

The Spectrum

Buffalo Astronomical
Association, Inc.
Darwin Christy, Editor

MAY - JUNE
1982

MAY meeting:- The May 14th meeting will begin at 7:30 P. M. in the Humbolt Room at the Buffalo Museum of Science. Our speaker will be Dr. Thomas Noonan from the S.U.N.Y. College at Brockport. His topic will be, "Black Holes."

QUIZ

True or False----

1) The 'Crab Nebula' is kept shining by energy supplied by a 'pulsar' in its center. The 'pulsar' is a rapidly-spinning neutron star, the very compact remnant of the supernova explosion which produced the gas in the nebula.

2) The orbit of Mars, an inferior planet, has phases like our Moon because its size is smaller than the Earth's.

3) Under excellent conditions it is possible for telescopes to photograph the fine mottling of the solar surface, known as the granulation. The gas within 150,000 km of the surface forms convection zones, and the top layer of convection material gives rise to the seething granules.

4) The rotation of the photosphere takes between 37 days (equator) and 26 days (poles), so that an imaginary line drawn across the Sun from pole to pole will orbit the Sun more rapidly at the poles than at the equator.

5) Sunspots look like irregular domes on the Sun's surface. Although they appear to be dark areas, this is entirely a contrast effect. A large dome radiates as much light as the Full Moon, but appears black against the brilliant photosphere.

Answers are elsewhere in the 'Spectrum.'

(The SPECTRUM DEADLINE for the JULY-AUGUST ISSUE WILL BE) -----MAY 29th-----

(The SPECTRUM DEADLINE for the SEPTEMBER-OCTOBER ISSUE) WILL BE -----AUGUST 25th-----

4-SALE - 6 inch f:7 Edmund Reflector with finderscope, German Equatorial mount and clock drive. Oculars - 25mm, 12mm, 6mm and a Barlow. Three (3) astronomy books. Call 683 1215 - Lester Dickey of Lancaster. Asking \$275.00

??? DID YOU KNOW ???

There are three planets in our solar system that have an average density less than water??? They are Saturn, Uranus and Pluto..

JUNE meeting:- The June 11th meeting will begin at 7:30 P.M. in the Humbolt Room at the Buffalo Museum of Science. This is our annual business meeting. We will hear reports from the President, Treasurer, Secretary and Membership Chairperson. We will also elect officers. In addition to the business portion of our meeting we will have as our speaker, George Keene from Eastman Kodak. Mr. Keene will speak on, "The Construction of a 20 Inch Telescope and Observatory."

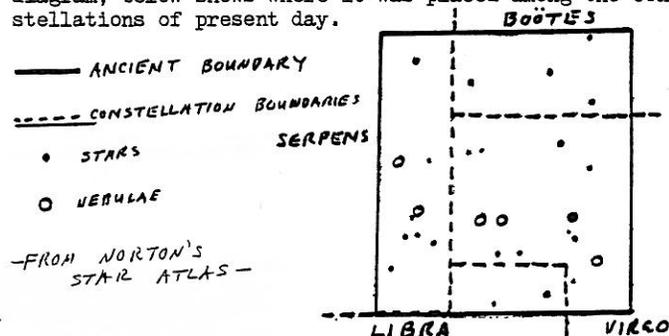
IF YOU FIND MISTAKES(!!) in this publication, just remember that they are there for a reason. We (I) publish something for everyone, and what some people look for, everyone finds---MISTAKES!!!!

Ancient Constellation

A the foot of Boötes, formed by Hevelius and published in his 'Firmamentum Sobiescianum', is the Mother Mountain, MONS MANAELUS. It is sometimes, but incorrectly given as 'Mons Menelaus', supposedly as Smyth suggested after the Alexandrian astronomer referred to by Ptolemy and Plutarch.

Landseer has a striking representation of the Husbandman, as he placed Boötes, with sickle and staff, standing on this constellation figure. Its origin can be explained, perhaps, in the, "Essays on the Ruling Races of Prehistoric Times" by Hewitt which he wrote, 'The Sun-god thence climbed up the Mother-Mountain of the Kushika race as the constellation 'Hercules', who is depicted in the old traditional pictorial astronomy as climbing painfully up the hill to reach the constellation of the 'Tortoise', now called 'Lyra', and thus attain the polar star 'Vega', which was the pole star from 10,000 to 8,000 B.C.

It has been stricken from the maps and catalogues in recent years but some maps still use it. Its position, in diagram, below shows where it was placed among the constellations of present day.



This year's observing season at Beaver Meadow got off to a great start with a star party on Saturday, February 27. The star party was not planned - it just happened. It was one of those rare winter nights when it actually stayed clear most of the evening! In addition to the 12½ inch, Doris Koestler, Carl Milazzo, John Riggs and Jim Russell all came out with their own telescopes. The biggest surprise was the appearance of Larry Carlino with his 17¼ inch reflector! Just about every interesting deep sky object available was seen with it, from the Horsehead Nebula to Hubble's Variable Nebula to remote galaxies. Hopefully, we will be able to have more impromptu star parties like this in the months ahead.

On March 6, the new astrophotography display was put up in the warming room. Some of the photographs will be familiar, but a few new ones have been added as well. More photographs by our members are needed. At the present time, we are short of photos of the planets and open star clusters, but all astronomical subjects are welcome.

