

THE SPECTRUM

Buffalo Astronomical Assoc., Inc.

Darwin Christy, Editor

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NOTICE / NOTICE / NOTICE / NOTICE / NOTICE / NOTICE

Due to renovation at the MUSEUM of SCIENCE, the January and February meetings of the BAA will be held in the auditorium of the Science Building at BUFFALO STATE at 7:30 p.m.

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The speaker for the January 14th meeting will be BAA member Shaun Hardy, who has a B. S. in physics, Geology and Astronomy from the University of Rochester and is presently the Education and Gallery Coordinator of the Kenan Center in Lockport, New York. He is interested in observing double stars. His presentation will be an illustrated talk entitled "The Classification and Origin of Meteorites". In addition, Shaun will have on display a collection of meteorites from the University of Rochester including a sample from the famous Allende fall of 1969.

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Two topics will be featured for the February 11th meeting. Ed Lindberg and Al Kolodziejczak attended the annual meeting at Stellafane this summer and will give us an account of the activities there. Ed has judged telescope competitions at Stellafane in the past and Al is joining the ranks of avid travelers to astronomy events.

Beverly Botto's topic has probably never been given to the BAA before--Space Art. Beverly has become well known in Western New York for her imaginative space paintings, and she has recently accepted a commission by the Museum of Science to paint for the new astronomy exhibit. Don't miss the chance to see Beverly's fine renditions of other worlds.

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MEMBERSHIP

Welcome back:-

Gilbert & Lois Brink
Leise Ness Shakleton

Welcome new members:-

G. Judith Buehlmann
Norman Eckhardt
Suzanne Klien
Julius & Rosemary Paar and daughters
Christina & Julianne
Patriace Loebel
Stuart Blaneck

Members continued:-

James Green
Franklin LaVoie
Daniel Collins

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OBSERVATORY NOTES

This is the time of year when most amateurs pack away their telescopes and wait for warmer weather to arrive. Fortunately for us, Beaver Meadow Observatory provides many of the comforts of home when those clear cold nights come our way. The most used piece of equipment (besides the telescope) must surely be the warming room's electric heater!

Several new pieces of equipment have recently been added to the Observatory which should also see heavy use in the months and years to come. One of these is the set of dew resistors designed and built by Rowland Rupp. Anyone who has worked with the telescope on a frequent basis is aware of the problems caused by dewing of the eyepieces and finder. Under certain conditions, almost as much time may be spent de-fogging the eyepieces as actually observing. The set of resistors should completely eliminate this frustration. All observers will sooner or later be thankful for Rowland's kind and most needed contribution to the Observatory.

The second new addition is the Sky Atlas 2000, field edition. If you haven't yet seen this newly published atlas or have been debating whether to buy it for yourself, come out to the Observatory some clear night and try it out. We now have three high quality star atlases at the Observatory: Skalnate Pleso Atlas of the Heavens, Sky Atlas 2000 and the SAO Star Atlas. These should solve most observer's questions when a fuzzy something unexpectedly appears in the field of view.

Where have all of the astrophotographers gone? Last year at this time a call was put out asking for new photographs for the Observatory by our members. Steve Desmond was the only observer to respond. One hears so much about the current interest in astrophotography but sees little of the results. Steve's very good shot of the lunar terminator would like some extra company on the walls of the warming room!

Our visual observers have been active at Beaver Meadow during the past two months. Carl Milazzo picked up the unusual planetary nebula NGC 2346 in Monoceros. This object was recently described in the October issue of Sky & Telescope, page 356. So far, Larry Carlino and Carl are the only observers in the area who have seen this elusive nebula.

RX Andromedae, SU Tauri and Z Camelopardalis have proved to be the most interesting variable stars monitored at the Observatory. Eruptive outbursts of RX And. and Z Cam. were seen in November and December respectively. SU Tauri, one of the best of the rare R Coronae Borealis type stars, has fallen from its usual maximum of 9.6 magnitude to below 14th magnitude. How long it will remain in this faint state is anyone's guess. The star is a real challenge with the 12.5 inch telescope.

The night sky is far from being a sleepy place. Don't let the cold stop you from coming out to Beaver Meadow!

John Riggs

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CONSTELLATION for JANUARY

CAELUM, or Scalptorium, the Burin or Engraving-Tool, or the 'Chisel', was formed by LaCaille about 1751 from stars found between Columba and Eridanus. This inconspicuous constellation was, perhaps, given its name as the tool of the Sculptor, a constellation which lies some 5 hours to the west of Caelum. It is bound by Lepus on the north; Eridanus and Horologium on the west; Dorado on the south; and Pictor and Columba on the east.

