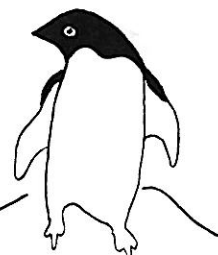
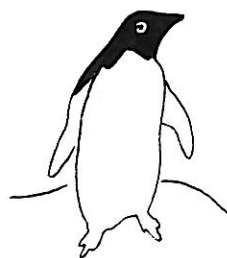
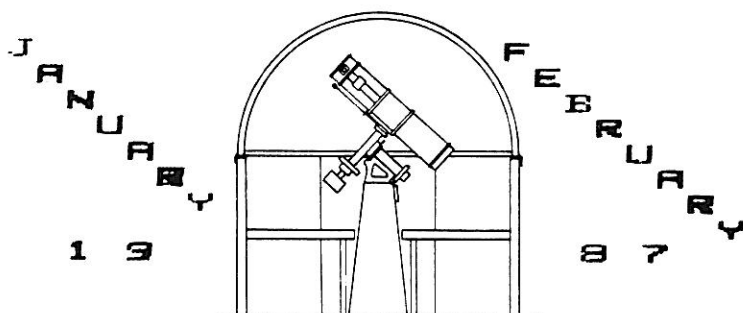


the

Spectrum



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!! MEETING NOTICES !!

JANURAY 9, 1987 beginning at 7:30 PM at the Buffalo Museum of Science, our first meeting of 1987 will feature a talk on the Sun by our own member Ken Kimble, who does an excellent job on the subject. And remember, its time to switch our meeting location from Buffalo State College to the Museum of Science. Ken's presentation on the Sun will be followed by refreshments for everyone. See you there....

FEBRUARY 13, 1987 starting at 7:30 PM at the Buffalo Museum of Science, our second meeting of 1987 should prove to be of special interest to all since it will feature a roundtable discussion of Cosmology. The table will seat such local luminaries as Dr. Jack Mack and Mr. Rowland Rupp; also perhaps Mr. Alphonse Kolodziejczak and Mr. Ken Kimble if they are available.

I would recommend we all bone-up a bit on the subject of Cosmology between now and February 13th (Friday the 13th) to make this a lively discussion, and if anyone else would like to be a member of the roundtable please let me know by meeting time.

Ken Biggie

The following articles may be helpful for those members interested in preparing for the February roundtable discussion on Cosmology :-

- 1) "THE INFLATIONARY UNIVERSE LIVES ?"
SKY & TELESCOPE 3/83, PG.207.
- 2) "BEYOND THE BIG BANG"
SKY & TELESCOPE 3/83, PG.211.
- 3) "TESTING GENERAL RELATIVITY : 20 YEARS OF PROGRESS" SKY & TELESCOPE 10/83, PG.294.
- 4) "THE DISTANCE SCALE OF THE UNIVERSE"
SKY & TELESCOPE 12/83, PG.511.
- 5) "THE FUTURE OF THE UNIVERSE"
SCIENTIFIC AMERICAN 3/83, PG.90.
- 6) "THE INFLATIONARY UNIVERSE"
SCIENTIFIC AMERICAN 5/84, PG.116.
- 7) "VERY LARGE STRUCTURES IN THE UNIVERSE"
SCIENTIFIC AMERICAN 7/86, PG. 38.

AL KOLODZIEJCZAK

I DON'T UNDERSTAND THIS !

Astronomy, at times, can be very confusing, particularly when it deals with related topics like relativity and cosmology. The difficult mathematics and complex concepts are enough to discourage any layperson. Recently, however, I've encountered a problem that stems more from a philosophical hurdle. It is called the "anthropic principle".

The anthropic principle says that the observer, presumably us, directly or indirectly, influences the structure of the universe. I find this hard to imagine. After all, haven't we been taught that mankind, the earth, even the sun and our galaxy have no central role in the cosmos? Thinking that we are significant in the scheme of the universe was presumed dead following the acceptance of the Copernican revolution. How did such an anachronistic idea get resurrected?

Several properties of nature contribute to the formulation of the anthropic principle. One is the large number relationships identified by such eminent theoreticians as Arthur Eddington, Paul Dirac and Herman Weyl. Secondly, many

coincidences in physics have caused outstanding scientists, including Fred Hoyle, Robert Dicke and Stephen Hawking, to speculate that the universe is not randomly structured but is, more or less, carefully designed. With such a roster of supporters one cannot dismiss the anthropic principle easily. The final foundation for this new concept is quantum mechanics, which postulates that observation influences the outcome of events at the microscopic level.

Physicists have noted that several large numbers which appear to be unrelated are fairly close to the number 10^{40} . Recall that 10^{40} means a one followed by forty zeroes, so 10^{40} is a large number indeed. Examples are: 1) the ratio of the time required for light to arrive from the edge of the observable universe to the time taken by light to cross a proton, 2) the gravitational fine structure constant and 3) the ratio of the electrical force between two protons to the gravitational force between them. Other parameters related to this magic number are the number of protons in the observable universe, 10^{80} or $(10^{40})^2$, and the ratio of the age of the universe to the Planck time, 10^{60} , or $(10^{40})^{3/2}$.