Bob Mayer went out to the Observatory with John Riggs on March 23 to replace some of the worn out teflon pads on the rotating ring assembly and fine tune the components of the motor drive. One of the problem areas in the past has been the reaction of the various metals in the mount to temperature change. At one temperature the drive system can be adjusted to run smoothly, but a 30 degree change up or down may cause slight binding to occur as the metals either expand or contract at different rates. Periodic checks are necessary to compensate for this and adjustments will be made when needed. Plans are also underway to provide for adequate balancing of the telescope when cameras or other heavy accessories are added to the mount.

One further reminder, volunteers of public night are always needed. Please don't hesitate to make your knowledge and skills available. This is one of the best ways our club has to reach others and promote astronomy.

John Riggs

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Did you know??? - Saturn's moon, Phoebe, is the only moon in the solar system that doesn't have a rotational period that equals its revolution. Phoebe's rotation is 9.5 hours and revolution is 550 days and 11 hours.

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Book Clubs

Some time ago, a friend asked if I knew anything about the Astronomy Book Club and I felt compelled to give it a bad recommendation. Since then, my opinion of that heavily advertised organization has deteriorated.

I won't bore you with details of my misadventures except to summarize by saying they have been billing me erroneously, in their favor, for over six months. The worst part is that after four letters and two telephone calls from me, I am threatened with "serious action" if I fail to satisfy their charges. And this occurs even after I have received their printed card stating that my account is fully paid. I believe they are utterly incompetent and incapable of correcting an error once it has been entered into their computer.

I strongly recommend that anyone considering joining the Astronomy Book Club reject the notion promptly lest they become entangled as I have. The bad reports about mail order organizations apply fully in the case of the Astronomy Book Club.

Rowland Rupp

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The largest constellation in area is Hydra with 1302° and the smallest is Crux with 68°

Sidereal rotation of bodies in the Solar System.

A - Jupiter	a - 10h 14m
B - Pluto	b - 27.322d
C - Earth	c - 15h 48m
D - Sun	d - 23h 56m
E - Moon	e - 6.3874d
F - Saturn	f - 58.65d
G - Uranus	g - 243d
H - Venus	h - 10h 49m
I - Neptune	i - 24h 37m
J - Mercury	j - 9h 50m
K - Mars	k - 26d

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Answers to last Match-up in last 'Spectrum'

- 1 - l; 2 - o; 3 - f; 4 - a; 5 - i; 6 - k; 7 - c; 8 - n;
- 9 - b; 10 - m; 11 - g; 12 - e; 13 - j; 14 - h; 15 - d.

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On Astronomy

The nine planets have lined up again
 an awesome sight to the eye of men.
 I hope their presence won't be a
 rebuttal
 to all the hard work
 of our brave Space Shuttle.
 It has been working so long
 on this third time around
 to prove men can live
 between sky and ground.
 And as for you Halley's Comet
 with your angel wings,
 after seventy-five years
 there's been a change in things.
 Don't be so cynical at what appears
 to be the same old wars with
 some old fears.
 The Earth still follows the beautiful Sun
 The moon since you left has been wooed and won.
 Man has grown wiser than ever before,
 Don't be surprised if he knocks on your door!

Esther L. Goets

from 'Sorry About That' collection

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Spy and Tell

The B.A.A. members who are also members of the L5 society are: Gary Herrnreiter, Anita and Bill Kirst, Dave Williams, Egbert Swoboda and Carl Milazzo.

We are sorry to report that Lillian Von Gerichten was mugged in a parking lot and had a most horrible experience. As a result of subsequent events, she had to spend some time in the hospital due to an injury to her ankle.

Poet Al Riccuiti spoke to an assemblage of students in Squire Hall at SUNYAB on the Friday night in February before they began their week-end sleep-in in Haas Lounge to protest the take over of Squire as a dental facility. He read many of his poems to the group.

Darwin Christy has a new plaything to keep him busy during his retirement. He put a Sinclair ZX31 together and is now enthralled with its performance. See Darwin for further information.

When Carl Milazzo went to Beaver Meadow on March 20th to supervise public night, he found that he was the only person on the 280 acres of land. There were no people, no cars, no lights,--- just nothing but plenty of clouds.

It looks like Al Mohn is going to be the winner in the competition with Al Kolodziejczak to be the first to see all of the Messier objects. Al M. has, at this writing, 6 more objects to observe to complete the list.

Gene Witkowski had the extraordinary opportunity of seeing the lift-off and landing of the Space Shuttle, March 22 - 30.

John Riggs reported observing a nova in Aquila which had been discovered by a Japanese astronomer on January 27th.

Congratulations to Al Mohn who will be married in June to Mary Alice Sanders.

Ken Biggie and Diane, who were skiing at Blue Mont, had a rather hair-raising experience when the chair-lift became stuck. At 30 feet off the ground they remained for an hour until they were rescued by the ski patrol.

Edith Geiger

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Instrument Notes

The main feature of our Instrument Section meeting for March was the testing of a fine 14 inch mirror brought in by our new member Tristian Dilapo. This mirror showed a peculiar waviness in its figure when it was first set up. But after it had stood on the test stand for some 20 minutes the irregularity cleared up and the mirror proved to be a very satisfactory paraboloid. The glass is apparently very sensitive to the surrounding temperature and because the thinness of the disc the figure changes considerably with temperature variation. Under average observing conditions after the glass has reached thermal equilibrium the mirror should show no ill effects from ambient temperature changes.