The astronomer Gould, now assigns 28 components from 4th to 7th magnitude. The brightest star being Gamma is 4th magnitude and the next brightest is Alpha of 4.5 magnitude. Other objects in this starry asterism include NGC 1679 at R.A. 04h 48m, dec. -32° and the variable star 'R' Caeli at R.A. 04h 40m, dec. -38° . It will be very difficult to observe from the Buffalo area but, perhaps, for those who go to Beaver Meadow Observatory might be able to detect this constellation. It would be a test to use the new Sky Atlas 2000 to help locate this asterism.

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FOR SALE

(To make room for his new telescopes) Larry Carlino has a 12.5 inch Newtonian Reflector (Cave Optical) on a wooden Dobsonian mount - excellent optics - heavy, but somewhat portable - a 24mm wide-field Erfle Ocular included ---- \$ 650.00 ; also an 8 inch Celestron with wedge, tripod, 8 x 50 right angle finder, full aperture solar filter, piggy-back camera mount, counterweights - 7 years old but in good condition, fine performer - --- \$ 725.00 ; and a heavy duty ($1\frac{1}{2}$ " shafts) equatorial mount from Cave 12.5 inch transportable. Sidereal rate drive, electric dec. slow motion with hand-held control box, 8 inch setting circles, massive portable pier with casters and leveling screws - good condition - has tube ring assembly if desired ---- \$ 325.00 or best offer

Contact Larry Carlino - 453 Nigara Falls Blvd.,
Amherst, N. Y.

phone - 716 832 0491

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ANSWERS to PUZZLES

In the last "Spectrum".....

The first puzzle depicted mirror images of numbers 1 - 7. The next image would be 3 which is 8.

The second puzzle presented the alphabet, and the next letter would be an 'U' and would go below the line as all letters with curves were below the line and straight letters were above the line. SIMPLE?!

editor

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"SPECTRUM" DEADLINE FOR THE NEXT ISSUE IS FEBRUARY 23rd

I need articles - observations - short quips - etc. I appreciate all the articles in the past from those who have and are contributing to the 'Spectrum'. THANK YOU!! Remember---you have two months to figure out what you can write and be a new contributor. Perhaps some one has some information others may like to share, so do not be afraid to attempt an article or observation.

STUDY GROUP

The Study Group did not meet in December but will resume this month. There is some indication that attendance may pick up as our November meeting was successful.

At our January meeting our topic will be Quasars, a broad subject but we will try. We will all see what information we can pick up on Quasars and Carl Milazzo will lead off the discussion. Should be a good one.....

In the February meeting, Stephen Kramer will give us a more detailed talk on his 'Antikythera' construction project.

The Study Group meets at 8:00 p.m. the Friday following a regular meeting in room 271-A of the New Science Bldg. at Buffalo State. ALL BAA MEMBERS OR VISITORS ARE WELCOME.....

Ken Kimble

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INSTRUMENT NOTES

The BAA Instrument Section meets on the fourth Friday of every month (except July, August and December). Various interesting things turn up. At the last meeting Len Milks brought in a 10 inch commercially made mirror for testing. The mirror had a good polish but it was only slightly parabolized. It was practically spherical. It would perform poorly to fairly well depending on what kind of objects were viewed. In some cases the spherical aberration might not be troublesome. Len has decided to have the mirror aluminized and will see how it performs on medium power planetary observing.

Dave Jauch brought in a mirror that had been made by our member Irv Goetz. It tested nearly perfect on both the Ronchi and Foucault tests. The test pattern was very pretty. It is a much better mirror than the commercially made one tested earlier. This comparison points up one of the big differences between commercial mirror makers and amateur craftsmen. The commercial men will tell you that they could make better mirrors than the amateurs but they cannot afford to do so. They make mirrors that are just good enough for the market and which will sell at a profit. The amateur craftsman continues improving his work until the product is the best that he can make. Many more hours are required by the amateur and such an expenditure of time could not be justified by a commercial firm. A telescope made by a skilled amateur craftsman is a joy to use.

Ed Lindberg

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Did you know that the Sun is 48753859000 times brighter than a zero magnitude star???? And that the Moon is 104712 times brighter than a zero magnitude star????

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Steve Desmond's address at R.I.T is:-
25 Andrews Dr.
P.O. Box 34
Rochester, N. Y. 14623

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OBSERVATIONS

On December 18 the northern horizon was pulsating upwards with aurora activity from midnight to dawn. It was of average strength made up of green and gold curtains and rays that looked 3-D, that at times extended as high as Polaris.

Also that night the double star Dunlop 36 in Canis Major was viewed which is a true binary. It consists of a 5.5 magnitude blue star separated by 43 minutes of arc from its companion which is a 7.5 magnitude white object.

Later that night the 6.5 magnitude open cluster NGC 2451 was seen in Puppis, which was only 9 degrees from the horizon when crossing the meridian. About 20 stars

were discernible and many were quite bright in its half degree area including a reddish 4th magnitude star towards the center.

