SJAA EPHEMERIS

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The Eyepiece
by Bob Madden

Here it is June, or about June. Many don't know that Bob Keller, our photographer, had suffered a heart attack just before the April auction. Bob was in serious condition in El Camino Hospital. We hope at this time Bob is getting and feeling better and the outlook is good. We need you, Bob, and wish you a speedy recovery. Hurry back. [May 14: Guarded, but showing some improvement]

Yes the auction was a success! The Association received a little over $620 from the sales and auction. It was a lot of fun. I even bid on a 5-1/2 inch Schmidt camera brought by Epoch Instrument's Kevin and Denni Medlock. I quit bidding at $550 and it went shortly after that. It was a real bargain as they are advertised in the Starry Messenger for $1400. There were many other bargins also. The one thing we missed is the sales of soda. Next year we will have some one at that post selling for the Association.

This month's speaker is Mike Rushford talking about his remotely operated solar telescope and his bulletin board, "Eye on the Sky". Mike's BBS is located in Livermore and has tons of graphic files and several conferences. In fact his BBS is a gateway for e-mail.

Jun 4: Star Party at H. Coe. Sset 8:23, 15% moon, rises 3:24 am.
Jun 11: Star Party at Fremont Peak. Sset 8:25, 8% moon Mset 10:17 pm (=ast. twilight). Also Pub star Party at Grant Ranch county Park.
Jun 17: Star Party at Houge Park. Sset 8:30, 65% moon, Mset 1:51 am
Jun 18: Observational Astronomy Class at Houge Park, 8:00 pm.
Jun 21: Summer begins at 7:50 am
Jun 25: General Meeting 8:00 pm at the Milpitas Library. Board of Dir. Mtg. at 6:15pm. Speaker will be Mike Rushford speaking about his remote solar telescope and "Eye on the Sky" Bulletin Board System.
July 2: Star party at H Coe. Sset 8:30, 28% moon rises 1:58 am.
July 9: Star party, Peak. Sset 8:27, 2% moon sets 8:55 pm. ALSO: Public star party at Grant Ranch County Park.
Jul 15: Star Party, Houge Park. Sset 8:28 pm, 51% moon sets 12:30 a ALSO Star Party at Yosemite 15/16th. Call Jim Van Nuland - room for 18.
Jul 16: Descriptive Astronomy class, Houge Park. Shoemaker-Levy begins impact on Jupiter, ends on the 23rd.
Jul 23: General meeting, Milpitas Library, 8:00p. Board of Dir meeting begins at 6:15p. The speaker will be Peter Jenniskens. Peter will talk about observing, photographing and gathering data from the Persied meteor shower.

We look forward to hearing from Mike.

We continue our series on collimnating, taking your telescope apart and cleaning the optics. This is some heavy stuff, especially for Schimdt-Cassegrains. If you aren't timid the article is interesting.

Patrick Donnelly is with us again with his multiple stars article. Pat is in Great Britian working and I think he will be home for the FPOA picnic. We are looking forward to seeing Patrick.

I received a very good suggestion at the auction with respect to the Ephemeris. It goes like this: "Why not publish the times and station Jack Horkheimer broadcasts his program?" Good Idea, however I don't want to chase down the data. I'll be happy to see that a regular piece gets into the newsletter. What this means is, I would like anyone who wishes to contribute, as Patrick Donnelly does, to do so. Please talk to me about it. I have no difficulty seeing that it will get into the Ephemeris.

Jim Van Nuland writes that the Yosemite Star Party will be held on July 15/16, with first quarter moon on the 15th. The party will be shared with MIRA group. We are allowed to send 18 people. It is not an ideal weekend, but is the only thing available. People who are willing to tollerate the bright moon will neverless have all of Yosemite during the day! Call Jim if you are planning to attend.

By the time this reaches the post office chances are it will be too late for those who are interested. There will be a concert series under the spheres held at Lick Observatory with an opportunity to view through the big refractor. I have to say the acoustics in the dome with the big clark refractor is wonderful. Weather permitting there will be viewing through the world famous 33-inch. I have enjoyed an evening there. Shilo Unruh will also be giving a history talk before the concert. If you are interested, at least to get on next years mailing, call (408) 274-5061, between 12:30 and 5 pm. A call may find a few empty seats available. It is a thrill to stand where history in astronomy has been made.

Double, Triple, and Multiple Stars

by Patrick M Donnelly

On several occasions I have been asked to relate the factors involved in the observation of double stars. This is a direct result of someone trying to view a double star and not being able to see it. My reply is that there are many factors involved. Some of the factors relate to the telescope, and some of the factors relate to the system being observed. However, the single most important factor in observing double stars is the sky itself. Let us now review these factors to see how they relate to observation.

