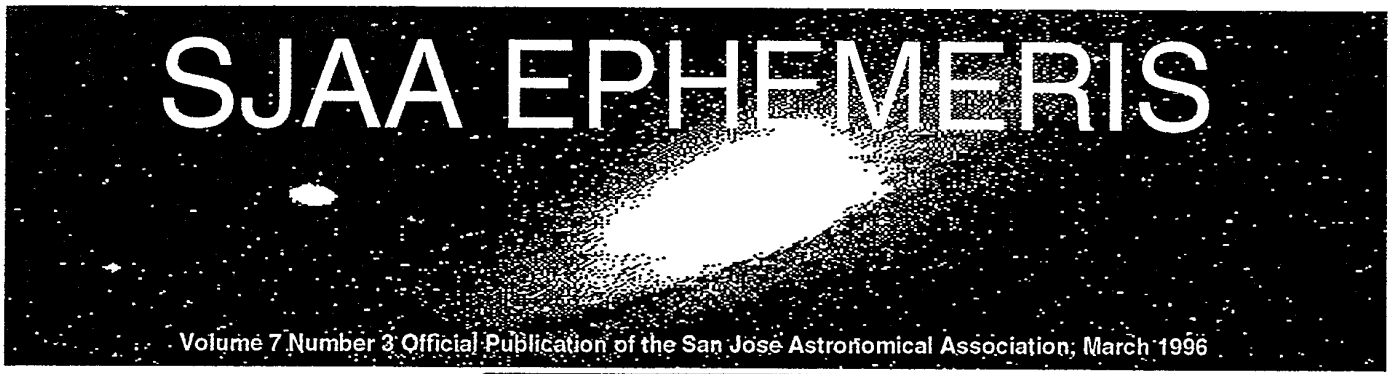


Eye on the Universe
by Lew Kurtz

The annual **election** for Board of Directors was held during the February general meeting. The 35 voting members elected Bob Brauer, Rich Neuschaefer, Bob Madden and Mark Wagner. Dean Linebarger was the other member running for a board seat. Club officers will be elected at the March Board meeting. On page 4 is a picture of the Motley Crew.

The 16th Annual Bay Area Astronomical **Auction and Swap Meet** will be on May 4 at Houge Park. Doors open at 12:00 noon for set up. Swap meet also starts at 12:00 noon. Auction starts at 4:00 pm. 10% commission goes to SJAA. Having heard the cries that 10% is too much on expensive items, SJAA's board has limited the maximum commission to $50 per item. So, if that scope sells for $700 or $7000, commision is $50. Page 7 has a map to Houge park and an Auction Registration form. Please use it.

The Astronomical Society of the Pacific's Universe '96 will be held in Santa Clara this year. Contact Bob Havlen or Lonny Baker at 415-337-1100, rhavlen@stars.sfsu.edu or lbaker@stars.sfsu.edu for more info.

The AANC is holding a one day long Deep Sky Observing Workshop on Saturday, March 23, 1996 at Lawrence Hall of Science, UC Berkeley. Contact Don Stone, DSO workshop Registrar, 4917 Mountain Blvd., Oakland, CA, 94610-3014 for details (sorry I don't have a phone number). Registration prior to March 13 is $20. $25 at the door.

Telescope Loaner Program Status, Astro Ads, and Celestial Calendar have been moved to page 5 this month.

SJAA Hotline: **408-559-1221**
24 hour News and Information

Mar 2: General meeting at Houge Park, 8:00 pm. Ernie Piini and the October 95 Eclipse over India. Board meeting, 6:30 pm is open to all members. Officer elections at this Board meeting.
Mar 9: No activity, too much Moon.
Mar 16: Star party at Henry Coe and Fremont Peak state parks. Sun sets 6:15 pm, 5% Moon rises 4:58 am. Messier Marathon anyone?
Mar 22: Star party at Houge Park, 7:00 pm. Sun sets6:22 pm, 15% Moon sets 10:04 pm.
Mar 23: Beginner's All-Purpose Astronomy Class at Houge Park, 7:00 pm. Open to all.
Apr 6: General meeting at Houge Park, 8:00. Craig Wandke will be talking about the Moon. Board meeting, 6:30 pm is open to all members.
Apr 7: Daylight Savings time begins, until Oct. 27.
Apr 13: Star party at Fremont Peak state park. Sun sets 7:39 pm, 14% Moon rises 4:33 am.
Apr 17: Partial Solar eclipse, Antarctica (I expect a lot of trip reports on this one! - Ed.)
Apr 20: Star party at Henry Coe state park. Halls Valley Astronomical Group at Grant Ranch. Sun sets 7:46 pm, 11% Moon sets 10:41 pm.
Apr 26: Houge park star party. Sun sets 7:53 pm, 62% Moon sets 2:55 am.
Apr 27: Beginner's All-Purpose Astronomy Class, Houge Park, 8 pm.
May 4: Swap Meet and Auction at Houge Park, 12:00 pm.

