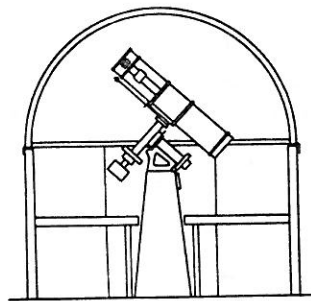


The Spectrum

elg

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MAY - JUNE
 1984

Our Feature Article is from the Past.

From the February 1969 issue of the "SPECTRUM", is the article entitled, "The Trouble with MASCONS" by Kurt Erland. This article, having been written 15 years ago, could have been researched further and therefore parts of the article may be altered to fit with the present day research. -dpc-

MASCONS = large scale (high density) mass concentration beneath the circular lunar maria.

The lunar Orbiter satellites, publicly well-known for their high-resolution and often spectacular photographs of the lunar surface, were also designed to provide information concerning the roughness of the Moon's gravity field - of interest in any manned or unmanned lunar exploration because of the perturbations produced on the trajectory of any probe. What originally started as an 'operational nuisance' in the tracking of the Orbiter satellites, eventually resulted in the recognition of the mascons and opened the door to a new field of lunar studies, lunar gravimetrics.

During the tracking of Orbiter V, it was found that the space craft accelerated in an unexpected manner whenever it passed over certain areas of the Moon. An analysis by Muller and Sjorgen (see references at the end of this article) of 80 consecutive orbits of this lunar satellite (closest approach to the Moon's surface = 100 km, period = 3 hllm) over a period of 10 consecutive days indicated the presence of large mass concentrations under the maria Imbrium, Serenitatis, Crisium, Nectaris and Humorum, as well as under the far-side Mare Orientale (for a discussion of

this very interesting lunar feature see SKY & TELESCOPE, February 1964, p. 89). The theoretical model used in tracking this satellite, considered the effects of a triaxial Moon, coupled with the perturbations produced by the Earth, the Sun, and the planets Venus, Mars, Jupiter and Saturn. Deviations from this theoretical model would have to result from peculiarities in the Moon's gravitational field. Analysis of over 9,000 data points indicated that the observed accelerations (above those produced by the expected ingredients of the theoretical model) were due to mass irregularities underneath the surface of the Moon, and indications were that these occurred somewhere

between 25 and 125 km under the surface. Since the altitude of Orbiter V above the lunar surface changed continuously, the observed accelerations were normalized for a mean altitude of 100 km on the assumption that the mass concentrations occurred at a depth of 50 km.

Muller and Sjorgen also discovered smaller mascons under neath Sinus Aestuum and near Sinus Medii, both of which may represent originally circular maria which later became buried. From the large rate of change in the spacecraft acceleration when passing over these mascon-areas, it appears that the physical extent of the typical mascon is rather small, say between 50 and 200 km. For example, assuming a depth of 50 km (as was done by Muller and Sjorgen), the mass of the Imbrium mascon would be 20×10^{21} (*) grams. This would be equivalent to a spherical nickel-iron object about 100 km in diameter, although the observations actually indicate an oblong object of unknown composition. The mascons raise interesting and fundamental questions; Do they represent the original asteroids which collided with the Moon, producing these maria (as some investigators envision the origin of the lunar seas)? If they do not represent the asteroid (or meteoroid) itself, what are they, and how were they formed? In view of their presence, can one really maintain the occurrence of large-scale lava flows in the Moon's evolutionary past? Etc., etc.... Muller and Sjorgen raise these and similar questions but they do not attempt to answer them. However, a number of investigators attempt some answers in the December 20, 1968 issue of Science, which we shall

-1-briefly review here.

J. Gordon Stipe, of Boston University, has carried out experiments with impacting steel projectiles, ranging in diameter between 1.27 and 15.5 cm, and in mass between 8.35 grams and 44 kg. Impacting these into concrete, at velocities of around 1.0 km/sec produces no deformation and no excessive heating in the projectile. In soil, however, the projectiles tend to break into pieces and/or deviate from a straight path as well as penetrating to smaller distances. Also smooth spheres penetrate farther than rough objects (akin to meteorites). Extrapolating to lunar sizes, Stipe finds that the object responsible for Mare Imbrium would have a (spherical) diameter of 61.2 km, at a depth of between 450 and 670 km, with a mass of 9.3×10^{20} (*) grams. If the object is irregular in shape (as one might expect) the depth could be considerably less, i.e. approaching the range indicated by Muller and Sjorgen

J.E.Conel and G.B. Holstrom of the Jet Propulsion Laboratory indicate that the mascon-effect need not be produced by a disk of dense lunar rock embedded in less dense rock and located near the surface of the maria. For Mare Serenitatis, for example, the fill would turn out to be 600 km in diameter and 8 km thick, with a density of 3 gm/cm³ (*) surrounded by material with a density of 2 gm/cm³ (*). According to their view the original meteorite will have been destroyed by the impact.

A somewhat similar conclusion is reached by Ralph B. Baldwin, one of the best-known proponents of the Impact Theory. He suggests that the mascon-effect is produced NOT by buried meteoritic bodies but rather by high-density lava lenses at depths down to 82 km. Using Mare Imbrium as an example, Baldwin reconstructs the following events in its formation: A giant impact forms the Mare Imbrium which originally has a depth of 50 km and was not lava-filled (i.e. the impact was dry). The original mare begins to distort in an isostatic way, the deformation slowing down with time. Several major flows of high density lava fill the low spots and subsidence and compaction takes place. Due to the increasing load of high density matter, the crater bottom is continuously depressed. In this way a dense lens forms, centered in the crater and producing the observed mass excess which would vary with the cube of the diameter. He maintains that if the impacts occurred at velocities of 2 km/sec or greater, "the back pressures generated should have been great enough to cause the asteroid to lose cohesion and to turn itself inside out" so that "a considerable fraction of the mass would have been backfired out of the crater."