The regular club meeting of April 9th took on the aspects of an Instrument Section meeting with the fine lecture-demonstration by Larry Carlino. Larry convinced the audience of the advantages of large apertures with the aid of fine drawings made with the aid of his 18 inch telescope. He exhibited and described his fine home made Dobsonian telescope produced from simple materials well within the reach of the average amateur.

The relatively new Dobsonian mountings are leading a revolution in telescope making. This new design is making it possible for amateurs to take advantage of relatively large apertures without having to build an unmanageably massive mount.

After Larry's demonstration of the feasibility of making a Dobsonian we were treated to a showing of a commercial version. Tristan Dilapo brought in his 14 inch Dobsonian. Because these mountings are relatively simple they can be manufactured at a price within the reach of amateur observers. Tristan has originated a variation on the Poncet drive and he explained it to us.

There is still opportunity for workers who wish to substitute hours of work for part of the expense. But for those who do not feel that they have the mechanical ability good equipment can now be bought at rather high, but attainable, prices.

The new designs exemplify the dramatic change in the telescope making hobby. During the years following World War I amateurs began making 6 inch reflectors (the so-called 'poor man's telescopes') as a reaction to the high prices of commercial telescopes. The only commercial versions available at that time were the brass reflectors costing up into the thousands of dollars. Clubs held fund raising drives to get a little telescope for their club use.

In recent years apertures have increased and much drudgery has been taken over by skilled manufacturers most of whom started as amateurs themselves.

Many builders now only make refinements to commercial instruments and add ideas of their own. But the more enterprising build the greater part of their own equipment. From seeing actual telescopes made by others they get ideas for their own designs and when they build them they improvise still further so that no two telescopes

are identical. So the ideas seem to feed on themselves. Telescope making is still a great hobby.

Ed Lindberg

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There are only three places where four constellations come to one common point and they are the following:-

Ursa Major	Lynx	Libra	Hydra	Microscopium	Sagittarius
Leo Minor	Cancer	Lupus	Centaurus	Indus	Telescopium

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Study Group

The Study Group did not meet in April and will not meet in May so that club members can assist Ernst Both with public nights. Unfortunately the Museum's 8 inch refractor has been out of commission for the first couple of weeks in April. Hopefully things will have improved by the time you read this.

The Study Group will probably not meet in June either, however at the June business meeting I am going to propose that the name of the Study Group be changed to something less formidable such as 'Discussion Group.' I think the name Study Group may frighten some newer members away. Our sessions are more like an extension of the general meeting rather than a formal class type affair.

For next season I am going to try to arrange to have members of the B.A.A. who have a specialized interest report on their own field, for example- Darwin Christy on meteorics, etc.

Ken Kimble

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B.A.A. ANNAIS

5 years ago - The May 1977 meeting featured Dr. James Oregren speaking on, "The History of Planetariums on the Niagara Frontier." Dr. Oregren researched back 30 years for his presentation. The June 1977 meeting was the annual business meeting. In addition to the regular elections, Tom Dessert, Edith Geiger, Bob Mayer and Fred Price were elected to the College of Fellows.

10 years ago - The May 1972 meeting was addressed by Dr. David Meisel. Dr. Meisel spoke on "Molecules in Space, Comets and Clouds." The feature article in the 'Spectrum' was about late spring observing by John Riggs. The June business meeting included short reports by members and a raffle as well as the annual elections.

20 years ago - The May 1962 meeting was a triple header; two speakers and a film about John Glenn's orbital flight. The June 1962 'Spectrum' is not in the archives, but maybe a club member can fill in the details.

Ken Kimble

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Observations

On February 26 a nova in Aquila was fainter than magnitude 7.5 but was not seen at 5:30 AM with binoculars through my back window because of light pollution. It turned out to be 10.6 magnitude and a fast type nova which rapidly becomes faint. The nova was mag.6.5 when it was discovered on January 27 by the Japanese amateur named Honda.

On March 13 winds were gusting from 20 to 60 mph yet the skies were crystal clear and some members of the UB astronomy club and I went to the Martz observatory near Jamestown, N. Y. Its domed observatory is on a hill 2080 feet above sea level with a pitch black sky. We observed through its 30 inch, f:3.8 reflector and 5 inch, f:14.5 refractor at M42 & M43 which looked bright green, large with a tremendous amount of dark and bright detail. In addition we saw the Crab Nebula (M1) which appeared irregular in shape and sharply edge that is filled with

a bright mottled surface of this 900 year old super-nova remnant. Finally the ultra rich open cluster M35 loaded with bright colorful stars and on its edge the cluster NGC-2158 which is a cross between an open and globular cluster.

A brilliant and rapidly moving aurora was seen on April 2nd which was colored white, green, yellow and orange. A faint glow extended as high as Polaris with at times four or five rays flaring up. The lowest ten degrees was by far the brightest, washed out first magnitude stars and was shaped like curtains and moved like waves.

Carl Milazzo

On February 27 I observed the first markings on Mars I have ever seen and proceeded to draw them. I also diagrammed Saturn and Jupiter.