As I said before, the sky itself is the single most important factor involved in the observation of double stars. For the sky, there are two parameters that control observation. They are the seeing and the darkness of the sky. The seeing is important, because that is the parameter that will allow you to split the double close stars. If seeing is poor, there is no size of telescope that will resolve a close double pair. Therefore, it is always a good idea to check the seeing before you begin your observing session. A good rule to follow is if two equal seventh magnitude stars separated by 1 arc-second cannot be resolved, the seeing is not good enough for close double star observation. This rule is applicable to any telescope, that is 4" or larger. The other parameter is the darkness of the sky. Faint companions to bright primaries cannot be seen in light polluted of moonlit skies. It is always better to observe in dark skies.

The second factor is the system being observed. Double stars have two properties that limit the ability to observe them. The first is the separation of the components. The closer together the stars are the more difficult it is to resolve each component. This problem is aggravated by the individual magnitudes of each component. It is much easier to resolve two close equal components than two components with large magnitude differences. Also, the brightness of the primary affects the resolving capability. For example, Sirius has a companion of magnitude 6, which is all but invisible at 5 arc-seconds. However, the 5 arc-seconds separating the components of Rho Scorpio are easily resolved in almost any telescope.

The final factor affecting the ability to see double stars is the telescope itself. It is commonly known that the larger the diameter of the objective of the telescope, the better the resolving power of the telescope. Thus, a larger telescope will be able to resolve doubles not resolvable in smaller telescopes. Keep in mind that this is true only to the extent that the sky will let the telescope work. I have found that the skies in Northern California are very steady and that investment in a bigger telescope for increasing resolving power is probably acceptable. However, this was definitely not true for the skies of Eastern Iowa. Moreover, the larger scope will increase light gathering power and allow one to view fainter doubles. The other consideration involved in the telescope is the type of telescope. I have used just about all types of telescopes, and have found very little difference in the ability of the different types. Perhaps, a refractor of a given size is a bit better, when compared to other types of the same size, but on most nights it is the sky and not the telescope that is the limiting factor to observing. One final note about telescopes is that use of high power on the telescope should be used for double stars. The sky contrast is better at high power, and the magnification of the image will permit closer and dimmer systems to be observed.

I would appreciate any comments that you may have on these factors.

Demounting the Optics

Celestron

[If you must, here are some instructions to take your Schmidt-Cassegrain apart for cleaning. It is recommended that you leave this operation to a professional, but if you must - you must]

If you need to remove the optics of your Schmidt-Cassegrain follow these instructions: Be very careful when you work. Not only is the corrector plate thin, it must be replaced in exactly the same orientation it was prior to removal. This is for reasons of collimation and also because both the corrector and secondary mirror are position-matched for optical performance with respect to the primary mirror. To remove the corrector lens:

1. Unscrew the 6 or 8 screws surrounding the Schmidt corrector lens.
2. Remove the corrector retaining ring.
3. Pencil an index mark on the inside of the tube showing the location of the corrector serial number. (When reassembling the telescope, the corrector lens MUST be replaced in exactly the same orientation.)
4. Locate the cork shims between the corrector lens and the front cell ledge. Pencil index marks on the inside of the tube showing the location of each.
5. Remove and number code each shim so it may be returned later to the same position.
6. Grasp the secondary mirror cell and lift the Schmidt corrector lens out of the tube.

Since the secondary mirror is mounted in the aluminum cell in the center of the corrector, it will also be removed by this procedure. If necessary, the secondary mirror may be removed by unscrewing the center screw on the front of the secondary mirror cell. When the secondary mirror is remounted, the index line on the back of the mirror must be pointing to the center of the code number etched on the corrector lens.

When replacing the corrector, align its code number with the index mark you made on the tube and return each shim to its proper position. After replacing the corrector lens and corrector retainer, tighten the screws down gradually, in round-robin fashion. The screws should be just tight enough to keep the corrector from moving whenever the telescope is repositioned. CAUTION: Too much tightening may cause the corrector lens to crack.

continued on page 3

Optics

continued from page 2

If it is necessary to remove the primary mirror for any reason, first remove the corrector plate as described above and then take the following steps:

1. Remove the snap ring from the end of the baffle tube.
2. Tilt the telescope upward and remove the focus knob from the back of the telescope by loosening its small set screw.
3. Remove the focus lock screw and washer located inside the brass focusing mechanism.
4. Remove the black focus housing from the rear cell by unscrewing the three screws.
5. Unscrew the brass focusing mechanism from the focus lead screw protruding from the the rear cell. CAUTION: The primary mirror is now free to slide off the baffle tube.
6. Reach inside the telescope tube, grasp the tube that the primary mirror is mounted on, and gently lift the mirror assembly out of the tube.

