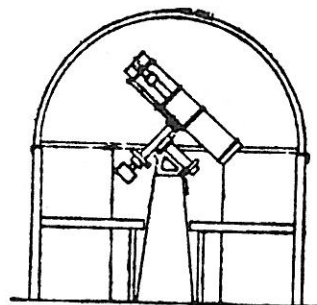


THE SPECTRUM

elg



JANUARY - FEBRUARY
1984

I S S U E

BUFFALO ASTRONOMICAL ASSOCIATION, Inc.

Rowland Rupp, Pres.

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Kenneth Kimble, Secy.

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DOUBLE STAR COLORS

At a recent meeting, Carl Milazzo asked if anyone in the B.A.A. knew of a catalog, or listing, of double stars with contrasting colors. He suggested that members might get together to compile such a list, which would prove valuable for public nights at Beaver Meadow Observatory. He felt, probably correctly, that the public would be more interested in colorful double stars than in the more typical plain white ones.

Having occasionally observed double stars in the past and having collected some resource material on this subject, I thought I might find some information that could help this enterprise. The first thing I discovered is that Carl is right--there is a lack of data specifically on this subject. That includes my notes.

But there seems to be good reasons for this paucity of data. For my own part, unless the colors are particularly vivid, I'm not very interested in what the colors are, much less in recording them. Also, discerning color is quite difficult when the star is dim because the eye is not very color sensitive for dim objects. There is a limited number of really bright double stars, so pretty soon one is observing dimmer stars where color identification is not easy. Moreover, I am well aware that I'm not especially accurate in describing color, so I avoid it. I'm sure others feel the same way. After all, position angle and separation are real, measurable properties of double stars that can be observed with confidence. Color is subjective.

When I turned to reference material, I found similar results. Both Norton's Star Atlas¹ and Burnham's Celestial Handbook² have extensive listings of double stars, but neither says much about color. Norton gives color for 10 to 20 percent of the stars listed, while Burnham practically never mentions the subject. He just notes spectral class and leaves it at that. In rare instances

of spectacularly colored binaries like everybody's favorite, Albireo, Burnham cites colors. I found another list of double stars in an old issue of Astronomy³. Of the 63 doubles there, most had a comment about color, but in only 18 cases were the colors of the components different. Apparently double stars with contrasting colors truly are scarce.

There is a correlation between the percentage of doubles with identified colors and limiting magnitude in these three lists. Astronomy listed bright doubles where color is more vivid; their limiting magnitude is about 5. Norton lists doubles with magnitudes as high as 7 for the primary star, while Burnham goes to 10 and sometimes 11. The lesson here seems to be; if you want to see color, concentrate on bright stars.

For what it's worth, and I'm sure it's not much, here is a list of double stars for which I have recorded color. I've included the color information from the other three sources for companion. Sometimes Burnham gave only spectral class, hence the letters in his column. Remember that O and B stars are blue, A and F stars are cooler and are more or less white, G stars (like the Sun) are somewhat yellow, K stars tend to be orange and M stars are red.

Three points emerge. One is that the dimmer star of the two tends toward the blue, which is borne out of Burnham's listing of spectral classes. An exception to that rule is 5 Aquilae. The A2 primary should be bluer than the A7 companion, and that's exactly what I saw. However, A stars should be white and I saw one as blue, the other as red.

That leads to a second conclusion. What one sees best is the contrast between the stars. One star looks a little bluer, so the other seems redder relatively. My note on

Canum Venatorum (Cor Caroli) is in this category. I saw the contrast, but an F star should be less orange than the Sun. Why did I see it as orange when it too should be white? On the other hand, Astronomy doesn't mention contrast at all, but it does depict the color of both stars as blue, which is much more realistic than my orange.

This suggests the third point, which is that star colors are very indefinite. Look at the companion of 24 Comae Berenices. Is it blue, greenish-white or aqua? It depends on who observed it. Perhaps one reason color lists don't appear very often is because observers realize their color perception is uncertain, especially if they're trying hard to see something that really isn't quite there. That would make most people cautious about publishing a list for posterity to judge.

As evidence of this uncertainty, I cite Burnham's commentary on 95 Herculi. In 1780 William Herschel saw the brighter component as bluish-white and the dimmer as white. His son John saw them as bluish-white and reddish in 1824. A few years later, Struve saw greenish-yellow and reddish-yellow. Piazzi Smythe, a relentless observer, was surprised to find both stars were white in 1856. The next year he saw them as "apple green and cherry red". A Captain Higgins thought both were yellow a few years later.

