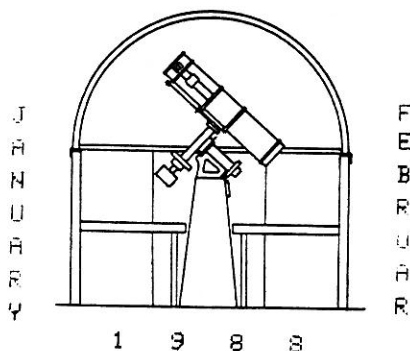


THE SPECTRUM

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Buffalo Astronomical Association, Inc.

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!! MEETING NOTICES !!

JANUARY 8, 1988 - Our first of the new calendar year will be held at the Museum of Science in Buffalo. We should all gather in the Roosevelt Room at 7:30 PM where, after our usual business is conducted, we will be presented with a talk by one of our own distinguished members, and past President of the B.A.A., Rowland Rupp. Rowland's topic will be, "Extra Terrestrial Intelligence", with a question and answer period, all to be followed by refreshments for those in attendance.

FEBRUARY 12, 1988 - This month's meeting, also at 7:30 PM in the Buffalo Museum of Science, will feature a special presentation by Darwin Christy, distinguished B.A.A. member, past President and currently the fine editor of our association's great publication, The "SPECTRUM". Darwin will enlighten us with his special knowledge on the topic of Micrometeorites, including some original research he has recently been conducting. Refreshments will also follow the meeting.

Let us all turn out at both of these meetings for a warm welcome for both Rowland and Darwin.

Previews of Coming Attractions-----

In MARCH we will be graced with a talk by another of our fine members, Dr. Jack Mack.

In APRIL we will see Ron Mauer, from the Elmira/Corning club, who will talk about Mars.

In MAY at our annual dinner meeting, our guest speakers Ken & Trudi Brown from Rochester, are preparing a new presentation which is sure to please us all.

PLEASE NOTE, there is a possibility that the May Dinner meeting may take place on Saturday the 14th rather than Friday the 13th --- so please leave both of those dates open on your busy schedules. The specific date will be known soon so there will be plenty of time to make your plans

Ken Biggie, President

Here is something old which I found in a "Bulletin" from the Rochester Academy of Science, dated April 1965. Thought it to be through our eyes, had we been from another planet.....ed.

THE THIRD PLANET

To the naked eye, the Terra appears as a bright morning or evening star, reaching eastern and western elongation at intervals of about 530 and 225 days respectively. Through a low power telescope, it exhibits phases, appearing as a small disk when beyond the sun, becoming decidedly gibbous at 90 degrees to the sun, and increasing to a large thin crescent when almost between us and the sun. It is accompanied by a satellite of a diameter one-fourth its own, orbiting Terra in about 26½ days. Terra's orbital period, or year is about 350 days, or a little over half our own, which is 670½ days. Its average distance from the sun is two-thirds ours; its diameter almost double that of our planet.

Terra is a beautiful sight in a large telescope, since its extensive atmosphere refracts the sun's light and gives it a reddish halo at nearest approach. The atmosphere is quite transparent most of the time, except that it is usually mottled with whitish spots which appear and disappear, frequently moving over the surface in a generally eastward direction. This is believed to be water vapor suspended in the atmosphere, and indicates the presence of large quantities of that substance. During periods when the atmosphere is clear, the planet's surface can be seen, and movement of surface features indicates an eastward rotation with a period of 23 hours and 24 minutes, only 36 minutes less than our own.

There are extensive white caps over both poles (probably water in a congealed state) extending as far as 30 to 60 degrees from the poles at various seasons. Four large land masses can be seen, occupying about one-fourth the

total surface area. These land masses have a greenish color in the equatorial zones, extending toward the poles until it merges into the white of the pole caps; this is strong evidence for the presence of plant life of a high order. Several tan colored areas are thought to be deserts. The remaining four-fifths of the surface appear to be covered with a liquid, bluish in color, from the surface of which flashes of sunlight appear under favorable angles of illumination.

On the dark side, tiny flashes of light of very short duration are sometimes visible in Terra's atmosphere in the mottled areas; this is thought to be an electrical phenomenon unknown here. During the past forty to fifty years, relatively bright spots of light have developed at fixed locations on the land masses, predominantly in the northern hemisphere; this is indicative of the presence of intelligent life. Over the past twenty years, our scientists have detected an increasing amount of electromagnetic radiation emanating from the vicinity of the bright spots. This probably indicates either the mastery of electricity as a form of useful power or a form of communication among the inhabitants.

If it is actually a means of communication, our scientists may be able to decipher the signals, which have so far been unintelligible, and learn to build apparatus that will enable us to respond. Then the age-old dream of extra Martian communication may at last be realized.

Walter W. Whyman
B.A.A. Fellow

* * * * *

IS THE SUN GROWING DIMMER?

Well, yes. But don't be alarmed. There's evidence to indicate the sun knows what it's doing. And between now and the turn of the century, we're likely going to find out, too!

by Richard M. Head, Ph.D.

"This article is reprinted with permission from The Old Farmer's Almanac published by Yankee Publishing, Dublin, New Hampshire." ed.

Ever since Galileo first observed sunspots on the sun with his newly constructed telescope at Padua in October of 1610, man has been fascinated with their waxing and waning and by numerous other manifestations of solar activity that have been discovered during the intervening years. Galileo and other early astronomers, working in a period of considerable sunspot activity, not only noted the movement of the spots across the visible disk of the sun and their subsequent reappearance on the next revolutions (by which they were able to determine a rotation rate of the sun itself of $27\frac{1}{2}$ days), but also the $7\frac{1}{2}$ -degree tilt of the sun's equator to the ecliptic plane. However, it was not until Schwabe's detailed studies over a 25-year period beginning in 1826 that a periodicity in their number was revealed. Schwabe found that it took a little more than 10 years to complete a sunspot cycle; modern study of historical records as well as new observations set the average cycle at 11.1 years from 1749 to the present (but with considerable variability, ranging from 9 to 14 years).