The mirror may be reinstalled by following the preceding steps in reverse order. The primary mirror will automatically be properly oriented when the focusing mechanism is reinstalled. After the primary mirror and the Schmidt corrector plate have been reinstalled, it will be necessary to collimate the telescope. Following the collimation instructions included in the telescope operating manual or follow the instructions given in last month's Ephemeris

NOTICE ! ! !

If you are reading this, it says that you have received your Ephemeris. Hopefully in good condition and on time. Now **please take note** of your mailing label. There, you should find the expiration date of your membership. Please Renew in a timely manner, so you will continue to receive your *Ephemeris*.

Directions to the San Jose Astronomical Association's star parties.

by Rich Neuschaefer

Note: When you go to a star party you may want to bring a flashlight with a red piece of paper or plastic taped to the lens so that you can see where you're walking without blinding anyone.

If you wish, you can buy flashlight with a red filter, or one with a high tech, ultra bright, variable, red LED. You can get either type from Orion Telescope Center.

HENRY COE STATE PARK

Take Hwy. 101 South towards Gilroy to the East Dunne Avenue exit. Continue East towards the hills (around and past Anderson Reservoir), or about 12 miles to the park. Past the park entrance, you will see a horse trough on your left with a gate immediately following. Stop there. If you reach the old ranch-type buildings ahead, you have gone too far. The gate is locked, just park outside the gate, hike in (about 50 yards) and someone from the SJAA can help you. The observing site is small, dusty and there are no restroom facilities.

HOUGE PARK

This is the location for the SJAA's Friday, in town, star party. Our Houge Park star party is usually held on the Friday closest to the 1st quarter Moon. It's fun, but not a very dark observing site.

1. From Hwy 17, take Camden Ave. east aprox. 1/2 mi to Bascom Ave.,
2. turn right (south) on Bascom Ave. until the 1st light, Woodard Ave.,
3. turn left (east) on Woodard Ave for two blocks and you will come to Twilight Ave.
4. Turn left (south) on Twilight Drive to get to the entrance - about three blocks and just past Sunset Ave.

Telescopes can be set up on the grass next to the parking lot. Restrooms are available.

GRANT RANCH COUNTY PARK

Take the Alum Rock Avenue exit off Hwy. 680 North. Go approxmiately 3 miles to Mt. Hamilton Road, (Hwy 130) and turn right. Drive for 8 miles to the park entrance (it takes about 30 minutes). The entrance is on the right, and after dark, the gates are closed. The SJAA as well as the Halls Valley Astronomical Group, set up telescopes in the main South parking lot adjacent to the public restrooms. This is a moderately dark observing site.

FREMONT PEAK STATE PARK

Located 70 miles south of San Jose, near the town of San Juan Bautista. Take Hwy 101 South towards Salinas. Then take Hwy 156 East (San Juan Bautista exit) for 2 miles to a yellow flashing light. Turn right and go about 1/4 mile to where the road reaches a "Y". Stay left for about 25 yards and then go right. Watch closely for the BROWN Fremont Peak signs. Follow the canyon road for about 11 miles up and into the park. The SJAA sets up either in the Coulter Camp area or the vista parking lot. They're visible on your right as you drive into the main area of the park. Please don't turn left, up the observatory road.

Expect to find lots of astronomical activity here every clear New Moon weekend. Arrive early if you are setting up equipment. During Summer months it's not uncommon to find 40 to 80 telescopes set up. Bring a RED filtered flash light. Restrooms are available. The park use fee for observing is $3.00. If you want to use a camp sight with a cooking area the fee is $7.00. Note: fees are subject to change.

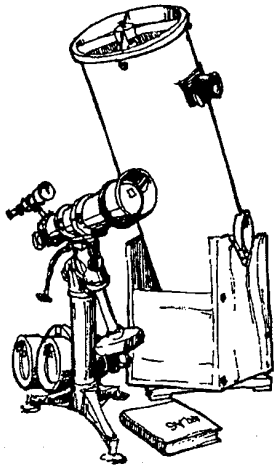
There is an observatory at Fremont Peak State Park that houses a 30 inch reflecting telescope. It's often open to the public on Saturday nights near a new moon. It's an easy walk from the Coulter area.