On March 3 I took photos of the 8.5 day old moon through my 8 inch reflector, I used 11 of the photos to produce a composite of the moon's surface. Size of the composite measures 13 x 20 inches.

On March 5 I observed Mars, Saturn & Jupiter as I did again on April 9 and 14 and drew them. I also made note of the shadows on Saturn made by its rings and also noted the 'red spot' possibly on Jupiter.

On April 15 I had trouble observing M95 & M96 due to the high winds.

Stephen Desmond

I did not do much observing these past two months, but did make notes on two occasions of meteors not related to any major showers. I have been making many finds though of those finite micrometeorites. I have again been picking up ash from Mt. St. Helens. In about another month or so I expect to start picking up ash from the volcano in Mexico which erupted, Mt. Chinchonal. I had the honor to speak to the London Center RASC on April 16th on meteorics.

Darwin Christy

On April 20th, Carl Milazzo reported having seen a -3 magnitude meteor about 11:00PM in Lockport. It was blue in color and lasted about 2 seconds. Its trajectory was 30° from Leo through Alpha Hydrae.

(REMICK OBSERVATORY
TWENTIETH ANNIVERSARY DINNER)

SAVE THIS DATE → Saturday, May 22, 1982. All members of the Lockport and Buffalo Astronomical Associations are cordially invited to this special dinner meeting at CANMARATA'S RESTAURANT, 6336 Robinson Road, Lockport, to celebrate twenty years of stargazing at Lockport's Remick Memorial Observatory. Our special guest speaker for the evening will be Dr. Judith Pipher, Associate Professor of Astronomy at the University of Rochester and Director of the C.E.K. Mees Observatory. Dr. Pipher is an active researcher, and has published over 40 papers in technical journals. She has done work at David Dunlap Observatory, Gerard P. Kuiper Airborne Observatory and is currently on the Time Allocation Committee of the Board of Directors of AURA. Although her research has encompassed topics ranging from properties of lunar soils to spectrophotometry of quasars, Dr. Pipher's specialty is Infrared Astronomy - her talk on May 22 is entitled, "INFRARED OBSERVATIONS OF STAR-FORMING REGIONS"

Tickets for the buffet-style dinner are \$8.00 per person. Menu includes: Chicken, Italian Sausage, Meatballs in Sauce, Macaroni, Salads, Relishes, Cold Cuts, Bread/Rolls, and a Yellow and Chocolate Anniversary Cake. Seating is very limited, so please purchase your ticket -4-

from Doris Koestler at the May B.A.A. meeting if possible. (Payment in cash or by check payable to 'Lockport Astronomy Association'.)

The evening is planned as follows:-

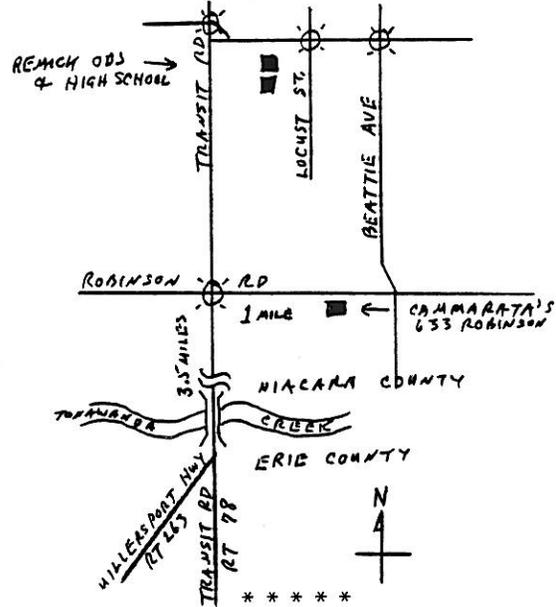
6:00 PM Cash Bar

6:30 PM Dinner

8:00 PM Evening talk by Dr. Pipher, followed by question period.

9:30 PM Open House at the Remick Observatory and Annex (5 minute drive from restaurant); observing with the 12 inch Cassegrain.

This should be a delightful evening with good food, excellent company and a speaker from the forefront of astronomical research. See you all in Lockport!!!



Klaus was born in Germany in the former maritime province of Pomerania, situated on the Baltic coast. It was there that he received his early education during the war years. With the end of the war in 1945, the family moved to lower Saxony in West Germany, near Hanover. Here Klaus attended the gymnasium, the classical secondary school of Germany, where he was enrolled in the language program.

After graduating in 1950, he went to work in retail management as a distributing manager for a food company until 1955. He married his lovely wife Johanna, and in that year came to the United States, having to leave his bride in Germany for nine months while she waited for her papers allowing her to come to this country. Klaus worked for almost a year in Perry and in Rochester. In the latter city he was employed as a toolmaker at Alliance Special Products.

Fate sometimes plays strange tricks. In 1956, Uncle Sam called him into the armed services, and Johanna arrived in the United States one week after he received his draft papers. Klaus was sent to Fort Dix and to Alabama, with Johanna driving from place to place following her elusive husband. He and his bride then found themselves back in Germany where Klaus was sent for fifteen months to Karlsruhe on the Rhine, near the Black Forest, as a driver and translator.