Working at the end of the 19th century, astronomers noted a total lack of sunspots in the historical record for the latter half of the 17th and beginning of the 18th centuries. (This research was corroborated and brought to the attention of the Royal Astronomical Society by E. W. Maunder at the turn of this century and rejuvenated by John Eddy in recent years.) This period around the end of the 17th century has been linked to the coldest stretch of what is now called the Little Ice Age, during which time Europe experienced more severe winters, Alpine glaciers reached their greatest extent in recorded history, freezing dates of Lake Suwa in central Japan were much earlier than normal, there was a paucity in the number of aurorae observed worldwide, tree-ring records in the southwestern United States indicated a period of anomalous climate in that area, and the Greenland colony perished because ships

could not break through the solid ice that persisted for several years. (This period of unusually low sunspot activity is now referred to as the Maunder minimum.)

In addition to the periodicity noted by Schwabe, a more fundamental period of approximately 22 years emerged as a result of G. E. Hale's measurements of the magnetic character of sunspots early in this century. He observed that sunspots frequently appeared in pairs, with the leading spot being of one magnetic polarity and the lagging one of the opposite polarity as they transversed the solar disk.

And not only were the leading spots in each solar hemisphere of opposite polarity from leading spots in the other hemisphere, but the polarities changed with each new 11-year cycle, to give a 22-year magnetic cycle to solar activity. As instruments became more refined, astronomers were able to measure the weak background magnetic field of the sun, which might naively be assumed to resemble that of the earth, with north and south magnetic poles. They found that a year or two after the sunspot activity reached its maximum in any one cycle, the field at one pole would vanish and reappear as one of opposite polarity, after which the other hemisphere would undergo a similar reversal in polarity. Today the double sunspot cycle, or Hale cycle, of approximately 22.2 years is considered the fundamental cycle of solar activity.

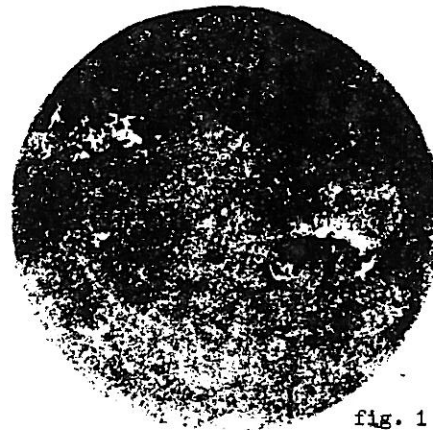


fig. 1

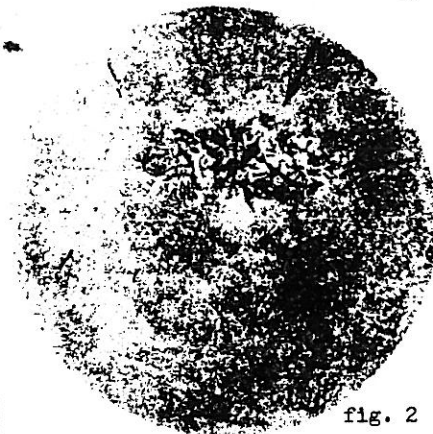


fig. 2

"Artist's rendering of sunspot data gathered in 1984 shows a complex sunspot group rotating onto the visible hemisphere of the sun on January 24 (fig. 1), crossing the central meridian on January 28 (fig. 2), and rotating off on February 2 (fig. 3). The solar constant decreased during this period.

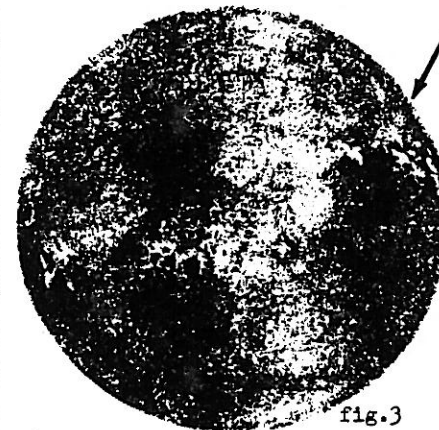


fig. 3

How does this affect life on earth? Ever since Sir William Herschel (discoverer of the planet Uranus) conjectured in the 1770s about the possible effect of sunspots on the price of Egyptian wheat, different scientists have both supported and denied various effects of changing solar activity on the earth's weather and other atmospheric phenomena. The connection between major solar flares

that erupt in the vicinity of large complex sunspot groups and intense aurorae and magnetic storms on earth has been

well established since the last century. Measurements made during the past 25 years from satellites and space probes have increased tremendously our knowledge of the far ultraviolet and X-ray radiations and the flow of high-energy particles and magnetic fields from the sun, particularly those associated with active regions and flares.

The effect of sunspots on the total radiant energy from the sun, termed the solar constant when measured at the distance of earth's orbit, has caused considerably more controversy. Observatories in southwestern United States, Chile, and Egypt monitored the sun almost continuously during the first half of the century. C. G. Abbott concluded that the solar constant increased with increasing sunspot number, but that it decreased when a large spot crossed the center of the disk, with a maximum variation of about 2 percent. However, because the corrections for atmospheric absorption were quite complex and open to question, his findings were never fully accepted.

The possible effect of changes in the earth's orbital parameters on the amount of energy received from the sun has been the subject of debate since the 18th century. J. Croll, in 1875, discussed the effect of the three major orbital changes: precession of the equinoxes, changes in the tilt of the earth's axis to the ecliptic, and changes in the eccentricity of the orbit. He presented strong evidence for these periodic changes being responsible for the ice ages. His arguments have been put on a sounder scientific basis in this century.

