

EPHEMERIS

Vol. 2 No. 5

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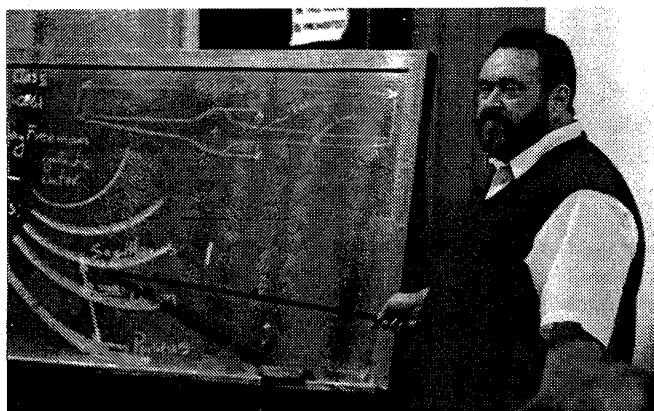
MAY, 1990

FIELD OF VIEW

- JOHN GLEASON

In place of this month's General Meeting will be the annual auction. It's time to sort through all those unwanted astro-goodies and bring them down to the Los Gatos Red Cross the afternoon of May 5th. In the last few years, this has been my way to pay off Uncle Sam's income tax bill! You'll find more auction information in this issue.

Comet Austin is certainly on everyone's observing list this month. As of this bulletin it is situated in the morning sky, visible deep in the early twilight. It is not the **MONSTER COMET** that the astronomy magazines earlier touted. John Bortell of Sky & Telescope called it a "pitiful little thing". I couldn't agree more. My observations on April 23 confirmed a 4.5 magnitude coma with a faint 2-degree ion tail. It's possible that it could get better as it gets out of the morning twilight later this month.



Although I haven't attended any this semester, it is reported that Wolfgang's Observational Astronomy class is a complete success. Their professor is seen here explaining why the summer Milky Way is brighter than our winter view of the galaxy. Members and their friends are encouraged to drop in anytime. Classes are held on the third Saturday every month. Photo by Bob Keller.

YOSEMITE STAR PARTY

The annual SJAA/Yosemite star party will be the weekend of July 20th & 21st. This moonless weekend provides six hours of full darkness under the peerless sky of Glacier Point. Both the Friday and Saturday star parties are being publicized in the park's newspaper, but there are enough SJAAers to cover both, even if you can't come until Saturday.

Jim Van Nuland informs me that the reservation list is full, but he is still taking names for the standby list. It is not guaranteed that standbys will get free camping, as we do not know until we arrive whether the Horse Camp will be available. Call Jim at 408-371-1307, 11 am to 11 pm.

10TH ANNUAL ASTRONOMICAL AUCTION

Enclosed this month you will find your pre-registration form for the upcoming auction. Please read the details carefully.

The 10th Annual Astronomical Auction will be held on May 5th at the Red Cross building in Los Gatos. As was done last year, we will have a Flea Market or Swap Meet during the afternoon from 2:00 to 5:00. Silent-bid sales may be conducted, too. Then from 6:00 until we finish, material will be auctioned. The building will be open by 1:00 pm. Come early, stay late.

Items having a (realistic) minimum bid of \$5 or less probably should be offered during the flea market, rather than the auction. Very specialized items, even if valued above \$5, should also be sold at the flea market, as auction time is limited. A silent bid sale could be used.

Items of general interest should be entered in the auction. The \$5 minimum is a guideline, but if the item is of wide interest, it could be auctioned. Pre-registrations is urged; forms will be published next month.

As before, SJAA's sales commission will be 10%, and a donation of \$1 is requested when registering to buy or sell. Please remember that everything is subject to prior sale.

BRANHAM LANE STAR PARTIES - WE WANT YOU!

Don't forget that the SJAA is holding public star parties on the following Fridays. Here are the upcoming dates: May 4, June 1, June 29,

MAY 5TH 10TH ANNUAL ASTRONOMICAL AUCTION!

MAY 4: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK.

MAY 5: SJAA/BAY AREA 10TH ANNUAL AUCTION. SEE NOTICE INSIDE.

MAY 12: SJAA BOARD MEETING AT THE RED CROSS, 6:30 PM, FOLLOWED BY THE INTRODUCTORY ASTRONOMY CLASS AT 8:00 PM.

MAY 19: STAR PARTY AT GRANT RANCH PARK. DUSK TILL YAWN!

MAY 26: STAR PARTY AT FREMONT PEAK STATE PARK. DUSK TILL DAWN!

