



# SJAA EPHEMERIS

## Intes 6-inch Maksutov, Extended-use Report Jay Freeman

I have had my Intes 6-inch f/10 Maksutov for five months now. I thought I would write an extended-use report.

In a nutshell, there have been no unpleasant surprises, and I am still very pleased with the instrument. But truth is in the details, so...

The Intes 6-inch f/10 Maksutov offers optics of sparkling quality in a compact, inexpensive, easy to use package. Wavefront correction is excellent, and that means that although the instrument gives up some image sharpness because of its 1/3-diameter central obstruction, it gives up little else. Furthermore, the designers have used the extra degrees of freedom given by the separate secondary to provide round, sharp, star images clear across the 1.8-degree field of a long focal-length two-inch diameter eyepiece. The design is well baffled against stray light across the entire field, too, so the telescope's excellent high-power images are complimented by high-quality low-magnification views of wide deep-sky objects. In practical terms, that means that I can use the telescope at 600x to examine the subtle elongation of the Airy disc of gamma-two Andromeda, or to study detail in the belts of Jupiter at 250x, then turn around and get a dazzling two-degree view of the stars and nebulousity of the Pleiades at 27x, or detect at the same magnification the broad, subtle, variation in background sky contrast that reveals the presence of the Sculptor or Fornax Dwarf Galaxy. A telescope that can do all of these things well is versatile indeed.

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## Activities Calendar

### January

- 3 Hough park star party. Sun set 5:03 pm, 30% Moon rise 2:31 am.
- 4 Star parties at Henry Coe and Fremont Peak state parks; Sun set 5:03 pm, 21% Moon rise 3:31 am.
- 11 Star party, Fremont Peak. Sun set 5:10 pm, 13% Moon set 8:35 pm.
- 17 Hough park star party. Sun set 5:16 pm, 74% Moon set 3:01 am.
- 18 Observational Astronomy class resumes, 7 pm.
- 25 General meeting at Hough Park, speaker TBA. Board meeting at 6:30 is open to all members.
- 31 Hough park star party. Sun set 5:32 pm, 47% Moon rise 1:17 am.

### February

- 1 Star party at Fremont Peak. Sun set 5:32 pm, 36% Moon rise 2:14 am.
- 8 Star parties at Henry Coe and Fremont Peak. Sun set 5:39 pm, 4% Moon set 7:22 pm.
- 14 Hough park star party. Sun set 5:47 pm, 58% Moon set 1:51 am.
- 15 Observational Astronomy class, 7 pm.
- 22 General meeting at Hough Park, speaker TBA. Board Elections Board meeting at 6:30 is open to all members.
- 28 Hough park star party. Sun set 6:01 pm, 63% Moon rise 0:07 am.

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

## Return to the Red Planet Bob Brauer

A couple of weeks ago, I was walking past the office of a colleague and noticed a brightly colored flyer tacked to the wall. "NASA Ames Research Center and The Planetary Society invite you to Return to the Red Planet." This intriguing statement topped an announcement of a free presentation on Thursday November 14th, at the Santa Clara Convention Center. Four speakers were promised for a 2 hour event from 7 to 9 pm. In addition to free parking and free admission, I discovered that they also had free posters, photos, and pamphlets. At that price, I couldn't stay away. The talks were held in a large auditorium that was almost full when I arrived. I believe that I saw several SJAA members in the audience.

The first speaker was Dr. Ben Bova, former editor of Analog and OMNI magazines and author of the novel "Mars Beckons". His topic was "MARS, Who Cares and Why?" His background in science fiction, especially with Analog magazine, gave him a different set of insights on the prospects of Mars exploration. While he is interested in the excitement of new discoveries, he is also well aware that these discoveries may have profound effects on our daily life.

Dr. Bova illustrated this point with a tale of the origin of his interest in science: In his boyhood days, the newspapers commonly reported on the victims of polio in his hometown. In a remarkably short span of time, the introduction of a vaccine brought an end to this tragic news. The threat of polio was dramatically reduced and the

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power of science improved the lives of everyone he knew. Such improvements may come from the exploration of Mars.

Is it possible that the first sign of life to be discovered from Mars is bacteria? Of course! Bacteria is the most abundant form of life on Earth so it just made sense to Dr. Bova that it should be the easiest to detect on Mars. The possibility of fossilized bacteria within the ALH84001 meteorite made sense to him. He hoped there might still be viable martian bacteria beneath the surface, metabolizing rocks and water in processes similar to those we find on Earth. This would effect us directly in an important way - psychologically. The discovery that we are not the only island of life in the universe should change the way we view each other. It could alleviate racism. Dr. Bova recounted a tale from his days editing *Analog* magazine for a large publishing house: he requested that the publisher send him a secretary. A young woman arrived wearing makeup and a costume that would have been right at home at a science fiction convention. During the interview, Dr. Bova determined that the young woman did not have the skills for the job and politely sent her back to the publisher. When asked if her appearance had shocked him, he replied "No, we're the science fiction magazine; all life looks good to us!" That is the realization he hopes would result from such a martian discovery, that all earthlings do look good.