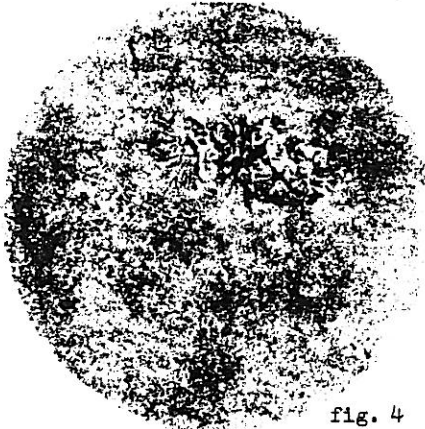


fig. 4

C. G. ABBOTT CONCLUDED THAT THE SOLAR CONSTANT... DECREASED WHEN A LARGE SPOT CROSSED THE CENTER OF THE DISK.

The most recent measurements of the solar constant have been made from satellites in low orbit, on Nimbus 7 and on the Solar Maximum Mission, and cover the years 1979-1984. These measurements show significant depressions in the solar constant of the order of 0.2 percent as a large sunspot group rotates from the edge of the sun to the center, corroborating Abbott's observation of a depression in the solar constant when a large sunspot crosses the center of the sun. Of even greater interest

is the overall variation over the complete period, indicating a continual decrease of between 0.015 and 0.019 percent per year. This period of time coincides with the declining phase of solar cycle 21 that reached its peak in 1979, further corroborating Dr. Abbott's measurements. Tree-ring data also show a periodicity of approximately 22 years in the extent of drought in the western Great Plains and the Southwest.

As a result, it is now known that not only do the far ultraviolet, X-ray, and radio emissions from the sun vary with solar activity, as well as the energetic particles and magnetic fields from solar flares and those carried by the solar wind, but so also does the solar constant. At least one to two more decades of measurement of the solar constant are required before the long-term variability of the solar constant and the reasons for this variability can be established. Does it vary with the 11-year sunspot cycle, the 22-year magnetic cycle, or is there some other subtle change, such as a variation in the diameter of the sun, that governs it?

It is not inconceivable that these most recent measurements of a continual decline portend the first indication of another chilly period of time analogous to that of the Maunder minimum that is waiting in the wings. Has the sun

lost so much magnetic energy over the past 350 years, through flares and that carried away by the solar wind, that it must go through a period of rejuvenation by means of its internal dynamo? We should know between now and the turn of the century.

* * * * *

A final note:- Dr. Richard Head, formerly chief scientist for the NASA center at Cambridge, Massachusetts, is the weather forecaster for The Old Farmer's Almanac.

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EVERY MEETING, AS I WATCH NEW MEMBERS BEING WELCOMED TO THE CLUB, I MAKE A MENTAL NOTE TO SEEK THEM OUT AND TELL THEM A BIT ABOUT OUR CLUB. OFTEN I GET TIED UP WITH GOOD CONVERSATION WITH OLD FRIENDS. STILL, THERE ARE THINGS I'D LIKE THEM TO KNOW. HENCE:

ADVICE TO A NEW MEMBER

THE CLUB IS JUST A LITTLE OVER 50 YEARS OLD AND CURRENTLY HAS ABOUT 100 MEMBERS. IT'S KIND OF HARD TO ESTIMATE - BUT I'D GUESS THAT WE HAVE ABOUT 60 STEADY MEMBERS AND ABOUT 40 MEMBERS WHO STAY IN THE CLUB FOR A YEAR OR TWO. THERE IS A BOARD OF DIRECTORS WHOSE MAJOR FUNCTION IS TO ARRANGE FOR SPEAKERS AT OUR 10 MEETINGS THROUGHOUT THE ACADEMIC YEAR. THE BOARD MEMBERS ARE LISTED AT THE BEGINNING OF EVERY SPECTRUM. THEY ARE THE PEOPLE YOU SHOULD TALK TO ABOUT OFFICIAL CLUB ACTIVITIES. THE FOUR OFFICERS AND THE THREE ELECTED "MEMBERS-AT-LARGE" SERVE 2 YEAR TERMS. AT THE JUNE 1988 BUSINESS MEETING WE WILL ELECT NEW OFFICERS. AT THE JUNE 1989 BUSINESS MEETING WE WILL ELECT THE "MEMBERS-AT-LARGE".

THE CLUB MEETS THE SECOND FRIDAY OF EACH MONTH FROM SEPTEMBER THROUGH JUNE. THE SEPTEMBER THROUGH DECEMBER MEETINGS ARE HELD ON THE BUFFALO STATE CAMPUS. THE JANUARY THROUGH JUNE MEETINGS ARE HELD AT THE BUFFALO SCIENCE MUSEUM. IN ADDITION TO REGULAR MEETINGS, THERE ARE INSTRUMENT SECTION MEETINGS AND SUMMER STAR PARTIES. YOU ALSO HAVE COMPLETE ACCESS TO THE CLUB'S OBSERVATORY. JUST TALK TO THE OBSERVATORY DIRECTOR FOR MORE DETAILS ABOUT THE 12" NEWTONIAN AT BEAVER MEADOW IN NORTH JAVA.

THE BAA IS MUCH MORE THAN JUST ONCE A MONTH SPEAKERS, COFFEE & DONUTS. THE BAA IS A LARGE SOURCE OF KNOWLEDGE EMBODIED IN ITS MEMBERS. THE TRICK IS TO FIND OUT WHO KNOWS WHAT. A PARTIAL LIST INCLUDES:

THE MOON - EDITH GEIGER AND DR. FRED PRICE. EDITH AND FRED HAVE HAD A LONG HISTORY OF OBSERVING FINE DETAILS IN THE SURFACE OF THE MOON.

THE SUN - KEN KIMBLE. KEN HAS BEEN VERY BUSY THE LAST FEW YEARS AND IS SELDOM AT MEETINGS, BUT IF YOU ARE INTERESTED IN THE SUN HE'S YOUR MAN. THE MUSEUM OF SCIENCE'S SOLAR OBSERVATORY IS ALSO AVAILABLE. CONTACT MARILOU BEBAK FOR DETAILS.

STARS - IN ORDER TO UNDERSTAND THE FORMATION AND EVOLUTION OF STARS YOU NEED TO SPEND SOME TIME WITH THE HERTZSPRUNG-RUSSELL DIAGRAMS. ORIN CHRISTY AND ROLAND RUPP HAVE BOTH GIVEN TALKS ON THE DIAGRAMS AND CAN PROBABLY RECOMMEND AN EXTENSIVE BIBLIOGRAPHY.