JUNE 1: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK. STARTS AT DUSK

JUNE 2: GENERAL MEETING, 8 PM
DR. DALE KRUICHSHANK -- "METEORS AND NEAR-EARTH ASTEROIDS"

JUNE 9: SJAA BOARD MEETING AT THE RED CROSS, 6:30 PM, FOLLOWED BY THE INTRODUCTORY ASTRONOMY CLASS AT 8PM.

JUNE 16: SJAA/HVG STAR PARTY AND ASTRO CLASS AT GRANT RANCH PARK.

JUNE 23: SJAA STAR PARTY AT HENRY COE STATE PARK. DUSK TILL DAWN!

July 27, August 31, September 28, October 26, December 28. Bring a telescope and tell your friends. For more information please contact Tom Ahl or Jim Van Nuland. Their telephone numbers are listed elsewhere in this issue.

MAY STARRY NIGHTS

- RICHARD STANTON

COMETS - A simple note of interest. In the weekly journal *SCIENCE* for March 2, 1990 there is a fine technical report entitled, "The Strange Periodic Comet Machholz." The authors abstract of the report says in part, "The recently discovered periodic comet Machholz 1986VIII (1986e) travels closer to the Sun than any known planet and known comet with an orbital period of less than 150 years, thus providing astronomers with a unique object for studying cometary evolution." This report is certainly not for all members but for those who are heavily into "orbital mechanics" and "cometary science" it is very interesting. (Keep up the good work Don. We all admire your commitment to the serious side of amateur astronomy...you're a model for us all.)

PLUTO - If you have any plans to finally see Pluto within the next three or four generations, May of this year is the month to do it. During this month, Pluto will be closer to the Earth than it has been in the last 248. Both of the magazines *Sky & Telescope* and *Astronomy* for May have good articles and finder charts to help you locate our most far-ranging planet in the night sky. If you don't have access to either of these magazines, any of our club officers can help you out.

METEORS - May the 4th will bring the maximum of the Eta Aquarid meteor shower. This meteor shower is attributed to the passages of Comet Halley and is rated as one of the annual Major Showers. The single observer hourly count rate can run between 20 and 40 meteors per hour at maximum. As maximums between First Quarter and Full Moon the wee hours will give you darker skies. It sure would be nice of some of our members would turn in observing results from this shower. If you hadn't thought about it, it's entirely possible to undertake the rigors of counting meteors while parked in an outdoor hot tub. Being an astronomer can be terribly demanding but somebody has to do it.

DEEP SKY CHALLENGE - Off we go to Ursa Minor in search of "Polarissima Borealis". This is an unremarkable 13.6 magnitude galaxy but is noteworthy because it is the closest galaxy to our North Celestial Pole. You'll find it round 11:50.2 +89:07. Let's see, who do I know that has a 17" newt. that loves me?

ONE OF THIS MONTH'S FINEST - A nice object to go for this month is rated as one of the NGC's finest. It is a Planetary Nebula called "The Ghost of Jupiter", NGC 3242. You'll find this one in Hydra around 10:24.8 -18:38. While it is not as challenging as "Polarissima" it is a fine planetary at magnitude 8.6 and a size of 16". Well worth the effort.

1990 MESSIER MARATHON

- DON MACHHOLZ

The San Jose Astronomical Association 1990 Messier Marathon was held March 24/25 at Henry Coe Park. About 15 observers and ten telescopes were there under thin high clouds. Daytime views included a Hydrogen-Alpha observation of the Sun.

Most of us saw Comet Austin low in the evening sky. The sky remained at least partly cloudy through the night. Fog crept up to us at the overflow lot a few times after 11 PM, finally settling in for good at 2:00 AM. At that point the last of us went home.

Due in part to the threatening weather only a couple of us tried the marathon. Jim Richardson, an experienced observer who is new to the SJAA, saw about half of the 110 objects, I picked up 66 objects. I was later able to get to Loma Prieta the following weekend to observe 109 Messier Objects, missing only M 74. Jim also picked up additional objects to bring his total for the two nights to 99.

STAR PARTIES VS. SOLITUDE

- STEVE WALDEE

The SJAA is, above all else, a social organization, dedicated to the enhancement of the members' and public's appreciation of astronomy. Star parties held even at the light-polluted site of Branham park can be of inestimable value in showing our solar system to folks who have never looked with discernment at the sky; every time I go, I myself have a worthwhile astronomical experience.

But in learning to appreciate the subtlest of details visible through a telescope, there is no substitute for a more intimate experience. Though it's great fun to try out several different scopes on a cluster of galaxy, and walk with a companion from one instrument to another, perhaps quietly kibitzing and sharing a whispered wry comment about which images we prefer, it's just not possible to deeply concentrate and let a profound awareness sink in while observing in quiet solitude. Such moments are

the ones we long remember, when the Horsehead was at long last visible, when we finally split a double under an arc-second separation, or when, after a patient half-hour of watching for a good moment,, the surface of Jupiter suddenly broke into a myriad of festoons, loops, ovals, and chimerical markings.

