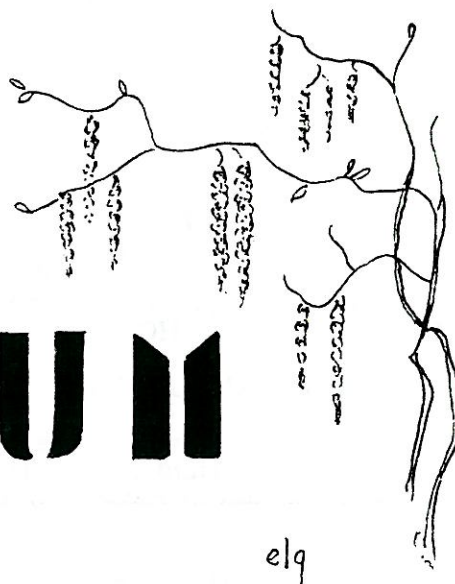


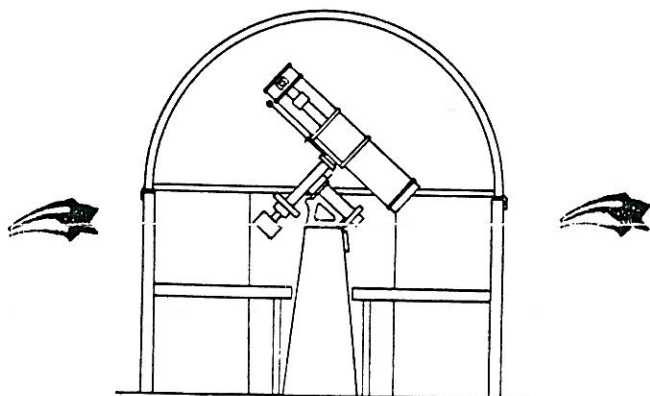
THE SPECTRUM



elg

BUFFALO ASTRONOMICAL ASSOCIATION, INC.

MARCH - APRIL



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"SPECTRUM" DEADLINE

THE DEADLINE FOR THE MAY-JUNE ISSUE OF
"THE SPECTRUM" IS APRIL 12TH 1991 !!

MEETING NOTICES

MARCH - The March 8, 1991 meeting will be held in the New Science Building of the Buffalo State College on Elmwood Avenue in Buffalo, beginning at 7:30 PM EST. Our meeting will try something new this month, and we will be entertained by, What do you use your computer for in Astronomy? Several of our members will bring in their computers. Why you ask? - To answer the question !!

There will be MS DOS and Apple DOS machines available for 3 or 4 intimate, face to face, interactive, hands-on demonstration of how other members stay up late at night with their computers on rainy nights. This will take place in Room 207 of the Science Building, so come on and bring your reading glasses; your favorite program in Astronomy and an open mind.

NOT interested in computers? Stop by anyway and let us know how you use your computer.

Dave Sepulveda

Refreshments will follow the meeting, but please don't drop any crumbs into the computer keyboards. Thank you. (ed)

APRIL - The April 12, 1991 meeting will also be held in the New Science Building at Buffalo State College beginning at 7:00 PM EDT. Our guest speaker will be Mr. Joe Cardin from the Space Products Division at Moog, Inc. His present job is working with NASA's Observatories Program, and his topic for the evening is entitled, "Serviceable Orbital Observatories - A Local Connection." Let's give Mr. Cardin a BAA welcome.

Following the meeting refreshments will be served.....

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CALL FOR LAST MINUTE WEATHER - OVERNIGHT
WARM ACCOMODATIONS
DAY ACTIVITIES: SKIING, HORSE RIDES, RELAXING
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To best ensure good skies we reserved three weekends around the new moon. Friday and Saturday nights. Due to the nature of this party last minute calls are encouraged. Call or just drop down. We'll have a weather message on the answering machine. Overnight in-house or camping for the hardy. Meals provided. Bring a dish (AND SCOPE) to pass.



ASTRONOMICAL HAPPENINGS

SOLAR:

The Sun will pass from Aquarius into Pisces on March 12th and from Pisces into Aries on April 16th. The Sun will graze Cetus on March 27th. On March 21st, the Sun will reach Vernal Equinox.

LUNAR:

The phases of the Moon are: Last Quarter on March 8th & April 7th; New Moon on March 16th & April 14th; First Quarter on March 23rd & April 21st; and the Full (SAP) Moon on March 30th & Full (PINK) Moon on April 29th.

LUNAR CONJUNCTIONS:

Antares - March 7th & April 4th; Uranus - March 10th & April 6th; Neptune - March 10th & April 7th; Saturn - March 12th & April 8th; Mercury - March 17th; Venus - March 18th & April 17th; Mars - March 22nd & April 19th; Jupiter - March 25th & April 22nd.

PLANETARY EVENTS:

Mercury at superior conjunction - March 1st; Mercury at greatest elongation, 19° east - March 27th; Jupiter stationary - March 30th; Mercury stationary - April 4th; Mercury at inferior conjunction - April 14th; Uranus stationary - April 18th; Jupiter stationary - April 18th; Mercury stationary - April 27th.

MINOR PLANETS:

Ceres stationary - March 3rd; Pallas at opposition - March 6th; Pallas in conjunction with the Moon - March 28th; Pallas stationary - April 10th; Ceres at opposition - April 17th.

METEORS:

Zeta Bootes - March 11th
 Corona Australis - March 16th
 Camelopardalids - March 20th
 Virginids **** - March 26th
 Kappa Serpentids - April 4th
 Delta Aquarids - April 7th
 Alpha Virginids - April 9th
 Rho Leonids - April 17th
 Lyrids **** - April 21st
 Mu Virginids - April 25th
 Alpha Bootes - April 28th



James P. Dow's death on December 25th, following the death of his mother, Jane P. Dow, on November 14th, came as a profound shock to his countless friends.

Jim was a fine gentleman of many talents and interests, and took great pleasure in serving his fellowman. His early interest in astronomy led to a B.S. degree in astrophysics from Harvard, where he had the good fortune of knowing Bart J. Bok, his freshman advisor; Armand Deutsch, Fred L. Whipple, Donald H. Menzel, Cecilia Payne-Gaposchkin, and Harland J. Schmidt who became Director of the McDonald Observatory at Fort Davis, Texas.

He was one of the early members of the Amateur Telescope Makers and Observers of Buffalo, which eventually became the Buffalo Astronomical Association, and was a steadfast and devoted member throughout the years.

An excellent musician, Jim was both an accomplished pianist and cellist. While at Harvard, he studied with Moleous, first cellist with the Boston Symphony, and was accepted for the summer orchestra at Tanglewood after his sophomore year. He also played cello in the Harvard College Observatory Orchestra.

He was very active in the First Church of Christ, Scientist, and served as First Reader, chairman of the Finance Committee, Sunday School teacher, and pianist.

He was a very important part of the family business of Dow & Co., serving as president after his father's death in 1958, until 1961 when he left Dow to teach physics and math at South Park High School, and Seneca Vocational High School, as well as in California; and chemistry at Riverside High School, returning to Dow from 1973 until 1984, when he formed his own company, James P. Dow & Associates.