PHYSICS - DR. JACK MACK IS A PROFESSOR OF PHYSICS AND ASTRONOMY AT BUFFALO STATE AND HE REALLY KNOWS HIS ORBITAL MECHANICS, FORMULAE, RELATIVITY AND COSMOLOGY. WHILE I RECOMMEND A BASIC TEXTBOOK OR ANY CLUB MEMBER FOR ROUTINE QUESTIONS, JACK IS YOUR MAN FOR A DEFINITIVE EXPLANATION OF SOME KNOTTY OR CONFUSING PROBLEM.

PHOTOGRAPHY - DAN MARCUS IS OUR CURRENT DEDICATED EXPERT IN PHOTOGRAPHY. HE HAS EXPERTISE IN CLOCK DRIVES, TRACKING, HYPERSENSITIZING & DEVELOPING FILM AND MAKING PRINTS. ALSO CONTACT CARL MILAZZO AND GENE WITKOWSKI.

CARL MILAZZO - CARL IS A CATEGORY UNTO HIMSELF. HE IS A

JUST ABOUT ANY CLUB IN THE U.S.A. AND CANADA. HE EITHER KNOWS THE ANSWER OR CAN DIRECT YOU TO A SOURCE THAT CAN ANSWER ANY QUESTION IMAGINABLE RELATED TO ASTRONOMY. HE IS A UNIQUE AND VALUABLE ASSET TO OUR CLUB.

IN THE NEXT NEWSLETTER I'LL CONTINUE MY "ADVICE TO A NEW MEMBER". JUST TWO PARTING SHOTS - DON'T BUY A TELESCOPE (OR ANY OTHER EQUIPMENT) UNTIL YOU HAVE TALKED TO MANY PEOPLE. AND DON'T BE SHY, USE YOUR DIRECTORY AND CALL SOME OF US. YOU'LL FIND THE MEMBERS OF YOUR NEW CLUB TO BE FRIENDLY, ENTHUSIASTIC, KNOWLEDGEABLE AND FLATTERED THAT YOU ASKED.

ALPHONSE KOLODZIEJCZAK

ASTRONOMICAL HAPPENINGS

SOLAR:- The Earth will be at perihelion with the Sun on January 3rd, 1988. The Sun will be passing through Sagittarius into Aquarius and then on into Pisces, these months of January and February.

LUNAR:- The phases of the Moon for January are: Full Moon (WOLF) on the 3rd; Last Quarter on the 12th; New on the 19th; & First Quarter on the 25th. For February the Full Moon (SNOW) will occur on the 2nd; Last Quarter on the 10th; New on the 17th; & First Quarter on the 24th.

Lunar conjunctions in January will be Spica on the 12th; Antares on the 15th; Mars on the 15th; Saturn on the 16th; Uranus on the 17th; Neptune on the 17th; Venus on the 21st; & Jupiter on the 24th. For February Spica will be on the 8th; Antares on the 12th; Mars on the 13th; Saturn on the 13th; Uranus on the 13th; Neptune on the 14th; & Jupiter on the 21st.

PLANETARY:- Conjunctions in January are:- Mercury & Mars on the 20th; Mars & Antares on the 21st; & in February are:- Saturn & Uranus on the 12th; Mars & Uranus on the 22nd; & Mars & Saturn on the 23rd.

METEOR SHOWERS:- For January we watch for the Kappa Cygnids of the 17th. These 'Fire-Balls' should prove to be a spectacle this year. The radiant is R.A. 19h 40m at dec.-+53°, being a stream for five days and at maximum 5 to 10 should be observed as bright as -7th magnitude with a whitish hue.

For February we can observe the Delta Leonids, although not as brilliant as the Kappa Cygnids, these yellowish, 4th magnitude meteors should be seen most of February. The radiant is at R.A. 10h 36m and of Dec.-+19°. Any observational data on these is welcome. The 26th is max.

Other meteor showers for January & February are:- the Quadrantids of Jan. 3rd; Delta Cancrids of Jan. 16th; & Coma Berencids of Jan. 17th; also the Aurigids of Feb. 26th.

Darwin Christy

ASTRONOMER FROM THE PAST

Johann Heinrich von MADLER, a German astronomer was born in Berlin, May 29, 1794 and died in Hannover, March 14, 1874. His education came from the University of Berlin and became a professor and one of the governing faculty at the Berlin Normal School. He was professor and director of the observatory at Dorpat (Tartu) from 1840 to 1865. His many observations were made with an accuracy never before attained and then he devoted himself principally to the fixed stars. From 1834 through 1836 he published maps of the moon in four sheets which surpassed anything which had been published at that time.

Charles MASON, an English astronomer and surveyor was born near Cambridge about 1730. He died in Philadelphia, Pennsylvania in February 1787. Before coming to America, he was for years assistant astronomer at the Greenwich Observatory and he was also sent on many expeditions in the service of science. In 1763 he was employed with another

surveyor, William Dixon, to survey the boundary line between Maryland and Pennsylvania until 1767. This boundary became known as the "Mason and Dixon's Line". The two of them returned to England where Mason later engaged in astronomical observations and researches. He then returned to America to continue his observations. Some of his works "Mayer's Lunar Tables Improved" as well as papers too numerous to mention. In 1860, those papers were accidentally found, of all places, at Halifax, Nova Scotia.

Darwin Christy

? ! ? SPY & TELL ? ! ?

Congratulations to Doug Smith who was one of the ten New York State winners of the U.S. Department of Education's Christa McAuliffe Fellowship award. He received \$25,000, and was one of the 115 teachers throughout the country chosen for awards. Doug teaches fifth grade in the Sweet Home Central School District, and his plans for his students, as a result of the grant, include an amateur radio lab, laser lab, and a rocketry lab.

Last fall Michael Krasner spent some time in Italy as part of his annual vacation.

In the October issue of Smithsonian, page 36, there is an article on Stellafane which some members may enjoy reading.