The problem is that our society doesn't understand people with telescopes. We are suspicious of a solitary, mysterious stranger standing or peering into a contraption that might be either a weapon, or more likely a gadget with which to spy on us. At best, we'd better go over and find out what he or she is up to; at worst, we should call the cops to have them protect us from this marauder. And as public-minded astronomers, we all have to be patient when somebody comes up and ask, "Hey, are ya lookin' at th' stars?"

My worst experience was five miles outside of Palm Springs. I pulled off a main road, set up a table for my Tirion atlas, and was studying the Milky Way with binoculars. A pickup truck careened to a halt in a cloud of dust, and a huge figure tumbled out and lurched toward me. In a slurred and nearly incoherent tirade, he informed me that yes, indeed, he was drunk again, and that I could do-- well go home and tell his wife all about it, because he didn't care! Meanwhile, I frantically stuffed my articles in the car and quickly departed as he stood waving his arms and calling out after me.. On another night, I accompanied a friend, who has permission to use some private school property near Ben Lomond for his astrophotography, when a group of beer-besotted Neanderthals were attracted by our presence and destroyed our enjoyment with screaming and rock-n-roll. The cops eventually came and allowed us to observe, but warned the rowdies to leave; they didn't. Our night was ruined.

Fremont Peak on a good summer night can be like a telescope store; one can forget about concentration and just go with the flow of astro-socializing. It's delightful, but such activities are only one part of the pleasures of studying the skies.

One of my finest moments was at Mount Hamilton, when Shilo Unruh rewarded my wife and me for our Observatory volunteer work with a chance to view through the 22" Cassegrain. I stood staring for ages at an unbelievably detailed M5; Regina and Shiloh got bored, and sat down against the inside of the dome and dozed a bit. The motors hummed, the wind howled and rattled the old dome, and I heard a coyote in the distance. I felt like old Ed Barnard on a 5-hour-long guiding run. There is just no substitute for that kind of solitude.

GREAT RED SPOT

- JIM VAN NULAND

This month closes another chapter in the continuing drama of the Great Red Spot. With Jupiter setting earlier, and the Sun setting later, the window has rapidly closed. Though Jupiter will be visible for another month, seeing will be a problem in the low sky. So this column will take a somewhat-deserved vacation to study other interests. My thanks to those who have encouraged me with your reports and questions.

Through the 1989-90 season, we have seen the Great Red Spot better than for many years, and have had the additional large surprise with the fading of the South Equatorial Belt. Take this last opportunity, as the SEB may be back by the time Jupiter is again observable.

Good seeing and a power of about 200-300 are needed. Begin half an hour before the given time. Focus carefully, then scan the southeast quadrant of Jupiter. Watch carefully for those moments when the air is especially stable, and the Spot will show itself in all its glory. Let me know of your results, especially if you are using an instrument smaller than 8-inches, or if you try various filters.

COMET COMMENTS

- DON MACHHOLZ

No new comets have been discovered or recovered recently, in that respect this is a slow year for comets. But comets found last year remain visible, not the least of which is Comet Austin.

We now know that Comet Austin is a new comet to the inner solar system and that some of its early brightness was due to the more volatile chemicals burning off. So unless the comet disintegrates near perihelion (unlikely), I expect the comet to put on a good show; but it will not be bright enough to cast shadows! Since much of its brightness in May will be due to a close passage to Earth (22 million miles), the comet can suffer much and still look good at the same time. The disadvantage of such distance is that the comet will appear large and you'll need dark skies to see it well. As with most comets, the view will be best with dark skies, trained eyes and high-contrast optical instruments.

One new comet has been discovered recently, this is only the second comet of the year. Yet we still have four comets easily visible. Comet Skorichenko-George (1989e1) is one of the two evening sky comets. It swings around the back side of the Sun in June; when it emerges into

our morning sky in late August it should be near magnitude 11.

Periodic Comet Schwassmann-Wachmann 3 has an orbital period of 5.4 years but is often missed due to poor placement. This time around it is favorably placed, passing only 34 million miles from Earth in mid-April. A month later it is at perihelion, 86 million miles from the Sun. While you are waiting for Comet Austin to rise, take a look at "SW 3".

Comet Austin, now in the morning sky, should be visible to the naked eye. Early hopes that it would reach first or even zero magnitude evaporated when the orbit was determined to be hyperbolic, indicating that the comet is new to the Solar System. This meant that early rapid brightening was due to "burning off" of the most volatile gasses, leaving only a "slightly brighter than average" comet beneath. But even such a comet can look good if placed well, and this comet has good placement.

