasadena, the bus trip seemed to go endless up hill for over 1 hour with narrow roads and steep cliffs. Driving only 10 miles per hour near the top, I began to wonder about Edwin Hubble who made many trips like this one in the early 1900's.

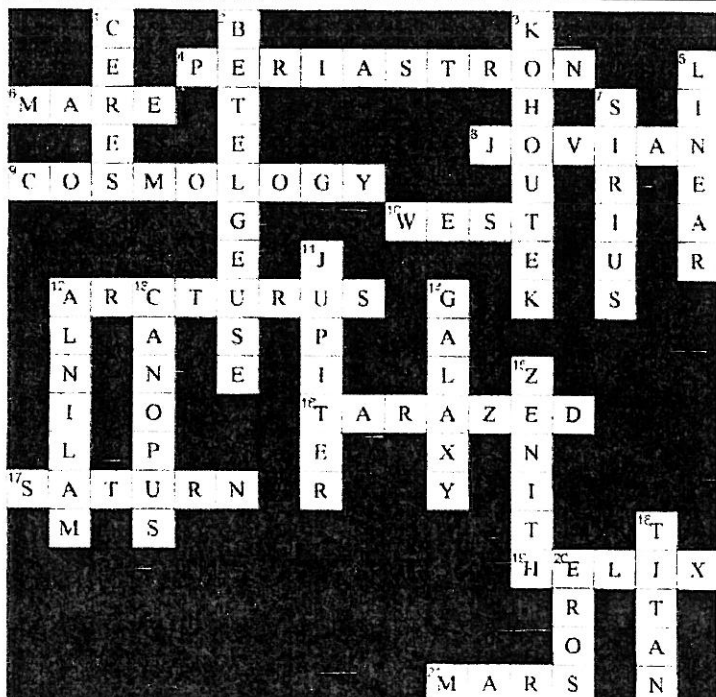
There is was.... The Hooker Telescope! 100 inch optics and 100 tons of metal! The dome was rotating slowing showing all the visitors it's functionality. Please visit www.mtwilson.edu/Tour/ This web site will give a virtual tour of the Mount Wilson area and all the telescopes including the

60 inch and the 150 foot Solar Tower. One bit of fact to pass along here, the expansion of the universe was discovered here at Mount Wilson by Edwin Hubble.

Another new feature of Mount Wilson is the CHARA Array of Georgia State University. They are designing a new INTERFEROMETER. Defined as; An Interferometer synthesizes a large telescope by combining the light from 2 or more much smaller telescopes in a way that mimics the properties of a single telescope. The most important of these properties is the requirement that starlight arrives at the same time at each element of the interferometer. One way of thinking of an interferometer array, like the CHARA Array, is that each telescope in the array is a small part of a mirror whose diameter is hundreds of meters across. Web site; www.chara.gsu.edu/chara.html. There are plastic cylinders attached to the scopes that act like a drainage system for light all over Mount Wilson. All the scopes capture the light and send this light into one building where the image is photographed. A light transit system hooked up to 6 scopes! This array will measure the diameters and surface temperatures of stars, detect companion orbiting stars and measure the masses of these binary systems.

The tour ended with a slide show showing the horses and donkeys pulling wooden carts full of all the detachable parts of all the observatories and telescopes. The room was full of photographs from Hubble and other astronomers. It was a nice history lesson learned.

Last Issue's Answer Keys



Word Scramble Answer Key

1. Aquarius
2. Deneb
3. Praesepe
4. Venus
5. Almach
6. Seginus
7. Kohoutek
8. Mara
9. Capella
10. Spectroscope

The crossword puzzle and Word Scramble will return in the next issue of the Spectrum.

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CLUB COMMUNICATION

An email group for communications within the BAA membership and friends. This was developed by Dennis Hohman and is restriction by invitation only (ie. BAA members). Available services include e-mail to the whole group or any member; review the history of messages (900+ in 5 months); view/post items to the calendar of events; and view/post items to our own storage area of files. You can be alerted for spur of the moment viewing, auroras or just take part in lively discussions of any astronomical nature.

Group email addresses:

To post a Message: buffalo_astro_assoc@eGroups.com

Subscribe to the group: buffalo_astro_assoc-subscribe@eGroups.com

Unsubscribe: buffalo_astro_assoc-unsubscribe@eGroups.com List

owner: buffalo_astro_assoc-owner@eGroups.com

To subscribe, send a message to

buffalo_astro_assoc-subscribe@egroups.com

or go to the e-groups's home page at

http://www.egroups.com/group/buffalo_astro_assoc/

Currently in the forefront:

Observatory events and facility expansion (ideas and pier work coordination)

Add your thoughts on Bylaws revision

Gamma ray burster news

Follow progress and submit photos and sky events for the 2001 BAA picture calendar project

Learn about astrophotography (and spur of the moment sessions at the observatory)

or

Start your own topic and be a part of BAA live!

You can even query the 39 group members (at once!) to see if anyone is going to the observatory or to get a question answered.

There are options when you sign up whether you get every e-mail message in its entirety; just a summary once a day or you can review the messages right from the e-group site by book marking: buffalo_astro_assoc@egroups.com which I prefer to do.

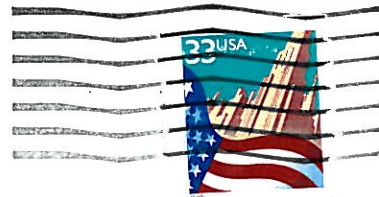
Bill Smith

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NEWSLETTER OF THE BUFFALO ASTRONOMICAL ASSOCIATION INC.

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