Diametrically opposed stands another well-known exponent of the Impact Theory - Harold C. Urey, who draws far-reaching conclusions from the mascons. It will be remembered that it was Urey who originally proposed a low-angle low-velocity collision between the Moon and an asteroid which produced Mare Imbrium and which gauged out the Sinus Iridum (which, incidentally, does not indicate the presence of a mascon). After shaping the Sinus Iridum, the asteroid buried itself south of the Imbrian center, flattened out below the surface and leaving a high density mass buried there. Precisely because of the presence of the mascons, says Urey, there could not have been any extensive lava flows on the lunar surface, for the mascons would have to sink toward the Moon's center in order to displace massive flows toward the surface. This situation would eventually lead toward an isostatic equilibrium and would not leave any mass concentrations. Urey concludes that 'the great smooth maria areas of the Moon are not lava flows, but owe their existence to some other process ...' probably surface water. He calculates that the Imbrian mascon is a flat, circular slab of chondritic material, 670 km in diameter and 4 km thick, having a mass of 5×10^{21} (*) grams and located near the center.

Thus the mascons are an exciting find, providing us with valuable clues about the Moon's early history. Gravimetric observations on the lunar surface itself, coupled with core sampling may eventually tell us more about their true nature.

References:

- P. M. Muller and W. L. Sjorgen, "Mascons: Lunar Mass Concentrations," Science 161: 680-684, 1968.
J. G. Stipe, "Iron Meteorites as Mascons," Science 162: 1402-1403, 1968
J. E. Conel and G. B. Holstrom, "Lunar Mascons: A near-surface Interpolation," Science 162: 1403-1405, 1968.
J. A. O'Keefe, "Isostasy on the Moon," Science 162: 1405-1406, 1968.
R. B. Baldwin, "Lunar Mascons: Another Interpretation," Science 162: 1407-1408, 1968.
H. C. Urey, "Mascons and the History of the Moon," Science 162: 1408-14010, 1968, and "The Contending Moons," Astro-nautics and Aeronautics 7: 37-41, 1969.

Foot-notes (*) indict that the exponential E was used to show the powers of ten. -dpc-

* * * * *

??? PUZZLERS ???

1) Assume that the universe is a billion billion light years in diameter and is packed with material weighing a billion billion tons per cubic inch and each gram of this matter contains a billion billion atoms.--Restricting yourself to a total of three digits, write a number that exceeds the number of atoms in the universe.???

2) What letter follows the following sequence???
O T T F F S S E _____.

Spy and Tell

In 1982 John Riggs called Bob Mayer's attention to an article in the September issue of Sky & Telescope on constructing a measuring engine (Bob's S & T hadn't arrived as yet). John was sure that Bob would be interested, and he was right. Bob, with his great skill, decided to duplicate the engine, and worked on it off and on for a year, finishing it recently. The measuring engine measures in increments of less than a micron (less than .0000031 of an inch). It can be used for measuring 4x5 negatives of the sky, finding orbits of comets and possibly binary stars. As always, hats off to Bob; a remarkable craftsman.

Dr. Elton Rock has been elected president of the medical staff of Sisters Hospital.

John Yerger gave a slide presentation on astronomy at the Lake Shore Branch Library in Hamburg on April 12th. The library invited elementary and high school students from the Frontier Central School District to attend.

After our February meeting, Doris Koestler was driving out route 290 and drove off the road. In driving back on, she hit a pothole and went across the road, over the guardrail and into the ditch, totaling her beautiful Chrysler Cordova. Police said that she probably bent or broke the front axle when hitting the pothole, thus causing the accident. There had been two other accidents at about the same spot within a couple weeks. Doris is now driving an AMC Concord.

On a happier note, Doris and hubby, Bill, mark their 25th wedding anniversary on May 16th, and are celebrating the event by taking a trip to Alaska from July 7-18.

Ken and Adrienne Kimble finished their CPR course recently. Adrienne is very busy heading the Health and Safety Committee at their children's school. This makes her responsible for the CPR course, blood mobile, bike rodeo, and Project Child Finder (fingerprinting children).

Jerry and Adrienne Morris are planning to go to Virginia for the May 30th solar eclipse.

On March 22nd, Carl Milazzo gave a talk on the University of Rochester's Mees Observatory to the Niagara Falls Ontario Club. He showed both slides and prints. Carl has spoken to the Rochester, Lockport and B.A.A. groups on the same subject.

Darwin Christy has finished the very tedious job of rewiring his whole house. He is now teaching telescope making at Remick Observatory.

Former very active member, Bill Chambers, has moved to Pasadena (the family will follow soon), where Bill will be working with lasers at Lockheed.

Beverly Botto, Jack Mack, Carl Milazzo, and former member, Dan Collins, went to see the Science Fiction, Science Fact Art Exhibit at the Cleveland Museum of Natural History where one of Beverly's space paintings was shown. There were 77 paintings, representing 44 artists.

Congratulations to Orrin and Jane Christy who have adopted a fine baby boy. He has been named Michael Erik. Darwin and Ruth are proud and excited grandparents.

Former member, Gene Witkowski, will be returning to Buffalo from Thailand at the end of May, and will be at our June meeting.

Shaun Hardy, Adrienne Morris and Carl Milazzo went to a meeting at the U.B. Observatory where they saw former Buffalonian, Cliff Stoll, and a few other acquaintances. Cliff, who in the past assisted Ernst Both on numerous occasions at the museum, has been working at Johns Hopkins University helping in the developing of computer software for the space telescope. He will be finished soon and will be going to Cornell University.

A photo of a brilliant aurora taken by Dan Marcus appears in the May issue of Astronomy magazine page 42.

Edith L. Geiger

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'SPECTRUM' deadline for SUMMER issue June 15th
SPECTRUM deadline for SUMMER issue June 15th

+++ ASTRONOMICAL HAPPENINGS +++

SOLAR: The SUN will leave Taurus and move into Gemini in May and then into Cancer in June. By that time the Sun will be near overhead marking 'summer solstice', the beginning of summer and warm weather. It also will mark the time when the Sun will start its southern journey again. All of this will occur on June 21st.