Jerry and Adrienne Morris and daughter, Lisa, went to Saint Marys, in Pennsylvania, on October 17th, where Jerry was performing with the Amherst Glee Club. Adrienne drove to nearby Kane and visited with Roger Collins, president of the Sir Isaac Newton Astronomical Society. The group's largest scope is a 10", owned by one of the members. The Small Club Award was presented to the society a few years ago by the Astronomical League for the excellent Astronomy Day program of activities. On October 24th Jerry and Adrienne went to Toronto with the Amherst Glee Club. It was raining and Adrienne was unable to make contact with an astronomy group, so she went to the science museum instead.

The NFCAA meeting at the Skylon Tower on November 7th was a very happy event. There were about 75 people in attendance and the BAA was well represented by Bill Kirst, Jack Empson, Dave Williams and wife, Anita, Tristan DiLapo, Dina Adimey, Doris Koestler, Brian Fallon, Hugh Pettit, and Carl Milazzo. Tom Dey was the speaker and, as usual, he presented an extraordinary talk. He asked some questions and rewarded those who gave correct answers with some of his fine photos. Tristan, Brian and Carl were among the winners.

The University of Buffalo campus was the setting for a star party on November 14th at which fifteen people were present. One of the UB students brought his 10" scope, and Bill and Caroline Halbert, BAA members, brought an 8".

Doris Koestler has a new '87 Dodge Charger. Seems the oil cap was left off on one occasion and oil was spilled on the engine, so this new car went smoking all the way home.

Dan Marcus held his photographic workshop at Campos Photographic Center on Niagara Falls Boulevard on November 20th. About eight people were in attendance. Two members brought prints and negatives. Ed Czapla had a picture of Andromeda, and Tristan DiLapo had one of Comet Bradfield.

Ted Zandarski has ordered a 25" f.5 Dobsonian telescope weighing 260 pounds. It is being made by Tectron in Sarasota, Florida, and will be delivered in August.

Orrin Christy is a very busy fellow. He traveled for Moore Business Forms to Boston the first part of November and went to Angola, Indiana, for four days in the middle of November and wine and dined two Japanese business men around the end of November.

In the article, "The Top 10 Telescope Ideas of 1987" in the December issue of *Sky & Telescope*, Carl Milazzo's picture appears on page 593 in which he is shown watching a demonstration at Stellafane by John Dobson of Dobsonian

Ken Biggie has been interested in flying since he went into the Air Force during the war and became an aircraft pneudraulic specialist. Shortly after the Cuban Missile Crisis he was stationed in England with the RAF for 26 months. He has been attending a 13 week ground school course at Buffalo Airfield on Clinton in West Seneca since the middle of September. As of December 1st he had logged 50 or 60 flight hours.

Hugh Pettit had an unfortunate fall as he and Gene Witkowski were loading his telescope into the trunk of his car after using it at the museum. Hugh fractured his upper left arm below the shoulder as he tripped over his battery case. In February he will be the proud owner of the CAT (Computer-Aided Telescope). The CAT has an internal memory of more than 8000 celestial objects and is claimed to be so fast that the observer can view 100 objects in an hour. For further information on CAT check your November Sky & Telescope, page 484 or the December Astronomy magazine, page 66.

On December 5th the following members were volunteers at the "Dinosaurs Alive!" exhibit at the museum: Gene Witkowski, Jack Empson, Doris Koestler, Ken Biggie, Jack Mack, Dave Sepulveda, Bob Hughes, Carroll and Edith Geiger.

Edith L. Geiger

MONTHLY CONSTELLATIONS

DORADO, the Goldfish, or Swordfish, or Dolphin, the latter not to be confused with 'Delphius', is another southern constellation having been placed there by Bayer. One interesting distinction in this constellation is NGC 2070; the head of the fish marks the southern ecliptic pole, thus it was named by Caesius as 'Polus Doradis'. Within 3° of the 'head' is the stellar like object 30 Doradis, 'the Great Looped Nebula'. It was also known as the 'True Lover's Knot' as explained by Smyth. It is explained, also, by Sir John Herschel as an assemblage of loops, one of the most extraordinary objects in the heavens. ----- 'Centre of a great spiral.' Today it is known as NGC 2070.

Surrounding Dorado are the constellations Horologium, Caelum, Pictor, Mensa, Volans, Reticulum & Hydrus. Objects of interest include Galaxies, NGC's 1515, 1533, 1546, 1549, 1553, 1566, 1617, 1672, 1688, 1796, 1947 & 2082. One Open Cluster - NGC 1910. Diffuse Nebulae - NGC 1936 & 2070 as explained above. Planetary Nebulae include NGC's 1714, 1722, 1743 and one located at R.A. 05h 43m at Declination -67.9 degrees.

Other objects are Variable Stars Beta, R, U, WZ & S. "S" Doradis is within the LMC (Large Magellanic Cloud) and is probably the brightest object yet discovered. Its absolute magnitude must be brighter than -8. About 600,000 times brighter than our Sun. It, too, is a double whose two components are said to be larger than the entire orbit of the Earth about the Sun.

PUPPIS, the Dech, was a part of the huge constellation, Argo Navis. It is also referred to as the 'Poop Deck' or 'Stern Deck'. Constellations bordering on Puppis are: Hydra, Monoceros, Carina, Vela, Pyxis, Pictor, Columba & Canis Major.

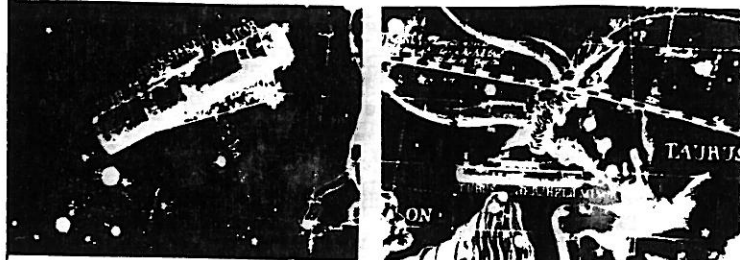
Objects of interest include Galaxies: NGC's 2310, 2427 & 2525. Diffuse Nebula, NGC 2467. Planetary Nebulae are: NGC's 2438, 2440 & 2452. Open Clusters include: Mel 171, H-2 & NGC's 2421, 2422 (M-47), 2423, 2432, 2437 (M-46), 2439, 2447 (M-93), 2451, 2453, 2455, 2477, 2479, 2482, 2489, 2509, 2527, 2533, 2539, 2546, 2563, 2567, 2568, 2572, 2580 & 2587.