	Rupp		Norton	Burnham	Astronomy
	Date	Comment			
γ Andromedae	11/16/80	yellow, blue	gold, blue	gold, blue	yellow, blue
12 Aquarii	9/22/78	orange, blue	—	G, A	—
5 Aquilae	10/2/83	blue, red	—	A2, A7	—
ι Cancri	3/19/77	yellow/orange, blue	yellow, blue	yellow, blue	orange, blue
α Canum Venaticorum	4/19/79	white, orange	—	A, F	blue, blue
ξ Cephei	10/17/77	yellow, white/blue	—	A, F	—
24 Comae Berenices	4/13/74	orange, blue	Yellow, green/white	Yellow, blue	orange, blue
β Cygni	5/20/74	orange, blue	Yellow, blue	golden/yellow, sapphire	orange, blue
61 Cygni	7/8/74	yellow, yellow	—	orange, orange	orange, orange
δ Delphini	8/13/77	yellow, blue	—	K, F	—
95 Herculi	5/9/75	Red, blue/green	—	See Text	—
ϵ 2894 Lacertae	9/22/78	white, blue	white, blue	—	—
η Persei	10/24/74	yellow/orange, blue	yellow, blue	yellow, blue	—
35 Sextantis	4/27/78	orange, blue	—	K, A	—

In the nineteenth century, before astronomers understood the mechanism of how stars produced light, they were relatively unperturbed about color changes. When observers described star colors differently on different occasions, the effect was thought to be real. Guillemin in his *The Heavens*⁴, commented on the changes, he cited that "the ancients" saw Sirius as a red star whereas today it is a brilliant white. He also mentions by way of a quote by Arago that green and blue stars may be in a "process of decay". Hence, as stars get older they may well go from red to blue as Sirius seemed to be doing. Actually, today we see things differently. As stars age and leave the main sequence they become red giants, not blue. And this process takes millions of years; color changes don't take place from year to year, but an observer's perception may.

I found another interesting note in Guillemin concerning M. W. Struve. Struve observed that of 596 bright double stars:

375 had components of the same color and intensity,
101 had the same color but different intensity,
120 had totally different colors.

He also found that the brighter star is generally more red, and the dimmer star is more blue, a point made earlier. That only 20% of the bright double stars Struve commented on had contrasting colors is in good accord with the more modern results seen before.

I'm sure Carl would like to get his hands on Struve's notes for his projects. Unfortunately, I have no idea when or where they were published. But I did find an interesting footnote in Guillemin. Admiral Smyth, whom I assume is Piazzi Smyth, wrote a memoir entitled, "Side-real Chromatics, or the Colours of Multiple Stars", which was published in London in 1864. So there is reference

material on this subject after all; it just may take some perseverance on Carl's part to locate it.

1. Arthur P. Norton, *A Star Atlas*, Sky Publishing Corporation, Cambridge, Massachusetts, Fifteenth Edition, 1966.
2. Robert Burnham, Jr. *Burnham's Celestial Handbook*, Dover Publications, New York, 1978.
3. *Astronomy*, November 1976.
4. Amedee Guillemin, *The Heavens*, Scibner, Welford & Co., New York, Fourth Edition, 1877.

Rowland Rupp

From Tom Milley

...It's lovely to live on a raft. We had the sky up there all speckled with stars, and we used to lay on our backs and look up at them, and discuss about whether they were made or only just happened. Jim he allowed they was made, but I allowed they happened; I judged it would have took too long to make so many. Jim said the moon could 'a' laid them; well, that looked kind of reasonable, so I didn't say nothing against it, because I've seen a frog lay most as many, so of course it could be done. We used to watch the stars that fell too, and see them streak down. Jim allowed they'd got spoiled and was hove out of the nest.....

somewhere out of Huck Finn-----

"SPECTRUM" DEADLINE

The deadline for the March-April 1984 issue is **FEBRUARY 22, 1984**. I am looking for articles, pot-porri, OBSERVATIONS, and what-ever anyone can give to me.

dpc

- ASTRONOMICAL HAPPENINGS -

SOLAR- On its way north, the Sun will pass through the constellation of Capricornus into Aquarius in January & into Pisces in February.

LUNAR- Phases:- New Moon - January 3rd, February 1st & March 2nd

First Quarter Moon - January 11th, February 9th & March 10th

Full Moon - (Wolf) January 18th & (Snow) February 16th

Last Quarter Moon - January 24th & February 23rd.

Conjunctions:- Mars - January 25th & February 22nd

Uranus - January 27th & February 24th

Mercury - January 30th

Neptune - January 29th & February 25th

Jupiter - February 26th

Venus - January 29th & February 28th

Saturn - January 25th

PLANETARY:- Conjunctions:-

Venus & Antares - January 7th

Venus & Uranus - January 10th

Jupiter & Neptune - January 19th

Venus & Neptune - January 25th

Venus & Jupiter - January 26th

Mars & Saturn - February 15th

Mercury is stationary January 10th & is at greatest elongation of 24°W January 22nd

Saturn is stationary February 25th

Pluto is stationary February 9th

METEOR SHOWERS:-

Coma Bereniceids - December 12 - January 23

QUADRANTIDS - January 4th about 06:00 hours

Delta Cancriids - January 16th

KAPPA CYGNIDS (fire balls) - January 17th

Virginids - February 3 - April 15

AURIGIDS - February 9th

Delta Leonids - February 26th

-: FOR SALE :-

SKY & TELESCOPE collection from 1947 - 1980. Asking \$ 250.00 and there are 100 extra issues free with the above collection. Call Warren Steinberg after 9:00 P.M. - 838 5672 Thank you.