In mid-April from mid-northern latitudes, Comet Austin rises about one hour before sunrise. In early May this time increases to four hours. By late May it rises near evening astronomical twilight and is up nearly all night long. The moon will provide little or no interference between April 21 and May 6, then again between May 20 and early June. In the ephemeris below I include two magnitude estimates, the comet will probably fall somewhere between them. The first is derived from an absolute magnitude of 5.0 and an "N" value of 4.0, this typifies a bright normal comet. The second set of magnitudes used data similar to that of Comet Cunningham, which in 1941 displayed pre-perihelion behavior similar to that of Austin. As for tail appearance, the gas tail should be visible, you might want to try various filters on this. But dust production on Comet Austin has been low so the dust tail may not be prominent.

Comet Cernis-Kiuchi-Nakamura (1990b): This comet was discovered in the evening sky on March 14 by Kazimieras Cernis from Vilnius in the (politically-troubled) land of Lithuania. He was using a 5-inch refractor to find this, his third comet. Thirty-nine hours later two Japanese amateurs picked it up, T. Kiuchi, using 25x150 binoculars and Y. Nakamura, using 20x120 binoculars.

The comet was closest the Sun at 1.07 AU on March 16, it is now pulling away from both the Earth and Sun. During the next few months it remains in our evening sky, slowly dimming. The ephemeris shows that the comet could have been discovered in the evening sky at magnitude 10 in mid-January or at magnitude 9 in mid-February, if it had followed a normal

brightness curve. degrees south of M31 on April 24.

METEOR NOTES

- JIM RICHARDSON

The month of May is dominated by the Eta Aquarid meteor shower, a moderate shower characterized by swift white and yellow meteors, many having long paths, and prominent trains. The maximum for this shower has a duration of 3 days (between days of 1/4 maximum rate), with the peak occurring on May 4 at 11:00 PDT (1800 Z). The Avg. hourly rate is about 20/hr. at the maximum rate. Because the radiant rises only about 5 hours ahead of the Sun, very few (if any) will be observable in the evening sky, with a few beginning to show around midnight or 1 am. The best time is in the 2 hours or so before morning twilight, and I expect about 10 to 15 per hour to be visible on the morning of the maximum. Look for the diamond shaped asterism known as the "water jar", in Aquarius, to find the radiant. This is one of the most common radiant areas, with 3 moderate showers, and 3 minor showers originating here throughout the year.

While looking for the Eta Aquarids, keep an eye out for a few which appear to originate a few degrees East of the rest. These are the Halleyids, a recently discovered shower associated with (you guessed it) Halley's Comet. Data on this shower is rough, but it appears to have a maximum around May 8.

The rest of the May showers are minor, and overlap into April and June, with no maximums in May except the Phi Bootiids on May 1. These are all very difficult to tell from the background sporadic meteors, which have a rate of 6 to 10 per hour (based on a clear dark sky).

In the data, all hourly rates include the background sporadic rate, and all those marked with an asterisk are less than 15 per hour.

March-April notes: The months of March, April, and May are accented by what is known as the "April Fireballs". This is a loosely knit cluster of meteoroids not associated with any known shower, but occurring around this time each year. I heard some local television and radio stations give reports of brilliant green fireballs, and on the night of March 24, at 10:24 pm PST, those of us who were out for the Messier marathon at Henry Coe St. Park were able to observe a beautiful blue-green fireball. I marked it as a magnitude -5, 1/2 degree., by 3 degree teardrop shaped meteor that covered about 90 deg. in 3 sec. (slow) and left a quickly fading train (1 sec.). Maybe we'll get lucky again soon.

If you are interested in learning about, and observing these sometimes spectacular objects, or if you see a fireball and would like to report it, please contact Jim Richardson at 408-578-0387 (h) / 408-978-8113 (w).

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.

BACK ISSUES OF DEEP SKY WANTED Pat Donnelly is looking for back issues of Deep Sky magazine to borrow. Please contact Pat at 408-778-2741 5/90

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NEW IN BOX Jagers 6" f/10, Jagers 6" f/8 air-spaced achromats, A-R coated, unmounted, \$750 each or \$1400 for the pair (current list \$945 ea. when available). 7" f/7 air-spaced achromat, A-R coated, Mfr. unknown. (1/16" chip on rear neg. lens, 1/2" from edge; \$800. Aluminized 3 3/8" f/12 A-R coated, spherical mirrors (meet Rayleigh's criterion); corner reflectors, flats, and smaller achromats. Large, huge, and humongous right angle prisms. Contact: Steve Greenberg, 415-423-4899 days, 209-239-2154 eves. 4/90

CELESTRON 8 w/starbright coatings, 8X50 finder, dew zapper, Motofocus, piggyback camera holder, multicoated diagonal, optical tube only one year old, Meade Tripod (more stable than Celestron's), Samsonite style case, \$1190.

