EPHEMERIS

Vol. 2 No.10 Official Publication of the San Jose Astronomical Association October, 1990

PULKOVO OBSERVATORY

Will be the featured subject at this month's General Meeting. Lick Observatory historian, Shilo Unruh will tell us about this historic astronomical facility in Russia, founded by F. G. W. Struve, who also founded the double star dynasty. Meeting starts at 8 pm.

SUBSCRIPTION RENEWALS

The renewal period for Astronomy and Telescope Making magazines is upon us. Astronomy will cost $14; Telescope Making, $8 for one year (12 or 4 issues, respectively). Unfortunately, Kalmbach sent the material just in time to miss the September Ephemeris, and they want it back by early October. So you must act immediately. All present group subscribers have been contacted by phone or postcard.

If you presently subscribe independently, you may convert to the group rate if your subscription expires on or before November 1991. Send a mailing label and enough $$$ to cover through December, 1991. Your subscription will be extended to synchronize it with the group renewal (calendar year). Phone Jim Van Nuland at 408/371-1307 if you have questions.

EQUIPMENT/SLIDE NIGHT

The attendees of the September Slide & Equipment night were treated to some outstanding equipment and to spectacular photography done with it. In particular, John Gleason showcased his Takahashi 5-inch refractor. On the Epoch Instruments mount, this was spectacular just to look at. He has been working/experimenting with the SBIG automatic guider. There have been "automatic" guiders before, but this one both works and is within range of real people's pocketbooks. Most impressive was an automatically guided photo of comet Levy, guided on the head of the comet!! Though the comet had considerable motion in declination, the star trails were flawless.

Other presentations included a new Odyssey II (the 17.5-inch) telescope, by Steve Waldee; and the usual 8-inch by Jim Van Nuland. Steve added wheels to make the 17.5" more movable. The Odyssey is not without it faults, but for the price it is a lot of telescope. Coulter in no longer building the big boxy rear end as pioneered by John Dobson. It is convenient by having the mirror stay in the tube during transportation, but the support system seriously needs improvement. Ron Walton dazzled everyone with his new Losmandy mounting supporting periodic error correction and a 5-inch Wright Schmidt camera.

OCTOBER 6TH
SHILOH UNRUH
PULKOVO OBSERVATORY

OCTOBER 6: GENERAL MEETING 8PM. SHILOH UNRUH, GUEST SPEAKER.

OCTOBER 13: BOARD MEETING 8 PM AT THE LOS GATOS RED CROSS.

OCTOBER 20: HALLS VALLEY GROUP PUBLIC STAR PARTY AT GRANT RANCH.

OCTOBER 26: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK.

OCTOBER 27-28: AANC CONFERENCE AT THE LAWRENCE HALL OF SCIENCE, BERKELEY. MORE INFORMATION INSIDE.

OCTOBER 28: (SUNDAY) DARKNESS SQUANDERING TIME ENDS. BACK UP YOUR CLOCKS AND OBSERVE FOR AN ADDITIONAL HOUR.

OCTOBER 31: (WEDNESDAY) HALLOWEEN. SET UP ON YOUR DRIVEWAY AND SHOW THE 96% MOON TO THE KIDS! THEY'LL LOVE IT. SATURN WILL BE HIGH, TOO.

NOVEMBER 3: GENERAL MEETING AT THE LOS GATOS RED CROSS. BOB FINGERHUT ON INTRODUCTORY ASTROPHOTOGRAPHY - HOW TO PHOTOGRAPH THE PLANETS.

NOVEMBER 10: BOARD MEETING AT THE RED CROSS, 8 PM (FOR THE REST OF THE YEAR)

NOVEMBER 17: HALLS VALLEY STAR PARTY AT GRANT RANCH.

AANC CONFERENCE

The Astronomical Association of Northern California sponsors an annual conference, this year at the Lawrence Hall of Science in Berkeley. October 27 & 28 will see amateur and professional speakers, equipment and photography show, banquet, and a star party at LHS on Saturday evening. The AANC requests papers/speakers for the conference. If you can put together 20 minutes plus 10 minutes for questions, call Jim Van Nuland for details for submission. You need only an abstract for the submission.