On May 30th, there is to be partial eclipse of the Sun as will be seen from our latitude. A path stretching from Mexico, through Texas, Mississippi, Alabama, Georgia, South Carolina, North Carolina, Virginia and finally out to sea through Maryland. Question(????) - Is it going to be 'total', 'annular', or 'antotalar'??? Oh well !!

LUNAR: The MOON will be at First Quarter, May 8th, June 6th and July 5th; Full Moons will occur on May 14th (Flower) and June 13th (Strawberry); Last Quarter on May 22nd and June 21st; New Moons will be on May 30th and June 28th.

On May 14-15 a penumbral eclipse of the Moon will occur as will there be again on the 13th of June. The May eclipse will be seen throughout the United States, but the June eclipse will not.

Conjunctions:- Mars - May 14th & June 10th

Saturn - May 14th & June 10th

Uranus - May 16th & June 12th

Neptune - May 17th & June 13th

Jupiter - May 18th & June 14th

Mercury - May 28th

PLANETARY:- Mars at opposition May 11th; closest approach on May 21st; Mercury at greatest elongation May 21st; Uranus at opposition June 1st; Venus in superior conjunction June 15th; Mars stationary June 20th.....

METEORS:- May 1st - Phi Bootes
May 3rd - Omega Scorpiids
May 4th - Eta Aquarids ***
May 15th - 'O' Cetids (daytime)
May 17th - Zeta Herculis
May 30th Eta Pegasids

June 3rd - Tau Herculis
June 5th - Chi Scorpiids
June 8th - Librids
June 8th - Arietids (daytime)
June 9th - Zeta Pegasids (daytime)
June 9th - Alpha Scorpiids
June 11th - Sagitariids
June 13th - Omicron Ophiuchids
June 15th - Lyrids
June 20th - Ophiuchids **
June 26th - Corvids (new)
June 28th - Bootids
June 28th - Draconids *****
June 30th - Beta Taurids (daytime)

* * * * *

\$\$\$\$\$ FOR SALE \$\$\$\$\$

Two (2) pieces of black PUC tubing, 12" in diameter by 1/4" wall thickness - good scope tubes. OFFER!!

ZX-81 + 16K RAM by Sinclair - \$55.00

I-M1 23K color computer, sound synthesizer, built-in tape deck, 2 hex pads, RAM expandable w/manual - \$300.00

Call 836 2048 between 6PM & 9PM, Monday thru Friday or between 10AM & 6PM, Saturday and Sunday.

David Jauch

* * * * *

* MAY Constellation *

COMA BERENICES, Berenice's Hair; "The streaming tresses of the Egyptian Queen----". This constellation can be found between Canes Venatici on the north; Leo and Leo Minor on the west; Virgo on the south; and Bootes on the east. It is not a conspicuous constellation as its brightest star is only of magnitude 4.2. Even so-- there are many deep sky wonders within its boundaries, listed as follows:

NGC (galaxies) 4032, 4037, 4064, 4136, 4150, 4152, 4158, 4162, 4168, 4192 (M-98), 4203, 4212, 4237, 4245, 4251, 4254 (M-99), 4262, 4274, 4283, 4293, 4298, 4302, 4312, 4314, 4321 (M-100), 4340, 4350, 4377, 4379, 4382 (M-85), 4383, 4394, 4414, 4419, 4448, 4450, 4455, 4459, 4473, 4474, 4477, 4494, 4498, 4501 (M-88), 4540, 4548 (M-91), 4559, 4561, 4565, 4571, 4595, 4635, 4651, 4670, 4689, 4710, 4712, 4725, 4747, 4793, 4826 (M-64), 4872, 4874, 4889, 4961, 5012, 6016, 5116, 5172.

NGC (globular clusters) 4147, 5024 (M-53), 5053.

Variables stars-

'R' Right ascension, 12 hours 10 minutes - declination, 18 degrees north.

'UU' Right ascension, 12 hours 30 minutes - declination, 25 degrees north.

Double stars-

'24' - orange & lilac, yellow & blue have also been given; '35' - lilac & blue; '17' - white & lilac; and Struve 1678 both white.

The North Galactic Pole (NGP) is located at right ascension, 12 hours 50 minutes - declination 17 degrees north.

Mythology has it as the glittering maze of Berenice's hair. Legend has it of a lady of great beauty named "Berenice", was of a royal family, married to Euergetes, one of the ancient Kings of Egypt. When her husband was about to set out on a dangerous mission, Berenice became so frightened that harm would befall him, she vowed to dedicate her beautiful hair to the goddess of beauty, should he return safely. Her fortune was good as he returned safely, and true to her vow, she promptly cut off her beautiful tresses and placed them in the temple of Venus.

Later, they were missed from the temple, but Conon, the Astronomer Royal, assured the King that Jupiter was so inspired by Berenice's sacrifice that he took her tresses the temple and enshrined them among the stars forever. He proved the statement by pointing out that glittering star cluster to the King and the people, reminding them it to be Berenice's Hair.

In the National Museum at Naples, there is a beautiful bronze bust of Berenice.

* Ancient Constellation *

TURDUS SOLITARIUS, "The Solitary Thrush" which was not really a thrush, but was a flightless pigeon related to the dodos. This ancient constellation was formed by Le Monnier in 1776 from some faint stars out of the tail-tip of Hydra. Another avian figure which some modern seekers of fame in the naming of constellations called it Noctura, the Night Owl. Little seems to be known of this figure in the sky, even though Ideler wrote about it being Einsiedler, the German Drossel.