Fremont Peak is a great place for observing. The sky is often very dark. In the summer the fog usually covers the lights in the valleys below. Also, the seeing is often good for high mag. viewing.

1994 SJAA Calendar

General Meeting		Houge Park Star Party	Observational Astronomy Class
June	25	17	18
July	23	15	16
Aug	27	15	16
Sept	24	9	17
Oct	22	14	15
Nov	19	11	no meeting
Dec	17	9	no meeting

Please read your *Ephemeris* each month for changes



Telescope Loaner Status

by Paul Barton

SJAA no.		Name	User	Due
1	4-1/2"	Newt/P mou	---------->	available
2	6"	Dobson	Rick Raw	5/22/94
3	4"	Quantum	Jason Sun	ON HOLD
6	C-8	Celestron	Ben Lee	5/24/94
7	12-1/2"	Dobson	Tom Rice	Indefinite
8	14"	Dobson	David Smith	5/29/94
9	C-11	Celestron	Paul Barton	********
14	6"	Newt/P mount	John Schoenenberger	6/26/94
15	8"	Dobson	Lee Courtney	5/27/94
18	8"	Newt/P Mount	Ken St George	5/20/94
19	6"	Newt/P Mount	---------->	available
20	4-1/4"	Dobson	Kristen Smith	5/29/94
21	10"	Dobson	Jim Marquis	5/15/94

Solar telescope (#16). Available only to experienced members for special occasions such as day time public star parties, etc. Call.

(on waiting list)

Albert Chen - #6 Alex Calderon - #21

John Schoenenberger - #15

If you want to borrow a telescope call Paul Barton (number is on the credit Marquee) and get your name on a general list (any telescope) or on a specific telescope list.

ASTRO ADS

ASTRO ADS are free to all noncommercial advertisers wishing to sell astronomically related products or services. Please send your ad directly to the Editor:

Bob Madden
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1 Teleview 19 mm wf
1 Teleview 15 mm wf
best reasonable offer. Call:
Rich Neuschaefer
work (408)-285-0730
home (408)-446-0975 4/94

Celestron SP-C8 (black Tube), Star bright coatings, 3 years old, nice images. Super Polaris GE mount (improved), motor drives RA and DEC, Celestron 8X50 convertable finder (illuminated). Also comes with: 1.25" and 2" visual backs, Celestron 26 mm pl eyepiece, 1.25 star diag., mounting bracket, hand controls, and footlocker case. $925
Rich Neuschaefer
work (408)-285-0730
home (408)-446-0975 4/94

The lost eyepiece belonging to the C-8 has been replaced by Stan Stanley at a cost to him of $50. It is not known where the eyepiece was lost, but Stan has been graceous enough to replace it. Thank you Stan.

This demonstrates the importance of care of the loaner equipment entrusted to you.

Eyepieces

by Joe Dellinger
Hawaii Institute of Geophysics
Honolulu

I did some side-by-side tests of various Televue eyepieces before and after buying a set. My comments after that experience:

1) The Naglers have a nice _wide_field, which is really useful if you don't have a clock drive. However, they definitely transmit less light than Plossls. Dim objects can lose a lot because of this. For dim objects, consider getting a lower-power Plossl with an equivalent field of view instead. If you have a light bucket, however, the Nagler's slight dimness may not be a problem. (It's also less of a problem for bright objects like planets.) Naglers also cost a lot more so you can't buy as complete a set for the same bucks.

2) The Plossls don't have as wide a field of view, but they're relatively cheap and you can get a complete set of them without busting the bank (or being overly paranoid about leaving one on the roof of your car for a minute while you rearrange things). The plossls will display some distortion at the edge of the field of view at lower powers if your telescope has a short focal length. Keep in mind, though, that if you want to use your short focal length scope for higher powers you can just put a Barlow on the end of the scope and effectively double or triple the focal length. Then even the lower power Plossls will work fine. You may require a little practice before you're able to use plossls comfortably in the dark; if you don't get your eye in quite the right position you may see only blackness or a piece of the image may be missing. Televue plossls are better about this than their competition.

3) For really nice BRIGHT low powers the Panoptics are WONDERFUL. The 35mm Panoptic, though, only comes in the 2" barrel size, is expensive, and weighs a ton. It's one of those eyepieces that you will constantly fear dropping or having fall out of the end of the scope in an accident, say when someone loosens the screw that holds the eyepieces in thinking its the focus knob. I've also found that the Panoptic won't focus within the range of focuser travel on some scopes. (You'll also have to do massive refocusing after switching from the Panoptic to something else, say a Plossl.) Some Barlows won't work well with them, either. But for awesome views at the low-power limit of your scope I don't think you can beat the 35mm Panoptic! It's my favorite low-power eyepiece. (Just keep a close watch on it!)