Also, Olympus binocular viewer with 2-pairs of eyepieces, \$350, lower price if purchased with telescope. Call after 7 pm, 209-463-1817 Edward Hillyer, 2305 De Ovan Ave. Stockton, CA 95204 4/90

C8 optical tube, case, 6x30 finder, starbright, good optics and collimation, new condition, \$400. 400mm f/6.3 telephoto lens, multicoated, t-thread system, rotating collar, 72mm filter adapter, \$175. Lumicon 72mm premium deep sky filter, \$150. 56mm Meade super Plossl, @" O.D., \$120. 40mm Konig II, 2" O.D. \$80. Lumicon adjustable piggyback mount for C-14 or other 16" O.D. tube (or larger), \$16. Orion 7mm and 9mm orthoscopes, multicoated, \$25 each. Televue 2" star diagonal with 1.25" adapter, \$105. Schmidt Cassegrain to 2" adapter, \$15. Meade 15mm and 9.7 mm super Plossl, 1.25", \$47 each. Orion dew zapper for 8", D.C. model, \$24. Jim Molinari, 8149 Park Villa Circle, Cupertino, CA 95014 (408) 298-7557 (W), (408) 255-7030 (H). 3/90

SPACE PROGRAM UPDATE

- BOB FINGERHUT

HUBBLE LAUNCH DELAYED

Hopefully, the Hubble telescope will be in orbit by the time you read this. The first attempt to launch on April 10 was prevented by a faulty

APU controller. The APU's (Auxiliary Power Unit) provide high pressure hydraulic fluid to actuators that gimbel the orbiter engines during launch and move the aerodynamic control surfaces during return to Earth. In the time it takes to replace an APU on the launch pad for the first time, the batteries in the Hubble telescope will become discharged. It takes eight days to gain access to the batteries, recharge them, and close up the telescope and shuttle payload bay again. The 400 mile high orbit that the telescope will be put into is the highest the shuttle has been. After deploying the telescope the shuttle astronauts will use their high altitude vantage point to study large geological and oceanographic features such as giant spiral eddies in the oceans.

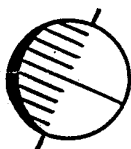
GIOTTO RETARGETED FOR COMET FLYBY

The European Space Agency spacecraft Giotto, that flew by Comet Halley in 1986, will now flyby Comet Grigg-Skjellerup on July 10, 1992. Two more small adjustment maneuvers are planned in the next couple of months and Giotto will take a gravity assist on July 2, when the spacecraft will pass within 23,000 Km of Earth. About 50 percent of Giotto's scientific payload was disabled by dust impacts while at Halley's Comet, but the high-resolution Halley multicolor camera among other instruments survived.

JUPITER'S RED SPOT

Great Red Spot on Meridian PST

da	mo	d	h	m	da	mo	d	h	m	da	mo	d	h	m
M	4	30	8	18 pm	W	5	9	10	46 pm	Sa	5	26	9	59 pm
W	5	2	9	58 pm	M	5	14	9	56 pm	Th	5	31	9	9 pm
M	5	7	9	7 pm	Sa	5	19	9	5 pm					



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MUSES-A IN LUNAR ORBIT

The Japanese Muses-A subsatellite was successfully injected into lunar orbit on March 19th. Japan is now the third country, behind the U.S. and the Soviet Union, to send a spacecraft to the Moon.

PEGASUS MAKES ORBITAL FLIGHT

The Pegasus air-launched booster put a payload into Low-Earth polar orbit on April 5th. The privately developed booster was dropped from a carrier airplane at 40,000 ft. altitude and at 0.8 Mach, and used a winged first stage rocket motor for additional lift. Pegasus is capable of placing about 900 lbs into low Earth orbit.

NASA CONSIDERING RESCUE

An Intelsat 6 spacecraft was left in a useless orbit on March 14 due to an incorrectly wired Titan 3 booster. In order to separate the spacecraft from the Titan, the spacecraft had to leave its perigee motor attached to the Titan. A shuttle mission in late 1990 or early 1991 could retrieve the spacecraft or possibly bring up and attach a new perigee motor.

SOVIET SPACE PROGRAM

Protein crystals were successfully grown on board the Soviet Mir space station for a U.S. company; Payload Systems Inc.. The Soviet shuttle orbiter Buran will not be launched into space again. The Buran was built without a life support system, full avionics system and fuel cell electrical system. It would be too costly and difficult to modify the vehicle. A new orbiter is nearing completion and is scheduled to make its first flight (unmanned) in 1991. An exhibit on Soviet space technology for American audiences is being prepared. It will go on display at the Bonton Museum of Science this summer. Equipment will include a scale model of Sputnik, and model of the Mir space station, the Lunakhod 2 satellite, a lunar roving vehicle and components from Luna 24.