Klaus had applied for enrollment at the University of Buffalo, so the army released him from the service three months early, so he could start classes. After one semester, he ran out of money, and found it necessary to seek employment. In 1960, he worked for a year as trouble-

shooter at Buffalo Steel in Tonawanda, and in 1961, he went to Western Electric where he was hired for seven years as a data processing analyst and cost accountant. It was also in 1961 that the Baerwaldt's first child, son Mark, arrived on the scene, followed in 1964 by another son, Cliff. While at Western Electric, Klaus was able to go back to the university part-time and received his degree in business administration in 1966.

A number of changes continued to take place in the lives of the Baerwaldts. In 1961, they were living in Amherst, but in 1967 they moved to another house in Amherst, off Niagara Falls Boulevard. In that year, Klaus changed jobs, enrolling again at the University of Buffalo, in education, while teaching German for two years. In 1969, he received his Masters in Education, and became employed as a teacher of German and business in Orchard Park High School, where he continues to teach. In 1977, it was time to move again; this time to Marilla where so he says, they plan to stay.

The Baerwaldts are seasoned travelers, going back to Germany every four years to visit relatives and friends, and taking side trips to such places as Denmark, Belgium, France, Spain and Morocco, the largest Barbary state on the northwestern corner of Africa. They have traveled 26,000 miles in the west alone, enjoying the mountains in both the United States and Canada. On Trail Ridge Road in Rocky Mountain National Park, in Colorado, Klaus found out what happens when one moves fast at altitudes of 12,000 feet. They were playing in the snow when it started to snow rather hard, so he ran back to his car when suddenly, altitude sickness really hit him; a most unpleasant experience.

The family has been to beautiful, mountainous Gaspé Peninsula, in Canada, and spent eight weeks at a camp ground on the north shore of Lake Superior where they enjoyed five miles of beaches and also the stately, verdant forests with their moose, bears, wolves and mountain lions. The family hopes to vacation in Nova Scotia this summer, if Johanna, who works for Nanodata, a computer research firm in Buffalo, can get her vacation at the same time as Klaus gets his.

Being interested in photography for about thirty years, he has had wonderful opportunities to take excellent pictures of their travels. He is very much an outdoor man, enjoying all the marvels of nature, and recording on slides its many splendid and amazing forms. He owns an Olympus OM-2 and has a darkroom, but only occasionally does developing. He has, however, made a few prints in black and white, and in color.

He is an enthusiastic reader of the twelve magazines to which he subscribes. Along with many books, he reads a number on World War II, and also on exploration in the late 1900s, especially those pertaining to Africa and the Arctic.

He has been fascinated with astronomy since he was 18 years old, but a class which he took from Orrin Christy in Tonawanda, inspired him to become further involved. He spent 100 hours working on a 6" Cassegrain, but problems arose which prevented him from finishing the telescope. He hopes some day the problems can be resolved. He now owns an 8" Dynamax. Jupiter, the Messier objects and lunar craters hold a special appeal for Klaus, and he has been sketching the many changing aspects of Jupiter's belts and some of the Moon's craters.

Of great interest to Klaus is the field of cosmology. He has become more and more curious about the many mysteries of the universe. He finds the writings of Velikovsky to be very provocative and has researched numerous footnotes, going back to many of the original sources. He feels that though the scientific community has shown vigorous reactions to Velikovsky's theories, it doesn't necessarily mean that his claims are completely wrong.

Klaus, with his broad range of experience and his inquiring mind, is a most interesting man with whom to converse. He has a zest for living, and finds particular joy in the wonders of the world around him. The B.A.A. is richer for having him and his family as members.

Edith L. Geiger

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Astronomical Happenings

Solar - The Sun passes from Aries to Taurus in May and from Taurus to Gemini in June. It crosses the summer solstice on June 21st. at which time it begins its journey southward. It will be partially eclipsed but will not be seen from the U.S. For those who wish to observe it you will have to go to the southern tip of Africa. Another partial eclipse will occur on July 20th. To see this one, you will have to travel to the extreme northwestern part of North America.

Lunar - The Moon will appear Full on May 7th, June 6th and July 6th; Last Quarter on May 16th, June 14th and July 13th; New on May 22nd, June 21st and July 20th; First Quarter on May 29th and June 28th. The Moon will be eclipsed on July 6th. Totality will begin about 01:38 AM and last until 03:24 AM, EST.

Comets - This year there will be four Comets that can be seen through an amateur telescope. They are: Grigg-Skjellerop in May (10th mag.), Bowell in June (9th mag.), D'Arrest in August (8th mag.) and Choryumov-Gerasimenko in October (9th mag.). Possibly Swift-Tuttle will pass through which a year over-due. It was magnitude 2 on its last passage in 1862.

Meteor showers - Eta Aquarids, May 4th; α Cetiids (day-time), May 15th; Zeta Herculis, May 17th; Eta Pegasids, May 30th; Arietids (day-time) June 8th; Zeta Perseids (day-time) June 9th; Alpha Scorpiids, June 9th; Lyrids, June 15th; Ophiuchids, June 20th; Draconids, June 28th; Beta Taurids, June 30th; Sagittariids, July 6th; Alpha Cygnids, July 14th; Omicron Draconids, July 16th.