Double Stars are: 2, 5, 9, 19, 21, Xi, M, F, D-2, H-2, I, P, G, Y, N, Kappa-1, Kappa-2 & Rho. Variable Stars are: L-2, Z, KQ, U, X, CH, R, RY, RZ, Rho, W, AP, V, AS, AT, RS, RW, YZ, HS (N-1963), CP (N-1942), & DY (N-1902).

Darwin Christy

ANCIENT CONSTELLATION

TUBUS HERSCHELLII MAJOR, Telescopium Herschellii AND TUBUS HERSCHELLII MINOR, are two ancient constellations created by Father Maximilian Hell about 1781, in honor of Sir William Herschel. They were published, first, by Bode in 1800 and appeared in Burritt's Atlas. They have disappeared from all charts and maps since Burritt's time. The larger or major telescope was shown from "Pi" in Gemini, through the "Psi" stars of Auriga to Beta Aurigae.



The lesser telescope, the minor, was placed just below and to the east of the 'Hyades' in Taurus. The tripod extended into Orion's left arm which is holding his prey.

Darwin Christy

** OBSERVATIONS **

On October 31st, I observed an occultation of the Jovian moon Europa at 8:33 PM EST. While observing the shifting equatorial belts with my six-inch f:8 Newtonian, I noticed the moon approaching the disc of the planet. At 8:30 PM EST first contact was noted. Approximately 3 minutes later, the satellite disappeared behind Jupiter's limb.

Three evenings later, November 3rd, I observed a transit of the Jovian moon Io across the disc of the planet. I first observed the satellite at 9:29 PM EST as it edged on to the south equatorial belt. Using the Beaver Meadow 12.5 inch reflector at 332x, I was able to follow this transit until the moon reached the planet's central meridian at approximately 10:22 PM EST. The sky was slightly hazy but the atmosphere was steady.

Now that Jupiter has passed opposition, it is conveniently placed for evening viewing. It has a disc size of almost 50 arc minutes and shines brilliantly at magnitude -2.9. Since this is the closest Jovian opposition in 12 years, now is a good time to observe the king of the solar system.

On November 22nd at 23:55 Universal Time, I observed Comet Bradfield near 18 (Y) Aquilae. The comet exhibited a starlight nucleus with a broad fanlike tail. The estimated magnitude was 5.2. The object was easily seen in 7 x 50 mm binoculars with the 1.5 degree tail pointing in a north-easterly direction. With an 8-inch f:8 reflector at 40 x, the comet was magnificent, very bright with its tail extending beyond the field of view.

Gary Kielich

At 6:09 PM on October 30th, in the constellation of Aquila, the Soviet space station Mir was seen as a -1 magnitude object moving towards the east. One of the cosmonauts on board passed the 300 day endurance record for a human, on December 1st, and its on-board observatory has been detecting X-Rays from the Supernova in the Large Magellanic Galaxy.

Comet Bradfield, 1987s, was seen with the naked eye as a 5.3 magnitude object on the border of Ophiuchus and Serpens Cauda at 7:15 PM on November 22nd from the Boston Hills. With binoculars, a 5 degree fan shaped tail was seen of low to medium surface brightness. With my jointly owned 26-inch Dobsonian telescope, the intense star-like nucleus was very bright. The inner coma was almost bright, and the outer half was shaped like the bow of a tug boat. It was of medium surface brightness. The tail could be

vision and rocking the scope, the tail could be detected 2 more degrees farther out. The inner half of the tail was hollow but of very low contrast, and the tail looked slightly brighter with a deep sky filter and a 20mm Nagler eyepiece. That night the comet was moving at the rate of $2\frac{1}{2}$ degrees per day which was noticeable in less than an hour because it was near some 8th magnitude stars in the open cluster NGC 6633.

The 7th magnitude Silver Dollar galaxy NGC 253 in Sculptor near Cetus was observed. It is 22×6 arc minutes in size with a bright round nucleus and an oval hub of only slightly lower surface brightness. All over, it is mottled heavily with dust patches and a two arm spiral which is seen faintly. One arm is slightly brighter than the other and about a dozen foreground stars are sprinkled in front of this galaxy which reminds me of the Andromeda galaxy. NGC 253 is 7 million light years from us which is why it looks like a miniature M-31, also because it is tilted 12 degrees.

As I galaxy hopped, a chain of them near Alpha Pegasus, I observed NGC 7432 a 13th magnitude galaxy with slightly brighter hub and a disk of 1 arc minute in size. Half a degree northeast of it is the galaxy UGC 12281 which is a 15th magnitude and a $\frac{1}{4}$ arc minutes in size. What helped make it easier to locate was a string of 8th magnitude stars pointing it out a half degree from it. On edge of the galaxy was a 15th magnitude star sitting there looking like a supernova.

A very dense cluster of galaxies was seen that resembled a partially resolved cluster of stars slightly out of focus. It is located $2\frac{1}{2}$ degrees N.E. of Alpha Andromeda. It contains 9 galaxies, NGC 68 is 13th magnitude and the brightest, but what makes it a little easier to see this group is their combined light and overlapped size. The same thing makes the great globular of Hercules easier to see, which is the bunching together of many faint 13th magnitude stars, makes it appear 5th magnitude.

Near the bright galaxy NGC 891 in Andromeda is a galaxy cluster with NGC 910 in it. Two arc minutes west of it is the Zwicky galaxy 539.012 which is 14.9 magnitude and of low surface brightness and a $\frac{1}{4}$ arc minute in size.

On November 16th a nova was discovered in the constellation of Vulpecula as a 7.2 magnitude object at R.A. 19h 02m & Dec. $+21^{\circ} 40m$.