James Dow was highly respected as an astrophysicist, scientist, musician, teacher and businessman, and left a heritage of achievement for which he will long be remembered.

Our sincere condolences to his daughters, Karen, and Kimberly, and son, David; and to his brother, Peter, and sister, Mary.

elg

BAA ANNALS

5 YEARS AGO - "Galaxy M-82" was the topic for our March 1986 meeting. The speaker was Professor Philip Hronberg from the University of Toronto's Department of Astronomy. For April we heard about Voyager Spacecraft from Ernst Both.

Michael Idem had two contributions to the SPECTRUM—an article on "The Effect of Atmospheric Turbulance on Telescopic Magnitude Limits" and a series of observation reports on Halley's Comet, which was still visible. Rowland Rupp had a comet article as well, but his reminded us of the disappointing Comet Kahoutek that put in a dim appearance a dozen years earlier.

10 YEARS AGO - Four club members spoke at the March 1981 meeting: Darwin Christy, Kurt Mancuso, Fred Price and Rowland Rupp. No mention is made of what their topics were. For April Dr. David Meisel spoke on "Comets and Meteors". He spoke from authority; he was head of the American Meteor Society at the time.

BAA member Paul Young wrote an article, which was completed in the following SPECTRUM, on how to construct and read sundials. A hint about what Kurt Mancuso's March talk was about is given in "Spy and Tell". Kurt, a senior at Nichols, had just received the Westinghouse Science Talent Search award for his work on the solar spectroscope for atmospheric research. Ernst Both was Kurt's advisor. Miro Catipovic's biography by Edith Geiger is an insight into an amazingly accomplished man.

15 YEARS AGO - "The Bright Ray Systems of the

Moon" was Fred Price's topic for our March 1976 meeting. In April we visited Rochester's Strasenburg Planetarium.

Bill Deazley, one of the designers of our new Beaver Meadow Observatory, wrote an article "to suggest a number of projects which could be undertaken by individuals or small groups within the B.A.A." They included:

1. Searching for asteroids or comets with a blink comparator.
2. Variable star observing with a photoelectric photometer.
3. Enhanced observing with an image intensifier
4. Stellar spectroscopy.

25 YEARS AGO - For March 1966 two BAA members were speakers. Leslie Stoklosa's topic was "Grinding a Telescope Mirror", while Paul Redding's was on searching for Dr. Van Duzee's 13-inch refractor. This telescope was originally in Buffalo and was, at one time, the largest refractor in the world! Three members spoke at the April meeting: Ernst Both "Activity on the Sun", Walter Semerau "Completion of my Rich Field Telescope", and Ed Lindberg "Construction of Eyepieces".

Darwin Christy had an article in the March 1966 SPECTRUM on eyepieces, which was continued in the April issue. At their Advanced Study Section meeting, members gave reports on stellar spectral classes. Participating were Jerry Cook, Fred Gordon, Charles Bull, Thad Toporczak, Margaret Rabe, and Albert Kaupa. Few of us go back far enough to remember them.

Rowland A. Rupp

INSTRUMENT NOTES

At our January meeting the Instrument Section continued working on our current project - a "practice telescope" for the Beaver Meadow facility. Some time ago we started out with a fine tripod mount donated by the Textron Corporation with some encouragement by Rowland Rupp. The we acquired a partly assembled six-inch reflecting telescope donated by Conrad Stolarski. The job we have undertaken is the attachment of the telescope to the mount. The design of the saddle for securing the telescope to the mount to the mount was largely taken on by Rowland, with some help by Dan Marcus, Conrad and a few helpful (?) suggestions by other members. Len Milkes did a good job of welding and other metal work and Ed Czapla lent us his woodworking expertise.

The telescope is intended for use by members and others who wish to get first hand experience at locating and studying celestial objects. It will also furnish a means of hands-on experience in astrophotography.

Our section started out to appeal to advanced telescope makers in the club. Members would bring in finished devices that they had made. Then there were some unfinished projects. The builder would run into problems and he would look for suggestions. I remember Bill Deazley bringing a variable speed telescope drive. We discussed the circuit. I don't know whether we helped him much but he did finish the drive and it has been in use for a long time on our main telescope. I remember the set of models of telescope mountings made by Bob Mayer. There is nothing as revealing as a three dimensional representation. Then there was the first Maksutov telescope ever made in Buffalo. It was made by our member Rudy Neuhauser. And a new way to make pitch laps by the "reese" method. There was seemingly no end of entertaining and information sessions.

During these years telescope making classes were being held at the Museum. Some of the students began coming to BAA meetings and some to the instrument meetings. After the course was over there would be some unfinished mirrors and some of them would appear at our instrument meetings. The makers would want the mirrors tested and would need suggestions on how to proceed. Our section became a telescope clinic.

With a few short lapses, our section has been meeting monthly since before the building of the telescope for the

club in 1960 or about 30 years. At present we meet on the fourth Friday of the month in Ed Czapla's basement. The meetings are open to anyone interested in the somewhat esoteric art of telescope making. All we ask is that you let our host know that you are coming. And if you have a problem that you need help with. Please let us know so that we can be prepared to help you. Keep track of the date - don't wait to be reminded. We might forget who it is that should be reminded.

Ed Lindberg

ASTRONOMER from the PAST

NUREDDIN AL-BĒTRUJĪ, whose full name was NŪR ĀD-DĪN ABU AL-QĀSĪM MĀHMŪD IBN ĪMĀD ĀD-DĪM ZĀNDĪ, was also called Al Malik Al-Adil, meaning "the just ruler." He was born in Damascus, Syria, on February 21, 1118. He was the son of Zangī, who was the ruler of Mosul, on the Tigris opposite the site of the ancient city of Nineveh, and was the founder of the Zangid Dynasty (1127-1262). Nureddin succeeded his father in 1146 as Muslim ruler of Haleb (Aleppo) in Syria, owing nominal allegiance to the Abbasid Caliph of Baghdad.

Nureddin, pronounced MŌŌR ĀD-DĒN, was also known by the name, Alpetragius, and was regarded as an astronomical authority at that time. Our moon has a fine 27 mile crater with an immense central dome-shaped mountain on its floor, bearing the name of this Arabian ruler-astronomer. Nureddin also disproved the Ptolemaic System; the theory of the epicycle.

He was an able general and succeeded in opposing the Christian conquest in the Middle East during the Crusades. Before his conquests, Muslim rulers in the region were divided and unable to create a unified military force against the Crusaders in an effort to expel them from Syria and Palestine. He recaptured Edessa, driving the Crusaders completely out, and in 1149, invaded Antakiya, an important military district. He seized Damascus from the Seljuk Turks in 1154 and attacked Antioch, a Crusader principality, bringing parts of it under his control. He then turned to Egypt, sending his general, Shirkuh, and Shirkuh's nephew, Saladin, where, after winning several victories, Shirkuh was given the position of vizier in Egypt. Shirkuh died in 1169 and Saladin was put in command of the Syrian troops in Egypt. His growing power became a threat to Nureddin in Syria, but before he could advance against his suzerain, Nureddin died on May 15, 1174, in Damascus, the city of his birth. Saladin, the beneficiary of Nureddin's rule, recaptured Jerusalem in 1187, and greatly reduced Crusader strength in the Middle East.