4) Keep in mind eye relief and exit pupil size when looking at eyepieces. Ask yourself why Televue stops at the 7mm Plossl as the highest power... it's because the eye relief would be intolerable for anything shorter. The Naglers are somewhat better, but the 4.8mm requires that your eye be up pretty close (my eyelashes sometimes touch the lens and leave smudges on it, which is annoying). The Panoptics are the best for long eye relief. Also remember you can use Barlows to get higher powers with good eye relief.

Exit pupil size sets a lower limit on the overall power you can use your scope at. If the exit pupil size gets larger than your eye's pupil size, lower powers won't be any brighter.

5) Always remember you can put the Barlow on EITHER side of the eyepiece: between the eyepiece and your eye or between the eyepiece and the telescope. You may find that only one or the other is within the range of focus for your scope. You'll get a higher power multiplication if the barlow is between the eyepiece and the scope, so be sure to take that into account if you plan on using the barlow to fill the holes in your power selections.

6) If you can, find someone who has one of the eyepieces of the same type as what you're going to buy and try it with your scope. It may turn out that it just doesn't fit yours... for example the 'fits both 2-inch and 1 1/4-inch' Naglers don't work very well with my Traveler refractor at the 1 1/4-inch size. They assume the eyepiece mount is a thin cylinder projecting out from the scope, not a cylindrical hole going in. As a result I can only insert the eyepiece part ways. I can always use it fine in the 2" mode, but then I can't quickly switch to the 1 1/4 inch Plossls and it's also nowhere near parfocal with the others as it would be if I could stick it all the way in.

7) Beware cheap aluminum tightening screws threaded into aluminum eyepiece bodies. They're very easy to crossthread and strip! Replace the cheap aluminum screw with a decent steel one, and be VERY CAREFUL with it so you don't damage the weak aluminum threads on the body.

Houge Park Star party

by Paul Barton

Friday the 13th of May at Houge Park was exceptionally successful. After many nights spoiled by inclement weather, we had a fine, clear, warm evening and a tiny sliver of a moon. It was enough to show, but not enough to "spoil" the rest of the sky. There also was no wind, no sprinklers and no dew. There were lots'a people, perhaps 100 or so. Set up were about 15 telescopes and no two were alike.

We observed Jupiter and it's moons in the east, the moon itself occulted a 5th magnitude star, various star clusters, M-3, M-13, M-44, a galaxy M-51 directly overhead was visible in the association's C-11. Those in attendence from the SJAA were:

Paul Barton	Bob Brauer
Jim Van Nuland	Mark Wagner
Jim Bartolini	Crazy Ed
Terry Kahl	Paul Graves
Rich Neuschaefer	Bob Madden
Bill O'Shaughnessy	Chuck Carlina
Dean Linebarger	Garry Pappani

The C-11, repaired by Pat Van Nuland, performed exceptionally well. We still need a "keeper" for this telescope who will bring it to most of the various, school and public, star parties. Its a very good telescope. The C-11 was purchased to be put in a permanent observatory. Halley Hill at Grant Ranch County Park was in mind at that time. Jack Petersen cared for it very well for several years before he was married. Now family responsibilities come first (of course!).

Comet Comments

by Don Machholtz

Many comets are visible in our skies with two bright ones found.

Periodic Comet Russell 2 (1994e): Recovered by J. Scotti of Kitt Peak on April 5, it will remain faint. The orbital period is 7.4 years.

Comet Takamizawa-Levy (1994f): Kesao Takamizawa of Japan photographed this comet in the morning sky at magnitude ten, David Levy of Tucson, Arizona picked it up visually a few hours later. Perihelion was May 22 at 1.35 AU.

Periodic comet Maury (1994g): J. Scotti recovered this comet on May 1 at magnitude 18. It has a 6.7 year orbit and will not brighten much.

Comet Takamizawa (1994i): Takamizawa picked up this one near opposition. It will be closest to the sun on July 8 at 1.88 AU.