Carl Milazzo

IT HAPPENED ONE NIGHT

It was a late fall evening and I had just come home. As I walked up the driveway to the house, I glanced up. The sky was quite clear, especially from where I live in the city.

I decided to go in the backyard where the street lights wouldn't affect my vision. As I looked up I saw Jupiter well above the horizon and climbing higher. I went inside to get my eight-inch scope to view our solar system's largest planet, especially right now when it's giving us the best show it has in twelve years.

As I looked through the eyepiece on low power, I noticed a small black dot on the planet. At first I thought I had a problem with my optics, but as I continued to watch, the small dot moved. I was witnessing a moon transiting Jupiter.

After I changed to a higher power, I not only saw the transiting moon clear the planet, but I saw Jupiter's Giant Red Spot as well. It was an evening well worth setting my scope up for.

After viewing Jupiter for a while, I star hopped to a few Messier objects before calling it a night. But as I was putting my scope away, I thought of how early astronomers must have felt when they first viewed the heavens with optical aids. OH!: What a feeling!!

David Bull

SOLAR ACTIVITY

Solar sunspot activity continues to increase noticeably as cycle 22 begins its second year. On November 22nd the Solar Flux reached a high of 121, the highest the solar flux has been since May 1984. During the months of November and the early part of December a series of southern solar hemisphere high latitude sunspots have been observed, accounting for the increased solar flux number. This sunspot group however have not caused any major geomagnetic disturbances or increased auroral activity during the last couple of months.

Bob Hughes

NEW MEMBERS

A welcome to the following new members:-

Donald S. French - Nancy Adams - Timothy Liddle

KELLOGG OBSERVATORY REPORT

The Kellogg Observatory at the Buffalo Museum of Science has been open 17 evenings since September. Only 5 nights were too cloudy for summer observing. BAA volunteers have been of tremendous assistance in handling the public. Over 5,000 visitors have looked through the telescope, an average of 333 per night. Several have become BAA members.

Objects observed have been those most interesting to the general public, and those able to be seen well from within the city. Saturn with nicely defined rings was popular during September and early October, and Jupiter with its 4 moons has been seen nightly since mid-October. The moon of course is a favorite, especially on Halloween evening. On Friday October 16th and Wednesday November 11th the red spot on Jupiter was observed by Marilou Bebak and Dan Marcus. Dan was also able to sight comet Bradfield in the Museum's Astroscan telescope on Wednesday November 11th, while Gene Witkowski and Hugh Pettit saw comet Bradfield in Hugh's celestron on Wednesday November 18th.

The following club members deserve many thanks for their invaluable help: Ken Biggie, Connie Brignole, Dave Cuzba, Ed Czapl, Tristan and Debbie Dilapo, Jack Empson, Rich Janas, Bill Kirst, Dan Marcus, Carl Milazzo, Hugh Pettit, Rowland Rupp, Lewis Sawicki, Gene Witkowski and Dave Bull.

Although the dinosaurs leave the Museum of Science on January 4th, the Kellogg Observatory will continue to be open on Friday evenings only, from dusk - 9:45pm through the month of May. Anyone interested in volunteering please call Marilou at 896-5200 (work), 627-2333 (home). (With 15 volunteers, you would only need to come in one time between January and May!)

Marilou Bebak

ANNOUNCING THE B.A.A. COMPUTER SECTION!!!!

Has your home become part of the computer age? You know the dream of a computer in every closet by the mid-1980's? Well, here's your big chance to merge your computer with your astronomy hobby.

If you ever wanted to predict what's up where and when, search for satellites, figure out how long that exposure of Jupiter should be, or if you need a program or have one that you would like to share, then this is where you can get started.

Like the various other sections of the B.A.A., the computer section will be here to help you use your computer for these and many other things. All that you need to do, is to dig deep into that closet or reach far under your bed, shaken out all the zapped aliens (and the few you may have missed) and give me a call between 6 and 10 P.M. at 694-3814 daily for more details.

Jack Empson

Our November meeting was a photographic printing session. We met at the Campos Photographic Center on Niagara Falls Blvd. They have several large well equipped dark-rooms available for rental. Ten members brought astro-photographic negatives for printing.

Dan Marcus showed us the way around one of the black and white areas.

The big enlarger and printing exposure meter made printing relatively straight forward and there was an auto-matic print processor which turned out finished prints in less than a minute. These facilities are excellent for those who have poor, or no darkroom at home.

All our work was black and white printing. There are some fine well equipped areas for color printing with equally magical quick processing machines. Some of the members had time to partake of a fine tour of the color facilities. Color printing of astrophotographs is a pretty specialized branch of the art and considerable judgment in addition to the automated features is required. So this was left for a possible future visit.

The future plans for the section are tentative. And they are always dependent on the weather. A meeting is scheduled for Friday, January 22nd to be held possibly at Beaver Meadow to turn out some more fine negatives. For February the most favorable date seems to be Friday the 19th. With a little break in the weather we should have some interesting camera sessions.

Ed Lindberg

***** PRESIDENT'S CORNER

Well, the Christmas Holidays have come and gone and we are all starting out in the new year of 1988. Let's hope it will be a good year for us all.

I would like to thank Doris Koestler, and all those who assisted her, for arranging our Christmas Party. I would also like to thank Edith Geiger for her usual superb job at showing us the lighter side of the B.A.A. members and events for the 1987 year.

I would also like to thank the members of the Board of Directors for all their efforts in keeping the business of the B.A.A. moving along. That also includes all my fellow officers.

I would also like to express my appreciation to all those who have helped out with various events at the Museum of Science last year. I think the Museum, as a vital cultural institution in this area, under the direction of Ernst Both, Museum Director, and long time B.A.A. member, has become a very exciting place again, and we should all get involved in its programs and activities whenever possible. Congratulations to Ernst and a wish for continued success at the Museum.

At the December 1st 1987 Board of Director's meeting, Mr. Bob Hughes was appointed Observatory Director. Bob will be in charge of the B.A.A.'s observatory located at the Beaver Meadow Environmental Education Center, off RT-77 in North Java, Wyoming County. Bob will be setting up a public night schedule for this year and will be looking for fellow members to assist with this very important club function. Please make yourselves available once or twice this year from April to October to help out.