Planetary - Conjunctions:- Mars & Moon, May 4th, May 30th and June 28th; Saturn & Moon, May 5th, June 1st and June 28th; Jupiter & Moon, May 6th, June 2nd and June 29th; Venus & Moon, May 19th and June 18th; Uranus & Moon, June 5th; Venus & Aldebaran, June 2nd; Mars & Saturn, July 9th.

Occultations - Neptune & Moon, May 11th; Mercury & Moon, June 19th; Venus & Moon, July 18th.

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May Constellation

Whose order'd beams

Present a figure driving on his teams,

Below his girdle, near the knees he bears

The bright Arcturus, faintest of the stars.

---Manilius

BOOTES The Herdsman, or Bear Driver, is located within the constellation of Draco and Ursa Major on the north; Virgo on the south; Hercules, Corona Borealis and Serpens on the east; and Canes Venatici and Virgo on the west. It contains one first magnitude star, Arcturus -0.06M. This star was used in 1936 to light the World's Fair which was held in Chicago. The reason, the light from Arcturus, which lighted the fair, left that star in 1900 or the beginning of the Century.

Bootes has had its place in Mythology. According to the Greeks, Bootes represented Icarus, the father of Erigone. Others considered 'the Herdsman' to be the inventor of the chariot. He was also heralded as the inventor of the plow in which he made his money tilling the soil, it being drawn by two oxen. Where his name, 'the Bear Driver' came about was the fact that the Greeks also considered the Great Bear (Ursa Major) and the Lesser Bear (Ursa Minor) were the two animals he (Bootes) was driving, pulling the plow.

THE SUNGRAZING COMETS

Ernst E. Both

My attempts to see the much advertised comet Ikeya-Seki (1965f = 1965 VIII) prior to perihelion passage (October 21, 1965) had been utterly frustrated by an endless succession of obscured sunsets and cloudy evenings. Reports of daytime sightings just before perihelion only made the frustration worse. And predictions for a spectacular postperihelion display in the morning sky were tempered with the knowledge that the "comet of the century" (somehow the press always advertises them that way! Remember Kohoutek?) would be moving rapidly south - at a time when the weather in our area becomes less reliable.

At long last the forecast for November 5 indicated clear skies. It was 5 a.m. when I stepped outside under a totally clear but chilly sky - the sight that awaited me will forever be indelibly painted in my memory: underneath the Lion fanned out the pale zodiacal light while parallel to it, reaching from the horizon toward Alphard, stood Ikeya-Seki in awesome splendor, its head nearly touching the horizon, framed to the south by a tall spruce and to the north by the silhouette of an empty tree. I suddenly realized the wonder and perhaps terror such a sight would create in an unknowing observer.

The somewhat cluttered office with the sterile numbers of the Smithsonian Observatory's announcement cards was a far cry from the wondrous sight earlier that morning - but it wasn't long before I recalled reading that Ikeya-Seki was the latest member of the "Kreutz group" of sungrazing comets. This was the first step in my fascination with an unusual bunch of comets.

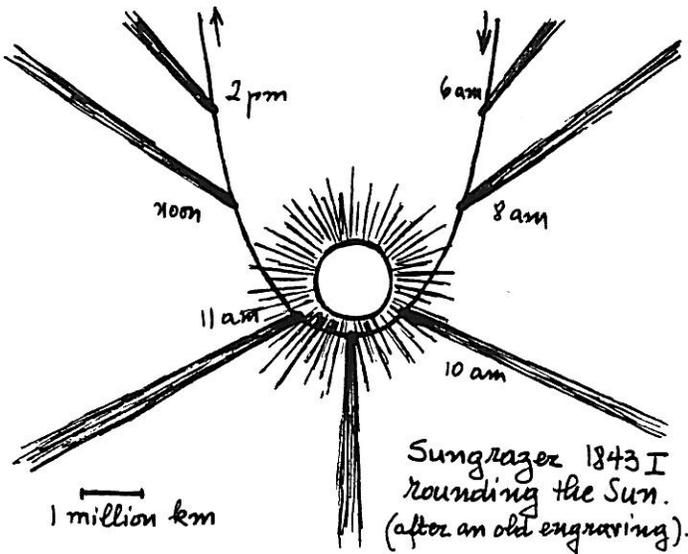
It has been known for sometime that there are groups of comets with similar orbits. One of these consisted of four comets (1843 I, 1881 I, 1882 II, and 1887 I) with nearly identical orbits that brought them extremely close to the Sun, nearly grazing its surface and suspected of being fragments of a comet that broke up long ago. These four comets were studied in a series of papers by Kreutz (between 1888 and 1901) and hence became known as the "Kreutz group." Following the appearance of Ikeya-Seki, Marsden re-examined this group, adding additional members and identifying the comet in 1106 as a possible parent of the group. Just this year an article in Science discussed yet another possible member (1979 XI), a comet that appears to have collided with the Sun. The following are the main features of the Kreutz group:

1. Highly inclined, retrograde, parabolic or near-parabolic orbits with periods between 500 and 1,000 (or more) years (a parabolic orbit has no period since it is open).
2. Very small perihelion distances (usually less than two solar radii) with collisions with the Sun possible (1979 XI, perhaps also comet 1882 Tewfik). Nuclear disintegration documented in a least three cases (1882 II, 1963 V, 1965 VIII).
3. Generally poor visibility before perihelion passage, except just before reaching perihelion, when the apparent brightness increases sufficiently to make visibility in broad daylight possible (1106, 1843 I, 1882 II, 1965 VIII).
4. Maximum tail development after perihelion with the tail generally very long and narrow. The head is often poorly defined. Most favorable visibility in the southern hemisphere.
5. Two or three distinct subgroups with very similar orbital characteristics, indicating several fragmentation events of a primordial comet, leading to several parent comets.