And finally a pair of very faint galaxies in Lepus, NGC 1889 is 13.8 magnitude and 1 x 4 minutes in size, a near edge-on with a slightly brighter center. Adjacent to it is NGC 1888 which is 14.1 magnitude and 1 x 1 minute in size, and almost past for a star.

Carl Milazzo

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A report of the Lunar Eclipse will be in the next issue of the "SPECTRUM". ed.

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RED DWARFS

Stars are the dominant feature of our universe. They provide its vitality, producing energy by converting hydrogen into complex elements that may someday form the next generation of stars and planets. At least, that's true of the stars we can see with the naked eye. But the most common stars of all are quite invisible to us. They are the red dwarfs whose low mass results in very low luminosity, making optical aid mandatory if we are to observe them. Some stars of this class are closer to us than brilliant Sirius, and yet can be seen only through a telescope. They are relatively newcomers to the astronomical scene. Their faintness caused them to be missed by astronomical census takers until recently. Since then, they have contributed significantly to the sum of stars and mass in our galaxy.

Red dwarfs are believed to form from gas clouds just as their brighter counterparts do, but their evolution is far slower. They contract slowly because their low mass produces feeble gravitational forces. When, at last, nuclear reactions ignite in their cores, red dwarfs reach a state of equilibrium where radiation pressure and gravity balance--they have entered the main sequence.

Now, they burn their store of hydrogen frugally for billions, perhaps trillions of years. These dim stars may live longer than the universe has existed and will probably never return processed material from their interiors to the interstellar medium. In fact, most of the heavy elements synthesized in the more massive, brighter stars are never formed in red dwarfs--their cores are too cool. And further, the nova explosion that returns stellar material to space almost certainly cannot occur in these stars. Red dwarfs are expected to fade away and eventually cool, if the universe lasts long enough.

Red dwarfs are red because their surface temperatures are low, and cooler objects radiate relatively more of their energy in the red end of the spectrum than do hotter ones. A cool red dwarf of spectral class M5 is believed to have a surface temperature of around 3000°K. It is hard to regard 3000°K as cool, but it is when compared to the sun's 6000°K surface temperature.

The dwarf's core is also cooler than the

sun's--about 9 million degrees K compared to 15 million degrees K. The pressure at the dwarf's center is less than the sun's too, but its density is greater by a factor of around ten. Small, cool stars are generally more compact than large, hot ones.

Even the process for transporting the energy produced in the core to the surface differs in red dwarfs. The material of these cool stars is opaque; that is, radiant energy cannot readily penetrate the bulk of the star. Energy flows by convection, like water boiling over a burner. In the sun, most of the flow of energy is by radiation; convection occurs only near its surface.

What would it be like if our Earth circled a red dwarf instead of circling the sun? Well--cold, for one thing; about 70°K or -330°F! An M5 red dwarf generates less than 1% of the sun's energy. A planet with 35% reflectivity (like the Earth has) orbiting 93 million miles from a red dwarf (as we do from the sun) will have a surface temperature equivalent to about that of Uranus in our solar system. Because a red dwarf tends to be relatively dimmer at visual wavelengths than it is in the red part of the spectrum, the visual luminosity will be further reduced. This star will be a thousand times dimmer than the sun. Its apparent magnitude will be around -19.2. The sun would appear that bright if viewed from Neptune, 30 times more distant from the sun than Earth.

The moon would be a great disappointment too. Since it only reflects light, and that light is reduced by 1000 times, the moon's apparent magnitude would drop to around -4.5. This matches Venus' brightness at its greatest, but Venus is only a brilliant point of light. When that light is distributed over a large surface like the moon's, we would see a profound reduction in surface brilliance.

The red dwarf would of course, appear redder than the sun, as well as dimmer. But it would also look smaller--because it is. Authors are not fully in accord on diameter, but 30% of the sun's is a good compromise. The dwarf's roughly quarter million mile diameter would subtend only 10 minutes of arc in our sky. A sky no longer bright blue, but drastically darker because of not only reduced illumination in general, but because red stars are poor sources of blue light.

A year will be a lot longer too. The speed of a planet around its star depends on the mass of the star. Since a red dwarf has only a fifth the mass of the sun, the gravitational force it exerts on its planets is reduced proportionally. The Earth could slacken its pace but still maintain its orbit. Our year would become $\sqrt{5}$ times our present year or about 817 days. Imagine a 200 day long winter season with a sun having less than 1% the luminosity of ours. Clearly, this is unsatisfactory.

So, let's imagine we transport our world to a new orbit closer to the red dwarf, where the temperature will return to that we now enjoy here on Earth. In that case, we would wind up only 7.7 million miles from the star.

Even then, the dwarf would be dim visually, fully 2 magnitudes or over six times dimmer than the sun. Recall that these stars radiate primarily in the red part of the spectrum, producing more heat than light.

The dwarf now dominates the sky with red dullness. At this distance, its apparent diameter is over $3\frac{1}{2}$ times the sun's, as we see it. Its disk, just under 2° across, appears to have a surface area 13 times the sun's. Sunspots, if red dwarfs have them (and they probably do), will be pronounced, extended features on their enlarged surfaces.