EPHEMERIDES

COMET TAKAMIZAWA-LEVY (1994f)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	19h39.3m	+57d04'	90d	M	8.8
05-28	18h30.4m	+65d24'	90d	M	8.9
06-02	16h42.4m	+69d57'	88d	M	9.0
06-07	14h48.3m	+69d16'	85d	E	9.1
06-12	13h30.9m	+65d20'	81d	E	9.4
06-17	12h46.3m	+60d33'	77d	E	9.6
06-22	12h19.9m	+55d59'	73d	E	9.9
06-27	12h03.4m	+51d55'	69d	E	10.2
07-02	11h52.7m	+48d23'	65d	E	10.4
07-07	11h45.5m	+45d19'	61d	E	10.7

PERIODIC COMET SHOEMAKER-LEVY (1993e)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	14h14.4m	-13d31'	154d	E	13.6
05-28	14h12.8m	-13d19'	149d	E	13.6
06-02	14h11.4m	-13d08'	144d	E	13.6
06-07	14h10.3m	-12d57'	139d	E	13.6
06-12	14h09.4m	-12d49'	134d	E	13.6
06-17	14h08.8m	-12d41'	129d	E	13.7
06-22	14h08.6m	-12d35'	124d	E	13.7
06-27	14h08.6m	-12d30'	119d	E	13.7
07-02	14h09.0m	-12d26'	114d	E	13.7
07-07	14h09.6m	-12d24'	110d	E	13.7

PERIODIC COMET TEMPEL 1

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	12h57.6m	+05d40'	128d	E	9.0
05-28	12h59.0m	+04d00'	125d	E	8.9
06-02	13h01.7m	+02d15'	122d	E	8.9
06-07	13h05.3m	+00d23'	119d	E	8.9
06-12	13h10.1m	-01d32'	116d	E	8.9
06-17	13h15.8m	-03d30'	113d	E	8.9
06-22	13h22.5m	-05d31'	111d	E	8.9
06-27	13h30.0m	-07d32'	108d	E	8.9
07-02	13h38.4m	-09d33'	106d	E	9.0
07-07	13h47.6m	-11d33'	104d	E	9.1

COMET McNAUGHT-RUSSELL (1993V)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	12h31.6m	+74d37'	79d	E	9.5
05-28	13h09.0m	+72d43'	81d	E	9.9
06-02	13h37.0m	+70d36'	82d	E	10.2
06-07	13h58.6m	+68d22'	83d	E	10.5
06-12	14h15.9m	+66d03'	84d	E	10.8
06-17	14h30.2m	+63d44'	85d	E	11.1
06-22	14h42.4m	+61d23'	86d	E	11.4
06-27	14h53.1m	+59d02'	87d	E	11.7
07-02	15h02.8m	+56d43'	88d	E	11.9
07-07	15h11.7m	+54d24'	88d	E	12.2

COMET MUELLER (1993a)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	23h10.7m	-11d31'	78d	M	10.5
05-28	23h10.3m	-13d14'	83d	M	10.5
06-02	23h09.3m	-15d06'	89d	M	10.5
06-07	23h07.6m	-17d09'	95d	M	10.5
06-12	23h05.0m	-19d21'	101d	M	10.5
06-17	23h01.6m	-21d44'	107d	M	10.5
06-22	22h57.1m	-24d17'	113d	M	10.5
06-27	22h51.4m	-26d59'	120d	M	10.5
07-02	22h44.8m	-29d47'	126d	M	10.6
07-07	22h36.7m	-32d40'	132d	M	10.6

COMET MUELLER (1993p)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	08h43.2m	-28d46'	85d	E	7.9
05-28	09h10.8m	-23d31'	84d	E	8.3
06-02	09h33.1m	-18d58'	82d	E	8.7
06-07	09h51.5m	-15d09'	81d	E	9.0
06-12	10h07.1m	-11d59'	78d	E	9.4
06-17	10h20.6m	-09d22'	76d	E	9.7
06-22	10h32.4m	-07d13'	73d	E	10.1
06-27	10h43.1m	-05269'	70d	E	10.4
07-02	10h52.8m	-03d57'	67d	E	10.7
07-07	11h01.8m	-02d43'	63d	E	11.0

COMET TAKAMIZAWA (1994i)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
05-23	15h19.8m	-08d44'	165d	M	9.9
05-28	14h43.2m	-09d54'	154d	M	9.9
06-02	14h09.0m	-10d51'	142d	M	10.0
06-07	13h38.9m	-11d34'	131d	M	10.1
06-12	13h13.3m	-12d08'	121d	M	10.2
06-17	12h52.2m	-12d34'	111d	M	10.3
06-22	12h35.2m	-12d57'	103d	M	10.5
06-27	12h21.4m	-13d19'	95d	M	10.7
07-02	12h10.4m	-13d40'	88d	M	10.8
07-07	12h01.6m	-14d02'	82d	M	11.0