GET INTO BLACK HOLES FIGURATIVELY ONLY, PLEASE

Astronomer (and popular lecturer) Andrew Fraknoi will offer a nontechnical introduction to "Black Holes: Spacewarps, Time Machines, and the Death of Stars" at U.C. Berkeley on Saturday, November 3. Sponsored by U.C. Extension and the Astronomical Society of the Pacific, the program will be offered in the Physical Sciences Lecture Hall from 9 am to 5 pm and will be illustrated with slides from the largest telescopes on Earth and in space. For more information about the program, call (415) 643-6903.

OCTOBER STARRY NIGHTS

- RICHARD STANTON

RETURN TO STANDARD TIME - October 28th, the last Sunday in the month we

return to Pacific Standard Time. Spring-forward, Fall-back. To find Pacific Standard from Universal Time you will now deduct eight hours. Don't forget to set your clocks back one hour least you forget Monday morning.....shucks.

BARSOOM - As Mars begins to approach opposition in November its visible disc diameter begins to loom larger. During October it will grow from 13.7 are seconds with 89% illuminations to 17.0 seconds and 96% illumination. It will rise shortly before 10 pm during the early part of the month and by the end of the month will rise before 9 pm. Dust storms may be blowing on the red planet this month and the South Polar Cap is still slowly shrinking. Traditionally a yellow filter has been used to help the visual observer detect dust storms but in late 1989 the Association of Lunar & Planetary Observers began to suggest a red filter (Wratten 23A) may be better. The best way I know to find out is to get out there and do some observing. On October 20th, Mars will be stationary as it prepares to embark on its retrograde loop as seen from Earth. You will be able to see its Westerly motion against the background stars of Taurus.

OCTOBER'S CHALLENGE OBJECT - For your viewing pleasure this month we will be showing Cygnus, the Swan. It is also called by some, "The Northern Cross". Our object for the month is Mincowsky 92, a starlike reflection nebula also known as "The Footprint" nebula. It measures 12" X 6" and shows at magnitude 11.0. Under high magnification it has a double appearance. The star associated with its reflectivity is not visible. The J2000 coordinates are 19:36.3 +29:33 in the general vicinity of the double star 15 Cygni. Although 11th magnitude is at the theoretical threshold of 7X50 binoculars, it is suggested that an aperture of 25cm or greater will yield the best results. For binocular viewing, Cygnus is in a very rich field of the Milky Way and both the Veil and North American nebulae should be within reach of your binoculars . As a matter of fact they will show visually better in binoculars than in a larger telescope. Make it a point to have a look at Albireo. It is rated as one of the most beautiful colored-double stars in the Northern Hemisphere skys. The two stars making up this set are mag. 3.9 and 5.11 with a separation of 34.3". According to Burnham's, "no more than 30X is required on a good 6-inch to show this superb pair as two contrasting jewels suspended against a background of glittering star-dust."

SPACE PROGRAM UPDATE

- BOB FINGERHUT

ASTRO-1 SPACELAB MISSION - As I write this, the launch of Astro-1 on the shuttle orbiter Columbia is being held up by another hydrogen leak. hopefully Astro-1 will have flown by the time you read this. The purpose of the Astro-1 mission is to study some of the hottest, most massive stars in the galaxy in the wavelengths of light that cannot penetrate Earth's atmosphere. The Astro-1 observatory consists of an X-ray telescope mounted on a two-axis pointing system and three ultraviolet telescopes mounted on the instrument Pointing System (IPS). The broad band X-ray telescope was designed to obtain X-ray profiles of high energy sources such as binary stars, galaxy clusters and black holes. The Wisconsin ultraviolet photo-polarimeter is designed to study the brightness and orientation of ultraviolet light from stellar objects. The ultraviolet imaging telescope records ultraviolet images on film in order to study hot stars as faint as 25th magnitude. The Hopkins Ultraviolet telescope is designed to observe far and extreme ultraviolet radiation to provide new information on galaxies, neutron stars and black holes.