What to Expect for Comet C/1996 B2 Hyakutake
By Charles Morris

IAU Circular 6299 (January 31, 1996) reported the visual discovery of a comet by Yuji Hyakutake (Hayato-machi, Aira-gun, Kagoshima-ken, Japan) using 25x150 binoculars. At discovery, the comet was about 10th magnitude, 4' in diameter and moderately condensed.

What to expect...

The following is based on a review of Comets 1P/Halley, C/1990 K1 (Levy) = 1990c, and C/1983 H1 (IRAS-Araki-Alcock) as they approached 1 AU. Trying to forecast what a comet will do is always dangerous. Hopefully if I err, the comet will be better than expected.

The orbit for this comet (MPEC C06, February 10, 1996) indicates that it may become a very bright object in March, April, and May of this year. The perihelion distance of this comet is only 0.23 AU. Perihelion will occur on May 1. However, the comet will also make a close approach to Earth (0.10 AU) on March 25. The Northern Hemisphere is favored preperhelion, particularly in late March when the comet will be circumpolar, reaching +80 degrees. The comet may be 1st magnitude at that time! However, the comet will be quite large. A coma size of more than half a degree in diameter is almost certain and a degree or more is possible (particularly if the comet has a faint outer coma). Thus, the comet will most likely look like a moderately condensed or very condensed fuzzball to the naked eye (remember IRAS-Araki-Alcock in 1983? - similar, but much more condensed than I-A-A). During this time, the comet will

continued on page 4, see **Hyakutake**

Observing Report 1/13/96
Mark Wagner

Saturday morning found the skies in the San Francisco south bay area to be above a thick layer of fog. The ceiling was 600 feet, but by noon was thinning to the point where I could tell there were no clouds above the fog. My local newspaper forecast showed contradicting reports. The graphic showed starry night skies, the state forecast said cloudy for our area, and the local "micro-climate" report said fog. So, I decide to trust the National Weather Service's home page (accessible from SJAA's web-page: http://www.rahul.net/resource/sjaa), which forecast clear skies over low fog, with clouds increasing Sunday.

The drive to Fremont Peak was easy. I had Rich Neuschaefer along in the truck, and by 4:30 PM we pulled in to the observing area. Doug Ferrell was already there setting up a 10" f/4.5, and John Kuklewicz an 18" f/4.5 dob. Noticing a 6" f/7 Astro-Physics refractor on a Parsec mount, we knew that bay area astrophotographer John Gleason was also around somewhere.

I set up the 14.5" f5.6 Crazy Ed built dob, and Rich brought out a nice 4"Takahashi on a Gibraltar mount.

Although I am not a "newbie" to observing, compared to some of the celestial Methuselahs on the net and in my club, I am. Having completed the Messier list last in 1994, I began working the Herschel 400, using an unofficial list generated on Dean William's great freeware program NGP. I still don't know what possessed me, but halfway through last summer, I combined all eight Herschel lists included in NGP, sorted them first by constellation and then in order of descending magnitude. That was it... I decided to do the whole Herschel list (if the 2300-2400 objects actually do comprise the *complete* list). This project will certainly take a couple years....

Several of our regular group did not come, as the observing conditions had been poor for over a month (significant dewing problems or just to many clouds). This night was truely a case of "if you don't go, you don't know .. as this particular night would make up for all recent disappointments.