CELESTIAL CALENDAR

June 1994

LunarPhases	Date	Rise	Tran	Set
NM 01:27hr	09-6	0609	1332	2054
FQ 12:57hr	16-6	1312	1917	0041
FM 04:34hr	23-6	2049	0101	0608
LQ 12:31hr	30-6	0024	0650	1323

Nearer Planets

Mercury	07-6	0715	1436	2157
0.575 AU	17-6	0646	1356	2106
Mag 0.00	27-6	0551	1254	1957
Venus	07-6	0814	1537	2259
1.200 AU	17-6	0833	1547	2301
Mag -4.40	27-6	0853	1555	2258
Mars	07-6	0350	1039	1729
2.075 AU	17-6	0332	1029	1726
Mag 0.90	27-6	0411	1019	1723
Jupiter	07-6	1652	2217	0346
4.730 AU	17-6	1610	2136	0305
Mag -2.30	27-6	1530	2055	0225
Saturn	07-6	0125	0702	1238
9.440 AU	17-6	0046	0623	1200
Mag 0.900	27-6	0007	0544	1120

SOL Star Type G2 V Mag - 26.72

RA	DEC				
0502	2247	07-6	0546	1306	2027
0544	2323	17-6	0545	1309	2032
0627	2317	27-6	0548	1311	2033

Astronomical Twilight		Dawn	Dusk
JD 2,449,510.5	07-6	0355 -	2219
,520.5	17-6	0353 -	2224
,530.5	27-6	0355 -	2226

Sidereal Time

Transit Right	07-6	0000	PDT=1557
Ascention at	17-6	0000	PDT=1636
Local Midnight	27-6	0000	PDT=1716

Darkest	**Saturday Night June 11**
Sunset	2029
Twilight End	2221
Moon Set	2221
Dawn next morning	0353

TIMES AND DATES ARE PACIFIC DAYLIGHT

Times are Local Civil

Planet distance and Magnitude for 17th of month

Derivation of these values are from

Astronomy with Your Personal Computer

by Peter Duffet-Smith

MacEphem

by Elwood Charles Downey

Archeo-Astronomy

Speaker: Dr. Jeff Buell

Peninsula Astronomical Society

Jeff had traveled to a number of the early dwelling sites in the southwest U.S. He was not simply a tourist, but rather on an organized archeo- and astronomical tour, led by a professional archeologist. They sought astronomical connections — building orientations, sight alignments, Sunbeam - target arrangements, and the like. Sites included Chimney Rock, Chaco and Crow Canyon, Hovenweep and Mesa Verde National Monuments, and others.

The early settlers are called the "Anasazi", which, however, is simply the Navaho word meaning "ancient ones". The Anasazi built increasingly elaborate stone buildings, many of them set into large natural cavities in cliff walls. The overhanging rock provided protection from heavy weather, and the cliff location made it very difficult to attack. But the general agreement is that these were mostly peaceful peoples, as there is little or no weaponry found.

On the open areas were built houses, and towers, both round and square, some of four stories. These are straight, well-built structures. The Anasazi also built irrigation systems, but eventually were driven out, probably by an extended period of drought, but possibly also by over-population as they used up the available trees and other building material.

Jeff found potsherds from the four styles that were used in the area; two were common, utilitarian vessels, and the other were carefully made and used in ceremonies. When the Anasazi left and moved to the Rio Grande area, they took along the two common forms, but no longer made the cermonial ones! Did they also abandon their religious culture?

There are many circular structures, set into the ground and capped by a log roof. The present-day people use these "kivas" as ceremonial chambers and also as meeting rooms. Kivas were obviously very important to the Anasazi, as even a small detached house of 2 or 3 rooms was also equipped with a kiva.

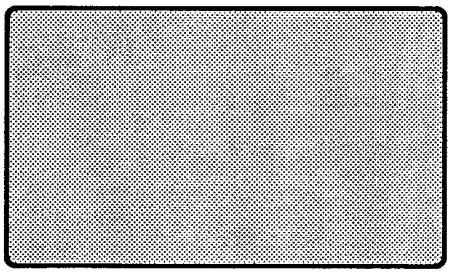
Jeff reported that many of the kivas have a north/south alignment of the internal features, that in some locations, especially cliff-sides, had been built with the usual alignment, but had later been modified. There are many sight lines — a window that oversees a distant feature, such as a vertical rock, aligned so as to match the sunrise on important events such as equinoxes and solstices. Since the Anasazi were farmers with a short growing season, it was important that they have a good calendar, or the crops would be frozen either after planting or before maturity and harvest.