During Nureddin's reign, his rule was extended to Egypt, parts of Iraq and Asia Minor. He was noted for his piety, integrity, and personal bravery. He was austere and self-denying, disclaiming the financial rewards of his conquests, and using the booty to build numerous mosques, schools, hospitals, and caravansaries.

Darwin Christy

SPY and TELL

Former BAA member, John O'Dee, is serving in Operation Desert Storm, in Saudi Arabia. He is a terrain analyst and cartographer. He receives satellite images of the desert, and makes maps showing the position of the troops. He would be very happy to hear from our members. His address is:

Desert Storm, Saudi Arabia
SPC John B. O'Dee
073-64-2536
HHC 82nd ABN DIV, G-2
541st ENG DET
ATO NY 09656

Brian Hughes is a junior and honor student at Williamsville East High School. He is working to become an Eagle Scout, hoping to complete the requirements this spring.

Brian is a musician, playing trombone in the school band, the district orchestra, and the school jazz ensemble. He has also been nominated for the Honor Society. Congratulations!

Gene Moderacki is a very active gentleman, working three jobs. He owns the Cone Castle Knitting Machine Store, 276 Oliver Street in North Tonawanda, and teaches aerobics Monday and Wednesday evenings on the North Tonawanda Community Education Program, and has been reinstated at the U.S. Post Office.

Luann Szucs is very busy at the Erie-Niagara Insurance Assn. where she has worked for three years. She has undertaken a personal project involving scientific research and her ability as an artist. She hopes to portray dinosaurs artistically and correctly. A great project!

It is a happy time for the Koestlers as they prepare for their daughter's upcoming wedding in June. Doris is making favors for the bridal shower to be given in April at the Holiday Inn at the Airport.

Christopher Biggie continues to excel as a student in Orchard Park High School. He is a senior and has always been on the Honor Roll. Congratulations!

On January 5th, Bryan Rzoska broke his right arm above the wrist as he fell while sliding on ice.

Dan and Melissa Marcus are having an exciting time remodeling their kitchen. They are doing all the work themselves with Dan installing the wiring and new lights. Melissa is president of the Garden Club again this year. The club is having a fund raiser on March 14th with Elaine, from Elaine's Flower Shoppe, demonstrating flower arrangements. The event will be held at St. Timothy's Church on Grand Island. Tickets are \$3.00.

The New Astronomy Products department of Astronomy magazine's March issue lists Carlino Woodcraft's hand-crafted wood tripods and mounts. Those of you who were at the Mack's star party last summer had the good fortune of seeing one of Larry's beautiful and expertly made tripods. We wish him the very best with his outstanding products.

Edith L. Geiger

ANCIENT CONSTELLATIONS

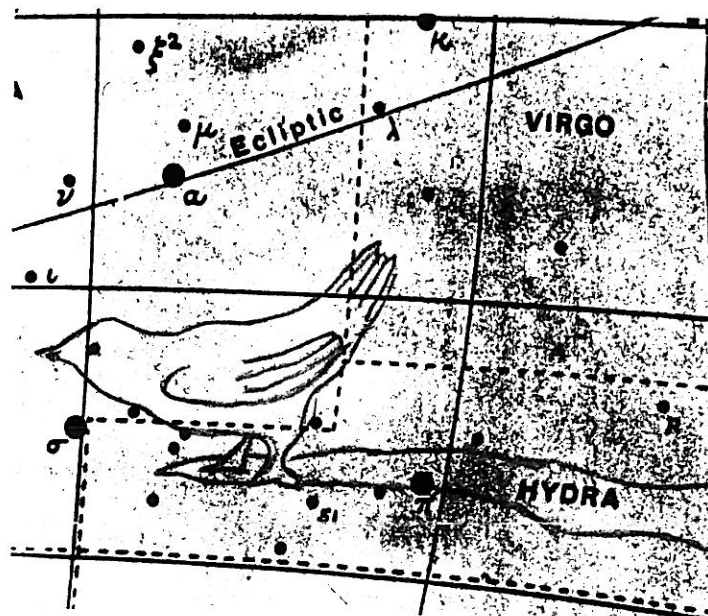
"TURDUS SOLITARIUS"

The Solitary Thrush, in 1776, Le Monnier formed this constellation from the faint stars in the tail-tip of another. Some seekers of fame substituted another Avian figure and called it Noctua, the Night Owl. Turdus is in actuality a generic word which really is erroneous. It is said to be that of the Solitaire peculiar to a little island named Rodrigues in the Indian Ocean. The isle is about 66 miles west of Mauritius. The bird, being extinct for centuries, was perhaps seen as the flightless pigeon-like bird related to the "DODO". During and after the 18th century, many skeletons of the bird have been found on the isle of Rodrigues.

An ole name, OUZEL, was derived from the Germans, referring to many thrush-like birds of that country. In England, it refers to a Black Bird or a larger thrush, Turdus Torquatus, with distinguishing broad white lunate markings or stripes across its breast and sides of the neck. This was called the Tor Ouzel. Perhaps another bird in the form of a "water ouzel" or a small wren-like bird, Cinclus Aquaticus, could have

been the calling of the Turdus. This bird is found throughout the world, especially in mountainous regions.

Another species, "Cinclus Mexicanus" is a small robust bird with a short tail, short wings and dark colored, is called a 'Dipper' and found near mountain streams. It has the remarkable capability to dive straight down and pull out inches from the ground. It lives on snails and young insects near the waters of streams. The Dipper also has the power to its prey under water, not only by diving, but by walking on the bottom of a stream and stay under for as much as two or three minutes, using their wings, fluttering them to keep them down until the prey has eventually drowned.

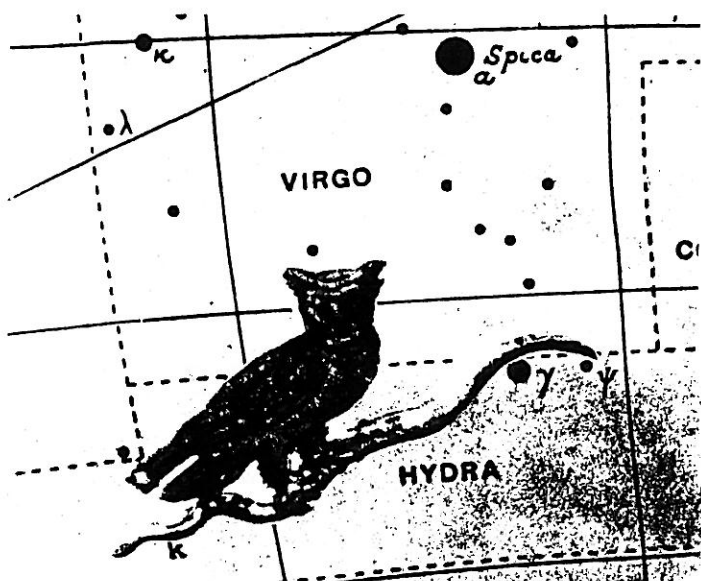


"NOCTUA"

An ancient constellation no longer on charts and maps, but which has been added to the overburdened constellation, Hydra. It was shown by Burritt perched on the extreme tip of the tail of that constellation but overlaying on the boundary of the Southern Scale. It formerly had been located in an area which Le Monnier had placed the Solitaire, or Turdus Solitarius. Another asterism which also has been eliminated from the maps and charts.