The fact that these values only approximate 10^{40} is dismissed lightly by those who find significance in them. As P.C.W. Davies said "compared to 10^{40} , even 10^2 is a minute fraction." I find this statement somewhat difficult to understand because the factor 10^2 is a multiplier that alters the result by 100 to one. Maybe Davies only thinks in terms of logarithms. Nonetheless, advocates ask what deep underlying principle may be involved in these relationships.

Other coincidences in nature lead some scientists to conclude the universe is fine tuned to support the existence of intelligent beings. The fact that carbon, an atom essential to life, is produced from helium in the core of stars as a result of critically balanced nuclear properties is one. Another is that the expansion rate of space is just right to permit life to develop. If the rate were faster, galaxies and stars wouldn't form. If the rate were appreciably slower, gravity would cause the universe to collapse long before life could evolve. Several other examples of finely balanced conditions in physics, without which we wouldn't be here, have been cited.

Advocates of this thesis fall into three groups. In the first are those who point out that if intelligent beings can observe the universe, then the universe must be structured such that intelligent beings can exist in it. This rather self-evident position is known as the "weak" anthropic principle. It does help explain one of the large-number relationships--the ratio of light travel time from the edge of the universe, in other words the age of the universe, to the time it takes light to cross a proton. The time required for light to cross the proton is believed to be fixed for all time, but the age of the universe, obviously, increases as the universe grows older. The present age of the universe allows enough time for stars to form heavy elements that eventually become beings who observe the universe. In far later eras the stars will have died out and so, presumably, will we. So we have to exist now, not earlier, not later. Therefore, surprisingly, biology offers insight into at least one large number coincidence.

The "strong" anthropic principle is much harder to accept. Its supporters state, as best I can tell, that any "real" universe has to contain intelligent life. This means that all these numerical and physical properties that combine to

permit our existence have to be what they are so we can observe them. This is much like the old problem of whether a falling tree that no one hears really makes a sound. If no one ever could observe the universe it wouldn't be a real universe at all, according to proponents of the strong anthropic principle.

How can this be? One suggestion is that the parameters of the universe were carefully adjusted at creation to produce a universe where observers can live. That sounds to me like the traditional religious view held in centuries past: God created the world for man to inhabit.

If such a provocative idea is too much for you, the strong anthropic principle also can be explained by a multitude of universes. According to this idea, physical constants differ slightly in each universe until all conceivable combinations are satisfied. In only a few of these universes will conditions work out right for the existence of observers and, obviously, we inhabit one of them. Since our observation is, by definition, limited to this universe it seems impractical to explain its properties on the basis of other universes with which we can never have contact. Invoking a concept that cannot be proven or disproven seems like cheating.

One interpretation of quantum mechanics also gives rise to multiple universes--zillions of them. (Please note: zillions far exceeds "billions and billions".) According to quantum physics, subnuclear activity is expressed by probabilities, not certainties. When one of these events is observed, it is transformed into a certainty by the act of measurement. Some physicists think that all the probabilities continue to exist in branching universes. While this may be a convenient way of looking at things, it certainly seems to be an awkward way for reality to be structured.

However, this viewpoint does link the observer, us, to elementary physical phenomena. It is suggested that in some way, incredibly vague to me, our effect on quantum activity today extends backwards in time and helps shape the earliest events in the universe. If so, we participate in the operation of the universe, maybe even in its creation which makes our existence as observers in its future inevitable. This third form of the anthropic principle is the "participatory" anthropic principle.

If anyone is familiar with the anthropic principle and can figure out what's going on, I urge you to explain it in a future issue of THE SPECTRUM. For myself, I am prepared to accept the relatively safe "weak" principle, although the suggestion that large number relationships are truly explained biologically sounds like stretching things a bit. And speaking of the large number relationships, it appears to me that with all the physical constants there are to choose from, one can always find some that can be twisted into showing a relationship that doesn't exist at all. Despite the credentials of the contributors to the anthropic principle, I have a strong suspicion that it is based on intellectual humbug.

Leslie Martin

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PRESIDENT'S CORNER

For all those members who have recently indicated an interest in activating our Study Section, Bill Rogers has proposed commencing section meetings on a regular basis at the Museum of Science possibly on the 4th Wednesday of the

north. Specific plans regarding time, date, format, etc. have not been finalized so all those interested please contact Bill as soon as possible.

I would like to give a special thanks to Marilou Bebak, Jack Empson, Jack Mack, Dave Sepulveda and Doris Koestler for volunteering their time on Tuesday, November 18th representing the B.A.A. for 3 hours at the Museum of Science fund raising campaign.

Just a reminder for everyone, but especially newer B.A.A. members, that in January we change our meetings location from Buffalo State College on Elmwood Ave. to the Museum of Science off of Humboldt Parkway. We will be at the Museum through June 1987, then in September its back to Buffalo State again through December 1987.