Once dark enough to see, I found that Pisces and Cetus were dropping quickly into the western twilight. I was so disoriented by the changed position of the constellations since my last night out, and the very dark sky, that I could not find (blush) M31. My Hershel hunt was to begin by star hopping to the galaxies clusters between Mirach and M31. I had to sit back in a chair and *study* the sky to realize the great square of Pegasus had turned over since my last good night out. But... once I saw that, it was easy pickings!

The conditions could not have been better. At astronomical dark, the temperature had dropped to only 53 degrees. In November, we were in the 30's (brrrrrr) at sunset. I doubt we dropped below 45 degrees all night. There was only an occasional mild breeze, otherwise the atmosphere was completely motionless. There was no dew... it was BONE DRY! Stars such as Sirius showed virtually no twinkle. The cities of Hollister, Salinas, Watsonville, Santa Cruz all muted out below a fog layer that increased as the night wore on. Even the light dome of San Jose, some 50 or so miles north, was gone by 9 p.m.

Pisces and Cetus soon began dropping out of sight, so it was time to move to the Winter Herschels. On to Orion, Taurus and Lepus, and if time permitted, Gemini and Camelopardalis. In the 14.5" inch, galaxies down to mag 14 were no problem. NGC 1678 in Orion is shown on the NGP as mag 14.5, which was just at my visual limit in those conditions.

All in all, I bagged 28 Hershels, and did not really work hard to do so. The excellent seeing conditions made it fairly routine. But, by midnight, my back was getting a bit tired of bending over my table to look atm charts, so it was time to view the "I know where it is" big spectacular objects.

If you ever do a Hershel hunt, make sure to finish the evening on the Messiers. What a treat! They were so much easier to find and view that the "is it really there" stuff that the Hershey's. My favorites on Saturday were M51 (of course) and M64/M65. I think 64 and 65 are two of the most beautiful pairs in the sky. Their size and PA are nearly identical, and on any kind of reasonable evening, a third, slightly larger galaxy (NGC3268) becomes obvious at a PA perpendicular to the Messiers. M51 ha d fine detail in the spiral arms, and the "bridge" was visible.

For me, the real highlight of the evening came when John Gleason called me over... "Mark... look at this..."... as I approached his scope, I saw that his Zeiss bino-viewers were installed. I knew there was going to be quite a sight in there, but was not prepared for what I saw.

Across the field lay the bright cup of M42, with six pinpoint stars in the Trapezium. In the field around the Trap were other tiny pinpoints. The Nebula itself had a distinct green tint to it. Viewing it with both eyes added an apparent depth of field I could not rival in the 14.5" dob. There is certainly something to be said for quality equipment! SJAA member Terry Kahl who arrived after dark commented to Gleason that it looked like what she saw in her 8" Orion dob (sure, Terry), but then noted that she felt that with the bino-viewers it looked like she could reach around the backside of the nebula. This was easily the sight of the night.

Before packing up, I called Rich over to look through the 14.5 at the Burning Bush off of Zeta (no relation to Nancy) Orionis. The Bush was gorgeous, glowing like a bright leaf off the star. Rich nudged the scope and said "wait a minute." Back he came with a Lumicon UHC filter. On it went and, looking through the eyepiece, there was the Horsehead... not the most distinct I've seen it, but sure not bad for a UHC with Orion getting low in the west.

I finished off the night with M42 (ever see the little galaxy NGC1924 just west of it?), M35, NGC4565, M3, M53, The Black Eye Galaxy (is that M63?), and other assorted goodies.

The moon rose at 1 a.m. We packed up and drove down the hill toward the fog covered valleys. Till next weekend...

Where Was Everybody? Star Party at Henry Coe, January 13, 1996

by Gary Mitchell

I was finally able to talk my mother into coming with me to a "real" star party (at a dark site) to see what we do and try out many telescopes. It was fairly warm for this time of year and fog was forecast for the valley (which greatly reduces light from the cities), so of course there would be large turn-out... Right?

We were a little on the late side, it was already dark by the time we arrived; so I was worried that we might have trouble squeezing in at the site. My heart sank at first-- a few telescopes were set up in that wide spot just before the gate. Evidently, the site was full... I pulled up to the gate anyway, just to see.