The City of Buffalo and Lake Erie can be seen from a hill 3 miles northwest of our club's Beaver Meadow Observatory. This view can be made from the highest point on Perry Road between Route 77 & 78 even though the city is 25 miles away as the crow flies.

Carl Milazzo

*** CONSTELLATIONS ***

AURIGA (The Charioteer) is an extremely ancient constellation. Greek legend has the figure representing Erichthonius the fourth King of Athens. He was the son of Vulcan and Minerva. His inability to walk, being deformed, with ease led him to invent a four horse chariot. This act enabled him to be placed in the celestial Hall of Fame. Others have him as the son of Mercury. Also he was reported as being a most skillful trainer of horses. Those having been trained by him were considered the fleetest steeds in Greece.

The constellation appears in the Greek star lists of Eudoxus in the 4th Century B.C. and Aratos in the 3rd Century B.C.

Auriga is bound by Camelopardalis on the north; Perseus on the west; Gemini and Taurus on the south;

and Lynx on the east. It lies between 04h 38m & 07h 30m Right Ascension & 28° & 56° North Declination.

Objects of interest are:- Capella a first magnitude star and 'Nath' a second magnitude star which is really Beta Tauri. Double or multiple stars include 26, 14, 41, Lambda, 56 and Struves 872, 645, 681, 698, 764, 533 & 552. Open clusters found in the Atlas 2000 include M-36 (NGC1960) M-37 (NGC2099), M-38 (NGC1912) & NGC's 1664, 1778, 1857, 1883, 1893, 1907, 2126, 2192, & 2281

Planetary Nebulae listed are I, 2120 & I, 2149

Diffuse Nebulae are I, 405, I, 410, I, 417, NGC's 1931, 1985, & 1891.

Variable Stars include AB, RX, UV, U, AR, AE, EO, UZ, R, RT, WW, CO, UU & TU.

GEMINI (The Twins) is another ancient constellation and is one of the zodiacal constellations. Castor & Pollux have been known as the Twins from early times. The Arabs counted them as 'Two Peacocks'; the Egyptians 'Two Sprouting Plants' and the Hindus regarded them as 'Twin Dieties'.

The two stars are great favorites of the mariners, especially those in ancient times. In honor of them the electrical effect known as 'St. Elmo's Lamps' darting down and about the rigging of the ships in a storm were known as 'Ledeans Lights'. It is recorded that this constellation was known to the 4th Century B.C. astronomers, where a lunar occultation happened.

Gemini is bordered by Lynx & Auriga on the north; by Taurus & Orion on the west; by Monoceros & Canis Minor on the south; and by Cancer on the east. It lies within 06h 00m & 08h 07m of Right Ascension - 35° & 10° North Declination.

Objects of interest are:- the first and second magnitude stars Pollux & Castor. Double or multiple stars include Alpha, Delta, Epsilon, Zeta, Lambda, Kappa, Upsilon, 15, 38, & 20. In 1912, a Nova was seen near the star Theta.

Open clusters found in the Atlas 2000 include M-35 (NGC 2169) & NGC's 2129, 2158, 2266, 2420, 2304, 2355, 2395 & I, 2157.

Planetary nebulae listed are NGC's 1900, 2392, 2371 & 2372

Diffuse nebulae are I, 443 & I, 444

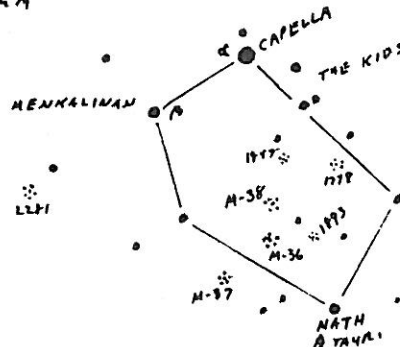
Galaxies found (only one) is NGC 2339

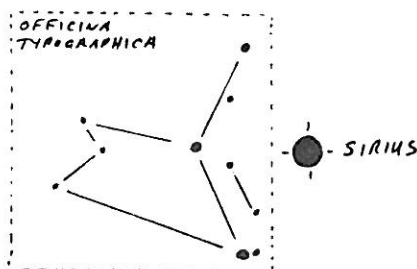
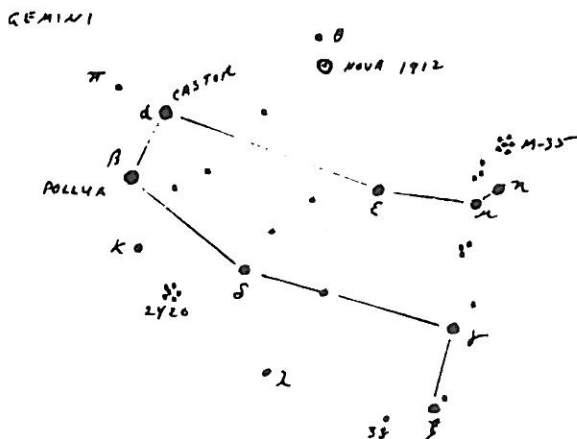
Variable Stars include TV, BU, WY, TU, DM, X, VW, DN, IS, OR, TW, BM, BQ, W, & V.