Our Earth will veritably whiz along in its new orbit. A year, one revolution around the dwarf, will last less than 20 of our days. Actually, the orbital speed will be 28 miles per second, compared to our current 18 miles per second. The real reduction in the length of the year results from the decreased length of the orbital path due to the proximity of the Earth to the dwarf.

But how long is a day in this new orbit? Tidal gravitational forces are proportional to mass and inversely proportional to the cube of distance. Recall that the dwarf has only a fifth the mass of the sun, but the Earth is now well over 10 times closer to the star. The tidal effect is over 300 times what the sun now exerts on the Earth. Almost certainly, Earth's rotation would be synchronized to its revolution around the star, just as the moon's rotation is synchronized to its revolution around the Earth. Half of the planet would be baked with perpetual red star light, the other half would endure endless night. A most inhospitable environment, indeed.

Could life exist here? Would anyone ever witness the looming aspect of a red dwarf close up? I doubt it. Fried on one side, frozen on the other is an unlikely arrangement for the occurrence of life. Tides are thought to have been an aid to the development of life in the early history of Earth, perhaps essential. But even a good thing can be carried too far, and here we seem to have a case in point. Trapped by mighty tidal forces and starved for ultraviolet radiation, a planet like our own can wheel around a red dwarf for a trillion years without chemistry ever leading to biology. The old cliché about a great place to visit, but no place to live, applies to a red dwarf system with a vengeance. Not only is it no place to live, but more than likely, it is no place to evolve.

(ANON)

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QUIZ

- 1) Where does the largest known Blue Shift come from ?
- 2) What was the bolometric magnitude of the Big Bang ?
- 3) What star is known as Alpha Zodiac ?
- 4) What are the north and south pole stars of the Sun ?
- 5) What is the fastest known object in the universe ?

Answers to appear elsewhere in the 'Spectrum'.

"SPECTRUM" Deadline

— FEBRUARY 23, 1983 —

Dr. Elton M. Rock

Elton Rock, a Buffalo born physician received his early formal education at School 56 and at the Nichols School from which he graduated cum laude. He went on to Harvard where he also graduated cum laude. Elton returned to Buffalo and enrolled in the University of Buffalo Medical School. While there he was a member of the Gibson Anatomical Society, an honor society for those who did well in anatomy. After graduating from medical school, he spent an internship at Buffalo General Hospital, and then became a three year resident in internal medicine at the internationally famous Mayo Clinic in Rochester, Minnesota.

Dr. Rock subsequently practiced medicine in Buffalo for a few years, in California for one year, and again in Buffalo for one year, after which he was drafted for a two year period as a medical officer at Reynold's Army Hospital at Fort Sill, Oklahoma. After the termination of his service in the army, Elton became a Fellow in Gastroenterology at the Lahey Clinic in Boston, and since 1970 he has continued his profession at Sisters of Charity Hospital in Buffalo and St. Joseph Intercommunity Hospital in Cheektowaga. He has an office which adjoins Sisters Hospital.

Elton's interest in astronomy started when his daughter, Wendy, was a student at Ithaca College. He was browsing through some books in a book store in Ithaca and came upon a children's book on stars. He was very impressed and bought the book, thinking that his youngest son, David, would like it. David was not excited about the book, but Elton was, and he proceeded to buy another book. This time it was H.A. Rey's book, The Stars, which had such a hold on Elton that he went out every clear night for a period of a year, identifying every star. His enthusiasm led to his taking a course with Dr. Jack Mack at Buff State on observational astronomy, and another on cosmology. Elton went to the museum to use the telescope there, and finally purchased one of his own, a Celestron 8.

He learned of the B.A.A. through Jack Mack and joined our group in January 1980. Naked eye viewing of the heavens has a tremendous appeal for Elton; he is always overwhelmed by the spectacular display of stars. He also finds great enjoyment in observing the planets. Someday, if he can find the necessary time, he hopes to do some work in astrophotography.

Another one of his wonderful hobbies is sailing. He owns a Dolphin 23 foot boat, appropriately named Aphrodite, after the Greek goddess of love and beauty, born of the foam of the sea. The family sailed on Lake Erie this year and plans to do some sailing on Lake Ontario next year. Elton dreams of someday owning a bigger boat. Another water related hobby is scubba diving which he finds stimulating.

The Rocks have traveled to Rome, Paris and London. Of special delight was sailing in the Virgin Islands. While the family was visiting Elton's sister-in-law in San Francisco, they were taken to a high hill one evening to see a dazzling view of the city. The rest of the group viewed the incredible sight with enthusiasm, but Elton found something far

more exciting; the entire constellation of Scorpius.