DOUBLE, TRIPLE, AND MULTIPLE STARS

-PAT DONNELLY

This is the time of year, when most amateur astronomers are spending their time observing the ultimate multiple stars, the galaxies. I must admit that I have been overcome with "galaxy fever" on a few occasions; pondering who could be looking back at me across the depths of intergalactic space. Then I realize that I won't be born for millions of years yet for an observer on M65 or M86. However, galaxies in general are dim, and it takes a moonless night to see them. What do you do when the moon is out?

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COMET EPHEMERIS

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
Comet Austin (1989c ₁)							
04-24	00h42.5m	+35°42'	00h45.2m	+35°59'	30°	M	1.4/3.6
04-27	00h27.3m	+36°00'	00h29.9m	+36°17'	33°	M	1.7/3.7
04-30	00h11.2m	+35°53'	00h13.8m	+36°09'	37°	M	1.9/3.7
05-03	23h53.9m	+35°20'	23h56.5m	+35°37'	42°	M	2.1/3.6
05-06	23h34.8m	+34°22'	23h37.3m	+34°38'	47°	M	2.2/3.6
05-09	23h13.1m	+32°50'	23h15.5m	+33°06'	53°	M	2.3/3.5
05-12	22h47.7m	+30°34'	22h50.1m	+30°50'	61°	M	2.3/3.4
05-15	22h17.5m	+27°13'	22h19.8m	+27°28'	70°	M	2.3/3.2
05-18	21h41.5m	+22°21'	21h43.8m	+22°35'	82°	M	2.3/3.1
05-21	20h59.2m	+15°30'	21h01.6m	+15°42'	96°	M	2.3/3.0
05-24	20h11.8m	+06°40'	20h14.3m	+06°49'	112°	M	2.4/2.9
05-27	19h22.6m	-03°07'	19h25.2m	-03°01'	130°	M	2.6/3.1
05-30	18h35.7m	-12°06'	18h38.5m	-12°03'	147°	M	3.0/3.3
06-02	17h54.5m	-19°08'	17h57.4m	-19°09'	162°	M	3.4/3.7
06-05	17h20.3m	-24°08'	17h23.4m	-24°11'	173°	M	3.9/4.1

Comet Skorichenko-George (1989e₁)

04-24	03h34.9m	+38°45'	03h38.2m	+38°55'	33°	E	8.8
04-29	03h54.5m	+37°35'	03h57.8m	+37°44'	31°	E	8.9
05-04	04h13.1m	+36°19'	04h16.4m	+36°27'	29°	E	8.9
05-09	04h30.6m	+34°58'	04h33.9m	+35°05'	27°	E	9.0
05-14	04h47.2m	+33°34'	04h50.4m	+33°39'	24°	E	9.1

Periodic Comet Schwassmann-Wachmann 3 (1989d₁)

04-24	20h54.7m	-08°58'	20h57.4m	-08°47'	80°	M	9.9
04-29	21h34.1m	-09°42'	21h36.7m	-09°28'	75°	M	9.8
05-04	22h10.0m	-10°05'	22h12.7m	-09°50'	72°	M	9.8
05-09	22h42.2m	-10°11'	22h44.8m	-09°55'	69°	M	9.9
05-14	23h10.7m	-10°02'	23h13.3m	-09°45'	68°	M	10.0
05-19	23h36.0m	-09°42'	23h38.6m	-09°25'	67°	M	10.1
05-24	23h58.4m	-09°15'	00h01.0m	-08°58'	66°	M	10.3
05-29	00h18.5m	-08°42'	00h21.0m	-08°25'	66°	M	10.5
06-03	00h36.5m	-08°06'	00h39.0m	-07°50'	67°	M	10.7
06-08	00h52.8m	-07°29'	00h55.4m	-07°13'	68°	M	11.0

THIS MONTH'S METEORS

Shower Name	Start Date	Max. Date	End Date	Hr. Rate	Rad. R.A./Dec.
Sigma Leonids	Mar 21	Apr 17	May 13	*	13:00 / -5
Mu Virginids	Apr 1	Apr 25	May 12	*	14:44 / -5
Alpha Scorpiids	Apr 11	Apr 26	May 1	*	16:04 / -24
Alpha Bootids	Apr 14	Apr 28	May 12	*	14:30 / +19
Phi Bootids	Apr 16	May 1	May 12	*	16:00 / +31
Eta Aquarids	Apr 21	May 4	May 12	20	22:17 / 0
Halleyids	?	May 8	?	*	22:32 / -01
Tau Herculis	May 19	Jun 3	Jun 14	*	15:12 / +40
Xi Scorpiids	May 27	Jun 5	Jun 20	*	16:25 / +13