OFFICINA TYPOGRAPHICA (The PRINTING OFFICE) is an ancient constellation formed by Bode - it is, perhaps, first printed by him. The stars making it up are ones found immediately east of the 'Dog Star' Sirius. It is seldom found on star maps of present day; and is NOT recognized by present day astronomers. It was inserted in the Planisphere of Father Secchi of 1878.

Bode was a German astronomer and Father Secchi was an Italian Jesuit who, after the Jesuits were eliminated from Italy, turned to astronomy and wrote many books.

AURIGA





Answers to PUZZLES in Last Issue

- | | | |
|--|--|---|
| 1) Tools for the
Astronomer-
telescope
clock drive
cameras
star charts
filters
film
spectroscope
slow motion controls
books
red flash light | 2) Solar System-
pluto
comets
moons of jupiter
asteroids
sun
earth
titan
neptune
mercury
rings of saturn | 3) Short Names in
Astronomy-
bode
bruno
rosse
airy
clark
wein
hale
mrkos
oort
pope |
|--|--|---|

O - 10
B - 7
A - 3
F - 1
G - 4
K - 9
M - 2
R - 6
N - 5
S - 8

Spy and Tell

Beverly Botto's space art has been chosen, along with the works of 26 other space artists, for the Science Fiction, Science Fact Art Exhibit to be held at NASA Lewis Research Center in Cleveland from January through March.

Former member, Phil Cizdziel, is working with the 150" infrared telescope on Mauna Kea. He has passed his oral exam and is now choosing his thesis subject for his doctorate.

A fine quarter page article on Shaun Hardy appeared on the front page of the Lockport Union Sun and Journal in November.

Orrin Christy enjoys running his power hydroplane by remote control along the canal.

Steve Desmond, home for the holidays, has changed his major at RIT to photo finishing. He reports that his social life is even better than it was last year.

Ken Kimble appeared on Channel 4 with weatherman, McNally, at the time of the last space shuttle flight, explaining where to look for the shuttle. He mentioned the B.A.A.

Our noted poet, Esther Goetz had one of her poems published in a Rochester paper recently. Peter Michael Gotez has just finished a movie with Dudley Moore called Easy Way Out, and is now back on Broadway continuing in Brighton Beach Memoirs.

Doris Koestler did very well selling her dolls at the Batavia Craft Show.

We welcome back our former long time member, Jerry Cook, after her absence the last few years.

The Lindbergs are well on the road to recovery after surgery during recent months. Olga had an operation for a benign growth on her spinal cord, and also suffered a blockage of spinal fluid circulation. Ed had surgery on both eyes and his vision is slowly returning, and he hopes to be able to drive when spring rolls around.

Carroll Geiger suffered a mild heart attack after strenuous work on the tractor, getting it ready for snow plowing on our long driveway. He was in the hospital for two and a half weeks and is recovering nicely, but must take it easy for a while.

May the coming year be a happy and rewarding one.

Edith L. Geiger

?? PUZZLE ??

Word Extraction - There are eight six letter words pertaining to astronomy. Each letter has a numerical value which is equal to the sum of the column and row values add up to. For example: one of the letters (T) is listed in column 3, row 3 which, when added, equals 6. One of the 6's in the puzzle is that 'T'. Other letters are represented by a 6. When a word has been worked out, cross off the letters in the graph as each letter is used only once.

	1	2	3	4	5	6	7	8
1	S	A	O	U	L	T	E	R
2	L	E	N	R	S	U	C	T
3	E	L	A	O	T	R	E	A
4	U	S	S	P	M	O	P	O
5	S	M	L	C	T	E	B	N
6	N	E	J	T	A	I	Y	K

Word #1 - 2 6 10 5 9 7 Word #5 - 11 8 11 13 8 7
Word #2 - 14 11 8 5 8 9 Word #6 - 12 9 5 6 3 7
Word #3 - 9 8 3 12 11 5 Word #7 - 12 7 10 10 10 7
Word #4 - 6 13 7 10 4 9 Word #8 - 9 4 7 4 8 6
Answer will appear in the next issue of the "SPECTRUM"....

BAA ANNALS

5 YEARS AGO....The Jan. 1979 meeting goer was treated to a movie made by Dr. Francis Lestingi about Albert Einstein. A member of the Buffalo State Physics dept., Dr. Lestingi is well known for his research into Einsteins life. I remember the meeting well and the movie was quite enjoyable. The Feb. 1979 meeting was addressed by Larry Hazel, Charlie Miess and Edith Geiger.