MAGELLAN OPERATING ERRATICALLY - Magellan is currently under stable control and has returned several Venusian images of stunning clarity taken with its synthetic aperture radar. The spacecraft has returned 1 1/2 orbits of radar test data that is about ten times sharper than data from other Earth bound radars and satellites. Still unexplained is why Magellan lost communication with Earth on Aug. 16 and again on Aug. 21 and went into safe mode. Each time Magellan goes into safe mode, it turns off nonessential electrical loads, switches to the low-gain antenna for uplink and the medium gain antenna for downlink, points the solar arrays toward the Sun, rotates to align on the Sirius and Rigel guide stars and then rotates to point the medium-gain antenna at Earth. Magellan then waits 18 hours for instructions. It appears that Sirius was missed and another object was mistaken for Rigel. The spacecraft therefore began rotating about the Sun axis once every 2 hours, scanning its antennas to find Earth. Once the signal from Magellan started sweeping past Earth every 2 hours, a command was sent to Magellan , instructing it to stop rotating with its medium-gain antenna pointed at Earth. Magellan has now been commanded into a safer operating mode and could start its mapping mission on September 15.

HUBBLE RETURNING NEW SCIENTIFIC DATA - An image taken with the Wide-Field and Planetary camera has shown 60 stars in a region that was once thought to be a massive star. Another image made with Hubble's faint object camera showed the remnants of supernova 1987A and a ring of gaseous material circling it. Earlier data from ground-based telescopes and the International Ultraviolet Explorer satellite has suggested that a shell of matter surrounds the supernova. The faint object camera also showed, in another image, that the core of the galaxy NGC 7457 is 400 times more densely packed with stars than previously thought. This suggests that the core may contain a black hole.

ARIANE 4 LOFTS TWO SATELLITES - The European booster successfully placed two communications satellites into geosynchronus transfer orbit on August 30th.

U.S. PARTICIPATION IN AUSTRALIAN SPACEPORT - The White House has given approval for a U.S. company to help build and manage a launch complex for Soviet Zenit rockets at Cape York, Australia.

PLANET EARTH MISSION CHANGES URGED - Scientists assembled by the National Research Council have recommended that the second large platform planned for the Earth Observing System, (EOS) be broken up into several smaller satellites. NASA's plan for EOS was for three pairs of 14 ton satellites. Two would be launched every five years beginning in 1997.

SPACE STATION RECEIVES SENATE

SUPPORT - Sixty four Democratic and Republican senators signed a letter to Sen. Barbara Mikulski, chairman of a key appropriations panel, urging support for the international space station. The letter praised the program as a "catalyst for advancement" in education, science and the future economic health of the United States and said that the space station urgently needs consistent policy and funding support.

Estimates of space station weight have decreased, power available for scientific use has increased and the number of flights to assemble the station has increased. The space station program manager told the NASA space station advisory committee that the station design would soon meet its solar power quotas, but, the station's total mass probably will not drop enough to be launched to the current assembly plan. Reducing some unreasonable operating time for station equipment, such as the dishwasher and microwave oven, which has been listed for 24-hour service, solved most of the power problem. Station weight has been reduced by 10,000 since July by creating lighter equipment cabinets and dropping some massive batteries used to store power when the station is in the Earth's shadow.

THE ASTRONOMY BOOKSHELF

- RICHARD PAGE

The Astronomer's Universe
Herbert Freidman
Norton, 1990
359 pages, $25.95

"Astrophysics, the science of the life and death of stars, and modern cosmology, which deals with the origin and fate of the universe, are developments that barely span our contemporary lifetime. Astronomy, the most ancient science, has become a prodigy of the Space Age."

These sentiments, from the preface to Herbert Friedman's The Astronomer's Universe, neatly express the primary emphasis of the book. Providing only enough historical foundation of the visual age of astronomy to make intelligible that which followed, Friedman undertakes the ambitious task of surveying the modern age of technologically based full-spectrum astrophysics and its consequent cosmological offspring. In this endeavor Friedman is eminently qualified, having been one of the pioneers of rocket astronomy, involved at the nuts and bolts level in the very first attempts to use captured German V-2 rockets to extend the astronomer's reach beyond the obscuring cloak of Earth's atmosphere. Many of the author's experiences in this field are related in the text, adding an interesting personal perspective to this well-conceived and executed overview of post-visual astronomy.