It was hard to tell in the dark (with no head lights of course), but I couldn't see any cars or telescopes up at the site. I got out and started to walk up to the gate-still I could see nobody up there. One of the people at the gate walked up and asked if we were here for the star party and was this the right place. "Yes to both questions" I said as I strained to see someone up at the site.

"There's nobody up there" the gentleman said. I couldn't believe it and had to walk up there to see for myself... Sure enough, not a soul; not even the water tank that was there before.

It turns out I was the only club member to show up--there were several people who came up to try out a club star party and learn more about the club. Some even wanted to join. Unfortunately, I had nothing regarding the club, not even my Ephemeris. As the only club representative there, the evening was a little embarrassing. I regret not at least getting the names of the folks that were there (more than half a dozen).

On the "bright" side: I had the gate combination, so we all moved up to the site. Fortunately, some of the visitors brought telescopes of their own, so we weren't limited to my C-6. The sky was very dark thanks to fog covering the city--similar to a decent night at Fremont Peak. It was cool, but a single coat was enough (unusual for January). The seeing was great too--very steady. I've only been to Henry Coe one other time when conditions were this good.

Of course, the Orion Nebula was first on the list and certainly did not disappoint. It's too bad there wasn't a large telescope there to really show it off. Various galaxies, globular clusters, star clusters, doubles, etc. made the trip well worth while. The moon became too much around 1:30 AM. After rounding out the observing with a look at some craters, time to go home.

You all missed a really fine evening, especially for a winter month.

Brian Drummand

Benoit Shillings

Clear Skies, Hot Photons, Cool CCDs

by Bill O'Shaughnessy

For February's general meeting we were fortunate to have two experienced astro-photographers talk about their experiences with CCD astro-photography.

Brian Drummond related his experiences with building the Barry CCD Kit. He was impressed with its general ease of assembly and use. The pictures from such an inexpensive camera were amazing.

Benoit Shillings then spoke about his experiences with the CCD Kit and the ST-7 CCD camera. He had tried several enhancements to the Kit and eventually it ended up in a non-working state. Benoit was lucky enough to have an ST-7 appear at his door step one day. He then showed us some very fine photos from this camera. Benoit also gave us a quick overview of his unique image processing programs and tricks.

Its hard to say what was most fascinating about the talks, the technology or the results of its use. I think quite a few of us will be looking into giving the CCD technology a try in the near future.

MGS MARS RELAY FLIGHT TEST

provided by Ron Baalke

The Public May Participate!

(Preliminary Information - 12/14/95)

With the launch of Mars Global Surveyor (MGS) in November of 1996, NASA with begin a decade long exploration of the Red Planet. With the program managed by the Jet Propulsion Laboratory (JPL), NASA plans to launch two spacecraft to Mars every alignment opportunity (approximately every two years). These missions will include a combination of orbiters and landers to explore Mars in a comprehensive and systematic way. To provide data communication capabilities between several of the landed systems to be placed on the surface of Mars and the spacecraft in orbit, many of the orbiters will carry UHF radio relays.

MGS will carry such a relay, called the Mars Relay. The Mars Relay will provide communication support, at first, between several Russian small lander stations on the surface of Mars and the orbiting Mars Global Surveyor. Then future missions planned for launch in 1998 and beyond will also be able to exploit this relay on MGS for surface data return.

During the Mars Global Surveyor Mission, JPL plans to perform a near-Earth test of the Mars Relay. Sometime around 20 to 30 days after launch of MGS in November 1996, JPL will initiate a test of the Relay employing UHF communication equipment on the Earth. Because the Relay operates at frequencies in the 70 cm band, an opportunity exists for student and amateur participation in the near-Earth test of the Mars Relay. Using 70 cm antennas, individuals will be able to listen for a 1.3-watt beacon operating from the spacecraft on 437.1 MHz at a distance of 8 million kilometers (20 times the distance to the Moon) - the ultimate DX!

Stay tuned to the Mars Global Surveyor Home Page for further details on how to participate in the test: http://mgs-www.jpl.nasa.gov/

Hyakutake, continued from page 1

move from the morning into the evening sky.