The Jan./ Feb. issue of the Spectrum featured an article by Tom Giosomo on sid-
 erial and synodic periods. After a mathematical
 dissertation, Tom provided a table showing the
 relationships between the two periods. Tom had
 a slight problem with his figures and asked for
 some " feedback " from interested members to
 show him the error of his ways. Remember that
 Roland?

10 YEARS AGO...Meeting topics for Jan. and
 Feb. of 1974 were respectively, Astrophoto-
 graphy by Dale Hankin and The Quest for the
 Black Hole by Dr. Jack Mack.

The BAA had two headliners back then. It
 seems that Darwin Christy was recovering from
 falling "on his head " from a power company
 cherry picker bucket.(say,I wonder if that is
 why he is.....oh never mind.) Fred Price was
 interviewed on a television show for a short
 segment on comet Kohoutek.

We are lacking in our files on Spectrums
 for Jan./Feb. of 15 and 20 years ago so this
 is it.

Ken Kimble

For the COMPUTER

For the VIC-20

```
10 PRINT CHR$(147)
20 POKE 36879,27
30 L = 42
40 POKE 7680+22*3+7,L : POKE 3840+22*3+7,7
50 POKE 7680+22*4+10,L : POKE 38400+22*4+10,6
60 POKE 7680+22*6+8,L
70 POKE 7680+22*8+11,L : POKE 38400+22*8+11,6
80 POKE 7680+22*13+13,46
90 POKE 7680+22*18+13,L : POKE 3840+22*18+13,6
100 POKE 7680+22*7+12,46
110 PRINT "DELPHINUS"
120 FOR T = 1 TO 1000 : NEXT
130 POKE 36879,8
200 GOTO 200
```

A similar program can be set up for the Sinclair ZX-81 as
 follows:-

```
10 CLS
20 PLOT 20,28
30 PLOT 27,29
40 PLOT 24,24
50 PLOT 31,24
60 PLOT 36,18
70 PLOT 38,12
80 PRINT AT 2,2; "DELPHINUS"
90 STOP
```

STUDY GROUP

The Nov. Study Group had as its topic
 " Scientific Space Satellites ". Attendance
 was so poor that we abandoned the meeting
 altogether. Most of the people who didn't
 show had legitimate excuses though. There
 was no December meeting because of its prox-
 imity to Christmas.

The topic for the January meeting will
 be " Supernovae ". We will discuss the types
 and their effects and supernova remnants. Carl
 Milazzo thinks the discussion should be inter-
 esting. I think so too.

For the February meeting I think we will
 try to discuss the scientific satellites again.

I still have my notes from the Nov. meeting
 that didn't come off. I'm going to talk about
 the Einstein X-Ray satellite. That leaves plen-
 ty of others including IRAS for others to dis-
 cuss. So lets look up some information on both
 of these topics and make these two meetings
 worthwhile.

Ken Kimble

OBSERVATORY NOTES

As mentioned in the last issue of the 'SPECTRUM', the
 12½-inch mirror and diagonal of the Beaver Meadow Obser-
 vatory telescope were removed for realuminization on Nov-
 ember 13. What was not anticipated however, was the very
 short turn-around time - just 7 days. By November 21, the
 mirrors were back from Evaporated Metal Film with beauti-
 ful, fresh aluminum coatings. Michael Idem and John
 Riggs re-installed the mirrors and aligned them on the
 25th. Generally cloudy weather prevailed during this per-
 iod so no observing time was lost. Unfortunately, the
 clouds have continued to prevail and no one has yet had
 an opportunity to use the telescope!

When the sky does clear, our Observatory users will
 also find that the frequency controller has returned.
 Over the Thanksgiving holiday weekend, Rowland Rupp com-
 pleted his repair work on the device. It was found that a
 small capacitor and one of the integrated circuit chips
 had become unstable and had to be replaced. Rowland also
 discovered what an excellent job our former member, Bill
 Deazley, had done designing and constructing the unit.
 Bill's fine workmanship and complete circuit documenta-
 tion saved Rowland hours of electronic detective work.
 Many thanks must go to Rowland for his generous repair
 efforts and also to Bill Deazley (now living on Long Is-
 land). A detailed instruction sheet written by Rowland
 Rupp and John Riggs on the proper use of the frequency
 controller will now be available at the Observatory. All
 those interested in using the telescope for long exposure
 prime focus photography will need to read these important
 instructions.

Another Observatory benefactor this Fall has been
 Darwin Christy. Darwin donated to the Observatory the 8-
 inch f/9.5 reflector he and Orrin built together and used
 for many years. At the present time the telescope has no
 mounting, but hopefully something will be worked out in
 the near future. A telescope like this is especially well
 suited for lunar and planetary observation. Darwin's
 thoughtfull contribution should greatly supplant the
 Observatory's existing equipment and capabilities. Thank
 you Darwin!