The Astronomer's Universe is intended for the reasonably well educated reader, but assumes no special knowledge of astrophysics or cosmology. With this in mind Friedman prefaces the main body of the book with a condensed introduction of the physical parameters and composition of the universe, and current cosmological theory. This is intended to provide an underpinning for the two principal sections that follow. The first of these concerns itself with the tools of modern astronomy; the second with the objects and processes that constitute the universe and the stories of their discoveries.

Organized chronologically and dealing with hardware and instrumentation, the first section is divided into chapters on visible light, infrared and radio wavelengths, and finally high energy ultraviolet, X and gamma ray emissions (including neutrinos and gravity waves). The telescopes and detectors of the modern age, how they work, and the visionaries who inspired and built them- all are explained with admirable clarity and judicious balance between oversimplification and needless detail.

The second section begins with a chapter on the Sun, and progresses through the stellar menagerie, from white dwarfs and red giants, through neutron stars, pulsars, and black holes. Friedman then turns to stellar populations, galaxies and quasars, and finally ends his survey with cosmological scale determinations, theories of the origin and destiny of the universe, and the search for extraterrestrial life. Again, the emphasis here is on 20th century science, with its shift away from mechanical and chemical processes toward relativistic and quantum effects.

Friedman's grasp of his subject matter is impressive, and although his style is authoritative and clear, it is far from cold and humorless. This is evidenced by a number of amusing and illuminating anecdotes ranging from the serendipitous nature of science to the pusillanimous nature of politicians. And, belying the stereotypical image of the scientist as single-minded (not to say narrow-minded), Friedman peppers his book with quotations extending from Plato and Shakespeare to T.S. Elliot and Thomas Wolfe. The photos, diagrams and charts throughout the work are well-chosen and informative, and possess the commendable quality of actually bearing some relationship to the text. Finally, at appropriate points within the narrative, Friedman has included about twenty little half-page biographies of the key figures in his story, each with a nicely executed portrait sketch by his son, Jon Friedman. These agreeable little addenda typify the author's concern with the human element in science.

If, like me, much of your knowledge of rocket and satellite astronomy and the latest discoveries in astrophysics has been gleaned scattershot from the odd magazine and newspaper article, you will certainly appreciate the comprehensive and cohesive overview presented in the The Astronomer's Universe.

METEOR NOTES

- JIM RICHARDSON

October is an excellent month for meteor observations, with the fourth best shower of the year conveniently peaking near new moon. Also, many minor showers occur during this month, so if you have never seen one of these elusive meteors, often counted as sporadic meteors by even experienced observers, now is your chance before the winter weather begins to move in. Your next good opportunity for minor shower activity will not be until April.

Robert Lunsford (ALPO Meteors Recorder) states the following about this month's ac-

tivity: "The Orionids reach maximum on Oct. 21, this year. The waxing crescent moon will be long set on Saturday, October 20th, and Sunday, October 21st (local time), which are the prime mornings for the Orionid shower. Up to 30 Orionids per hour should be visible under dark skies at the peak, and high rates will continue through October 24th.... Also, while observing the Orionids, activity may be noticed from the Taurids, Epsilon Geminids, Delta Aurigids, and the Northern Piscids."

Anyone conducting meteor observations, even if it is only hourly counts, is encouraged to turn those observations in to me, and I will gladly include them in my data sent to the American Meteor Society (AMS), and the ALPO Meteors Section. I also collect photographs of Meteors, so if you have "caught" one on film I'd love to have a copy.

INDIVIDUAL SHOWER NOTES:

KAPPA CYGNIDS: Though much weaker, this stream creates a good contrast with the nearby Perseids, which are much swifter and brighter than these moderately bright, slow meteors.

ANNUAL ANDROMEDIDS: This stream begins near the visual Piscids, and then moves northward toward the radiant of the famous Andromedid showers. Two radiants and sets of elements are given to display the changes during the Earth's passage through the stream. Associated with the Andromedid shower, and P/comet Biela.

OCTOBER DRACONIDS: Also called the Giacobinids. Strong showers occurred in 1927 (17/hr), 1933 (30,000/hr.), 1946 (10,000/hr), 1952 (200/hr), and 1985 (200/hr). This stream is extremely narrow, and is only visible for a few hours. The last appearance was visible from Asia only, in 1985. However, the 1946 appearance provided one of the most impressive meteor storms visible from North America this century. The shower is associated with P/comet Giacobini-Zinner.