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* JUNE Constellation *

LUPUS, The Wolf, is more or less a southern constellation as its northern most point is -30 degrees. It is located between Libra on the north; Centaurus on the west; Circinus on its south; and Norma & Scorpius on the east. Should any of our members plan a trip south, they might be interested to take along the following deep-sky objects:-

NGC (galaxies) 5530, 5643; ---I,4444.
NGC (globular clusters) 5824, 5927, 5986.
NGC (planetary nebulae) 5882, 5873, 6026; ---I,4406.
NGC (open clusters) 5593, 5749, 5822.

Variable stars:

'S' Right ascension, 14 hours 53 minutes - declination, 47 degrees south.

'GG' Right ascension, 15 hours 19 minutes - declination, 41 degrees south.

'GH' Right ascension, 15 hours 25 minutes - declination, 53 degrees south.

'GO' Right ascension, 15 hours 28 minutes - declination, 37 degrees south.

Double stars;

'Pi' Lupi; 'Kappa' Lupi; 'Mu' Lupi; & 'Eta' Lupi. None of which, color designations could be found.

* * * * *

J. Tristan and Deborah A. Di Lapo

Tristan, a successful restaurateur at a very young age, was born in Buffalo and spent his early years in Amherst where he went to St. Benedict's School for his elementary education. He went on to Bishop Neuman High School and became a member of the National Honorary Society. He went out for track, and also found that astronomy had a great appeal. He had a 60 mm refractor which provided him with much enjoyment as he watched the heavens.

Tristan continued his education at Canisius College, majoring in physics for one year. He then decided to transfer to the State University College on Elmwood Avenue from whence he received his B.S. in physics in 1972. On graduating he had a 4.0 average, and was honored by being elected an associate member of Sigma Xi, a National Scientific Research Society. In 1974-75 he went to the University of Buffalo to work towards a Masters in physics. While there he was offered an assistantship in physics in the graduate department, but turned it down as he was planning to change his course with the idea of getting his M.B.A. in business. He went to work so he didn't finish his Masters, but in 1976 he went back to the university for a year and received a B.A. in secondary education.

Tristan's grandparents and father are the owners of the Cloister on Delaware Avenue, "one of America's 'top 100' restaurants," and Tristan worked there during his high school and college years. With that background it was quite natural for Tristan to go into the restaurant business. He designed both the inside and outside of the building on Virginia Place in which he owns Coco's restaurant. This fall marks his successful three years in business. The building was built by Tristan and the family construction company of Di Lapo and Di Lapo. Tristan has entertained the B.A.A. at two summer star parties at the restaurant and is a generous and most gracious host, serving a bountiful repast to very appreciative members who have voracious appetites. If he ever decides to give up the restaurant business, he will probably teach physics in high school.

Interest in astronomy lay dormant during Tristan's college years. In January of 1981 he heard of the Dobsonian telescope, and read about it with fervent curiosity. He purchased a 13", and has been experimenting with it ever since. He is now computerizing his scope and working with Joe Cardin, a former B.A.A. member and a mechanical engineer in the Space Products Division at Moog, to produce a system whereby they will be able to locate and track celestial objects. Tristan is also working on an 18" Dobsonian which he hopes to finish in a month or so. He and Debbie became members of the B.A.A. in 1981. Tristan is one of the members serving on the nominating committee for this year's election.

He and Debbie Lagodna were married in October 1983, and are building a geodesic type home on a ten acre tract on Cole Road in North Boston. They hope to have it finished by early fall. The view of the area and of the skies is magnificent.

Several years ago Tristan played country music on his six string guitar. He has been so busy of late that he hasn't had the time to continue this enjoyable pastime. At the restaurant, however, he keeps abreast of the music scene by acting as disc jockey on numerous occasions.

Both his mother and father attended art school and, as a result, Tristan has inherited a certain artistic ability which he finds advantageous from time to time. He likes to read; especially science fiction, and books and articles on computers and, of course, astronomy.

Tristan has done considerable traveling in the past, but his whirligig life in Buffalo has kept him from further travel. He has been to California, Florida, the Keys, Virgin Islands, Puerto Rico, Montreal, and parts of eastern Canada. He hopes to go to Europe some time in the future. If, by the way, you are traveling off Sheridan Drive, and east of North Forest, you may pass Tristan Lane, named for Tristan by his father while doing construction work in that area.

Debbie, throughout her days in public schools and college, was an extraordinary student. She won the Jesse Ketchum Medal for scholarship and good citizenship at School 51. She went on to Riverside High School where she won two Latin awards and was a member of the National Honorary Society. This outstanding student took college subjects in her sophomore year, and graduated from high school at the end of her junior year. School authorities, along with Dr. Manch, then Superintendent of the Buffalo Public Schools, thought Debbie was ready for college so she was permitted to skip her senior year and go on to the University of Buffalo where she majored in speech communication. She spent three years as an undergraduate and one and a half years in graduate school, receiving her Master's degree at age 21. She became an assistant at the graduate school and won the Tindle-Shupe Award for Clinical Excellency from the Department of Communication Disorders and Sciences. For the past eight years Debbie has been a speech pathologist at Children's Hospital where she finds her career helping children very rewarding.

Debbie is very fond of birds and animals and, as a result, she and Tristan have two parrots, a 32 inch macaw and a Mexican redhead Amazon; two cockatiels and two parakeets. The birds are not caged and are free from traditional fetters. The Di Lapos also have a cat that has learned to ignore birds. Debbie had an iguana, named Cecil, when she was a teenager, and through the years it grew to be about five feet long and very tame. He died a few months ago of old age. Added to her interest in creatures, is her growing curiosity about the unfathomable stars. It should also be noted that Debbie is a vegetarian.