Anyone who would like to suggest a particular topic for a future meeting, or who may know someone who could be a speaker at a future meeting please feel free to contact me or any other Board Member. Your input is welcome and appreciated.

Ken Biggie

JANUARY CONSTELLATION

CANIS MAJOR, the Larger Dog is a small constellation but has one of the brightest stars within its boundary, Sirius. It is surrounded on the north by Monoceros; on the east by Puppis; on the south by Puppis & Comlumba; on the west by Columba & Lepus. Its coordinates are R.A. 06h 10m by 07h 25m and declination -10° 10m by -30° 20m.



Objects of interest include Open Clusters NGC 2204, 2243, 2260, 2287 (M-41), 2343, 2354 & 2362. Planetary Nebulae NGC 2283, 2327 & 2359, also I,468 & I,2165. Double Stars are- Alpha, Mu, Epsilon, Tau, 17, Pi, & Upsilon-1; Variable Stars include UW, R, & W.

FEBRUARY CONSTELLATION

CANIS MINOR, the Lesser Dog is a smaller constellation and not even bordering Canis Major. It is bound by Gemini on the north; Cancer & Hydra on the east; Monoceros on the west & south.

Objects of interest are few. One star is of the first magnitude, Procyon, which is also a double star. The other object is another double star, Eta.

Darwin Christy

MEMBERSHIP DUES

FAMILY - \$ 15.00
REGULAR MEMBER - \$ 10.00
STUDENT - \$ 5.00
SENIOR - \$ 5.00
SUBSCRIPTION ONLY - \$ 4.00

PLEASE MAKE PAYMENT TO DORIS KOESTLER -
166 POINCIANA PKWY., CHEEKTOWAGA, N. Y. 14225 OR
JOHN RAYMONDA -
80-A FOXBERRY DR., GETZVILLE, N. Y. 14068 OR
YOU CAN GIVE YOUR REMITTANCE TO EITHER OF THEM AT
ONE OF THE MEETINGS.

OCTAVIA S. BLACK

OCTAVIA S. BLACK

The B.A.A. lost a long time friend and loyal supporter with the death of Octavia Black. Mrs. Black dies November 9th at her home in the Kensington section of Buffalo, after a lengthy illness.

Mrs. Black, a native of Buffalo, graduated from Wells College and became a teacher in the Buffalo school system. She taught swimming and other athletics. She went on to become the director of the Presbyterian Camp at Allegany State Park. She was a member of the Girl Scouts for 68 years. She became the first in Western New York to attain the rank of Golden Eaglet Scout. She was a drum major in the Girl Scout Drum Corps in her youth. She was a tireless worker for the welfare of young people. She established Sprucelands, a camp near Java and operated it for 44 years.

She was a life long lover of fine horses and was a breeder of the renowned Morgan horses. A featured activity at her camp was the teaching of horse back riding and the instilling of a sense of responsibility in her young campers. Among the enjoyable activities were swimming, canoeing hiking and woodsy living in the isolated little cabins. The fine horse shows she put on, with the help of the campers, were widely acclaimed.

She was very helpful to the B.A.A. She appeared on the membership rolls of our club for 20 years. She encouraged us to hold regular star parties at her elegant observing location. She enthusiastically backed Dick Zygmunt of our club when he offered to build an observatory on a high spot at the camp. The building, with its 6 inch rich field telescope, was popular with the campers and also with our club when we held star parties there. Learning that our club was in need of funds for its observatory, she put on a widely advertised horse show, with all proceeds going to our fund.

The B.A.A. will long remember her admiration for our activities and her friendly support. We won't soon forget those gala star parties which were followed by the sumptuous buffet suppers in the homey lodge.

Hearing that Olga and I were planning a trip to Vienna, she requested that we bring back a statuette of a Lippizaner horse. Those are the magnificent white horses, so elegant at shows and which have brought such fame to Vienna. She was delighted with the statuettes and showed us around the little cottage packed full of artifacts, where she lived near the lodge.

Mrs. Black could never be repaid for her noble work for young people. Who knows how many of the young campers have been inspired to follow astronomically related careers? Her memory will live long in the hearts of her charges and of her friends in the B.A.A.

Ed Lindberg

? ? ? QUIZ ? ? ?

The following is a match-up game. You have to match up the objects in column one with symbol in column two. Easy, isn't it?????

(1)	(2)
A- EARTH	1- ♀
B- MOON	2- ♀
C- SUN	3- ♀
D- MERCURY	4- ♀
E- VENUS	5- ♀
F- MARS	6- ♀
G- SATURN	7- ♀
H- JUPITER	8- ♀
I- NEPTUNE	9- ♀
J- URANUS	10- ♀
K- PLUTO	11- ♀
L- STAR	12- ♀

Answers to appear in the next 'SPECTRUM'.....