Probably the name 'Noctua' was coined by Le Monnier because of the nature of the owl being active during the night hours, thus being nocturnal. Although the owl can see as well during the day, it has no better vision than man has at night. Its keen sense of hearing is its asset to catch its prey.

The maps and charts do not outline these two birds in the same manner but they do overlay each other. Of course, the thrush came first and was later changed into the owl.



Another bird constellation which rides on the tail of Hydra is the Crow, CORVUS. This constellation will be written on future issue of the "SPECTRUM." (ed)

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Thank you,

Herbert G. Engelhardt
(Rev) Herbert G. Engelhardt

VISUAL METEOR OBSERVATION FOR AMATEURS

by

R. D. Manners

For presentation at the 1967 Annual Convention Northeast Region of the Astronomical League, Buffalo, New York, May 26 - 28, 1967.

APPENDIX

Being a copy of the Summary or Index List of Radiant Groups published originally as a part of the Memoir by W.F. Denning 'General Catalog of the Radiant Points of Meteoric Showers and of Fireballs and Shooting Stars Observed at more than One Station', and contained in the Memoirs of The Royal Astronomical Society Vol LIII, 1896-99, Burlington House, London.

XXIII.	Great Andromedid shower	24.3 + 44.1	82	The radiant is very diffuse, and covers an area quite 7° in diameter. Rich displays occurred in 1872, 1885, and 1892. The next will very probably be observed in 1905 Nov. 17.
XXIV.	o Cetids	28.7 - 4.3	3	Observed by Schmidt, August to October.
XXV.	o Triangulids	30.5 + 35.8	38	A very sharply defined series of radiants, presented between July and December, and again in February-March.
XXVI.	o Arietids	30.9 + 9.6	14	Precisely determined, and distinct from following.
XXVII.	o Arietids	30.9 + 18.5	28	Another well defined group, forming a shower visible from July to November.
XXVIII.	o Fornaxids	31 - 34	1	Radiant of Fireball, 1861 November 19.
XXIX.	o Triangulids	31.6 + 27.4	9	Near but distinct from XXVII.
XXX.	o Perseids	33.0 + 48.2	23	Positions do not agree very well. Perhaps several different systems are involved.
XXXI.	o Cetids	33.8 - 14.5	4	
XXXII.	o Perseids	34.8 + 58.7	11	The shower is doubtful. Some of the positions are certainly erratic determinations of the great August shower of Perseids.
XXXIII.	Arietids (39)	39.9 + 30.9	16	Formerly known as Muscids, as the radiant lies in Bode's modern asterism, Musca.
XXXIV.	o Eridanids	41.7 - 25.3	3	Exact position doubtful.
XXXV.	o Perseids	41.7 + 39.4	11	Well defined, and certainly distinct from XLIII.
XXXVI.	o Arietids	41.9 + 13.7	9	One of several closely adjoining Arietid showers.
XXXVII.	o Arietids	41.9 + 21.3	19	A fine shower, both in August and October. Does not appear to have been recognised in September.
XXXVIII.	o Cetids	42.9 + 5.4	17	Chiefly observed in October. Occasionally supplies fireballs at the Leonid epoch.
XXXIX.	o Perseids	43.8 + 57.1	24	A very persistent shower, directed from the same apparent place as the great Perseid display on the date of its maximum.
XL.	Great Perseid shower	44.0 + 56.9	280	Visible from July 11 to August 19, with a radiant shifting to the E.N.E. about 1° per day. (See p. 210.)
XLI.	o Eridanids	45.4 - 6.2	5	Chiefly in September-October.
XLII.	Arietids (56)	45.8 + 25.6	13	Different from XXXVII., but, like that shower, it has been chiefly observed in August and October.
XLIII.	o Perseids	47.3 + 45.0	59	A succession of splendidly well defined positions during the eight months from July to March.
XLIV.	o Arietids	49.3 + 18.7	22	Probably separate from XLII., XXXVI., and XXXVII., though suggestively near them in position.
XLV.	o Camelopardids	50.0 + 72.3	29	Actively continued over a long period. The exact centre is at about 55° + 71°.
XLVI.	o Polaris	50 - 85	1	In July.
XLVII.	Camelopardids (Piazzi, III. 94)	50.4 + 62.9	8	Certainly distinct from XXXIX.
XLVIII.	o Perseids	51.6 + 30.1	20	The positions do not accord very closely amongst themselves, but there is certainly a very definite and long enduring shower with this centre.
XLIX.	o Taurids	53.2 + 7.6	23	Apparently continues from August to November. Rich shower on 1886 November 2
L.	o Perseids	54.2 + 51.5	6	Rather doubtful, and possibly confused with XLIII. and LVI.
LI.	o Eridanids	56.1 - 12.1	14	Slow-moving fireballs are sometimes directed from this position in the first half of January.
LII.	o Ursae Minorids	58.8 + 84.3	8	One of the best-defined N. polar showers. Its activity seems chiefly confined to the period from August to the first few nights of October.
LIII.	o Taurids	59.7 + 20.3	84	There are probably several showers here. One is splendidly defined over a long interval of time from the point 63 + 22.
LIV.	o Taurids	60.1 + 28.9	7	This is quite different from preceding.
LV.	Camelopardids (Piazzi, III. 208)	60.1 + 59.2	17	Sharply defined. This shower is liable to confusion with late Perseids, as the radiants nearly coincide.
LVI.	o Perseids	60.9 + 48.3	46	A rich and frequently recurrent display of exceedingly swift meteors visible during the last half of the year.
LVII.	o Taurids	61.4 + 11.8	14	A minor branch of the o Taurids (LIII.).
LVIII.	o Perseids	61.7 + 36.8	41	Another fine and long-enduring shower like LVI., but the meteors are not nearly so swift. It supplies many bright streak-leaving meteors in the first half of September.
LIX.	Eridanids (54)	66 - 22	1	In September.
LX.	o Orionids	68.3 + 2.7	9	Swift, long meteors diverge from this point on the mornings of September.
LXI.	o Camelopardids (I.)	70 + 70.2	4	Probably a distinct shower from the next and LXVI.
LXII.	o Camelopardids (II.)	70.4 + 64.9	30	A well-marked and frequently observed shower of long duration. Its chief activity is in August, and it is often detected by observers when watching for Perseids.
LXIII.	Camelopardids (8)	70.3 + 51.8	9	Very contracted, and certain radiant, lasting from July to October.
LXIV.	o Orionids	73.4 + 14.4	21	Sharply defined. Meteors very swift in September and October.