In 1958, Elton and Barbara Miller were married, and in March they will be celebrating their twenty-fifth wedding anniversary. Barbara was an art teacher until she left the profession to become a mother. She and Elton have six children: Michael, a collegian at the University of Chicago; Wendy, a recent graduate from Ithaca College, now working at Channel 29; Steve, a student at St. Lawrence University; Jacqueline, at Indiana University; Lisa, at Williamsville North, and David, at Heim Middle School in Williamsville. David has been going out with his father of late to observe the nighttime sky through the telescope.

Being a physician takes endless hours of service to others, but somehow, Elton finds time to study and appreciate the firmament above, and to enjoy the quietude and lifting of spirits that sailing imparts. With his wonderful family and very successful career, Elton leads a full and rewarding life.

Edith L. Geiger

BAA ANNALS

5 Years ago - The January 1978 meeting was addressed by 3 speakers, Jack Mack, Paul Schenk and Walt Whyman. The February meeting featured Phil Cizdziel speaking on his recent research in astronomy. Phil has gone a long way since then. The Jan-Feb 'Spectrum' profiled Darwin Christy and included two black and white photo's of M 42 and M 31. Jack Mack's daughter was only 3 months old.

10 Years ago - The January 1973 meeting had Larry Hazel as featured speaker. In February Tom Dessert spoke on telescope accessories. Bill Chambers was doing some infrared star work using an image converter - interesting! Also interesting was a rumor that Ernst Both was tracing his family tree in a book called the search for "DRACULA".

15 Years ago - The January 1968 meeting was treated to a talk by Ray Manners on his theory of solar system formation. A copy of a paper by him on this subject is available from me. It is very interesting and complete.

Ken Kimble

Spy and Tell

As most of you know, Ed Lindberg is a ham radio operator. When the Viking ship was in Buffalo, Ed and a group of ham radio operators helped install the radio on the ship. Various groups followed the ship via radio across the ocean. An appreciation party was held in Fargo, North Dakota, for those who had been so helpful in maintaining contact throughout the voyage. The Lindbergs were invited to the party and had a wonderful time. On the way back, they stopped to visit astronomer Dr. Shirley Jones, formerly of Buffalo, who lives in Urbana, Illinois. Dr. Jones wished to be remembered to her many Buffalo friends.

Former member, Phil Cizdziel, who is studying astronomy in Hawaii, passed his exams for his Master's degree and is now eligible to continue for his doctorate. He is planning to return to Buffalo for a short visit in early July.

Congratulations to Jack and Jayne Mack on the arrival of baby John who tipped the scales at a little over 10 pounds at birth in early December.

Steve Desmond is enjoying his first year at R.I.T., and finds there is a great deal of studying to do. He reports, however, that his social life is great.

Gary Herrnreiter is doing construction work in the Gibson Hall of Space which has a planned opening date set for May.

In November, Claudia Bielinski spent eight days visiting a friend in Pompano Beach, Florida. She enjoyed collecting shells as she walked along the beach. She would like to have found some shark's teeth, but not being that lucky, she purchased some. She also went on a weekend Buffalo Museum of Science fossil trip. The group went to the Lockport gulf area where Claudia found a part of a cephalopod which was $2\frac{1}{2}$ " wide and 7" long. If complete it would have been 18" long; an excellent find. The group also went to the Bayview Quarry where Claudia found a complete cephalopod 5" long and $\frac{1}{2}$ " wide. She collected numerous fossils on this exciting trip.

Edith L. Geiger

CONSTELLATION for FEBRUARY

Each after each, ungrouped, unnamed, revolve--- LEO MINOR, the Lesser Lion was formed from 18 stars by Hevelius between the Greater Lion and the Greater Bear. It is bound by Ursa Major on the east and north; Leo on the east and south; Lynx on the west.

Objects in Leo Minor include two variables - 'R' at R.A. 09h 43m, dec. +34° 45' & 'S' at R.A. 09h 51m, dec. +35° 10'. NGC's include 2859, 2942, 2955, 3003, 3021, 3158, 3245, 3254, 3277, 3294, 3344, 3396 & 6, 3414, 3430, 3432, 3486, 3504, 3510 & 3512.

Unlike the January constellation, this asterism is almost overhead for observing. It should be very easy to locate, knowing the two constellations on the south and north, Leo and Ursa Major.

ASTRONOMICAL HAPPENINGS

SOLAR:- The Sun passes from Sagittarius to Capricornus in January and from Capricornus to Aquarius in February. The Earth is at Perihelion on January 2nd, being only a mere 91.4 million miles away from the Sun.