ANSWERS TO QUIZ

The answer to the last puzzle was as follows:

TAURUS
GEMINI
CYGNUS
ANTLIA
TUCANA
FORNAX
SCUTUM
BOOTES

ASTRONOMER FROM THE PAST

RUDOLF WOLF, a Swiss astronomer was born July 7, 1816 in Fallanden, a small place near Zurich and passed away there December 6, 1893. After graduating from Berne University, he became a teacher of mathematics and physics in the Real-schule at Berne from 1839 to 1855. During those years in 1847, he was made director of the observatory. He was also professor of astronomy in the Berne University. He also was professor of astronomy in the Polytechnikum and director of the observatory in Zurich in 1855 where he later became professor of mathematics and astronomy in the University of Zurich.

He was famous for his investigations concerning the periodic Sun-Spot activity as well as the accompanying magnetic variations. He wrote extensively on the history of science, especially astronomy. Some of his works are: Astronomy Miscellany - 1856-93, a series of well-known papers and his history of astronomy (1877) which is a standard work of reference.

Darwin Christy

O PROFILE O

Jack C. Empson Jr.

Jack was born in Blossburg, south of Bradford, Pennsylvania. The family later moved to Niagara Falls where Jack attended the 5th Street Elementary School, which was the oldest school in the Falls. It was torn down around '69 or '70. He graduated from Niagara Falls High School where he majored in math and science. While in high school he worked in the broadcast radio station in the school. At graduation, he received a Regents Diploma and a Regents Scholarship. He didn't have a chance to use the scholarship as he went to college outside of New York state.

He wanted to study broadcast journalism and there were only two colleges that offered courses. One was the Graham Junior College in Boston, so he went there for two years and earned his Associate degree. During college he worked in fast food chains and also worked at a Boston radio station. At the station he covered an election, and reported on desegregation with first hand visits to crucial areas.

After graduation he returned to Niagara Falls and worked part time at K mart, and then became employed at the Radio Shack Service Center in Tonawanda, where he has worked for eleven years repairing broken equipment. While on the job at K mart, he met Rebecca Marohn, a fellow employee, and they were later married in August of 1976. They live in the Town of Wheatfield, and have three daughters, Amber 9, Leslie 7, and Shauna, a bit over 2.

Jack has been absorbed in science since he was in grade school, and has followed the space program with enthusiasm. He became interested in astronomy in the late '60s through observing sessions with a high school friend who had a 2.4" telescope. Along the way, Jack acquired a 3" or 4" homemade reflector. He works with BAA member, Bob Hughes, and it was through him that he learned of our organization. They were at the museum when the BAA was having a meeting. Bob suggested that Jack attend the meeting to see if he might be interested. Jack joined the BAA in 1980.

He has a special interest in radio astronomy and wishes there were some people involved in it locally. He seriously tracks shuttle programs on shortwave radio, and finds meteorology a fascinating pastime, using his computers, weather charts and shortwave radio to receive data on weather conditions. Some of his information he gets from satellites passing above. He is a ham radio buff and uses shortwave to tune in on WWV in Colorado where he receives information on solar activity. He checks solar reports because radio propagation is dependent on solar activity.

Jack has three Radio Shack computers, each one being used for different things, such as plots, graphics, weather maps, etc. He has been very helpful at our Mall shows, bringing a computer along for viewers at the exhibits. On request, he has handed out print sheets with astronomical facts. He would like to organize a computer software exchange for the general membership, which he feels would prove to be very useful for the several members in our group who own computers. Those who are interested should contact Jack.

He has added some excitement to observing meteor fall. In listening to CHU in Canada after sunset, in between Jack and the station in Ottawa, he could hear the signal bounce off the trail of meteors going through the atmosphere, which produced a little beep sound. When he went to Lewiston to see the Perseid meteor shower, he took a radio along to hear the meteor beeps. To hear these beeps, the radio must be pointed in the direction of the radiant.

A huge meteorite or perhaps a small asteroid struck in the Sudbury region in Ontario about 1,850 million years ago. It formed a crater more than 70 miles in diameter. Impact melt rock (micropegmatite) formed by melting and cooling of rock at impact, and the gigantic explosion, threw colossal amounts of rock into the air which fell back in the form of breccia (sharp cornered bits of fragmented rock, cemented together by sand, clay or lime). Jack is fascinated by this incredible area and goes there to find shatter cones (cone shaped flaws in solid rocks formed by shock waves after meteor impact) and also the numerous other minerals and metals including iron, uranium and magnesium. About 70 percent of the world's nickel comes from this area.

Another of his hobbies is photography. To learn more about various techniques, he took a week's course at a photographic model studio on Delaware Avenue. He acquired skills in model photography for magazine portraits, and studied lighting techniques. He enjoys a wide range in photographic expression, from sporting events, models, and astrophotography, to most anything that appeals to his artistic eye.

An exhilarating event which Jack finds breathtaking along with member, Dave Sepulveda, is the Road Rally held in the spring and fall in Boston, Colden, and the southern tier. Around ten races are held each year, sponsored by the South Towns Motor Club, in which a very ambiguous course is plotted, and where each car is timed between check points, and must travel the course in the exact time as the person who charted the course. Jack and Dave have entered this unusual and spirited race about four or five times in the last two years.