Fortunately, there are in the springtime skies plenty of bright double and multiple stars to explore until the moon sets. Here are just a few to examine. Begin with Castor in Gemini. Castor has been described before in detail. However, it is so pretty that one should examine it about once a month. Next to Gemini is Cancer it contains two very nice doubles. Zeta Cancri is a pair of 5.5 magnitude stars separated by about 6". If you have a large telescope and good seeing, the A - component is a very close 0.9" pair of magnitude 5.5 and 6.0. However, for fun and visual satisfaction try Iota Cancri. It consists of a magnitude of 4.5 and magnitude 6.5 pair separated by about 30". The intense yellow and blue color to the pair would make it all but an identical twin to Alberio.

Above Iota Cancri in Lynx is 38-Lynx. This star is a fine triple with the A & B components of magnitudes 4 and 6.5 respectively, separated by a close 3". There is also a magnitude 11 C component about 88" from the others. It is a finesight. If the Moon is too bright for 38-Lynx, go over to 12-Lynx. It is a true triple system. The magnitudes are 5.5, 6, and 7.5. The first two are separated by a very close 1.8", and the first and third by 8.5". It is a very pretty trio under high power. I've observed this trio many times.

Just east of Lynx is Ursa major. It has many remarkable double stars, but three of them stand out. Check out Mizar (Zeta Ursa Majoris) first. It's a 2.5 and 4.0 magnitude pair separated by 15". It's easy to resolve in almost any telescope and along with nearby Alcor the sight of the trio is made. Besides Mizar there are two other notable bright doubles Xi and Nu Ursa Majoris. They are located down around +30 declination. Nu is a rather easy double consisting of a magnitude 4.0 primary and magnitude 10 secondary separated by about 7". Just below Nu is the rather difficult Xi Ursa Majoris. Xi is a true binary with a period of 60 years. It is fun to watch because the position angle and separation change quickly from year to year. Right now the magnitude 4.5 and 6 pair is separated by about 1.3" and the P.A. is about 60 degrees. A good project would be to continue to observe Xi each year. One only needs one good night a year to note the separation and position angle. Xi is closing right now, so one would be smart to observe it before its components are too close to observe.

After Ursa Major observe Gamma Leonis. It is one of the finest doubles in the sky. It consists of a magnitude 2.5 and 3.5 pair separated by about 5". It makes a very pretty sight in any telescope, and to me it seems like my idea of how a double star would appear. Move down now to Virgo. In Virgo are two splendid

doubles, Gamma Virginis and Theta Virginis. Gamma Virginis like Gamma Leonis is a true double system with a period of 171 years. The system consists of a pair of 3.5 magnitude stars separated by about 5". Observe this pair now because by the year 2008 the separation will be under 1" and impossible to resolve. The other star in Virgo is Theta Virginis. It is a triple star with a 4.5 magnitude primary. The other components are magnitude 9 and 10 separated by 7" and 71", respectively. This triple is fairly easy to resolve.

The final double to observe is the double that I show to people, who want to see a double star. I show them Cor Caroli, Alpha Canes Venatici. Cor Caroli consists of a magnitude 3 primary and a magnitude 5.5 secondary separated by 20". Just about any telescope under almost all seeing conditions will resolve this pair. Even three old kids can see this pair. That's why I picked it.

FROM THE COSMIC MIND BOGGLING BOOK

- NEIL McALEER

REVOLVING THROUGH TIME

The Milky Way Galaxy has revolved only 20 times since the Sun and solar system formed, 15 times since the earliest microscopic life on Earth existed, 10 times since the Earth's oxygen-rich atmosphere evolved, 5 times since the worms and jellyfish were the most advanced life forms on Earth, and less than one hundredth of a revolution since the appearance of early humans - those curious and perplexing creatures who discovered in the late 1920s, just about the time of the Great Crash, that they were living in a spiral galaxy and that it was revolving every once in a cosmic while.

A COSMIC TURTLE'S PACE

Our Milky Way Galaxy is flying through the Universe at about 1.4 million miles (2.3 million kilometers) an hour, heading in the direction of the constellation Hydra. No one really knows where we are going, but some scientists believe our 100-billion-plus star spiral is being pulled along by a supercluster of distant galaxies.

As fast as this galactic velocity seems, it would still take a spaceship over 2,100 years at this speed just to reach the nearest star system, Alpha Centauri, and 50 million years for the Galaxy to cover a distance equal to its own diameter, about 100,000 light-years - a turtle's pace on a cosmic scale.