Prior to its close approach to Earth, the tail of the comet will be significantly foreshortened (apparent length reduced by ~40% assuming the tail is pointing directly away from Sun - an assumption that does not always hold for dust tails). However, as C/1996 B2 passes by Earth, the foreshortening disappears and with the reduced distance, there is a real possibility of a very long tail (tens of degrees). The prime time for this is March 22-March 31. The question is: Will a tail be visible? The tail(s) will be poorly developed compared with the postperihelion time period. The tails, even if significant, will probably be faint. This is particularly true of the gas tail because the eye is much less sensitive to the gas emissions. It is possible that a long faint tail may be spotted with the naked eye or binoculars by experienced observers observing from dark sites (without the Moon). Using Comet Levy as an example, a tail as long as 20 - 40 degrees is possible. (For those of you who think that it is impossible to have such a long, faint tail, I suggest that you read the accounts of 1P/Halley at the end of April 1986. At that time Halley had a very faint 30 degree tail.) The likelihood of a bright tail seems remote at this point. For many observers, particularly those looking from a city, the comet will just be a fuzzball with little or no tail.

As the comet recedes from Earth and approaches Sun, foreshortening of the tail will not be a problem. However, the growth of the tail will be offset by the increasing Earth-comet distance so the tail will rapidly diminish in length in early April. As the comet approaches perihelion, it will become more condensed - that is, it will look more star-like. How spectacular the comet appears will depend on both the brightness of the coma and the amount of dust the comet generates. The human eye is most sensitive to the reflected light from the dust. For a bright tail to be obvious, the comet must produce a lot of dust. Remember P/Halley in 1986? Halley's dust tail was relatively faint and most general observers were disappointed. Within a few days of perihelion, the tail quickly becomes foreshortened (by as much as 60%) as the comet swings around Sun. The tail is likely to be quite short at perihelion. Moon, which will be full at the time of perihelion (although in the opposite part of the sky), will hinder observations.

Postperihelion is totally a Southern Hemisphere event. Tail development will likely reach a maximum a month or so after perihelion. Foreshortening of the tail will become less of a problem by the middle of May. These two effects should result in a rapid lengthening of the tail. At this point, I am not willing to speculate on how long the tail will become during this time period. However, the comet will be more than 1 AU from the Earth so a very long tail seems unlikely. The downside for the Southern Hemisphere observers is that the comet will rapidly fade. It is likely to be lost as a naked eye object in early June.

How bright the comet actually becomes will depend on its rate of brightening. Many observers will remember Comet Austin in 1990, which was suppose to reach 0 magnitude and only made it to 4.5. I believe that the peak brightness will be between magnitude +1 and +2 in late March and -0.5 to 3.0 at perihelion. We will know more by the end of February.

(See the Comet Observation Home Page (http://encke.jpl.nasa.gov), which Charles authors. You can find updates on the comet including images and observations. -Ed)

Ephemerides for C1996 B2 Hyakutake at closest approach to Earth. These Ephemerides are based on data available as of Feb 12. Notice that there is already discrepancy with Don Machholtz's Ephemerides that are dated Feb 2. Expect more revisions as the comet gets closer. (Distances are in AU.)

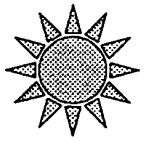
date	RA	Dec	Dist. Earth	Dist. Sun	Mag.
3-20	14h53m	-00°24'	.20	1.15	2.7
3-21	14h52m	+05°01'	.18	1.13	2.3
3-22	14h51m	+12°24'	.15	1.11	1.8
3-23	14h48m	+22°35'	.13	1.09	1.4
3-24	14h44m	+36°23'	.11	1.07	1.0
3-25	14h35m	+53°37'	.10	1.05	0.8
3-26	14h12m	+71°48'	.10	1.03	0.7
3-27	10h41m	+86°07'	.12	1.01	0.9
3-28	04h06m	+78°49'	.14	0.98	1.1
3-29	03h33m	+70°02'	.16	0.96	1.3
3-30	03h22m	+63°32'	.19	0.94	1.6

The new SJAA Board of Directors. sitting (left to right: Ed Erbeck, Bob Madden, Rich Neuschaefer, Jim Van Nuland (secretary); standing (left to right): Lew Kurtz, Bill O'Shaughnessy, Bob Brauer (president), Bob Elsberry (treasurer), Mark Wagner.