Jack is not given over to much traveling, but he has a friend who has a cottage on Georgian Bay, and on occasions he goes to the northwoods for a weekend visit with his friend, sometimes alone, and sometimes accompanied by his family. It is peaceful, quiet, and a great place for real relaxation.

Jack is a very friendly, happy fellow with a sly wit. He is most cooperative, and though he is busy with his family and his many hobbies, he has a great willingness to be of assistance wherever needed. Jack is our present treasurer and a member of the Board of Directors. His service to the BAA is greatly appreciated.

Edith L. Geiger

ASTRONOMICAL HAPPENINGS

SOLAR: The Sun will be driving towards the northern hemisphere through January and February. We will be at perihelion with the Sun of January 4th. I received NO report on solar activity this issue.

LUNAR: The Moon's phases are as follows for January and February----

First Quarter - January 6th & February 5th
Full Moon - January 14th & February 13th

Last Quarter - January 22nd & February 21st

New Moon - January 29th & February 27th

LUNAR CONJUNCTIONS: Jupiter - January 4th & February 1st;
Mars - January 5th & February 3rd; Saturn - January 26th & February 22nd; Venus - January 26th & February 24th; Uranus January 26th & February 22nd; Neptune - January 27th & February 22nd; Antares - February 21st....

PLANETARY & STELLAR CONJUNCTIONS: Venus & Antares - January 15th; Venus & Saturn - January 24th; Venus & Uranus - January 31st; Venus & Neptune - February 11th

METEOR SHOWERS: QUADRANTIDS of January 3rd is one of the best with a radiant of Right Ascension 15h 20m and declination +52°. It is an annual shower producing 100+ meteors but only for about a 6 hour duration. This year they should prove to be very spectacular as they will be seen in the early morning hours. The average magnitude is about 3 and are sort of yellowish in hue. A very good shower to watch should the clouds stay away.

AURIGIDS of February 9th are the most significant in February. They come out of R. A. 05h 00m and declination +41° and can be seen for about 5 days (nights) around the above date. They are an annual shower producing nearly 20 per hour and are about as bright as the Quadrantids. They also seem to have a yellowish hue. As much data as they have given, more is still needed by the American Meteor Society. Any one wishing to observe them and record the data can send it to the A.M.S. % Dr. David Meisel, Geneseo State College, Geneseo, N. Y. 14454....

Darwin Christy

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INSTRUMENT REPORT

A note in the Rochester Astronomer will interest many T/M's. Rochester club president Louis Fico introduced the term AST or Amateur Standard Telescope. The standard of comparison is taken as a 6 inch f/5 scope which is called 1 (one) AST. A 12 inch f/5 would be 4 AST in area or light gathering power and 8 AST in volume and hence in weight. This type of comparison is not new but this is the first time I have seen it standardized in this way.

If you compare two mirrors, the light gathering power will compare as the areas or as the squares of the respective diameters. If the two mirrors have proportional thickness and are put into mountings of proportional sizes, the volumes and hence the weights will be in proportion to the cubes of their apertures. Just to consider an extreme example, the 200 inch mirror has 400 times the light gathering power of a 10 inch mirror. The weight ratio is about 20 cubed, or 8000. That is a ratio of 4 TONS per pound. The moving part weighs over 500 tons, which is the weight of a small steam locomotive.

Many beginners want to try a big telescope. A 16 inch mirror is only twice the diameter of an 8 inch, but the finished scope is about 8 times as heavy and takes about 8 times as many man-hours to complete. I recommend 10 inches as about the biggest practical size and I further counsel making a 6 inch mirror before going on to the 10 inch size. It's easier to make your mistakes on the smaller one.

I have seen many projects founder. The larger sizes sorely try our perseverance and our physical stamina. I would rather see a finished 6 inch telescope than an abandoned project.

Ed Lindberg

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STUDY SECTION

If your fascination with astronomy outstrips your knowledge of the subject, the Study Section's regular meetings and readings may be just what you're looking for.

Bill Rogers will head up the section which will meet on the Wednesday following the monthly general meeting. He has selected a popular work, Stars and Nebulae by William Kaufmann, as the vehicle for the group's efforts. Orders for the book will be taken at the January regular meeting (\$12.95 + \$1.00, shipping and NYS tax).

The Section's first meeting will be at the Science Museum at 7:30 PM on January 14th. Bill Rogers can be contacted at home (937 6277) or at work (896 5200).

Bill Rogers

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? CORRECTION ?

Paul Noye's article in the November - December SPECTRUM, "Two & Two Do Not Always Equal Four", is not only interesting, but answers a question often asked when the topic of relativity comes up. How can two galaxies receding from us in opposite direction at nearly the speed of light not exceed the speed of light when one of them is observed from the other?

However, I think Paul's calculator let him down. When I worked out his equations using his numbers, I found the velocity transformation yielded 248,031 km/sec. not 182,081 km/sec. This corresponds to just under 83% of the speed of light.