LXV.	α Aurigids	...	74°2 + 43°6	35	A fine long-enduring shower, really from η Aurigae (Dec. 41°). From many observations at Bristol the radiant is identical in place from August to December.	CIX.	ξ Leonids	...	142°2 + 14°8	5	Feeble radiant, distinct from true Leonids.
LXVI.	Camelopardids (Groombridge 928)	...	75°9 + 74°8	12	Chiefly in August and September.	CX.	θ Ursids	...	142°4 + 49°4	17	A group of positions indicating a fixed radiant from October to April.
LXVII.	α Aurigids	...	76°8 + 31°9	37	Another fine long-enduring shower like LVI, LVIII, LXII, LXV, LXVIII, &c.	CXI.	ν Ursids	...	142°5 + 56°0	2	Well seen 1886 January 2-5.
LXVIII.	β Camelopardids	...	78°8 + 55°6	25	Meteors very swift in September and October.	CXII.	ϕ Leonids	...	145°4 + 4°8	17	Well defined and long continued: maximum in 1877 December 8.
LXIX.	ζ Taurids	...	79°8 + 22°9	40	Maximum during first half of December, about December 6. The Taurids II. of Greg's catalogue.	CXIII.	ϵ Antlids	...	146°5 - 37°0	2	In December and January.
LXX.	α Orionids	...	81°5 + 4°4	11	In October and November.	CXIV.	λ Hydrids	...	149°3 - 9°4	7	Well-defined shower of swift streak-leaving meteors at the time of the Leonids.
LXXI.	κ Orionids	...	86°0 - 11°5	4	Contemporary with the Orionid shower LXXXVII.	CXV.	Great Leonid Shower	...	149°7 + 22°7	109	The exact place of the Leonid radiant indicated by some of the best observations is $151^\circ + 22^\circ.3$. This is probably within $\frac{1}{2}^\circ$ of error.
LXXII.	β Aurigids	...	86°0 + 44°3	18	Specially well defined in September, when the meteors are very swift.	CXVI.	α Ursids (I.)	...	152°3 + 64°3	7	Rather uncertain.
LXXIII.	α Columbids	...	86°3 - 32°3	3	Seen chiefly in November and December.	CXVII.	γ Leonids	...	152°6 + 21°6	5	A spring shower, from the same apparent place as the great Leonid radiant.
LXXIV.	θ Aurigids	...	87°2 + 34°0	10	Sharply defined; fairly active in Sept. and Nov.	CXVIII.	μ Ursids	...	153°7 + 40°0	24	A rich long enduring shower. Specially active in November.
LXXV.	χ Orionids	...	88°5 + 18°4	10	Probably distinct from, though lying very near, the periodical shower of Orionids (October).	CXIX.	λ Ursids	...	156°0 + 47°0	4	Separate from, though near the preceding.
LXXVI.	δ Aurigids	...	90°4 + 56°4	20	Chiefly visible in August and December.	CXX.	α Leonids	...	157°5 + 13°7	8	A feeble shower.
LXXVII.	Orionid Shower	...	90°8 + 15°7	57	Endures from October 8 to 29. The radiant seems to be fixed in its apparent place amongst the stars.	CXXI.	Leonids (54)	...	158°6 + 26°2	12	Positions not accordant; several showers involved.
LXXVIII.	α Canis Majorids	...	94°7 - 17°3	3	In October; based on Tupman's observations.	CXXII.	ω Ursids	...	160°0 + 40°7	3	Probably same as CXVIII. or CXXVI.
LXXIX.	γ Geminids	...	96°6 + 16°5	19	Apparently a branch or contemporary stream of the Orionid shower (LXXVII).	CXXIII.	β Ursids	...	161°6 + 57°9	19	Very sharply defined and often repeated between the months of November and April.
LXXX.	ϵ Geminids	...	96°4 + 29°5	8	Quite distinct from the Geminid showers LXXXVIII. and LXXXIX. Brilliant, slow meteors fall from this radiant at the end and beginning of the year.	CXXIV.	λ Draconids	...	163°8 + 76°3	12	Possibly two showers here at $161^\circ + 73^\circ$ and $165^\circ + 80^\circ$.
LXXXI.	Aurigids (56)	...	98°5 + 43°3	16	A very well defined shower. Meteors very rapid, with streaks in September.	CXXV.	ξ Ursids	...	164°3 + 34°0	8	Contemporary with Leonids, and the meteors are very similar in appearance.
LXXXII.	Camelopardids (43)	...	100°8 + 70°7	21	Meteors very swift in September and October.	CXXVI.	ψ Ursids	...	165°6 + 45°4	5	In November and the early months of the year.
LXXXIII.	θ Canis Majorids	...	102°5 - 12°	1	In November.	CXXVII.	τ Leonids	...	166°4 + 3°4	8	A tolerably rich and accurately centred shower, though it has not been much observed.
LXXXIV.	Lynceids (Groombridge 1272)	...	103°4 + 50°8	21	A fine shower, commences in July, and remains in evidence during several succeeding months. Different from LXXXI, and equally well defined.	CXXVIII.	ϵ Craterids	...	166°2 - 9°2	4	Probably two showers, $165^\circ - 6^\circ$ and $165^\circ - 15^\circ$.
LXXXV.	δ Canis Majorids	...	104°0 - 27°3	3	Radiant of Comet of 1092, $103^\circ - 34^\circ.5$ Feb. 5.	CXXIX.	δ Leonids	...	172°2 + 21°5	6	Exact place rather doubtful.
LXXXVI.	Monocerotids (22)	...	104°7 - 1°3	7	Chiefly in October and November.	CXXX.	α Ursids (II.)	...	173°3 + 63°3	3	Requires more observations.
LXXXVII.	ν Argids	...	105° - 45°	1	In February.	CXXXI.	γ Ursids	...	173°5 + 55°3	6	The near agreement in the various positions indicates a well-defined radiant. It has supplied several fireballs.
LXXXVIII.	Geminid Shower	...	106°0 + 32°4	61	Probably this periodical shower, maximum December 10-12, has a shifting radiant, but the meteors are short and quick, and difficult to record accurately.	CXXXII.	ζ Craterids	...	173°8 - 23°3	3	Possibly two showers, $174^\circ - 20^\circ$ and $174^\circ - 30^\circ$.
LXXXIX.	α Geminids	...	106°2 + 33°6	22	This radiant is virtually identical in place with the radiant of the periodical shower of December (LXXXVIII.), but endures from September to March following.	CXXXIII.	ζ Centaurids	...	174° - 52°	1	In February.
XC.	δ Geminids	...	107°1 + 23°0	26	Quite distinct from the preceding pair. It furnishes many very swift meteors in the mornings of October, and is sometimes richly contemporaneous with the December shower (LXXXVIII.) Called Gemelids by Mr. Greg.	CXXXIV.	β Leonids	...	175°1 + 11°0	22	A remarkably definite shower, often observed in the autumn and winter months.