LEO MINORIDS: Associated with P/comet Zanotti.

PEGASIDS: Associated with the December Phoenicids, and Comet Blanplain.

DELTA AURIGIDS: Not formally in the lists of visibly resolvable meteor streams, but usually active in mid-October.

(Data from "A Working List of Meteor Streams", A.F. Cook (1974)

COMET COMMENTS

- DON MACHHOLZ

No new comets have been discovered recently, but Comet Levy, an easy naked-eye object for these past few weeks, heads into our southern evening twilight sky. We'll see it in our morning sky late this year at about magnitude 7. Comet Tsuchiya-Kiuchi is now emerging into our morning sky, it should be visible in binoculars.

Let me take a moment to mention the passing of two well-known comet discoverers. On May 30, John Bennett of South Africa, discoverer of two comets, passed away. Then on August 26, Minoru Honda of Japan, who discovered 12 comets and 11 novae, also passed away.

SEEKING COMETS

What types and size instruments do amateurs use to visually find comets, and how many hours does it take? These are perhaps two two most-asked questions of comet hunters. Over the next three months we'll conclude this "Seeking Comets"

Comets Found With Reflectors

COMET	DISCOVERER	TELESCOPE	MAGNITUDE	ELONG	SKY	# HRS.
1975h	Milon	4"	7.6	133	M	0
1975k	Suzuki	5.8", 22x	8.8	52	M	---
1975h	Kobayashi	6", 30x	7.6	133	M	117
1975j	Sato	6", 25x	10.7	65	M	---
1975q	Sato	6", 25x	9.8	78	M	---
1975k	Saigusa	6", 27x	8.8	52	M	480?
1983e	Sugano	6", 29x	7.0	29	M	450
1987c	Nishikawa	6"	8.4	66	E	---
1989e1	Skorichenko	6"	10.3	58	E	360
1975j	Fujikawa	6.2", 23x	10.7	65	M	700?
1975a	Boethin	8"	11.0	61	E	---
1975h	Berger	8", f/7.5	7.6	133	M	0
1980u	Panther	8",f/4, 35x	9.7	63	E	602
1983e	Saigusa	8", 37x	7.0	28	M	750?
1987y	Levy	8", f/7	9.5	33	E	105
1989a1	Brewington	8", f/4, 27x, 2.4d	9.0	49	E	231
1989c1	Austin	8", f/4, 41x, 1.7d	11.1	83	E	49
1978L	Machholz	10", f/4, 36x, 2.8d	10.7	72	M	1700
1985e	Machholz	10", f/4, 32x, 2.4d	9.3	49	M	1742
1984a	Bradfield	10", f/6, 44x 1.3d	10.7	46	M	384
1989c	Bradfield	10", f/5, 44x, 1.3d	11.6	41	E	164
1978f	Meier	16", f/5, 56x, 1.3d	10.4	71	E	50
1979i	Meier	16", f/5, 56x, 1.3d	11.8	69	E	29
1980q	Meier	16", f/5, 56x, 1.3d	10.3	75	E	25
1984o	Meier	16", f/5, 56x, 1.3d	11.7	52	E	86
1989e1	George	16", f/5	10.3	58	E	65
1984t	Levy	16", f/5, 64x, 0.8d	9.4	60	E	917
1987a	Levy	16"	10.3	42	M	205
1988e	Levy	16"	11.6	39	M	162
1989r	Levy	16", f/5	10.6	75	E	350
1983L	Cernis	19", f/5, 65x	10.7	73	M	297