Telescope Loaner Status
by Paul Barton

No.	Scope Description	Borrower	Due Date
1	4.5" Newt/P Mount		**available**
3	4" Quantum S/C		**available**
6	8" Celestron S/C	Steve Wincor	3/9/96
7	12.5" Dobson		**available**
8	14" Dobson		**available**
15	8" Dobson	Bob Elsberry	3/9/96
18	8" Newt/P Mount	Jerry Lovelace	3/6/96
19	6" Newt/P Mount		**available**
21	10" Dobson	Rich Navarrete	3/3/96
23	6" Newt/P mount	Shelly McAleese	4/11/96
25	8" Dobson	Bob Ashford	3/26/96
26	11" Dobson		**available**
27	13" Dobson		**available**
28	13" Dobson		**available**

SJAA has 16 reflectors and several small refractors in the Loaner Program.



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San Jose Astronomical Association
5380 Pebbletree Way
San Jose, CA 95111-1846

Members are encouraged to submit articles for publication in the SJAA Ephemeris. Send articles to Lew Kurtz (via e-mail to lewkurtz@aol.com; or a text file on a 3-1/2" diskette, or typed, or hand written to 1336 Bobolink Circle, Sunnyvale, CA, 94087). Articles received by the 10th will be put in the following month's newsletter. Please include your name and phone number.

Celestial Calendar - Mar 1996
by Richard Stanton

Lunar Phase	time	date	rise	trans	set
FM	01:24pst	05	18:45	00:13	06:33
LQ	09:15pst	12	00:54	06:06	11:18
NM	02:47pst	19	06:14	12:33	18:59
FQ	17:30pst	26	11:04	18:18	00:45

Mercury Dist: 0.86AU Mag: -2.0

date	rise	trans	set	RA	Dec
07	05:56	11:18	16:40	22:10.6	-13:32
17	06:00	11:43	17:27	19:28.5	-20:03
27	06:04	12:13	18:24	00:24.0	+01:11

Venus Dist: 1.11AU Mag: -5.1

07	08:15	15:02	21:50	01:55.2	+13:14
17	08:02	15:04	22:07	23:42.0	-02:49
27	07:50	15:06	22:22	03:18.5	+21:16

Mars Dist: 2.35AU Mag: +1.1

07	06:33	12:18	18:02	23:11.8	-06:13
17	06:13	12:07	18:02	21:36.9	-15:22
27	05:52	11:56	18:01	00:09.2	+00:05

Jupiter Dist: 5.99AU Mag: -2.2

07	03:13	08:01	12:49	18:55.6	-22:40
17	02:39	07:28	12:16	18:30.7	-23:03
27	02:05	06:54	11:42	19:07.2	-22:24

Saturn Dist: 10.3AU Mag: +1.1

07	07:01	12:54	18:47	23:49.4	-03:21
17	06:25	12:19	18:13	23:35.8	-04:50
27	05:48	11:44	17:40	23:58.5	-02:22

SOL Star Type G2V

07	06:29	12:19	18:09	23:12.5	-05:06
17	06:14	12:16	18:18	21:10.5	-16:17
27	05:59	12:13	18:28	00:25.7	+02:46

Astronomical Twilight		Begin	End
JD 2,450,150	07	05:03	19:35
JD 2,450,160	17	05:40	19:04
JD 2,450,170	27	04:31	19:56

Sidreal Time				
Transit Right	07	00:00	=	10:53
Ascension at	17	00:00	=	11:33
Local Midnight	27	00:00	=	12:12

Darkest Saturday Night:	16-Mar-1996
Sunset	18:17
Twilight End	19:44
Moon Rise	04:18
Dawn Begin	04:49

COMET COMMENTS, Feb, 2, 1996

by Don Machholz

Three new comets have been discovered in the past month, one of them is expected to become a naked eye object in March and April. Meanwhile, Comet Hale-Bopp has now reappeared in our morning sky, it's a little brighter than expected. We now have the luxury of having four comets visible in binoculars. All four comets have been discovered in the past eight months by American and Japanese amateur astronomers.

C/1996 A1 (Jedicke): Robert and Victoria Jedicke discovered this comet using the 36" Spacewatch (with a CCD) from Kitt Peak on Jan. 14. The comet was at magnitude 17 in Hydra. We now know that it is over 5 AU away from the sun and over a year away from perihelion. When it reaches perihelion in April 1997 at 2.5 AU it will attain eleventh magnitude.