LUNAR:- Last Quarter Moon - January 5th & February 4th
New Moon - January 14th & February 12th

First Quarter Moon:- January 22nd & February 20th
January Full Moon - January 28th & February 27th
January Full Moon is 'Wolf' & February Full Moon is 'Snow'

CONJUNCTIONS:- January 7th - Mercury & Venus
Saturn & Moon

January 9th - Jupiter & Moon

January 10th - Uranus & Moon

January 15th - Venus & Moon

February 3rd - Saturn & Moon

February 6th - Jupiter & Moon
Uranus & Moon

February 10th - Mercury & Moon

February 14th - Venus & Moon

February 15th - Mars & Moon

February 17th - Jupiter & Uranus

February 18th - Venus & Mars

-5- OCCULTATIONS:- January 12th - Neptune & Moon

January 18th - Vesta & Moon
 February 8th - Neptune & Moon
 February 15th - Vesta & Moon

METEOR SHOWERS:- January 3rd - QUADRANTIDS
 January 17th - Kappa CYGNIDS - fire-balls
 January 17th - Coma Berenicieds
 January 13-21 - Delta Canerids
 February 9th - Aurigids

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CURIOUS APPEARANCE OF A CRATER ON THE INTERIOR OF THE LUNAR FORMATION NASMYTH.

The lunar formations Nasmyth and Phocylides are a close pair of large walled plains near to the south-east (old sense) limb of the moon. In shape, the two bear a resemblance to a human shoe print, Phocylides being the 'sole' and Nasmyth the 'heel'.

On the evening of June 3rd 1982 I was observing Phocylides and Nasmyth with my 8-inch refractor. The seeing was fair and the sun had just risen on those formations. Most of the floor of Phocylides was in shadow but floor of Nasmyth was well lit. I was not at all familiar with the details of their interiors so I thought this was as good an excuse as any to make a drawing. The only feature that I detected and drew on the floor of Nasmyth was an ill-defined fuzzy hump near its center. Outside both Nasmyth and Phocylides several small craters were plainly visible, their interiors partly filled with shadow and all clearly defined. When I compared my drawing with other drawings, charts and maps made by various observers I could see that there was plainly something odd about

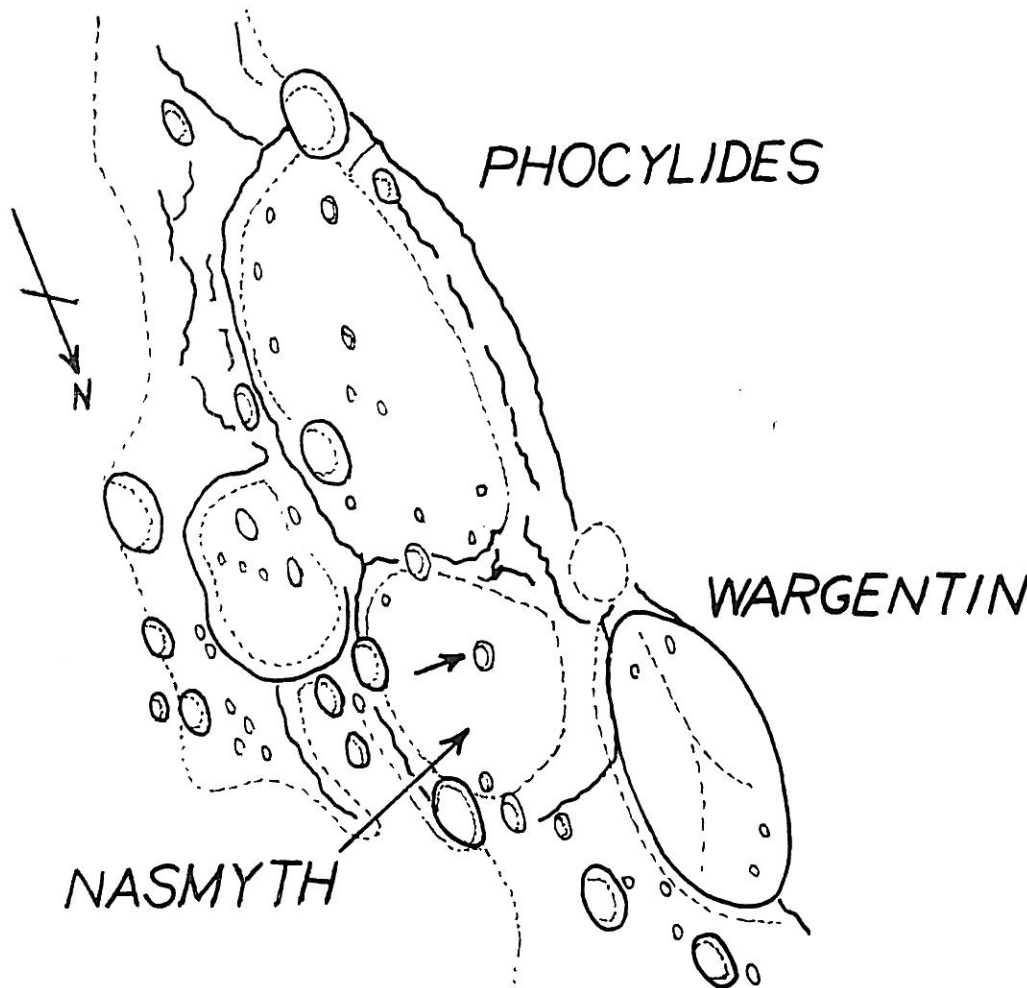
the appearance of the object I had drawn on the interior of Nasmyth. Most observers show a clearly defined crater similar to the ones on the outside of the formation, in the same position where I had drawn the hump. Two drawings made by K.W.Abineri using an 8-inch reflector at lower and higher angles of illumination respectively, on November 25th and October 28th 1955, both show a crater near the center of the floor of Nasmyth and a crater is shown by F.H.Thornton and T. Maloney in drawings made on the same evening of April 15th 1954. The photographs that I have examined of the area under both morning and evening illumination all show the object near the center of Nasmyth to be a typical small crater.