Comets Found With Binoculars

COMET	DISCOVERER	TELESCOPE	MAGNITUDE	ELONG	SKY	# HRS.
1980t	Bradfield	7x35	6.0	22	M	113
1983d	Alcock	15x80	6.4	92	M	---
1980k	Petrauskas	12x80	8.5	43	E	100
1978m	Seargent	15x80	5.0	35	M	650
1980k	Cernis	20x110	8.5	43	E	808
1978n	Fujikawa	12x120?	10.0	39	M	525?
1983e	Fujikawa	12x120?	7.0	28	M	800?
1975j	Mori	20x120	10.7	65	M	---
1975k	Mori	20x120	8.8	52	M	1
1984j	Takamizawa	20x120	9.4	171	M	---
1987d	Terasako	20x120	6.9	41	E	---
1987d1	Ichimura	??x120	8.5	141	M	---
1986e	Machholz	29x120	10.3	39	M	174
1988j	Machholz	29x120	8.6	67	M	476
1988r	Yanaka	25x125	9.3	38	M	---
1989a	Yanaka	25x125	10.7	81	M	---

Don Machholz (408) 448-7077

section by looking at these questions.

Most successful comet hunters use more than one instrument, since comets come in all sizes and magnitudes. As you look over these lists, you'll probably realize that you have a telescope similar to one of these. It is not the telescope that finds the comet, but the person behind it.

Here I list those comets found with reflectors and with binoculars, (well cover refractors next month). They are listed in increasing diameter of aperture. In include aperture size in inches and other instrument data, at the comet's discovery magnitude, elongation and sky (morning or evening), and the number of hours to find the comet.

ASTRO ADS

ASTRO ADS are free to all non-commercial advertisers wishing to sell astronomically related products or services. Please send your ad directly to the Editor, John P. Gleason, 5361 Port Sailwood Dr. Newark, CA 94560 **NO LATER THAN THE 15TH OF EACH MONTH.** Your Astro Ad will run approximately 3-months.

TELESCOPES AND ACCESSORIES - Meade model 622 6-inch f/3.6 wide field Schmidt-Newtonian on Meade equatorial mount. 2" focuser, 25mm eyepiece. Used twice. Excellent condition, $700. Telrad Finder, $30. Lumicon 80mm Super Finder, $150. Celestron 5X24 orange finderscope with bracket for C5, $20, Celestron 6X30 orange finderscope with bracket for C8, $20. Celestron 10X40 orange finderscope with bracket for C14 $45, Celestron 10X70 giant finder with bracket for C14, $140. Declination motor for sandcast C8, $20. Celestron T-Adapter for camera (T-ring for your camera not included), $15. Celestron tangent assembly for C8/C14 $175. Orion Telescope Center Dew gun, $5. 1 1/4" Optica filter set, green, red, yellow, orange, violet, blue, and Moon filter, 19mm clear aperture, $25. .965" star diagonal from C90, $5. Tuthill polar axis finder, cord 25' with cigarette plug for use with #784 motor, $15. Meade #604 A.C. converter with 25' cord for use with #784 motor, $20. Home made 8-inch f/4 Newtonian optical tube assembly with Novak spider and mirror cell, Meade 680 focuser, end rings, dust caps, 2.60"

COMET EPHEMERIS

EPHEMERIDES

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
			Comet Levy (1990c)				
09-26	15h50.6m	-37°31'	15h53.9m	-37°40'	63°	E	5.3
10-01	15h36.7m	-38°23'	15h40.0m	-38°33'	56°	E	5.4
10-06	15h25.4m	-39°01'	15h28.6m	-39°11'	50°	E	5.4
10-11	15h15.7m	-39°29'	15h18.9m	-39°40'	45°	E	5.6
10-16	15h07.1m	-39°50'	15h10.4m	-40°02'	39°	E	5.7
10-21	14h59.8m	-40°06'	15h02.7m	-40°18'	35°	E	5.8
			Comet Tsuchiya-Kiuchi (1990i)				
10-06	11h02.9m	+02°33'	11h05.4m	+02°17'	26°	M	7.8
10-11	10h58.2m	+00°36'	11h00.7m	+00°19'	32°	M	7.8
10-16	10h52.9m	-01°32'	10h55.5m	-01°48'	37°	M	7.8
10-21	10h46.9m	-03°53'	10h49.4m	-04°09'	43°	M	7.7
10-26	10h39.8m	-06°29'	10h42.3m	-06°45'	49°	M	7.7
10-31	10h31.4m	-09°25'	10h33.9m	-09°40'	56°	M	7.7
11-05	10h21.0m	-12°44'	10h23.5m	-12°59'	62°	M	7.7
11-10	10h08.1m	-16°31'	10h10.5m	-16°45'	69°	M	7.6
			Periodic Comet Encke				
09-26	09h01.5m	+29°40'	09h04.6m	+29°28'	54°	M	9.1
10-01	09h47.9m	+25°02'	09h50.8m	+24°48'	47°	M	9.0
10-06	10h31.4m	+19°26'	10h34.2m	+19°11'	41°	M	8.9
10-11	11h11.3m	+13°18'	11h13.9m	+13°01'	34°	M	8.9
10-16	11h48.2m	+06°58'	11h50.7m	+06°41'	28°	M	8.9