Paul's observation that 2 + 2 doesn't always equal 4 shouldn't be a surprise. Do you remember the old high school proof that 2 = 1? If you've forgotten, it goes like this:

1. Let the variable x equal 1. - - - - - $x = 1$
2. Multiply both sides of the equation by x. - - - $x^2 = x$
3. Subtract 1 from both sides of the equation. - - $x^2 - 1 = x - 1$
4. Factor the left side of the equation. - - - - - $(x-1)(x+1) = x-1$
5. Divide both sides of the equation by (x-1). - $x+1 = 1$
6. But in step one we set $x = 1$. Hence:
 $1+1=1$, so $2=1$.

Rowland Rupp

* * * * *

! SORRY ABOUT THAT !

ON THANKSGIVING DAY

T.S. Eliot would have
loved this cat
biding his time
on the kitchen mat
watching his master
carving the bird
that soon would feed
a holiday herd.
This cat was polite
he did not beg
he simply ran off
with a turkey leg!

Sorry about that
Esther L. Goetz '86

ON PROGRESS

Once I had a Dante
and a Keats
arranged along my window seats
when I was young and
poets were many.
Now I am old and can't
find any.
Video cassettes
have come on strong
where little verses
don't belong!

Sorry about that
Esther L. Goetz '86

FOR SALE

A 10" Cave Newtonian Telescope with a 4½" reflecting guide scope with offsetable mount. Excellent shape.
Dave Steinagle -- (716) 652-0796 -- Offers accepted!!

- - - - -

A Celestron C-11 with special coatings, tripod and wedge includes 8 x 50 finder, 2" Star diagonal, 32mm 2" Erfle Ocular, 18mm 1 $\frac{1}{4}$ " Ocular, innovative telecompressor, thread-in counterweights. Excellent condition, black finish with original cases. \$4500 canadian or \$3100 U.S. - cash or certifies cheque. You pick up. Write Clive Gibbons, 516 Bridgman Ave., Burlington, Ontario, Canada - L7R 2V4 or phone 1-416-632-7656 week nights 9 PM - 11 PM On Sunday 11 AM - 10 PM.

* * * * *

ATTENTION AMATEUR ASTRONOMERS If you are an American Citizen, who is not a professional astronomer, and would like some observing time on the "Hubble Space Telescope" to be launched by NASA when the space shuttle returns to service, then here is the opportunity of a lifetime.

The HST is the most advanced telescope ever built. With a 92.5 inch mirror it should be able to detect objects fifty times fainter and with ten times more clarity than any ground based telescope. It will possess unique high sensitivity, extended wavelength range, and extremely high resolution.

Dr. Riccardo Giacconi, director of the Space Telescope Science Institute, in Baltimore, Md. is making time available to any serious amateur astronomer who has a specific project in mind which would require the unique capabilities of the space telescope. To receive instructions for making preliminary proposals, send \$1.00 to HST Amateur Astronomers Working Group, c/o AAVSO, 25 Birch St., Cambridge, Mass 02138. Make check payable to AAVSO. The deadline for applications is March 31, 1987.

Ken Biggie.

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? ! ? SPY & TELL ? ! ?

Carl Milazzo and another amateur astronomer are going to submit a proposal for amateur research for the space telescope. The deadline is March '87.

Congratulations and best wishes to Shaun Hardy and Claire DeBus who were married on December 27th. Claire is a member of the museum staff.

Al and Mary Kolodziejczak have roller skis which they are enjoying in this delightful new sport of the last few years.

They had a pleasant vacation in Montreal during the Christmas holidays visiting the art galleries.

Gene Witkowski was honored by the Red Cross Blood Service, along with six other people who have given a pint of blood on forty separate occasions, totaling five gallons. Congratulations!

Larry Hazel and Bob Mayer took their 8" mirrors to widely known Evaporated Metal Films in Ithaca to have them illuminizied.

Carl Milazzo, Jim Dow and his wife, Dave and Anita Williams, Bill Kirst, and Ed and Olga Lindberg attended the NFCAAA meeting on November 15th at the Skylon Tower. Dr. William Wehlau from the University of Western Ontario spoke on international astronomy. He and one other astronomer are the only western astronomers who have ever used the Russian 236" telescope. Dr. Wehlau is a student of stellar atmospheres of variable stars. The next NFCAAA meeting will be in Corning, N.Y. in the spring.

A picture of Ernst Both, along with two other people, appeared in the Buffalo News on November 20th with a model of a space shuttle in the new Lawrence D. Bell Hall of Space Exploration at the museum.

Peter Michael Goetz, son of Irv and Esther, is appearing in the TV comedy series, "The Cavanaughs."

Wanted: George Scheck is an ice skater, and he is looking for a partner with whom to do ice skate dancing.

Edith L. Geiger

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** OBSERVATIONS **

One of the brightest reflection nebulae known as NGC-7023 in Cepheus was seen on November 6th with the 26 inch jointly owned Dobsonian from Boston, N. Y. At its center is a 6th magnitude blue star, surrounded by a pretty bright diamond shaped inner core of the nebula. Running diagonally is a dark lane that is tapered and is of low contrast. Extending from it and gradually dimming is the irregular outer part, are 3 branches of low contrast, and small patches, giving it an over-all size of 20 arc minutes. Its perimeter is nearly void of stars because of a dark nebula.