The following is a complete list of "certified" (underlined) and "suspected" (not underlined) members of the Kreutz group. The dates of perihelion passage are given in parentheses: 371 B.C. (January or February?); 531 (October?); 1075 (November); 1106 (February); 1668 (March 1); 1689 (December 2); 1695 (October 23); 1702 (February 25); 1843 I (February 27); 1880 I (January 28); 1882 Tewfik (May 17); 1882 II (September 17); 1887 I (January 11); 1945 VII du Toit (December 27); 1963 V Pereyra (August 23); 1965 VIII Ikeya-Seki (October 21); 1979 XI Howard-Koomen-Michels (August 30). The comet of 1680 (also a sungrazer) may be related to this group, although its motion was direct and its orbital elements are different.

Comet 1882 Tewfik was only seen and photographed during a short total eclipse of the Sun in Egypt (it was named after the Khedive of Egypt) and was not observed before or after the eclipse. It may have collided with the Sun.

A: Designation of comet; B: Date of perihelion passage; C: Angle from the ascending node to the perihelion point; D: Longitude of the ascending node; E: Inclination of the comet orbit to the ecliptic; F: Perihelion distance in astronomical units; G: Perihelion distance in solar radii; H: Period in years.



In the table below the orbital elements are arranged according to three possible subgroups. The names of these subgroups are suggested here and are not commonly used.

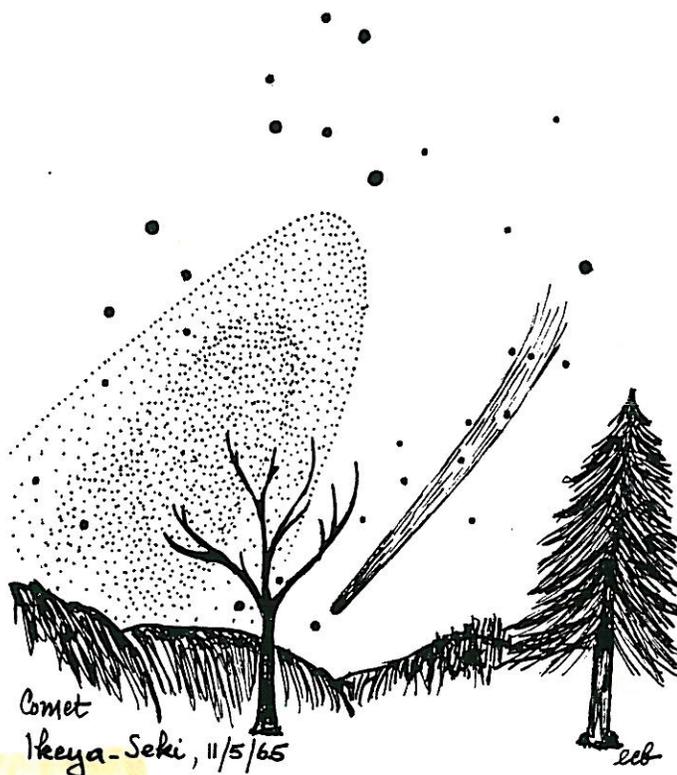
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
1. Subgroup <u>du Toit</u>								
1945	Dec. 27	50.°9	321.°7	137.°0	0.006305	1.35	parabolic	
1887 I	Jan. 11	58.4	325.5	128.5	0.009665	2.07	parabolic	
2. Subgroup <u>Ikeya-Seki</u>								
1965 VIII	Oct. 21	69.0	346.3	141.9	0.007761	1.66	929	
1882 II	Sept. 17	69.6	346.9	142.0	0.007751	1.66	761	
1689	Dec. 2	Orbit similar	(Marsden)					
1702	Feb. 15	Orbit similar	(Marsden)					
3. Subgroup <u>Pereyra</u>								
1979 XI	Aug. 30	80.7	354.2	139.0	0.003489	0.75	parabolic	
1882Tewfik	May 17	Orbit similar?						
1843 I	Mar. 1	82.6	2.8	144.4	0.005527	1.18	512	
1695	Oct. 23	Orbit similar	(Marsden)					
1963 V	Aug. 23	85.8	6.8	144.5	0.005161	1.10	1111	
1880 I	Jan. 28	86.3	7.1	144.6	0.005494	1.18	parabolic	
1668	Feb. 28	109.8	2.5	144.4	0.066604	14.3	parabolic	
For comparison:								
1680	Dec. 18	262.5	272.1	60.8	0.0062	1.35	8816	

As Marsden has pointed out, if perihelion passage occurs in December or January, comets of this group are best seen from the southern hemisphere. Appearances from mid-May to mid-August are very unfavorable, since comets then approach and leave the Sun from behind and can only be detected if they are visible in the daytime in close proximity to the Sun (1882 Tewfik; 1979 XI). Therefore, comets seen only during an eclipse within this period become likely candidates. Marsden estimated that the total number of sungrazers may be much higher than observed, since we may miss one comet out of four, or even one out of two.