The azimuth of sunrise varies through the year and the extremes in azimuth are very nearly the same from year to year (at any latitude). But for the Moon the story is very different. The Moon's orbit is inclined to the Earth's equator by 5.1 degrees, and the orbit processes in just 18.6 years. So the azimuth of moonrise is more extreme, because the total inclination to the ecliptic ranges from 18.4 to 28.6 degrees, over an 18.6 year cycle. These extreme values are called "standstills".

The Anasazi may have placed much importance on the Moon, as there were many alignments with these extremes in moonrise azimuth, both the the maxima (major standstills) as well as with the minima (minor standstills). Jeff showed a photo of a series of lines with tic-marks, that may have been a record of the 18.6 year cycle!

Jeff's talk was very well illustrated. His first night was interrupted by ongoing severe thunderstorms, so he took a series of one and two minute exposures, capturing some spectacular lightning!

An excellent talk. Thank you, Jeff.



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THE UPCOMING COLLISION OF PERIODIC COMET SHOEMAKER-LEVY 9 WITH JUPITER

For five days in July, fragments of a comet discovered in March 1993 will collide with the planet Jupiter. It is not the first time that a comet has hit another Solar System object, but it is the first time that such a meeting has been predicted and then observed.

The comet was probably very normal until it passed about 16,000 miles from the cloud tops of Jupiter on July 7, 1992. This placed it in orbit around Jupiter, it also fragmented it into several pieces. At discovery nine months later, it appeared as a "string of pearls". Even now, the comet is continuing to evolve, some of the pieces have further divided, others have disappeared.

It is presently unknown what effect these fragments will have on the planet Jupiter. They will hit the planet, which is ten times larger than Earth, at 37 miles per second. But the pieces are rather small, no larger than 3 miles in diameter and may be similar to lightly-packed snowballs.

Jupiter will be situated high in the south at evening twilight, setting around midnight local time. Observers are encouraged to watch Jupiter, even during daylight, at the times of collision and for the hours afterwards. The comet will approach from the south, and hit Jupiter at about -44 degrees (south) latitude (for comparison the Red Spot is at -20 degrees). The impact points will not be visible from Earth, they will be just beyond the rising edge. Matters are complicated by our own moon, which will be in First Quarter phase and three degrees south of the planet when this all begins. It will move away from Jupiter, but brighten, during these days.

Below are the collision times for the comet fragments. They are current as of June 8. The times listed here are accurate to within about 20 minutes. Next month I'll mail out the latest predicted times, editors should receive them by July 12, perhaps too late for widespread distribution.

NUCLEUS NUMBER	IDENTITY LETTER	COLLISION TIME UNIVERSAL TIME Mo. Day	HHMM	P.D.T. Mo. Day	HHMM	COLLISION POSITION ON MERIDIAN (PDT) Mo. Day	HHMM
21	A	July 16.83	1955	July 16	1255	July 16	1548
20	B	July 17.13	0307	July 16	2007	July 16	2259
19	C	July 17.29	0658	July 16	2358	July 17	0250
18	D	July 17.47	1117	July 17	0417	July 17	0708
17	E	July 17.65	1536	July 17	0836	July 17	1128
16	F	July 18.03	0043	July 17	1743	July 17	2036
15	G	July 18.33	0755	July 18	0055	July 18	0345
14	H	July 18.82	1941	July 18	1241	July 18	1531
12	K	July 19.44	1034	July 19	0334	July 19	0622
11	L	July 19.94	2234	July 19	1534	July 19	1822
9	N	July 20.43	1019	July 20	0319	July 20	0609
8	P	July 20.64	1522	July 20	0822	July 20	1112
7	Q	July 20.84	2010	July 20	1310	July 20	1558
6	R	July 21.25	0600	July 20	2300	July 21	0145
5	S	July 21.66	1550	July 21	0850	July 21	1135
4	T	July 21.76	1814	July 21	1114	July 21	1358
2	V	July 22.17	0405	July 21	2105	July 21	2348
1	W	July 22.36	0838	July 22	0138	July 22	0420

CC191.TXT

Don Machholz (916) 346-8963

Please delete my recent article on this subject and replace it with this one. In the previous article some of the times are incorrect by several hours - sorry. Anyway, please replace it with this article. Editors on the East Coast will also find EDT times replacing PDT times.

Don Machholz