C/1996 B1 (Szczepanski): Edward Szczepanski was photographing M 101 on the evening of Jan. 27 from the Houston Astronomical Society in southern Texas. It was his last exposure of the night. After a couple of hours of sleep, he awoke and developed his film. Upon close examination he noticed a fuzzy patch near M 101. Confirming that it wasn't on an earlier film, and learning that it wasn't a known comet, he called the Smithsonian Astrophysical Observatory. On the following night confirmation came from several quarters. The magnitude was about 8.6. Comet Szczepanski was closest to the sun on Feb. 7 at 1.45 AU. Over the next few weeks it will be heading south through Leo, passing near Regulus in mid-March. It is closest to us in early March at 0.54 AU.

C/1996 B2 (Hyakutake): Yuji Hyakutake discovered his second comet in five weeks on the morning of Jan. 30. He was using the same 25x150 binoculars and this comet was found about three degrees away from the discovery location of his other find.

An early orbit suggest that the comet is approaching the earth and will pass 10 million miles from us in late March. This passage will take place outside and above our orbit, so the comet will be seen against the dark background of the northern polar region. Its magnitude will be about 1, and it should appear at least a half-degree in size. Through April it should dim slightly as it moves away from us and continues toward the sun. It slips into our evening sky and heads southward brightening through the last half of April. By April 27 it will be low in our WNW sky after sunset and magnitude 1.5. The tail, and it will probably have one at that distance from the sun, ought to be rather interesting.

You or your astronomy club may consider a public star party to show your neighbors this comet. Astronomy Day is April 20, the moon will be three days past New and Comet Hyakutake should be about second magnitude near RA 2h 50m, +34 degrees. Your neighbors may ask: "Is this that Comet Hale-Bopp that I have been hearing about?". And you can say, "No, that will be by next year at this time...same part of the sky, and even brighter than this comet." After late April we will lose Comet Hyakutake as it moves south of the sun and is seen much better from the Southern Hemisphere.

EPHEMERIDES

C/1995 Y1 (Hyakutake)

DATE	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
02-27	19h12.4m	+09°05'	54°	M	8.3
03-03	19h36.5m	+12°33'	53°	M	8.3
03-08	19h59.8m	+15°44'	53°	M	8.5
03-13	20h22.0m	+18°35'	52°	M	8.6
03-18	20h43.1m	+21°07'	51°	M	8.8
03-23	21h03.1m	+23°20'	50°	M	9.0
03-28	21h21.9m	+25°17'	51°	M	9.2
04-02	21h39.5m	+26°58'	50°	M	9.4
04-07	21h55.9m	+28°27'	49°	M	9.6

C/1996 B1 (Szczepanski)

DATE	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
02-27	11h25.2m	+35°51'	151°	M	7.8
03-03	10h56.7m	+29°11'	158°	M	7.9
03-08	10h32.0m	+22°04'	160°	M	8.0
03-13	10h11.8m	+15°08'	157°	E	8.1
03-18	09h55.8m	+08°51'	150°	E	8.4
03-23	09h43.6m	+03°24'	143°	E	8.6
03-28	09h34.5m	-01°10'	137°	E	8.9
04-02	09h28.1m	-04°58'	131°	E	9.2
04-07	09h23.9m	-08°07'	125°	E	9.5