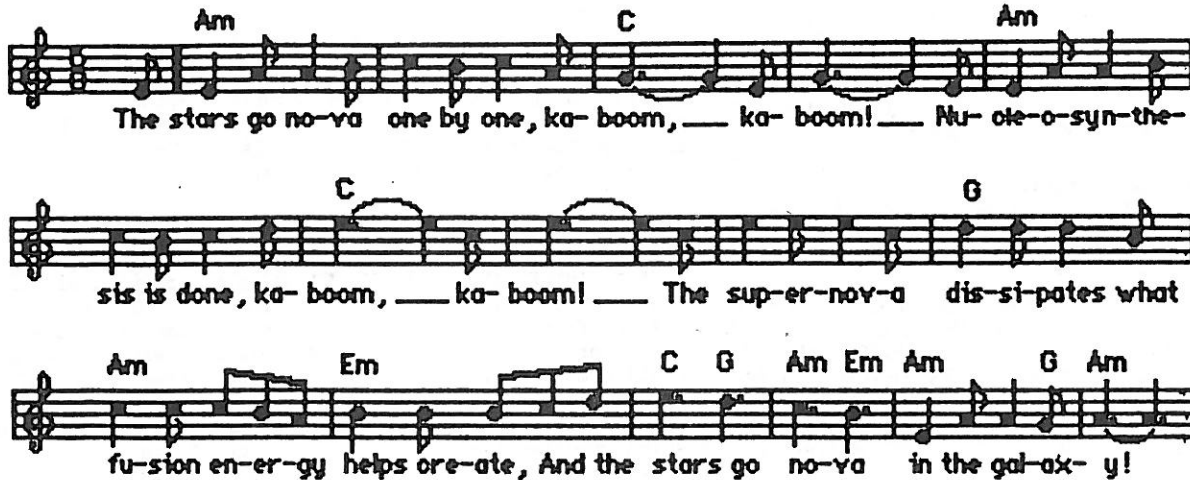
Tristan and Debbie are an amazing couple. They are both intellectually gifted and are polished, cultured and refined young people who have established themselves in worthwhile careers at an early age. We wish them continued success in the years ahead, and a bright and happy future.

Edith L. Geiger

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SUPERNOVA

To the tune of "When Johnny Comes Marching Home"



The heavy elements are formed, kaboom, kaboom!
And from their stellar cores are torn, kaboom, kaboom!
Shells of gas are strewn through space / distributing matter all over the place,
And the spiral arms are / littered with debris.

As years go by, the remnant spreads, kaboom, kaboom!
But the universe is far from dead, kaboom, kaboom!
To eliminate the tedium / the interstellar medium
Forms the molecules that / make up you and me.

Heard at Stellafane '82
Attributed to David Levy and
Peter Jedicke

Composed on a Macintosh
computer by Jerry Morris,
Adrienne Morris, and
Carl Milazzo

+ INSTRUMENT NOTES +

Now and then there is an echo from the past at our Instrument Section meetings. At our March meeting Norm Nighter brought in a mirror which he wanted to have tested before having it re-aluminized, Norm mentioned that Miro had offered to do the re-coating.

The mirror rated an 'excellent' on the test stand. It turned out that Norm had been in the Museum Telescope Making class in the spring of 1956, or 28 years ago. The records for that class show the sketches of the test figures for each mirror as it was being figured. Norm's mirror showed improvement as different corrective measures were applied. The final sketches have been lost, or were not made, but the progression of sketches showed a steady improvement. The final figure must have been very satisfactory as that is the present status of the mirror.

Norm duly finished a mounting and has been using the scope through the years. Norm's work has had an influence

down through three generations in his family. His granddaughter has become very much interested in the instrument. She was so taken up with the scope that one day she requested that Norm leave it to her in his will. "But I don't have a will", said Norm, somewhat taken aback. "Well then, you can give it to mother and she can give it to me." It certainly looks as if Norm's scope will see good use during the coming years. Perhaps it was this thought that made Norm look over the mirror and decide to have it put into good shape again.

Dick Szymanski brought in a 6 inch Dynascope which was out of alignment. Bob Mayer duly collimated it. And so another proud owner was sent away rejoicing. The slogan for our "shop" should perhaps be: "Limp in - Leap out". What if just a few of the many scopes we have helped revitalize could be brought together on a clear night?? Wouldn't that make a bang-up star party???

Ed Lindberg

* * * * *

1) "999" - A quick calculation of the number of atoms gives a number with digits numbering in the hundreds. The number nine to the exponent (nine to the ninth) has a number of digits in the hundreds of millions, so it is much greater than the total number of atoms.
2) "N" - This is true if we assume that the letters are the first letters of the numerals in the sequence One, Two, Three, Four, etc.

!!! ANSWERS !!!

New members:-
Paul G. Scolese &
Francis E. Scolese
Daniel Hamilton
Alexander Z. Chaberski
David R. Crosson
Milton Correll &
Madlyn Correll
Welcome back members:-
Frank Zajzck
Michael Krasner

-*- MEETING NOTICES -*-

MAY MEETING: - THE B.A.A. WILL RETURN TO THE AUDITORIUM OF THE SCIENCE BUILDING AT BUFFALO STATE FOR THE MAY 11TH MEETING. INSTEAD OF A TALK ON A SPECIFIC TOPIC, WE WILL HAVE A PANEL OF EXPERTS. SIX EXPERTS FROM OUR CLUB, ERNST BOTH, JACK MACK, MICHAEL IDEM, FRED PRICE, CARL MILAZZO AND JOHN RIGGS, WILL FIELD QUESTIONS FROM THE AUDIENCE ON ANY TOPIC IN ASTRONOMY. TAKE A MINUTE OR TWO TO ORGANIZE THOSE QUESTIONS THAT HAVE PLAGUED YOU FROM TIME TO TIME; HERE'S A GOOD CHANCE TO HEAR THE ANSWER. MEETING TIME IS 7:30 P.M.

JUNE MEETING: - THE JUNE 9TH MEETING WILL ALSO BE HELD AT BUFFALO STATE, STARTING PROMPTLY AT 7:30 P.M. THE SPEAKER FOR THE EVENING WILL BE JEFF PIGNATORA OF NORTH TONAWANDA, WHO IS A MEMBER OF THE WEBB SOCIETY AND THE LOCKPORT ASTRONOMY ASSOCIATION. HE HAS RECENTLY BUILT AN ULTRA LIGHT WEIGHT 18 INCH TELESCOPE THAT HAS AN OPEN TRUSS TUBE.