Bob will also be in charge of providing any dues paying member with proper training on the use of our 12.5-inch telescope and accessories (astrophotography, etc.) at the Beaver Meadow facility. Remember, you must be checked out on the use of the observatory if you want to use it on your own ---- so- see Bob for details.

Carl Milazzo is trying to locate any of the recently donated telescopes the B.A.A. has acquired. He has generously offered to build or refurbish the mountings for these instruments which will then be made available for

use at our Beaver Meadow Observatory. If anyone knows the whereabouts or general location of any of these instruments, please contact Carl or any of the B.A.A. officers or Board of Director members. The same goes for anyone who would care to donate such an instrument for this purpose. Your donation would be appreciated. Thanks to Carl for the offer.

Ken Biggie

***** JUMBLED ASTRONOMY

MANY A SORT - HOW MANY EYEPieces ONE HAS TO HAVE.
ON ARM TOYS - HAND-HELD ADULT TOYS JUST COST MORE (SANS TRIPOD).
MANY ROOST - GATHERING AT A STAR PARTY ON A RAINY NIGHT.
MOON TRAYS - A PLACE TO KEEP VARIOUS MOON FILTERS.
MANY TORSO - CLIMBING AROUND YOUR SCOPE TO GET A GOOD VIEW.
MOOT YARNS - I DISCOVERED THIRTY DIFFERENT COMETS IN ONE HOUR.
TOMS RAYON - WINTER CLOTHING FOR OBSERVING THE ORION NEBULA.
O NO SMARTY - THAT'S NOT 1987-A ITS A PIECE OF LINT!
YON A STORM - WHAT HAPPENS ONCE YOU GET YOUR SCOPE ADJUSTED?
TO MY SONAR - TELESCOPE ACCESSORY FOR CLOUDY NIGHTS.
YAMS OR NOT - KEEP THE FOOD OUT OF THE OBSERVATORY!
STRAY MOON - USUALLY WHAT YOU SEE AFTER MANY VIEWING HOURS.
SOON MY ART - MANUALLY DRAWN : COULI NOT AFFORD A CAMERA.

Bruce Newman

Perhaps the members of the B.A.A. do not realize that "The SPECTRUM" is not the only newsletter available for reading at their request. Even though every member receives "The Spectrum", the 'Club' receives other newsletters from other clubs. These newsletters can be borrowed upon request from the 'keeper of the archives', our secretary, Dave Sepulveda. The following is a list of the newsletters and clubs they come from:-

"SCOPE" from the Toronto Centre R.A.S.C.
"SPACE" from the St. Petersburg Astronomy Club, Fla.
"ORBIT" from the Hamilton Centre R.A.S.C.
"The ASTRONOMICAL CHRONICAL" from the Syracuse Astronomical Society
"NIAGARA WHIRLPOOL" from the Niagara Centre R.A.S.C.
"The ROCHESTER ASTRONOMER" from the Rochester Academy of Science, Astronomy Section
"STARLITE" from the Peoria Astronomical Society, Peoria, Ill.
"ASTRONOMY LONDON" from the London Centre R.A.S.C.
"AD ASTRA" from the Atlanta Astronomy Club, Georgia.

MEASURING A MIRROR'S RADIUS OF CURVATURE

From the April 1971 "Spectrum" by Robert Burdick, a former member now deceased, we find an excellent article for you T.M.'s ----

To the mirror maker who is looking for a simple method to measure the radius of curvature of his mirror during grinding, a steel ball whose radius is accurately known and a stop watch which will measure to 1/10 second is needed. The procedure is as follows: level the mirror, face up, using the ball which will roll to the mirror's center, if level. The mirror must be solidly supported, and both ball and mirror surface should be completely clean of dust and dirt particales. The ball is brought to

the other edge of the mirror, then back to the release point; when it reaches the release point the stop watch is started. If P = period, in seconds/cycle, and frequency, in cycles/second, then:

$P = \frac{1}{f}$; this value is placed in the formula- $R = r7P^2$, where r = radius of ball, and R = radius of the mirror.

I have a 2-inch diameter ball, and for a 12.5-inch, $f:4$ mirror the number of oscillation cycles of the ball is 40 in $150.4 \pm .1$ seconds. This is accurate to within 0.14 inches for a 100-inch focal length. A table of seconds and mirror radii can be calculated for your particular mirror and converted into a graph. All that is needed each time the radius is measured is to look up the seconds in the graph and read off the corresponding radius.

(This is written verbatim. Later, in the June 1971 "Spectrum", Dr. Fred West noted that the formula for the mirror's radius of curvature, $R = r7P^2$, should have read $R = r + 7P^2$. That article by Dr. West will be seen in the next issue of the "Spectrum"; again for you T.M.'s.)dpc

"SPECTRUM" DEADLINE
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*** THE SPECTRUM ***

BUFFALO ASTRONOMICAL ASSOCIATION, INC.

DARWIN CHRISTY, EDITOR
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FIRST CLASS
MAIL

The following is an editorial I am rewriting from the December 1970 issue of the "Spectrum";----eeb (Ernst Both)

A NOTE CONCERNING THE "SPECTRUM": The "Spectrum" is YOUR newsletter. What appears in the "Spectrum" should, to a certain extent, reflect the wishes and needs of the membership. It is virtually impossible for the 'editor' to know what these wishes or needs are, unless YOU enlighten him. So why not drop him a note and tell him what you think about the "Spectrum" (good or bad), what you would like to see in the "Spectrum", etc. Members are encouraged to submit articles, news-items concerning their astronomical activity, observations, etc. Other members are interested to find out what YOU are doing, so let them know. GET INVOLVED. Write something for the "Spectrum" and send it to me, your editor.....

Darwin Christy
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Tonawanda, N. Y. 14150

- ACKNOWLEDGEMENTS -

I wish to thank the many people who have contributed to the "SPECTRUM" or helped put it together. I list those who have done so:----

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