THIS MONTH'S METEORS

SHOWER NAME	DATES	DATE OF MAXIMUM	MAXIMUM VISUAL ZENITHAL RATE (per Hr.)	RADIANT POINT (ON MAX DATE) R. A.	DEC	VELOCITY km/sec.	NOTES
October Draconids	October 9 (only)	Oct. 9	<1	17h 28m	+ 54	20.4	very narrow stream rare meteor storms
Northern Piscids	Sept. 25-Oct. 19	Oct. 12	<1	1h 44m	+ 14	29	weak visual stream
Epsilon Geminids	Oct. 14 -Oct. 27	Oct. 19	<1	6h 56m	+ 27	69.4	very swift velocity weak visual stream
Orionids	Oct. 2 - Nov. 17	Oct. 21	30	6h 18m	+ 16	66.4	very swift velocity good mod. display
Leo Minorids	Oct. 22 -Oct. 24	Oct. 24	<1	10h48m	+ 37	61.8	swift velocity weak visual stream
Southern Taurids	Sept. 15-Nov. 26	Nov. 3	15 (w/ N. Taurids)	3h 22m	+ 14	27.0	long duration shr w/ N. Taurids
Pegasids	Oct. 29 -Nov. 12	Nov. 12	<1	22h 20m	+ 21	11.2	very slow velocity weak visual stream
Northern Taurids	Sept. 19-Dec. 1	Nov. 13	15 (w/ S. Taurids)	3h 53m	+ 22	29.2	long duration shr w/ S. Taurdids

secondary. Optical performance unknown (my first and last mirror). No finder or eyepeice included. Make Dobsonian mount and your all set, $175. (hardware alone a $164 value) All above equipment is in new or very good condition. Bill Dellinges, 415-792-9206

10-inch NEWTONIAN telescope with equatorial mount, motor drive, Richfield scope, spotter scope and is on a tripod with casters. $1500/obo. Contact Nancy Piekarczyk 415-632-6542. 10/90

MEADE motor drive for model 100 equatorial mountings. Fits models 291 and 300 refractor telescopes that came with this mounting. Never used, $50. Martin Miller, 415-898-1765 10/90

CELESTRON SUPER C8 w/tripod, wedge, 8 X 50 finder, 26mm Plossl, 7 mm Ortho eyepieces, 120/12 V. TeleDrive R.A. & Dec. drive, counter weights, original case...seldom used. $900/obo. Herb Builtemen, 867-3917 10/90

CELESTRON C4.5 Newtonian reflector in excellent condition. 25 mm Kellner eyepiece and a 2X Barlow, along with all the standard options Celestron offers in this package. Asking $400. Ralph, 408-943-6155 or 408-262-2826 10/90

CELESTRON SUPER C8 PLUS w/ starbright coatings, Byers drive, latitude adjuster, wedge, tripod, piggyback camera mount, star diagonal, 26mm Plossl eyepiece, 7mm ORtho eyepiece, 8 X 50 finder, Lumicon Easy Guider for deep sky photography, tele-extender for planetary photography, 2X delux Barlow, dual axis drive corrector, declination motor, dew cap lens shade, counterweight bar, extension tubes. All equipment in mint condition. $1200 takes it all. David Schamber, 209-333-0919 after 7 pm. 10/90

MEADE 107 D Spotting telescope w/ accessories: 4-inch f/10, perfect for the upcoming total solar eclipse: $150/obo. Meade adjustable tripod for Meade or Celestron telescopes: $95/obo. Contact Ron at 415-278-3335; before 9 pm please. 10/90