HIS TALK IS ENTITLED, 'GALAXY CLUSTERS' WHICH WILL DEAL WITH WHY AMATEUR ASTRONOMERS SHOULD OBSERVE THEM AND HOW. ALSO GALAXY CLUSTER DISTRIBUTION, PHYSICS, EVOLUTION, CLASSIFICATION AND STRUCTURE. IN ADDITION, HE WILL BE DISPLAYING SOME BOOKS AND CHARTS ON THE SUBJECT, ALONG WITH SOME PALOMAR SKY SURVEY PRINTS OF SOME BRIGHT AND RICH SUPER GALAXY CLUSTERS.

* * * * *

NOMINATION AND ELECTION NOTICE---Elections will be held at the June meeting for the offices of President, Vice President, Secretary and Treasurer. Larry Carlino and Tristan DiLapo have been appointed as the nominating committee, and they will name their slate at the May meeting. Nominations from the floor will be accepted at the May meeting, and those nominated will have their names placed on the ballot. Nominations will also be taken from the floor in June prior to the election.

A quorum of 20% of the members eligible to vote is needed at the June meeting, so plan to attend. All regular members are eligible to vote as are all family members who are 18 years old or older.

* * * * *

:** OBSERVATIONS **:

March 30-31 I observed planet Mars with the 13.1" reflector, very striking view at 372x. Dark Mare Syrtis Major on planet's central meridian at 2:00 AM EST. Yellow-white dust cloud noted over the Hellas region. Planets 94% illuminated gibbous shape is quite evident even at 87x. Employing a 25a red filter, a darker shaded border was detected surrounding the north polar cap remnant. Not bad for a still small disk of only 12.5 arc seconds in diameter.

After observing variable stars now for the past 6 months I find that my 'velocity' of observations has grown to 150% that of my deep-sky observations. In my opinion, variable star observing can be even more challenging than deep-sky viewing. As an example - a given telescope might be employed to observe late 14th magnitude galaxies but when used to observe faint variable stars, it may be asked to punch down to the late 15th magnitude with the additional demand of a 2/10th or so accuracy of magnitude estimation!

Deep-sky objects appear the same over a period of centuries but variable stars are ever changing allowing the modestly equipped amateur to still contribute useful data to professional astronomy.

After a while one finds that variable star observing is actually additive, luckily variables can still be observed at full moon, unlike deep-sky objects.

How good is the Beaver Meadow
Telescope's new mirror coatings?

On the night of March 24-25, John Riggs and myself were out at the Observatory estimating a number of variable stars. One particularly difficult variable was 'TT' Bootis. If we can accept this stars comparison magnitudes as accurate then the 12.5" reflector was penetrating to as faint as magnitude 15.8. Thus - the new coatings can be considered to be very good.

On that same night we briefly compared John's French made Clave Plössl eyepieces with my tele-vue Plössls. In so doing one point became apparent, at low and medium powers, both eyepiece sets performed equally well but at high power the Clave eyepieces are rated superior.

From what I've seen, in-order of increasing 'average' perfection, I rate Brandon Orthoscopic eyepieces as very good, Meade research grades as very good, Tele-vue Plössls and wide fields as excellent, and Clave Plössls as something approaching the best yet made.

Michael Idem

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Even though the skies opened up on the morning of April 21st, I was very disappointed to find that only seven meteors from the Lyrids came shining through. What there were, were as bright as 2nd magnitude and very yellow. One could almost smell the aroma of yellow daffodils in the air, because of their brightness of color. One more meteor which I observed was a sporadic and came out of the north which produced a rather dull red color of 4th magnitude.

The evening skies did not produce any meteors which I might have seen as Lyrids. In fact, I did not see even one sporadic meteor. Of course I did not observe too long that evening anyway.

Darwin Christy

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* Observatory Notes *

Public Nights at Beaver Meadow Observatory are now under way. The general schedule is the first and third Saturday nights of a month, weather permitting, now through June. During July and August, every clear Saturday night will be set aside for Public Night. In addition, during the morning and afternoon of Wednesday, May 30, the Observatory will be open to view the partial eclipse of the Sun. This will be the first time that a partial solar eclipse may be easily seen from the Observatory. It should be quite an event. And, if the weather is good, you can take a pleasant walk on one of the many trails at Beaver Meadow after the eclipse is over.

The freshly aluminized optics of the 12½-inch telescope have enabled our observers to see stars as faint as 15th magnitude on most nights. Only occasionally in the past was this possible with the deteriorating coatings. Dan Marcus and Bill Smith have recently taken advantage of the repaired frequency controller to produce a number of excellent astrophotos from the Observatory. It has been several years since the Observatory has been used by members for an organized program of astrophotography. Variable stars continue to receive their share of observing time at Beaver Meadow. Of special interest were the eruptive outbursts of 'SS' Aurigae and 'Z' Camelopardalis seen in March. With the arrival of spring and summer, activity at the Observatory is bound to become even greater!