John Riggs.

Editor's note-----You are all very welcome to the tele-
 scope I gave to the Observatory of the B.A.A.
 dpc

---- Another For Sale ----

GRANT AMEY - phone 683 1462 has some equipment for
 sale:- An Edmund Astroscan 4¼-inch RFT - very good cond-
 ition, with universal base, carrying strap, 2 eyepieces:
 28mm RKE for 16x (s degree field) and 9mm Ortho for 50x.
 Asking \$ 125.00----

TRUE or FALSE ???? The New Moon is visible only at high
 noon.
 Meteors can be detected only at night, even with radio
 telescopes.
 Radio telescopes are designed to read longer wave-lengths
 than optical telescopes.
 The Lunar Astronauts were able to see the dark side of
 the Moon.

MEETINGS FOR THE JANUARY AND FEBRUARY WILL BE AT THE MUSEUM OF SCIENCE

Meetings from January through April will be held at 7:30 P.M. at the Buffalo Museum of Science. For May and June, we will return to Buffalo State.

The Museum has adopted a new policy whereby it will not provide meeting space to affiliates in the evening during June without special charges. To avoid confusion in the May-June meeting notice, the general membership voted to meet at Buffalo State in May also.

The Museum asks us to leave the Museum by 10:30 P.M., and suggests we begin to clean up by 10:00 P.M. We will also have to sign in when we meet, but we will not be charged admission.

* * * * *

MEETING NOTICES-

JANUARY - Dr. H. James Bix, Chairman of the Sociology/Anthropology Department at Canisius College, will speak at our January 13, 1984 meeting at 7:30 P.M. His talk is entitled "Eternity and Infinity: Speculations in Cosmology". Dr. Bix is an active lecturer and author in the field of evolution, the development of scientific thought and philosophy. His most recent book, Theories of Evolution, is being published now by Charles C. Thomas of Springfield, Illinois. We look forward to hearing from Dr. Bix on a topic in which he is a recognized authority.

FEBRUARY - Our February 10th meeting will also be held at 7:30 P.M. at the Museum. The topic and format will differ from our usual meetings. Claudia Bielinski will give a demonstration of the procedure for casting a horoscope. Claudia, in addition to being our Membership Chairman, has been active at Rosary Hill College, as well as privately, and has taught Astrology and given readings herself. We can all benefit from learning something about a subject that shares a common ancestry, and at one time an identity, with Astronomy.

Anyone wishing to participate by having his horoscope cast can do so by giving his exact date of birth to the nearest minute and the location (city or town) of birth to Edith Geiger either at the January or February meeting or by mail. We will draw one set of statistics by chance, but without the name, at the start of the demonstration.

If you don't know the exact minute of your birth you can find it by requesting a copy of your birth record from the Bureau of Vital Statistics at the City Hall of your birthplace. A birth certificate will not generally give this information.

* * * * *

OBSERVATIONS

On the morning of November 1st, there was a beautiful conjunction above the eastern horizon. It looked like a mirrored image of the constellation of Triangulum, consisting of a 3 days before new moon, 5 degrees from Venus. $2\frac{1}{2}$ degrees above Venus is orange Mars of 2nd magnitude, and all of which are in Virgo.

The double star Eta Cassiopeia was viewed on the evening of December 3rd which is easy to locate and resolve, and has a beautiful color contrast. It consists of a yellow 3.5 magnitude star separated by 12 arc seconds from a reddish 7.2 magnitude star forming a binary with a period of 480 years. Eta is only 18 L.Y. distant and is located about half way between Alpha and Gamma Cassiopeia.

Carl Milazzo

- - - - -

1) September 30 - October 1 - I observed a spectacular -13 magnitude meteoric fireball, seen through broken clouds it illuminated the sky, for approximately 1.5 seconds, with the equivalent brilliance of a full moon. Apparently the only other person to actually witness this

event was John Riggs. Direction of motion was SSE - NNW and its length of travel about 15° .

2) December 7 - 8 - I observed the galaxy cluster Abell 1377. This 1 billion light-year distant assemblage, in Ursa Major, is the most difficult grouping listed in the Webb Society Handbooks of deep-sky objects. Never-the-less its location in the sky, at least, is easily found within the bowl of the 'Big Dipper'. The coordinates of its 'brightest' member being -----R.A. 11h 44.4m - Declination $+56^\circ 01'$ (1950). More of this cluster's member galaxies were detected than I had expected but their estimated magnitudes ranged only from a feeble 14.4 to 14.9. Beware, however, if you attempt to observe this cluster of galaxies for a 6th magnitude star lies within the same field. Thus a high enough magnification must be employed so as to exclude this star from the eyepiece field.

3) The same night I observed the distinctive, red-orange, long period variable star R Leonis. It is just now beginning its rise to maximum. Tonight it is an easy magnitude 9.5.