XCI.	β Canis Minorids	...	107°3 + 11°0	25	A good shower, lasting all through the autumnal months, and still visible in January.	CXXXV.	χ Ursids	...	177°4 + 47°9	7	Reliable and exact. From November to April.
XCI.	Camelopardids (47)	...	108°6 + 60°4	17	Visible during last quarter of the year; meteors exceedingly swift in October.	CXXXVI.	η Virginids	...	180°7 + 1°4	4	Needs further corroboration.
XCI.	Camelopardids (Piazz, VII. 132)	...	111°4 + 81°1	7	Chiefly in September and October.	CXXXVII.	κ Draconids (I.)	...	180°8 + 73°7	9	Well defined in August. ? = Comet 1737 II.
XCI.	Lynceids (26)	...	116°4 + 47°0	9	The positions forming this group are discordant, and several showers are probably involved.	CXXXVIII.	Comæ Bereniceids (Piazz, XII. 29)	...	181°1 + 34°9	22	A frequently observed and long-enduring shower.
XCI.	β Geminids	...	118°0 + 29°9	24	This is different from LXXXVIII. and LXXXIX., though contemporary with them. Well pronounced at Geminid epoch.	CXXXIX.	δ Ursids (I.)	...	181°6 + 61°4	5	Possibly these bordering showers N. and S. of δ Ursæ are identical. They were never well seen at Bristol.
XCV.	ζ Cancerids	...	119°0 + 14°6	10	Well-defined radiation from this point from September to January.	CXL.	γ Comæ Bereniceids	...	182°7 + 25°7	10	Well marked. 9° S. of CXXXVIII.
XCVI.	Monocerotids (30)	...	121°5 - 2°1	8	Well defined.	CXLI.	β Corvids	...	183°7 - 29°	6	Well seen by Professor Herschel in 1898 April.
XCVII.	Lynceids (31)	...	121°8 + 40°8	10	Prominently visible at the period of the Leonids.	CXLII.	Virginids (18)	...	185°0 + 15°0	2	Uncertain. Rests on slender testimony.
XCVIII.	ζ Argids	...	125°5 - 40°0	2	Seen by Neumayer in March and April.	CXLIV.	Comæ Bereniceids (35)	...	190°7 + 20°0	8	Very sharply defined in March and April.
XCIX.	ϕ Ursids	...	125°9 + 56°2	12	A well-pronounced autumn shower, and very obvious in September and November.	CXLV.	Camelopardids (Bradley, 1730)	...	191°3 + 80°3	3	Meteors very slow in September, rapid in November. Only seen at Bristol.
C.	δ Cancerids	...	130°4 + 20°1	16	Well defined in October and December.	CXLVI.	ϵ Ursids	...	191°7 - 58°2	9	A rich and well defined shower like the β Ursids (CXXIII.), and generally visible at same time.
CI.	κ Ursids	...	131°4 + 47°3	23	Composed possibly of 2 showers at $131^\circ + 48^\circ$ and $132^\circ + 43^\circ$.	CXLVII.	θ Virginids	...	192°2 - 5°8	5	Meteors swift in Dec., very slow in Mar.-April.
CII.	α Cancerids	...	131°7 + 30°3	15	Contemporary with Leonids, when it supplies many very swift, streak-leaving meteors.	CXLVIII.	ι Centaurids	...	193°0 - 34°0	2	Very possibly the same as CXLII. The positions suggest three radiants at $180^\circ - 20^\circ$, $178^\circ - 35^\circ$, and $190^\circ - 30^\circ$.
CIII.	Ursids (22)	...	133°2 - 77°2	15	Rich and well-defined shower, noted as specially rich in the first half of October, 1877.	CXLIX.	δ Virginids	...	192°4 + 5°6	10	Near CLIV. but probably quite different.
CIV.	ζ Hydrids	...	134°9 + 7°9	8	Visible during last quarter of the year.	CL.	α Canum Venaticids	...	193°7 + 42°0	7	Meteors very swift in December.
CV.	σ Ursids	...	135°0 + 66°7	23	Active shower, with very definite radiation in autumn, winter, and spring.	CLI.	κ Draconids (II.)	...	194°0 + 69°0	4	Rich shower during 1st half of 1886 December.
CVI.	α Hydrids	...	135°5 - 4°5	2	Best seen in December.	CLII.	β Comæ Bereniceids	...	195°7 + 30°8	6	Sharply defined in December 1886.
CVII.	Lynceids (38)	...	137°9 + 39°0	11	Radiant sharply defined. Meteors very swift. Visible at the same epoch as the great Leonid shower, and likely to be confused with the meteors of that stream.	CLIII.	α Comæ Bereniceids	...	200°4 + 19°6	5	Radiant accurate though but slightly observed.
CVIII.	μ Leonids	...	142°0 + 28°4	10		CLIV.	ϕ Virginids	...	201°7 + 7°8	15	Well-defined shower from April to May.
						CLV.	ζ Ursids	...	202°4 + 55°0	26	Very active and well-observed radiant.
						CLVI.	θ Centaurids	...	202°8 - 27°6	5	Founded chiefly on Tupman's observations.
						CLVII.	Canum Venaticids (25)	...	205°3 + 36°1	7	Positions in good agreement.
						CLVIII.	α Virginids	...	205°4 - 8°7	22	Supplies many large slow-moving meteors in April. Distinct from CLXVI.
						CLIX.	η Ursids	...	206°0 + 45°6	10	Distinct from and $9\frac{1}{2}^\circ$ N. of CLVII.
						CLX.	α Draconids (I.)	...	207°7 + 67°9	13	Possibly connected in December with Pons's periodical comet of 1812.
						CLXI.	α Bootids	...	209°6 + 18°9	10	Apparently distinct from CLIII.
						CLXII.	Bootids (15)	...	211°0 + 9°0	5	Exact place uncertain. Requires more obs.
						CLXIII.	β Ursæ Minorids	...	214°3 + 75°4	9	About 8° N. E. of CLX.
						CLXIV.	ϕ Bootids	...	214°2 + 52°6	18	Well-defined shower extending over a long interval.
						CLXV.	η Lupids	...	215°7 - 42°3	3	Possibly two showers, $212^\circ - 49^\circ$ and $218^\circ - 39^\circ$.
						CLXVI.	μ Virginids	...	216°7 - 8°6	14	Rich shower distinct from CLVIII. Yields many slow-moving fireballs in April and May.
						CLXVII.	ρ Bootids	...	218°2 + 31°7	11	Apparently well defined between December and April.
						CLXVIII.	α Draconids (II.)	...	218°4 + 61°9	7	Appears to be distinct from CLX.
						CLXIX.	ζ Bootids	...	219°3 + 17°0	18	Active long-continued shower. The exact position is probably $221^\circ + 14^\circ$.
						CLXX.	β Bootids	...	221°8 + 41°7	8	The radiant is well defined in January.