John Riggs

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NOMINEES AS PRESENTED BY THE NOMINATING COMMITTEE FOR THE YEARS 1984-1986 ARE:-
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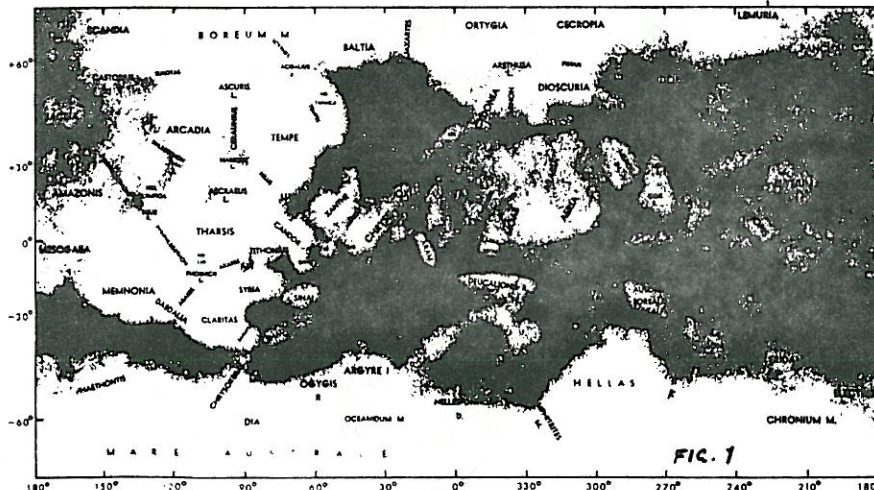
'SPECTRUM' deadline for SUMMER issue June 15th

Both seasoned planetary observers and casual viewers are in for a treat this spring and summer as the planet Mars makes its closest approach to Earth since 1973. Shortly after its May 11 opposition to the Sun, the Red Planet grows to an apparent size of 17.6 arc sec., large enough to reveal considerable detail and sufficient to allow serious visual and photographic observations. With the demise of the Viking orbiters, recording critical Martian surfaces and atmospheric phenomena once again becomes the domain of the earth-based observer.

The current apparition of Mars presents an appearance similar to that of 1969. The northern hemisphere will be tilted toward the earth initially, with the southern hemisphere swinging into our line-of-sight in the fall. This geometry affords a unique opportunity to view all the Martian surface within a six-month period.

On opposition night (May 10-11) the Red Planet brightens the southeast sky at magnitude -1.9 showing its characteristic strong red-orange coloration. It is now mid-summer in the Martian northern hemisphere and mid-winter in the south. A 3-inch refractor or 4 $\frac{1}{4}$ -inch reflector should reveal some of the more prominent surface details. The dark triangular Syrtis Major will probably be broad and distinct against the ochre backdrop of the surrounding Martian desert. The planet's atmosphere is characteristically devoid of dust storms or major obscurations during this season, so a complete "washout" is unlikely. The tiny residual North Polar Cap (consisting largely of water ice) may be much more difficult to view and could be hidden by polar hazes later in the apparition. (I managed to glimpse the cap through a 5-inch on April 20 and found it easy with an 11-inch.)

Limb brightenings and the hazy South Polar Hood are a possibility with a 6-inch 'scope, and some of the other major dark markings such as Meridiani Sinus, Mare Acidalium Aurorae Sinus, and others will be visible if high magnification is employed and the air is sufficiently tranquil. (see the attached Mars map {figure 1} for specific coordinates.)



Some of the less prominent Martian features tend to be highly variable in shape and intensity and bear careful watching. Solis Lacus at lat. -30, long. 80 and the Thoth-Nepenthes complex of streaks at +10, 270 are two such areas. In addition, occasional white clouds, a short-lived phenomenon, may suddenly appear in the Syrtis Major and Solis Lacus regions. They probably require a good 8-inch scope for visibility as do the strange W-shaped clouds sometimes found in the Tharsis volcanic area. An approximate "calendar" of key Martian events is provided below:

MAY 5 - Mars approaching opposition, Diameter 17 arc sec. clouds, frosts prominent in northern hemisphere but rare in south. Limb brightenings.

- MAY 11 - Mars at opposition. disc diameter 17.4 arc sec. mid-summer, northern clouds frequent. Syrtis Major broad.
- MAY 19 - Mars closest to earth (49.5 million miles) disc 17.6 sec. fine surface detail visible in good seeing conditions. position of north polar hood forming.
- JUNE 8 - Disc diameter 17.2 sec. N. polar area tilted toward earth all month, both N. & S. polar hoods may be present.
- JULY 14 - Autumn equinox in northern hemisphere. disc diameter has dropped to 12.8 arc sec. Hellas area probably bright.
- JULY 25 - Disc diameter below 12 sec. good detailed views still possible with 8-inch or larger 'scope. S. polar cap large and bright.
- AUGUST 21 - Disc less than 10 sec. Both polar regions can be seen through the end of 1984.
- OCTOBER 1 - Disc diameter 8 sec. Polar region tilted toward earth.
- NOVEMBER-DECEMBER - Disc diameter shrinks to 6 sec by end of year. Possible formation of dust storm yellow clouds in S. hemisphere, especially near Hellas and Solis Lacus.

Seeing the finer Martian detail is not easy and training the eye is a 'must' if serious disappointment is to be avoided. Low-contrast markings can be observed only if the seeing conditions are excellent (difficult because Mars is at a very southerly declination, not too far from Antares). In addition, the optical quality of the observer's instrument must be first-rate and all mirrors and lenses clean and dew-free.

I would suggest three or four preliminary observing sessions of some 15-20 minutes, trying a variety of eyepiece and filter combinations until the optimum result is achieved and both eye and mind acclimated to observing low-contrast detail. Interestingly, the Martian 'day' of 24 hr 37 min provides a gentle and consistent progression of the surface features across our line-of-sight at a rate of just under 15 degrees per hour (consult the chart, -figure 2- for the Martian central meridian on selected dates). By viewing

Mars at the same time every 3rd or 5th evening, an observer can cover all longitudes in about a forty-day period, the Martian topographic features working their way backward by some 9 degrees per day.

Sketching Mars at the eyepiece is a bit more leisurely a pursuit than drawing the fast-rotating Jupiter, and a careful scrutiny of the planet should be undertaken before attempting the actual sketch. Pay attention to the size and position of the 'phase defect' that makes Mars appear gibbous any time more than two weeks from opposition. Use the traditional 2-inch circle, sketching in the main details first and fixing time and central meridian. The subtle details can then be added and bright features denoted by utilizing dashed lines. Notes on color, intensity and any peculiarities may also be useful, and telescope and seeing transparency parameters should be recorded.