4) Afterwards I observed the far more difficult eruptive variable X Leonis. I observed only during moments of improved seeing conditions. It, with reference to its comparison stars, was found to be of magnitude 15.5. Significantly, this is the faintest object, of any type, that I have ever succeeded in glimpsing. - chalk this one up to a naked eye limit of magnitude 5.8 and good seeing conditions.

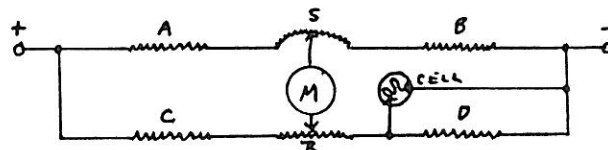
Michael Idem

- - - - -

On December 19th a partial penumbral eclipse of the moon was provided to us. Preparing for this, I had decided to set up some recording instruments to record the dimming effect that a penumbral eclipse might show. Equipment used was an old Micromax Recorder with 10" strip chart. I re-worked the bridge circuit for it to conform to my specifications. The movement (meter) can read a change of one 'nano-amp' or $1/1000000000$ of an ampere of electrical current. The bridge circuit incorporated is just a resistance bridge, not too sophisticated, but sensitive to the least amount of light change. The unit for sensing any change of light intensity is a 'cadmium sulphide cell', which, by the way turns on your street lights at night. When it is struck by light, the chemical structure changes from an infinity resistance to a less resistive nature electrically. This upsets the current flow through the movement causing it to deflect. This deflection causes the pen on the strip chart to change, thereby registering a higher or lower reading. Because of the sensitivity of the movement, the pen has to be moved mechanically and this I will not go into because of the complicated explanation it would afford.

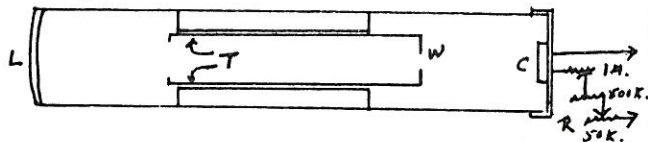
Sensitivity and calibration of the instrument was prepared by using the full moons from months past, and the instrument was then calibrated using footcandles, which calibration I was able to obtain through the National Bureau of Standards. Magnitude, which we refer to, was calculated to meet the foot-candle calibration also with respect to the inverse square law of light.

A simple circuit shown here can be changed in many ways to be made either more or less sensitive. My use of the cadmium sulfide cell was placed in parallel with one of the fixed resistors. Alone, the sensitivity would be less as well as stability be less. A regulated voltage supply was also needed to feed the resistors, setting up a current flow of electricity. A supply was made whereby the output voltage was not changed by any fluctuation from the primary source. This is done with a voltage regulating SCR.



Resistors A, B, & C are fixed known resistors and D is a compensating resistor to the first three. S is a slide wire attached to the mechanical portion of the instrument causing the pen to be moved. R is the calibrating resistor to set the instrument up at zero deflection. The 'cell' has three rheostats in series with it for coarse, medium and fine adjustment to set maximum deflection (not shown).

The cadmium cell had to be set into a telescope like tube with glare stops and windows to allow only that light from the moon to strike the it. This was done with a specially prepared tube, using a simple lens for focusing, although the moon's image would be out of focus at the cell. It would be in focus at the last window as shown in the accompanying drawing. The reason for this is the whole cell should covered entirely with the light for best accuracy.



L - meniscus positive lens.

T - tube with forward glare-stop and rear window.

W - rear window in which the moon's image is at prime focus.

C - cell for pick-up of light.

R - series of resistors not shown in circuit before - Coarse adjustment is 1 meg-ohm, medium adjustment is 500 kil-ohm and fine adjustment is 50 kil-ohm.

I set the telescope to drive at lunar rate which did a very fine job with little or no correcting in R.A. Preparing for first contact, according to four sources I have (Astronomy, Sky & Telescope, Farmer's Almanac and the Observers Handbook by the Royal Astronomical Society of Canada) I was ready at 23:46 UT or 18:46 EST. The near full moon was then calibrated, as in the preceeding months, to register on the strip-chart at -12.55 magnitude. This magnitude is another referenced by sources which I have (1001 Questions, the Moon & Planets by W. A. Hartman, the Cambridge Encyclopedia of Astronomy and others) and used in the calibration.

Of course "Mur phy" appeared on the scene as time progressed into the eclipse with his haze and clouds. It was almost becoming a lost cause but I stayed with it and did get check points on my chart. The haze and clouds did a number on the chart by scribbling red lines all over it.

As time went on, and the moon seemed to escape the haze and clouds occasionally, I detected changes in magnitude on the instrument, showing the collapse of light. With this, I started to check each time the pen started to increase in magnitude, I would go out of or up into the observatory to check on the moon for possible clearing. It was a task to do this but worth it. At these points I would mark an 'x' for my reference. I did not get many of them but enough to draw a curve and make a conclusion of results. The results were enlightening too.