In a drawing made using an 8½-inch reflector on April 21st 1891, T.G. Elger shows something that looks more like a hill than a crater in the center of Nasmyth, if the shape of the shadow it casts is anything to go on. Patrick Moore drew Nasmyth and Phocylides using a 12½-inch reflector on July 7th 1955. The floor of Nasmyth was fully and obliquely illuminated at the time so that a crater on its floor should be distinctly seen and filled with shadow. Now, although Moore has carefully drawn several of the small craterlets on the outside of the two larger formations, he shows absolutely nothing on the floor of Nasmyth. One might suggest that Moore merely omitted the floor crater - but why would anyone of his reputation as an observer take the trouble to record the exterior craterlets yet omit to depict the central crater which is a feature of Nasmyth? That is, assuming that the central crater was visible at the time Moore made his observation - it should have been. Was something obscuring it? Remember, the floor of Nasmyth was well lit.

The central crater in Nasmyth is also omitted in drawings by J. D. Bestwick (6-inch reflector X240, September 28th 1955) and W. Cameron Walker (December 26th 1955) which were made under similar illumination conditions to the foregoing. The crater is of a size that is well within the reach of 6- and 8-inch reflectors so that its omission from these drawings cannot be attributed to its being difficult to see at times because of small size.

Ever since serious telescopic observation of the moon began there have been numerous reliable reports by experienced observers of 'clouds' 'mists' and 'obscurations' that temporarily alter the appearance or visibility of certain lunar surface features. It is not unlikely that in the above drawings of Nasmyth, the omission of the floor crater when it should have been visible and its odd uncrater-like appearance when I observed it may be due to obscuration.

Of course, it is always possible that I may have been mistaken about the hump-like appearance of the object in Nasmyth but this does not explain why the similar-sized craters in the same general area had the usual crateroid appearance under the same conditions; they therefore served as 'controls'. Moreover, as previously mentioned, I was unfamiliar with the interior detail of Nasmyth and also the topography of the surrounding terrain so I was quite unbiassed by previous knowledge when I made my ob-



BASED ON PHOTOGRAPH BY 36" REFLECTOR.

F.W.P. 1982.

servation and drawing.

Whatever the reason, the odd appearance of the central floor crater of Nasmyth on this occasion is difficult to explain. It might be a good idea to keep a watch on it to see if the hump-like aspect manifests itself again. The best time to observe the object is a little before full moon when the morning terminator is past the east (old sense) walls of Phocylides and Nasmyth and the floor of the latter has just become fully illuminated. A power of about 250X should be employed. The accompanying drawing shows the position of the crater in Nasmyth.

Fred Price

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The "GREAT COMET of 1843" was spotted on February 28th (that date) at 12:00 Noon.

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ANSWERS

- 1) The largest Blue Shift known in the universe is from SS 433 and is approaching at the speed of 14% of the speed of light.
- 2) The Big Bang had a brightness of -108 magnitude.
- 3) The star known as Alpha Zodic is 1/63,310 of a light year from the Earth or .000005" of a parsec, it also called the 'Sun'.
- 4) The North Star of the Sun is +4.6 magnitude Pi Draconis and the South Pole Star is +3.3 magnitude Alpha Pictoris.
- 5) The fastest known object in the universe is a star pulsating (pulsar) in Vulpecula designated 4 C 21.53. It spins 641 times a second which is more than 20 times faster than the next fastest, which is the 'Crab Nebula' (M 1) in Taurus.

* * * * *

In the groups below - each has one object NOT associated with the others. Your job is to remember which one does not belong....

- | | |
|------------------|-----------------|
| A) 1- black hole | B) 1- planetary |
| 2- worm hole | 2- whirlpool |
| 3- blue hole | 3- lenticular |
| 4- white hole | 4- irregular |
| | 5- saturn |
| C) 1- crab | D) 1- globular |
| 2- dark | 2- trapezium |
| 3- bee-hive | 3- hyades |
| 4- owl | 4- double |
| 5- ring | 5- open |

Answers will be published in the next issue of the 'Spectrum' with the reasons.