CLXXI.	β Librds	...	226 4 - 51	18	A prominent display simultaneously with the Lyrids in April.	CCXXI.	ψ Sagittarids	...	286 8 - 24 3	8	Well-defined shower, though its S. position has prevented it being much observed.
CLXXII.	β Serpentids	...	230 5 + 16 5	4	Also one of the co-Lyrid showers, and among the best of them.	CCXXII.	β Cygnids	...	286 5 + 24 2	6	Well seen in 1887 June.
CLXXIII.	Quadrantid Shower	...	230 6 + 51 1	32	Very rich annual display of bright, long meteors of moderate velocity. Best observed before sunrise. Maximum January 2.	CCXXIII.	γ Lyrids	...	287 8 + 30 7	17	Definite and exact. It lies near the preceding, and it is not far E. of CCXXVI., but seems to be quite different from either of them.
CLXXIV.	Quadrantids	...	230 4 + 50 7	9	Well defined and certain. Presents a long-continued shower from nearly the same apparent centre as the preceding.	CCXXIV.	ϵ Draconids	...	288 8 + 60 0	17	One of the most prominent of the minor showers. It furnished quite a special display of bright, slow, trained meteors, August 21-25, 1879. The radiant is active during a long interval, and its R.A. is really 291°.
CLXXV.	α Coronids	...	231 3 + 27 0	21	Specially active at the middle of May.	CCXXV.	δ Draconids	...	291 0 + 69 6	17	Often recognised in July, August, September.
CLXXVI.	θ Coronids	...	232 0 + 34 2	16	A group of showers probably quite different from preceding.	CCXXVI.	κ Aquilids	...	291 9 - 11 6	7	Further observations required.
CLXXVII.	α Serpentids	...	234 4 + 8 5	13	Begins in January, and is still evident in the summer. Perhaps there are two or more showers in this particular region.	CCXXVII.	ϵ Sagittids	...	292 1 + 13 5	14	Very reliable.
CLXXVIII.	η Librds	...	234 4 - 13 6	5	Very well defined at the Lyrid epoch, though it does not appear to have been frequently noticed.	CCXXVIII.	δ Cygnids	...	292 9 + 42 5	15	A very pronounced shower in July and August.
CLXXIX.	ϵ Ursæ Minorids	...	238 8 + 82 0	9	The positions are somewhat discordant.	CCXXIX.	θ Cygnids	...	293 4 + 51 4	24	A fine shower often perceptible in July and August, and especially rich in August 1893.
CLXXX.	η Draconids	...	239 7 + 62 8	23	A rich and durable radiant, quite distinct from CLXXXIV.	CCXXX.	η Aquilids	...	296 1 + 12	14	A tolerably active and sharply centred radiant between April and August.
CLXXXI.	τ Herculids	...	239 9 + 47 5	16	This group of radiants, similarly to CXCVIII., forms a shower in the same place amongst the stars all the year round!	CCXXXI.	δ Ursæ Minorids	...	300 3 + 84 5	11	The R.A. of this shower is more correctly 295°.
CLXXXII.	κ Coronids	...	240 1 + 23 6	9		CCXXXII.	η Sagittids	...	300 9 + 22 2	18	Furnishes many swift streak-leaving meteors in the mornings of April, and visible thereafter until September.
CLXXXIII.	ω Herculids	...	242 0 + 13 0	5	Mar. to Aug. Places in excellent agreement.	CCXXXIII.	γ Cygnids	...	302 5 + 40 2	26	Very well defined and long enduring.
CLXXXIV.	θ Draconids	...	242 7 + 55 0	6	Near CLXXX. and CXCI., but probably represents an entirely separate shower.	CCXXXIV.	Cygnids (33)	...	304 3 + 53 7	12	This is certainly distinct from, though near, CCXXIX. and CCXLIV.
CLXXXV.	η Herculids	...	243 8 + 41 0	6	Near to but distinct from CLXXXI.	CCXXXV.	θ Cepheids	...	303 0 + 62 3	6	Probably accurate, but it requires re-observation, as it lies suspiciously near CCXLI.
CLXXXVI.	γ Ursæ Minorids	...	244 1 + 72 9	13	Well defined. Comes into prominence at the April epoch.	CCXXXVI.	α Aquilids	...	303 0 + 8 6	22	Frequently observed and distinct from CCXLIII.
CLXXXVII.	λ Ophiuchids	...	244 2 + 29 6	6	Exact place doubtful.	CCXXXVII.	α Capricornids	...	303 5 - 10 2	28	Rich shower of very slow and often bright meteors at the period of the August Perseids.
CLXXXVIII.	γ Herculids	...	247 0 + 19 3	7	Near CLXXXIII., but probably different.	CCXXXVIII.	ϵ Cygnids	...	304 5 + 29 2	8	Appears quite distinct from CCXXXII.
CLXXXIX.	μ Scorpiids	...	249 0 - 37 0	4	Probably two showers in December with δ - 34° and - 46°.	CCXXXIX.	α Microscopids	...	306 8 - 39 5	4	Perhaps two showers, 307-33 and 306-46.
CXC.	α Scorpiids	...	249 1 - 20 5	21	Many splendid slow-moving fireballs have been directed from this radiant in June and later months.	CCXL.	κ Cepheids	...	308 0 + 78 6	24	A very fine shower, specially active on October 3-4, '77. R.A. more exactly 312°.
CXCI.	μ Draconids	...	251 7 + 52 8	22	This group probably includes at least two showers. One is sharply defined at 254° + 56°.	CCXLI.	ϵ Draconids	...	309 8 + 68 6	18	Not to be confused with preceding, which is certainly different.
CXCII.	κ Ophiuchids	...	252 0 + 9 4	5	Rests upon rather slender evidence.	CCXLII.	Aquarids (1)	...	312 0 ± 0 0	1	Radiant of a fireball 1897 Aug. 2.
CXCIII.	Ophiuchids (30)	...	254 0 - 2 5	6	Radiant of Comet 1862 IV. 250 + 1 March 16.	CCXLIII.	γ Delphinids	...	312 9 + 12 7	12	A sharply defined series of radiants. Chiefly visible in July and August.
CXCIV.	δ Herculids	...	254 3 + 24 4	13	A well-defined shower, apparently often repeated between January and September.	CCXLIV.	λ Cygnids	...	313 2 + 36 8	6	Near CCXLVIII., but different.
CXCV.	ω Herculids	...	255 2 + 37 1	20	A rich and sharply centred radiant visible during a lengthened interval. It has been observed to the greatest advantage in April and July.	CCXLV.	α Cygnids	...	313 5 + 48 0	36	One of the finest of the Cygnid showers. Well marked in July, and the radiant is sharply defined at other periods.
CXCVI.	ϵ Herculids	...	257 7 + 31 3	3	Distinct from preceding, but rarely seen.	CCXLVI.	α Cepheids	...	313 7 + 60 1	24	Usually a fine shower in June, and perhaps connected with Comet 1850 I. The shower was notably rich in August 1893 and October 1879.
CXCVII.	ν Serpentids	...	258 0 - 13 0	2	This is quite possibly an erratic position for CXC. The places are significantly near.	CCXLVII.	Vulpeculids (33)	...	315 8 + 21 2	17	The R.A. is more exactly 318° or 319°.
CXCVIII.	ζ Draconids	...	260 5 + 63 3	34	Fine shower often repeated from same point, if not continuously in play during the entire year.	CCXLVIII.	ζ Cygnids	...	316 1 + 30 6	15	Well defined. R.A. probably 320°.
CXCIX.	β Draconids	...	261 1 + 48 7	15	Rather uncertain. Possibly confused with CCVII.	CCXLIX.	β Aquarids	...	318 1 - 11 4	23	A prominent S. radiant liable to be confused with CCXXXVII. It sometimes supplies very slow-moving fireballs in July and August.
CC.	β Ophiuchids	...	261 1 + 4 0	15	Sharply defined. January to July.	CCL.	ϵ Pegasids	...	321 5 + 11 2	8	Near CCXLIII, but different.
CCI.	ω Draconids (I.)	...	262 0 + 69 0	6	Accurate. Radiant distinct from CXCVIII.	CCLI.	θ Pegasids	...	324 5 + 3 3	8	Well defined and distinct from preceding.
CCII.	ρ Herculids	...	264 0 + 37 7	8	Lies closely E. of CXCV., and may in reality represent the same radiant.	CCLII.	ϵ Aquarids	...	328 9 - 13 6	14	Fireballs in July and August.
CCIII.	ϵ Scorpiids	...	266 0 - 42 0	1	In August.	CCLIII.	κ Pegasids	...	330 5 + 35 8	11	Well defined in July, August, September.
CCIV.	ν Ophiuchids	...	267 6 - 12 4	7	A very well defined summer shower.	CCLIV.	β Cepheids	...	330 5 + 69 1	30	Shows active and exact radiation for a long period.
CCV.	Herculids (97)	...	269 5 + 24 2	23	One of the best known and most definite of the minor showers. Often well seen in April and July. Correct position, 271° + 21 1/2°.	CCLV.	Lacertids (6)	...	331 1 + 41 9	9	Appears different from, though near, CCLVII.
CCVI.	κ Lyrids	...	270 2 + 35 2	4	Slightly N. of radiant of the April Lyrids.	CCLVI.	ζ Cepheids	...	331 6 + 59 8	31	A fine long-enduring shower like CCLIV. and CCLVII.
CCVII.	ψ Draconids	...	271 0 + 76 8	4	Reliable, though little observed. Seems visible from the end of May to the Perseid epoch.	CCLVII.	Lacertids (4)	...	332 1 + 49 2	26	Well known and frequently observed, April to November. = Greg's No. 112, Lacertids.
CCVIII.	γ Draconids	...	271 1 + 47 6	29	A beautifully defined series of radiants. In Spring the meteors are very swift, in summer slow, and in autumn very slow and trained.	CCLVIII.	γ Aquarids	...	332 8 - 3 8	8	Rich shower at close of April and opening of May. Discovered by Tupman. Probably associated with Halley's Comet.
CCIX.	Lyrid shower	...	271 5 + 34 0	50	The radiant is very probably a mobile one like the Perseids, but the fact has not been demonstrated by sufficient observation.	CCLIX.	η Pegasids	...	333 4 + 27 1	21	Very active at end of May and to June 4. A fine shower also in July, and often recognised then.
CCX.	δ Sagittarids	...	271 3 - 26 8	6	A well-marked Southern shower.	CCLX.	ζ Aquarids	...	334 4 - 1 8	12	Nearly accordant in place with CCLVIII.
CCXI.	η Serpentids	...	274 2 - 3 4	5	Radiant of Comet 1618 III 274 ± 0 June 10.	CCLXI.	ζ Pegasids	...	334 5 + 12 9	29	Another strong radiant in nearly the same R.A. as many others.
CCXII.	Ophiuchids (BAC 6213)	...	274 9 + 10 8	9	A reliable group of positions.	CCLXII.	α Piscis Australids	...	338 7 - 29 8	11	Rich at end of July. Well seen in the S. hemisphere in 1881 (Cruls).
CCXIII.	ω Draconids (II)	...	276 0 + 67 6	10	A very definite shower situated near the pole of the ecliptic.						
CCXIV.	α Lyrids	...	277 5 + 36 8	10	Perhaps connected with CCVI.						
CCXV.	δ Draconids (39)	...	279 4 + 57 6	26	Frequently observed, but exact place open to some doubt.						
CCXVI.	β Lyrids	...	280 2 + 29 0	4	This radiant and CCVI. and CCXIV. are near together, and somewhat uncertain.						
CCXVII.	β Coronæ Australids	...	282 0 - 39 0	2	In April and July.						
CCXVIII.	λ Aquilids	...	282 9 - 14 1	9	Very distinct and certain. Meteors very swift in February and March, very slow in June and July.						
CCXIX.	Lyrids (13)	...	283 8 + 43 7	24	Frequently observed. Different from CCXXXVIII.						
CCXX.	θ Serpentids	...	284 4 + 4 0	5	Requires further corroboration.						