MEADE standard field tripod for Celestron or Meade Schmidt Cassegrains. Fully adjustable, heavy duty. $95/obo Call John Gleason 408-720-2493 9/90

CELESTRON SUPER C8 w/Starbright coatings, w/Powerstar mounting, - stepper motor drive with dual-axis drive corrector, MotoFocus, deluxe heavy duty wedge, Meade heavy duty adjustable tripod, dew shield, star diagonal (1.25"), 8 X 50 finderscope, tele-extender tube for planetary photography, prime focus camera adapter, counterweight bars. Superb, recently collimated optics. Meade 20mm Erfle Research Grade eyepiece. $850 or best offer. Contact: John Gleason (work phone only please) 408-720-2493. 9/90

CELESTRON C90 W/case. $250. Contact: O.C. Fox 415-856-6666. 9/90

CELESTRON 5 1/2" Schmidt Camera with 3 film holders, 1 roll film holder, filter holder, #29 & #92 filters, mounting rings for Super Polaris Mount, mounting rings for 60mm guidescope, carrying case & manual. $1350. Contact: Jim Eiselt, 408-374-5491. 9/90

LUMICON DEEP SKY FILTER. 2" Premium Grade + (hand selected). $75.00. Call Jim Baumgardt 415-692-5337. 9/90

CELESTRON 8 perfect condition with Starbrite, dew zapper, Motofocus, Meade tripod, Samsonite style case and more. Call for details. Also, installment payments available. Will sell for best offer. Call after 7 pm, 209-463-1817 Edward Hillyer, 2305 De Ovan Ave. Stockton, CA 95204 9/90

TELESCOPE, EYEPIECES, & ACCESSORIES - All the equipment listed below is near New - Mint + condition. A few items including the telescope have been used twice and most of it has never been used: Televue-Genesis, f/5 Fluorite telescope, includes fitted case, 1.25"-2" adapter, 2 extension tubes and lens hood, asking $1285. Orion Universal (telescoping) Camera Adapter, $25. Televue 13mm Plossl, $65. Televue 15mm Wide Field, $110. Televue 19mm Wide Field, $115. Televue 20mm Nagler Type 2, $295. Celestron 22mm Plossl, $55. Celestron 26mm Plossl, $45. Televue 32mm Plossl, $80. Televue 40mm Wide Field (2"), $260. 60mm Plossl eyepiece (2"), $40. Televue 2.5X Barlow lens, $60. Lumicon Deep Sky filter, $45. Orion, 5 filter set + moon filter (1.25"), $40. Brass and Wood, Televue tripod with leg spreaders (made for Genesis), $295. Will sell all for $2550. Contact: Marty Lutzker, Cupertino 408-257-8706 or 446-4134. 8/90

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Get Into Black Holes (Figuratively Only, Please)

At U.C. Extension Program with Andrew Fraknoi

Astronomer (and popular lecturer) Andrew Fraknoi will offer a *nontechnical* introduction to "Black Holes: Spacewarps, Time Machines, and the Death of Stars" at U.C. Berkeley on Saturday, November 3. Sponsored by U.C. Extension and the Astronomical Society of the Pacific, the program will be offered in the Physical Sciences Lecture Hall from 9 am to 5 pm and will be illustrated with slides from the largest telescopes on Earth and in space.

Topics covered will include:

- ★ **what black holes are and why astronomers are so excited about them**
- ★ **why falling into a black hole is a once-in-a-lifetime experience**
- ★ **what happens when a black hole eats a star or another black hole**
- ★ **how black holes make time travel possible**
- ★ **how super black holes may explain the mysterious cosmic powerhouses called *quasars***
- ★ **how science fiction writers are using black holes to expand the frontiers of science fiction**

For more information about the program, call (415)-643-6903

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Note to editors or radio producers:
To schedule an interview with Andrew Fraknoi, you can reach him at (415) 337-1100

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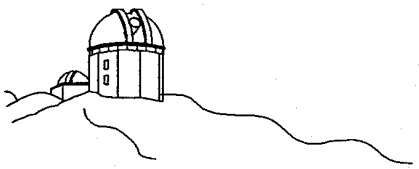

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