* * * * *

The February 1968 meeting of the BAA ANNALS was left out by your editor by mistake - it follows:-

The February meeting was treated to a talk on the possibility of water and life on the moon by Fred Price. Kurt Erland was a lot more prolific back then with observing articles and one about the Cerro Tololo Observatory.

* * * * *

A reprint from the April 1969 "SPECTRUM"

"CHANCES ARE"

Listening to the evening weather forecast, we often hear the probability of precipitation for the next day. For a prediction of a 30% chance of rain, we would think given 10 days with exactly the same conditions, it would rain on 3 of them. (But if you planned star nights on these ten days, it would rain all 10 days. Noah had this

trouble once, when he planned a 40-day star party!) But the idea of chance is not only with us in meteorology, but a great many astronomical phenomena are explained because of their deviation from a normal chance event.

One of the best known fields in which chance plays such a role is that of visual binary systems. Take for example Castor, one of the bright first magnitude stars in the constellation of Gemini. In this binary we have two stars, one of which is the 50th brightest star in the sky, and the other of which is about 400th brightest. Their average separation is about 5 seconds of arc. If we assume that the stars are distributed randomly across the sky, which would eliminate the possibility of having binary stars, chances are very slight that so bright a pair should exist with such a small separation. The probability would be the same as if we took 50 grains of corn and 400 grains of wheat, and spread them randomly over a 10 acre tract of land. The chances of finding a grain of corn within a half inch of a grain of wheat are the same as finding the two components of Castor so close together (it gets wilder if you consider the rest of the Castor-system! eeb)*. Numerically, this would be one chance in 300,000. There is a 0.00003% chance of finding two bright stars so close together. No other comparable system should therefore exist in the sky. When other close bright pairs are found, such as Mizar, chances are that stars are not randomly distributed, but are often found in pairs or as multiple systems, the binary stars.

In the radio source Cygnus A, theory had it at one time that it may be a pair of galaxies colliding with one another. What is causing the tremendous output of radio energy (10^{38} watts) - stars in collision? Well, chances are that individual stars will not collide. The average distance between stars in a galaxy is immense. So stars in collision are probably not the cause of this energy. The collision of gas and dust of the interstellar space is most likely the cause of this.

One last example concerns the structure of a globular cluster. If you have ever looked at a picture of M-13 in Hercules, or of Omega Centauri, you have probably marvelled at the beautiful symmetry, and how compact the stars are in the middle. Well, chances are, if you were to shoot bullets randomly, at the center of the cluster, only one of every 100 billion would hit a star, unless of course you aimed at one intentionally (and even then, chances are....). So they are not really packed that tightly. There are still great distances between stars, even in globular star clusters.

So, much of astronomy is explained by deviation from a probable event, or number of events. One last probability - chances are, it will be very cloudy tonight, especially if you were planning to observe.

Orrin Christy

* this little insert was put in by the article by the editor then, Ernst Both.

* * * * *

? DO YOU REMEMBER ?

The B.A.A. maintains its own observatory, "The Newstead Observatory", (from a handbook published in 1967) located 1.5 miles east of Clarence, N. Y. on the grounds of Cornell Aeronautical Laboratory's Radio Physics site. It is presently equipped with a 12.5-inch Newtonian reflector to be used by those members who require this type of instrumentation for serious observing programs. It is also used for general observing on star nights and other occasions.

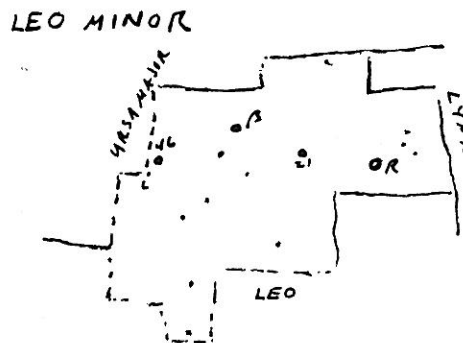
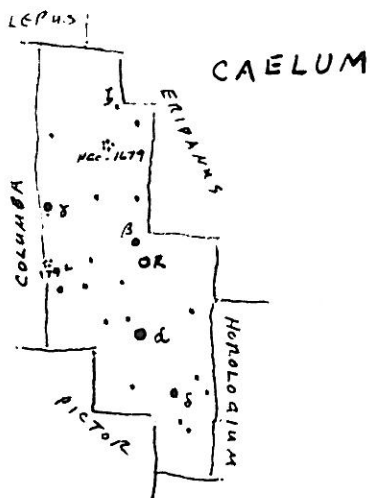
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Elementary Study Section.....
Paul Redding
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Ron Clippinger
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Ernst Both

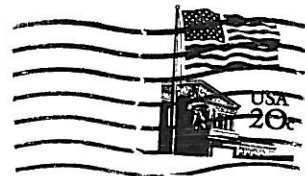
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