The list of Meteor Showers will be concluded in the next issue of the "SPECTRUM." If you have saved the previous newsletters, you have a most complete list of meteor showers for the year. Since this list was comprised, there have been others discovered. A scan of the skies could reveal the new showers for those interested in meteor observing.

90 -'91 Directory Completed

It's DONE - it's COMPLETED! If you were not at the February meeting, you missed receiving the 1990-1991 B.A.A. Directory. This years directory totals 36 pages, that's right, 36 pages! It includes not only our membership listing, but also information to help you plan your observing schedules. It contains information to help you answer those many questions that you are asked about astronomy related topics. Here's what you will find:

- astronomical distances/conversions
- solar/planetary data (physical & orbital)
- schedule of annual meteor showers
- complete Messier catalog by constellation (also lists page numbers in Uranometria & SkyAtlas)
- color filter usage (lunar & planetary)
- major bright star listings (RA, Dec, magnitude, spectral type, distance, etc.)
- stellar spectral types/temperatures/colors
- six major constellation pictorals (star names, spectral type, distance, magnitude)
- measuring angular distances by hand
- 1991 lunar phases/eclipse schedule for the entire year
- all 88 constellation abbreviations
- sidereal time chart
- binary/triple/multiple star listings

Also included are the complete B.A.A. By-Laws, general information, observatory information, and a membership renewal form for 1991/1992.

Because of its weight, we ask that you pick up your copy at the next general meeting. If however, you cannot make our meetings due to distance or health problems, please let me know by mail, and we'll get your copy out to you right away (two first class postage stamps would be much appreciated to defray what could potentially be a massive postage bill).

I hope you all enjoy this years directory and find the information in it to be useful. I would appreciate receiving comments regarding format and content. Suggestions for next year?

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