Suitable color filters are a great aid in discerning both atmospheric and surface detail. A Kodak (Wratten) W-23A (Orange) is especially effective in improving the contrast of surface markings while also helping to steady the image somewhat. Those with longer apertures might find a W-25 (Red) even more effective, and observers with small 'scopes may find a W-15 (Yellow) useful as it subtracts less total light. The same W-15 or a W-58 (Green) will serve to improve the contrast level of white clouds, frosts and dust storms should they be present. Finally, a Blue W-38A (small 'scopes) or Violet W-47 (larger apertures) will help to reveal limb hazes and Martian atmospheric phenomena such as the "blue clearing", a sudden increase in the transparency of the Martian air in blue light where it is normally opaque.

Without a doubt, observing Mars is one of the most challenging and fascinating tasks an amateur astronomer might undertake. At the very least, it teaches patience and perseverance in observing; at the best, it may add measurably to our incomplete knowledge of the planet and even provide the opportunity for the discovery of the unexpected.

Martian Central Meridian at 10P.M. EDT approximately

MAY 5 - 265 degrees	JUNE 20 - 215 degrees
MAY 11 - 211 degrees	JULY 5 - 76 degrees
MAY 20 - 138 degrees	JULY 20 - 295 degrees
MAY 26 - 80 degrees	AUGUST 5 - 143 degrees
JUNE 5 - 350 degrees	AUGUST 20 - 0 degrees

To find the central meridian for dates and times not listed, subtract 9 degrees for each day after the date given. Add 14.6 degrees per hour for times after 10 P.M.; subtract for times before 10 P.M.

Fig. 2

References: SKY & TELESCOPE, March 1984, pp. 252-254
The Strolling Astronomer, January 1984
 pp. 125-130

Larry Carlino

* * * * *

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 John Riggs
 Al Kolodziejczak
 Doris Koestler
 'me'

MALL SHOW A GREAT SUCCESS !

ON APRIL 6TH AND 7TH OUR CLUB SPONSORED A MALL SHOW AT THE EASTERN HILLS MALL. THE SHOW CONSISTED OF SKETCHES, PHOTOS, PAINTINGS, BOOKS, CHARTS, BINOCULARS, BOTH COMMERCIAL AND HOMEMADE SCOPES, AND AN ANTIKYTHERA. MEMBERS SPENT 2 DAYS ANSWERING THE QUESTIONS OF CURIOUS MALL SHOPPERS AND PASTING OUT INFORMATION ABOUT THE BAA. ALSO, DURING QUIET TIMES, THERE WERE OPPORTUNITIES TO GET KNOW EACH OTHER BETTER. IN ALL, 34 MEMBERS OR 44 % OF OUR CLUB MADE SOME CONTRIBUTION TO THE SHOW.

HOPING WE DO NOT FORGET ANYONE, WE WOULD LIKE TO ACKNOWLEDGE:

CLAUDIA BIELINSKI FOR HER TIME; KEN BIGGIE FOR HIS TIME; BEVERLY BOTTO FOR HER TIME AND PAINTINGS; LARRY CARLINO FOR HIS SKETCHES AND PHOTOS; MIRO CATIPOVIC FOR HIS C 8; DARWIN CHRISTY FOR HIS PHOTOS; TRISTAN & DEBBIE DILAPO FOR THEIR TIME, RV-6 & TABLE; JACK EMPSON FOR HIS TIME; EDITH & CARROLL GEIGER FOR THEIR TIME & EDITH'S MOON SKETCHES; DAN HAMILTON FOR HIS TIME; KEN KIMBLE FOR HIS TIME, BOOKS, DRIVING AROUND & ROPES; DORIS KOESTLER & HER HUSBAND FOR THEIR TIME, 6 " SCOPE AND MANY HOURS OF ORGANIZATING; AL KOLODZIEJCZAK FOR HIS TIME, BOOKS , 10 " SCOPE AND MANY HOURS OF ORGANIZING; STEPHEN KRAMER FOR HIS TIME & ANTIKYTHERA REPLICA; STEVE KRICKORICH FOR HIS TIME & HOMEMADE 10 " SCOPE; JOHN LIPTAK FOR HIS PHOTOS; PAT LOEBEL FOR HER TIME & 80 MM BINOCULARS; DAN MARCUS FOR HIS TIME & PHOTOS; BOB MAYER FOR HIS TIME, MODELS & ANTIKYTHERA REPLICA; CARL MILAZZO FOR HIS TIME, ADVICE, VAN WHENEVER WE NEEDED IT, KNOWLEDGE OF THE CLUB'S SCOPE OWNERS, 13 " SCOPE & PHOTOS; ALLAN MOHN FOR HIS TIME & MIRROR BLANK; ADRIENNE MORRIS FOR HER TIME; STEVE NOWORYTA & HIS WIFE FOR THEIR TIME & 10" HOMEMADE SCOPE; DR.PRICE FOR HIS MOON PAINTINGS; JOHN RIGGS FOR HIS PHOTOS; ROWLAND RUPP FOR HIS TIME, 2 " HOMEMADE SCOPE, PHOTOS, PRINTING OF HANDOUTS & HIS SUPPORT AND ENCOURAGEMENT; JIM RUSSELL FOR HIS TIME; BOB & LINDA SCHNEIDER FOR THEIR TIME; BILL SMITH FOR HIS TIME & EXHIBIT EASELS; MICHAEL SCROGER FOR HIS TIME; WALT WHYMAN FOR HIS MOONWATCH SCOPE; AND JOHN YERGER FOR HIS TIME, SLIDE SHOW & 3.5" HOMEMADE SCOPE.

CONGRATULATIONS BAA FOR A JOB WELL DONE !

AL KOLODZIEJCZAK
 DORIS KOESTLER

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Buffalo Astronomical Association, Inc.

D. P. CHRISTY JR.
 216 KOHLER ST.
 TONAWANDA, N.Y.
 14150



KENNETH & ADRIENNE KIMBLE
 4 EDEN AVE.
 TONAWANDA, NY 14150