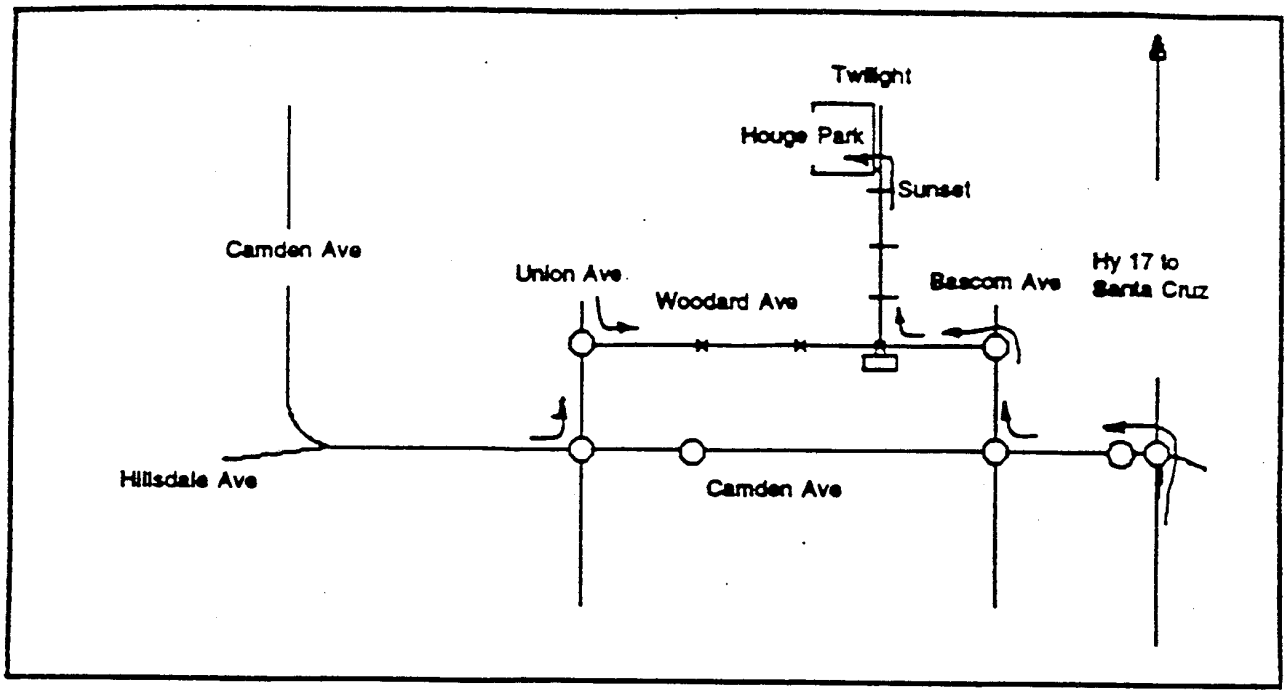
C/1995 O1 (Hale-Bopp)

DATE	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
02-27	19h28.8m	-21°55'	47°	M	9.0
03-03	19h31.4m	-21°36'	52°	M	8.9
03-08	19h33.9m	-21°16'	56°	M	8.8
03-13	19h36.1m	-20°56'	60°	M	8.7
03-18	19h38.2m	-20°36'	65°	M	8.6
03-23	19h40.0m	-20°15'	69°	M	8.5
03-28	19h41.6m	-19°54'	74°	M	8.4
04-02	19h42.9m	-19°33'	78°	M	8.3
04-07	19h44.0m	-19°11'	83°	M	8.2

C/1996 B2 (Hyakutake)

02-27	14h50.1m	-23°22'	111°	M	7.3
03-03	14h52.5m	-22°11'	115°	M	6.6
03-08	14h54.3m	-20°10'	121°	M	5.8
03-13	14h55.3m	-16°25'	127°	M	4.8
03-18	14h54.5m	-07°54'	134°	M	3.4
03-23	14h47.8m	+21°10'	136°	M	1.5
03-28	04h21.9m	+80°21'	90°	E	1.1
04-02	03h12.5m	+52°31'	56°	E	2.1
04-07	03h05.9m	+43°44'	45°	E	2.5

Object	Hyakutake(95Y1)	Szczenpanski	Haykutake(96B2)	Hale-Bopp
Peri. Date	1996 02 24.2909	1996 02 07.12974	1996 05 01.55295	1997 04 01.09192
Peri. Dist (AU)	1.05456	1.4507841	0.2294915	0.913959 AU
Arg/Peri (2000)	046.353°	151.44985°	130.29556°	130.59470°
Asc. Node (2000)	195.7592°	345.41073°	188.15597°	282.47161°
Incl (2000)	054.4667°	052.07280°	124.65024°	089.42447°
Eccentricity	1.0	1.0	1.0	0.9950751
Orbital Period	Long Period	Long Period	Long Period	Long Period
Source	MPC 26543	MPEC1996-C02	MPEC 1996-C03	MPC 26374



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