TRAVELING LIGHT

Our vast and spiraling Milky Way Galaxy is so large that a powerful flash of light from one

edge, traveling at its natural speed of 670 million miles per hour (1.1 billion kilometers per hour), would take 100,000 years to reach the other side.

IN OUR GALAXY, FAR, FAR, AWAY

The most distant star in the Galaxy's disk system lies directly opposite us, beyond the dense galactic core and the trillions of miles of obscuring gas and dust. This region of the Galaxy is even closed to the far-probing radio astronomers, who have mapped large areas of the Galaxy by observing neutral hydrogen at the 21-centimeter (8.3-inch) wavelength. Even at one tenth the speed of light, it would take a starship 800,000 years to reach this faraway region of the Galaxy. If the Sun-Earth distance of 93 millions (150 kilometers) were represented by 1 inch (2.54 centimeters), the farthest star in the Galaxy from the Sun would be 79,000 miles (127,000 kilometers) away.

LOOKING DOWN THE ARM

Spiral galaxies, like our own Milky Way, are the most beautiful galactic shapes in the Universe, and it is the spiral arms, trailing away from the galactic motion in varying wisps of cosmic motion and light, that give them their beauty.

The Galaxy's spiral arms are within the disk, where young hot stars are constantly born out of condensing star stuff. This is so because the clouds of gas and dust are thickly distributed along the spiral arms, concentrated there because of the gravitational density waves that flow around the Galaxy. In the 1950s, optical astronomers mapped small areas of three spiral arms in our Galaxy. They did this by tracing the hot bright stars and gaseous nebulae known to populate only the disk. Because of this concentration of gas and dust in the disk, optical astronomers have about a 6,000-light-year limit to their galactic surveying, and only radio astronomers can further plumb the depths.

The Orion arm, our arm, is the where the Sun is located, near the inside lower edge of a local system called Gould's belt, which faces the galactic nucleus about 30,000 light-years away. Some 6,000 light-years farther away from the Center is the Perseus arm, and an equal distance closer, toward the nucleus, is the Sagittarius arm. They were named for well-known constellations located within them.

Next winter, when you see the famous Orion constellation and the sword's gaseous nebula, you will be looking down the Orion arm about 1,600 light-years and seeing an image that left its source in A.D. 380 - perhaps to a time before our solar system even entered the arm.

* * *

The tenth annual Bay Area Astronomical Auction is approaching, so it's time to start looking around for those items not earning their space, whatever is astronomical or telescope-making related, that you would like to turn into cash.

Pre-registration makes it easy. Fill in the form below or a copy of it. List each different item you have. If there are several of one item, use a single line and show the quantity. Enter a minimum bid, even if you wish to let it go really cheap. Indicate whether the item is an outright donation; if not, the commission is 10% of the selling price. The SJAA share of all sales is tax deductible, and goes to further public education in astronomy.

Next, and most important, MAIL the complete form with a SASE, to Jim Van Nuland at 3509 Calico Ave., San Jose, CA. 95124. You may wish to keep a copy for your files. Jim will assign a bidder/seller and item numbers, and return the form to you promptly. If you omit the SASE, Jim will assign numbers, but hold the form for your pickup at the auction. Use adhesive labels to label each item, indicating the minimum bid and item number on each item.

To accommodate the increasing volume of good stuff, we will have a Swap Meet in the afternoon. No registration is needed for the Swap Meet. Items having a realistic minimum bid of \$5 or less probably should be Swap Meet material, as auction time is limited. Items of limited or specialized application, even if valued above \$5, should be considered for the swap meet.

A silent bid will run throughout the day. This is mostly for big ticket items such as complete telescopes. A sheet with the minimum bid is attached to the item; you write in a new bid and line out the old one. Results of the silent auction will be made final at the break and the winning bidders announced. However, a seller may close bidding and sell at any time.

DIRECTIONS to the Red Cross building

Take Hy.17 (880) toward Los Gatos. Take the Los Gatos-Saratoga Rd. (Hy.9) exit and continue west for 0.6 mile. Turn right on Rose Ave., then another immediate right into the parking lot. The address is 16011 Los Gatos-Saratoga Rd. Car-pool if possible.

Doors open at 1:00 pm, Swap Meet 2 to 5, auction from 6 pm. \$1 donation is requested for registration to buy or sell during the auction. Refreshments will be available. Come one, come all!

1990 SJAA Auction Registration				
Bidder Name: _____ Club: _____				
# _____ Addr: _____ City: _____ Zip: _____				
Item num.	Qty	Min. bid	Donation? Y/N	Description . . . (<~60 charcters)

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