Tristan Dilapo

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On November 30th the Bubble Nebula NGC 7635 in Cassiopeia was seen near the open cluster M-52, while observing with Larry Carlino's new Oxygen-3 nebula filter and his 22 inch Dobsonian scope. The Bubble Nebula is a Super Nova remnant 3 by 9 arc minutes in size, and of very low surface brightness. At first, one will notice two 7th magnitude star, one sharp and the other slightly fizzy, which is the brightest part of the nebula. Much larger and fainter, is the fan shape envelope that resembles a ghostly Orion Nebula shape. Extending from one side is a large haze, with several low contrast patches in it, that are brighter.

Later that night the H-2 region in Cassiopeia, NGC 281 was seen as an arrow head shaped object, of medium surface brightness. This emission nebula is about as large as a full moon, and in it is a blue 8th magnitude star with 3 other companions. The nebula has an uneven surface brightness which makes it look lumpy. Two edges are diffuse, but the third is a sharp and concave edge, and the background rich with stars.

Also that night, the Planetary Nebula in Cetus, NGC 246, which is 4 by 3 arc minutes in size was observed. It has an 11th magnitude central star, and is ring shaped. It has a low surface brightness that is mottled and contains a few foreground stars. Its outer edges are the brightest part of the nebula, and one edge is slightly brighter showing fine detail.

The Helical Nebula, NGC 7293 in Aqarius is a Planetary that can be seen with binoculars. It is a ring shaped object a $\frac{1}{4}^{\circ}$ in size with low surface brightness and soft edges. It was seen on December 1st with my jointly owned 26 inch Dobsonian scope. The nebula has a gray inner hollow and a 12th magnitude central star with several foreground stars. The ring is oval and with its minor axis being brighter, and one containing a patch that is even brighter.

Carl Milazzo

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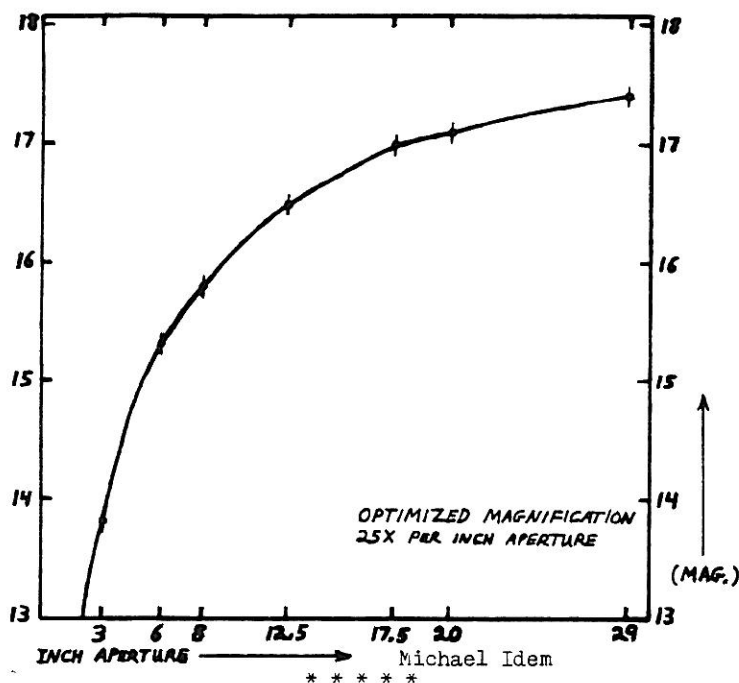
November 17-18 A fascinating night for the observation of the Jovian Moon System. At 7:00 PMEST the moons Io and Europa formed an extremely close apparent 'double star'. At higher magnifications the slightly different disk diameters of the two moons were quite apparent. By 8:00 PMEST the two moons were slowly drawing away from one another.

November 25-26 GK Persei (Nova Persei 1901) has experienced a significant outburst, for the past several nights this old nova has been shining at magnitude 11.4. In its normal quiescent state this star rests at about magnitude 13.1.

November 27-28 Carbon rich star SU Tauri has once again begun one of its rapid fadings into visual oblivion. After having spent the last few years at magnitude 9.6 it has, as of this night, sunk below magnitude 15.0. Like R Corona Borealis, as a carbon ash builds up in the star's outer atmosphere, its light is increasingly obscured from view. Eventually the star's circumstellar wind will disburse the carbon envelope and the star's light output will recover.

November 28-29 I observed the faintest star that I have ever here-to-for observed. At 397x and moments of good seeing the magnitude 17.0 comparison star lying upon the field of variable star KU Cas was just visible. The simultaneous

occurrence of excellent seeing conditions and excellent transparency is quite rare in this part of the country seemingly occurring much less than 1% of the time. Combining this observation with others made under similar conditions but employing varying telescopic aperture a graph of minimal magnitude versus aperture may be constructed...