Any history of our gradual understanding of the Kreutz group might well start with the sungrazing comet of 1680. Although not a member of the group, as mentioned earlier, it has been linked in various ways with it. For example, Marsden speculated that it separated from the Kreutz group in 371 B.C., for the Greek historian Ephorus reported having seen the bright comet of that year split into two comets. It was the careful observation of the comet of 1680 that led Doerfel to deduce (before Newton and apparently unknown to him) that comet orbits are "parabolas, in whose focus the Sun is found." Newton also observed this comet and found that its orbit could be represented by a parabola, although he much preferred to think of comet orbits as being greatly elongated ellipses. If this were true, than comets had to return to the Sun eventually. This idea set Halley off on a search of historical records for comets that might have previously appeared with the same orbit as comet 1680. He believed that those of 44 B.C., 531, 1106, and 1680 were all the same object with a period of 575 years and an expected return in 2255. Halley's contemporary Pingré also thought the comets of 1680, 1106, and 531 to be separate appearances of the same comet.

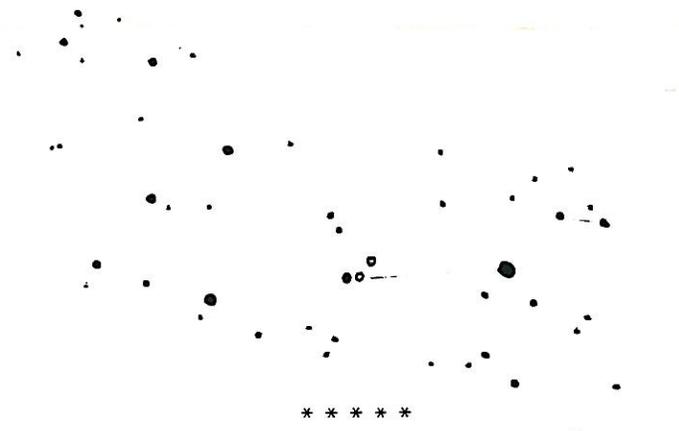
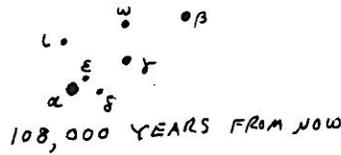
We now know that both Halley and Pingré were wrong in this instance, but slightly later Halley deduced, this time correctly, that the comets of 1682, 1607, and 1531 were identical, leading to his famous prediction of a return in 1758. As is well known, Halley's comet is scheduled to return in 1985/6.

Continued next issue.



To find Arcturus, find the stars in the handle of the Big Dipper and follow the arc to that bright star. Other objects in Bootes are double stars, Pi, Delta, Mu, Iota, Epsilon, 44, 39 and many 'Struve' () doubles. Epsilon Bootis was called "Pulcherrima" by the elder Struve on account of its extreme beauty. Yellow and bluish are colors of the two components. They are separated by 2.9" of arc. Variable stars 'V' Bootis is a long period variable, 258.2 days, spectral type 'M'; and 'R' Bootis is a long period variable, 223.3 days, spectral type 'M'. Zeta Bootis is a binary with a period of 130 years and Xi Bootis is a binary with a period of 152 years.

-8- fade to 13th magnitude and again slowly increase back to magnitude 6. "T" Coronae Borealis is known as the 'blaze star'. It marks the position where the Novae of 1866 occurred.



June Constellation

And midst the glittering symbols of the sky,
The starry crown of Ariadne glides.

-Apollonius Rhodius

CORNOA BOREALIS the Northern Crown is placed over head near the May Constellation, Bootes. It is located within the bounds of Hercules on the north, east and south; by Bootes on the north and west; and Serpens on the south. it is a small constellation but does have a couple of interesting objects. Alpha is the brightest star with a magnitude of 2.23. It is an eclipsing variable with a period of 17.4 days. Double stars include Zeta, separated by 6" of arc and Sigma separated by 5" of arc. There are other such as Eta and Nu. 'R' Coronae Borealis is a remarkable variable and is irregular. It will remain at magnitude 6 for years, then in only a few weeks it will

Nominations

The nominating committee has selected the following as nominees- Doris Koestler & Fred Price for President, Ken Biggie for Vice President, Ken Kimble for Secretary, and Edith Geiger for Treasurer. Nominations will be open to the members at the May meeting.

Elections will be held at the Annual Meeting in June.

Acknowledgments of contributors for the 'SPECTRUM' are-
Esther Goetz Edith Geiger Ernst Both
Rowland Rupp Shaun Hardy Al Kolodziejczak
Stephen Desmond Carl Milazzo the Edotir
John Riggs Ken Kimble

Answers to Quiz.

- 1) TRUE
- 2) FALSE - The orbit of Mars, a typical superior planet, can have phases similar to the Moon, at quadrature and then they would be gibbous in appearance.
- 3) TRUE
- 4) FALSE - The rotation of the photosphere takes between 26 days (equator) and 37 days (poles), so that an imaginary line drawn across the Sun from pole to pole will orbit the Sun more rapidly at the equator than the poles.
- 5) FALSE - Sunspots look like irregular holes in the Sun's surface.---- A large spot radiates as much light as the full moon.-----

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"the SPECTRUM"

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