One other thing that had to be taken into account was that the brightness of the moon at a low altitude above horizon would be less than that when it reached a point near the zenith. That point which would be at the end of the eclipse. It is due to the dense atmosphere at low altitude. The effect caused a pattern on the check points to produce a curve similar to that of a question mark (?) and not a French curve. By using mathematical formulae using cosine and/or tangent, calculations were made with great accuracy in magnitude.

As time passed, I did not find accurately mid-eclipse, but calculated it to be near 01:51 UT or 20:51 EST. If this was within 2 or 3 minutes I would be happy. As it turned out in the Observer's Handbook, 01:49 UT was the time given. The magnitude of the moon at that point, registered on the chart was -12.08 or a dimming of .47 magnitudes. That would be in the order of about 1.56 times

fainter. I was able to see a slight dimming of the southern part of the moon but a friend of mine said he did not see any at all. Of course he is not astronomical oriented.

Perhaps a camera with a very high contrast film could record such dimming but not to make it appear totally darkened. Shaded - yes! I was going to set up my time lapse cameras but did not feel it would give me enough results, so---I do not have any record of that. It was a hard and tedious task but well worth it. I am planning to record the next eclipse to be on May 15, 1984. This one was rather cold too, the temperature was a mere 10° f.

We will be in for a treat at the next eclipse too. We will see a conjunction of Saturn and Mars. Even though it will be at full moon, they are bright enough to be seen and not washed out by the glare of the full moon.

Darwin Christy

Editor's note:- I am wondering if that last observation wasn't supposed to be an article instead??????????????

dpc

P.S. I never knew him to have his senses back from that fall mentioned in the BAA Annals.

MEMBERSHIP

New members include:- Anthony I. & Anthony M. Casio
Daniel R. & Melissa Marcus

William S. Smith

John Liptak

Steven Krickorick

Frank V. Brady

Returning members are:- William Gehrke

Gertrude Cook

Dues are payable to membership chmn. Claudia Bielinski
5450 Clinton St.
Elma, N. Y. 14059
ph 668 2860

PARTY FOR ANYONE INTERESTED IN ASTRONOMY OR SPACE

Sunday, January 15th from 4:00 to 10:00 P.M. at B.A.A. member Tristan Dilapo's nightclub, named TNT COCO's at 41 Virginia Pl. between Allen and Virginia streets in Buffalo- There will be NASA video-tapes and Tristan's and Joe Cardin's computer controlled 13-inch Dobsonian Telescope. This all accompanied with lots of talk, beef, chicken, sausage, cheese dis etc., even a special for vegetarians. \$4.00 for children under 14 and \$7.00 for all others. If interested call Carl Milazzo at 688 7620.

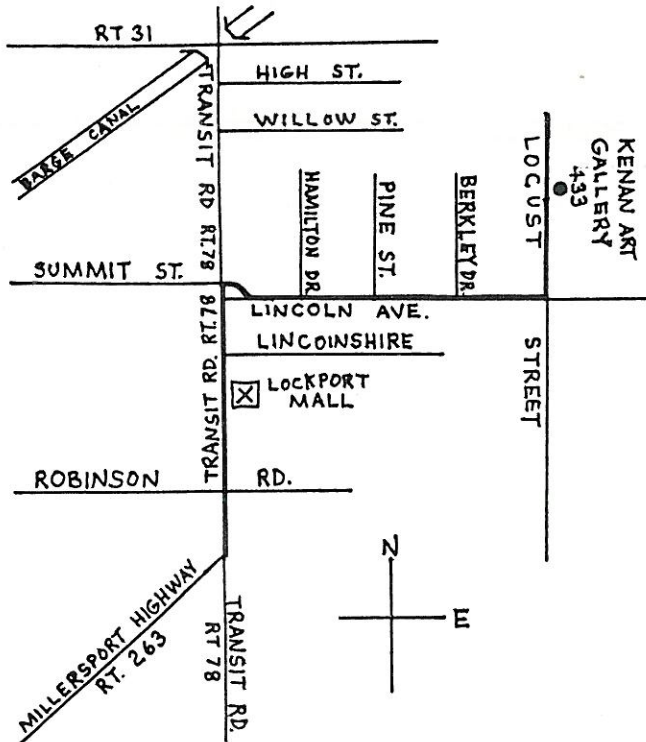
A map showing where this will all take place follows:-



Former B.A.A. member Phil Cizdziel will be talking to the Lockport Astronomy Association on the subject of "Mass Loss of Young Stars". His illustrated talk will also include slides of the 150-inch telescope on the summit (14,000 feet) of Mauna Kea volcano in Hawaii. It is covered with snow from a storm in June while he was working at the observatory. Phil is presently an Astronomy Doctoral candidate at the University of Hawaii, and is in the process of selecting a topic for his thesis. All B.A.A. members are welcome to Phil's talk on Sunday, January 8th at 7:30 P.M. in the Keenan Art Gallery at 433 Locust Street, Lockport, N. Y.

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