BOOK REPORT

Leslie Peltier's "GUIDE to the STARS" is a book which explores the skies with binoculars and is a well put together tome. It is from 'Astromedia' publishers of ASTRONOMY Magazine. It sells for \$11.95, containing 185+ pages.

I found when reading it that it started out as most astronomy books do, with the circumpolar stars and then working down to the seasonal constellations as it progresses. One advantage I found within its cover is, there are many pages with a wide margin for one to record any information they may desire for future reference. Also, it has pages at the end which are referred to as 'Observer's Log' as well as some charts already prepared for notations.

Continuity from one chapter to another keeps you from wandering away from the subject at hand. I do believe that any beginning amateur would be well versed into astronomy with this book. I also think that any intermediate astronomer would be given an opportunity to self advance and the most avid astronomer could also be pleased with its contents. It is especially well written for the guy who wishes to observe strictly with binoculars.

Darwin Christy

INDEX TO PAST SPECTRUMS

The Buffalo Astronomical Association has a "SPECTRUM" Index which contains articles from 1958 to the November/December 1985 issue. Anyone who might be interested in wanting to know what may have been published and can use it for any reference, see Rowland Rupp and for a couple of bucks its yours.

The occasion was the annual Oration given for the American Philosophical Society (founded by Benjamin Franklin). This was an important event in Philadelphia and a number of people whose names we know today were there. Rittenhouse was well known as a craftsman and scientist, especially as the "celebrated inventor of the American

Oratory," the mechanical model of the solar system. His basic topic here was astronomy - its history and current state then - which was used as a platform to give his greater view of mankind. The original text is over 10,000 words; this is condensed to 1600.

An
ORATION,
Delivered February 24, 1775,
before
The American Philosophical Society,
by
DAVID RITTENHOUSE, A.M.

The history of astronomy, and its purpose as well, is lost in ancient times, and little if any of the findings of the ancient civilizations have come down to us. The astronomy that we know had its foundations with the ancient Greeks and their improved geometry. After that is a period of little account. It is revived in the 1400's, and in the 1500's Copernicus, Tycho, and Kepler give us planets which orbit the sun, the laws of these orbits, and more accurate observations. Astronomy is becoming a science...

"Astronomy, like the Christian religion, if you will allow me the comparison, has a much greater influence on our knowledge in general, and perhaps on our manners too, than is commonly imagined. Though but a few men are its particular votaries, yet the light it affords is universally diffused amongst us; and it is difficult for us to divest ourselves of its influence so far, as to frame any competent idea of what would be our situation without it."

Through astronomy the heavens show us that the earth is round, it turns, and it - along with the other planets - go around the sun.

"Hence a hint was taken that opened a new and surprising scene. The earth might be similar to them in other respects. The planets too might be habitable worlds. One cannot help greatly admiring the sagacity of minds, that first formed conclusions so very far from being obvious; as well as the indefatigable industry of astronomers... emancipating mankind from a thousand superstitious fears and notions, which juggling imposters (the growth of all ages and countries) would not fail to turn to their own advantage."

Accurate observations before the telescope had also shown us the bending of light in the air, the size of the solar system, the behavior of planet orbits, the nature of comets, and the motion of the north pole. Thus have they freed us from ancient misconceptions as those of "Aristotle, that tyrant in philosophy." The early 1600's bring the discovery of the telescope and Galileo's observations so mortifying to the followers of Aristotle: detail of the moon, sunspots, the four moons of Jupiter, the ring of Saturn, and the innumerable stars of the Milky-Way. Larger telescopes and more discoveries follow. How unfortunate that ancient philosophers, and recent astronomers, were excluded by death from the invention of the telescope.

"...what an immense treasure would they have given for it... would they have not travelled over all the countries of the world, for the sake of knowing such secrets of nature, and enjoying such sights as these?

"Thus have we seen the materials collected, which were to compose the magnificent edifice of astronomical Philosophy; collected, indeed, with the infinite labour and industry, by a few volunteers in the service of human knowledge, and with an ardour not to be abated by the weaknesses of human nature..."

It was now time, no doubt by a particular appointment of Providence, for the great master-builder to appear - the immortal Newton. Those materials of astronomy were now put into due order and proportion by his discovery of the principle of gravity.

" Other systems of Philosophy have been spun out of the fertile brain of some great genius or other; and for want of a foundation in nature, have had their rise and fall, succeeding each other by turns. But this will be durable as science, and can never sink into neglect, until "universal darkness buries all."

" Other systems of Philosophy have found it necessary to conceal their weakness, and inconsistency, under the veil of unintelligible terms and phrases, to which no two mortals perhaps ever affixed the same meaning: But the philosophy of Newton disdains to make use of such subterfuges; it is not reduced to the necessity of using them, because it pretends not to be of nature's privy council, or to have free access to her most inscrutable mysteries; but to attend carefully to her works, to discover the immediate causes of visible effects, to trace those causes to others more general and simple, advancing by slow sure steps towards the great First Cause of all things. " And now the Astronomy of our planetary system seemed compleated. The telescope had discovered all the globes whereof it is composed, at least as far as we yet know."

--to be continued in the next "SPECTRUM"--

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