The gain of knowledge is always helpful. Martian life could give great insights in our own life processes by showing us different possibilities. Dr. Bova expressed his belief that Life is commonplace in the universe and discoveries of any form of life increases the odds that intelligent life exists somewhere else.

The second speaker was Dr. Michael Carr, an astrogeologist with the US Geological Survey. His topic was "The Water Story". There are 3 likely places to find liquid water in the solar system: Earth, Mars, and Europa.

The possibility of water on Mars comes from the geological model

of the martian crust. From 4.5 to 3.8 billion years ago, the inner solar system experienced a cratering epoch. Most of the impact craters that we see on the surfaces of the inner planets occurred at this time. (It is believed that the meteorite ALH84001 was blasted off of Mars from by an impact in an ancient cratered zone that dates back to this cratering epoch.) These impacts left Mars with a crust of breccia or shattered rock. Over time, the cracks at the bottom of the crust were squeezed shut by the weight of the overbearing rock and the surface was sealed by a thick layer of permafrost. This leaves a space between the basement rock and the permafrost that could hold an aquifer of liquid water. Erosion features that we can observe on the surface are consistent with liquid water flowing to the surface via geysers or springs and forming channels and lakes before the low surface pressure can sublimate the water away.

When questioned about the evidence that the ALH84001 meteorite was really from Mars, Dr. Carr explained that the analysis of trapped gases from the meteorite, oxygen and deuterium isotopes, match the abundances found on Mars by the Viking lander.

The third speaker was Dr. Chris McKay of NASA Ames Research Center, who was a recent speaker at the SJAA. His topic, "Life on Mars, Past, Present, and Future", was the same presentation that we were given but it was adjusted to fit into the shorter timeslot. While he could not give the amount of details that he presented at our club meeting, he did spice up his act with a great deal of humor. His presentation was plagued with problems from the slide projectors and the stage lighting, but his quick wit played off of these surprises and kept the audience laughing. At one point, the lamps in the slide projectors went out. While the technicians scrambled to swap bulbs, Dr. McKay continued with a parody of his subject and the obvious dark features displayed on these slides from the night side of the planet. His summary of the findings of the Viking lander was a simple "It's Dead, Jim!"

In short, Dr. McKay described his desire to explore an ancient martian lakebed for fossilized signs of life, such as algae. His research has taken him from beneath the frozen surface of an Antarctic lake to the ancient permafrost of Siberia. His findings supply hope that fossils of life may be detectable on Mars.

The final speaker was Donna Shirley, the Mars Exploration Program Manager at JPL. Her topic was the Mars Surveyor Programs for the next 10 years. A lot of lessons were painfully learned with the loss of the Mars Observer spacecraft. Now, the goal is to launch smaller, cheaper spacecraft and have a lot more missions. The plan is to launch a pair of spacecraft every 26 months, one orbiter and one lander.

She presented 2 movies describing the current orbiter/lander pair: the Mars Global Surveyor and the Mars Pathfinder lander. These missions are described in the December 1996 issue of *Sky and Telescope*. The Mars Pathfinder will include a small rover robot named Sojourner, which will carry an X-ray spectrometer across the surface to perform an analysis of the composition of various surface rocks.

The lineup of missions in the current plan is the current Mars Surveyor pair, the 1988 Mars Surveyor pair, Mars'01 which is a pair in 2001, and a pair called Mars'03. (See pg 86 of the November *Scientific American* for more details) These missions were planned to serve three main mission goals: Life, Climate, and Resources. The search for life as discussed by the previous speakers was to share the spotlight with the study of climate conditions and the exploration of martian resources that we could use for manned exploration. With the announcement about ALH84001, the goal of detecting possible life is at the forefront. This means that a mission to capture and return samples to Earth for detailed analysis has been entered into the mix. How this will effect the mission lineup is unknown since the funding for the later missions has not been secured. To keep up with these devel-

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I and several others have compared this instrument to similarly compact high-quality refractors like the 105 mm Astro-Physics Traveler or the 100 mm Tele Vue Genesis. The Intes is a clear competitor in this rather exclusive league: The 4-inch instruments of course lose on overall light grasp, lose on sharpness of high-contrast features (like close double stars of comparable brightness), and approximately keep up on low-contrast stuff like subtle planetary detail. What's more, the Intes is every bit as portable as even a stubby refractor like the Traveler, and at \$950 (US) for the optical tube assembly, lists at a substantially lower price. 6-inch and larger refractors would out-perform the Intes across the board, but at vastly increased cost and with far less portability.

A high-quality 6-inch Newtonian would probably perform about as well as the Intes on axis, and do it at lower cost, but would be much less portable. Any Newtonian used at wide field would suffer from substantial coma and astigmatism off axis, unless equipped with an expensive coma-corrector.

A well-made Schmidt-Cassegrain of comparable aperture would also perform as well on-axis as the Intes, but good Schmidt-Cassegrains are scarce. Also, the common commercial designs do not give particularly good images away from the center of the field.

I have been using the Intes on a Vixen German equatorial mounting, the one OEM'd for Celestron under the "Great Polaris" label. That is a good combination. Many other small mountings would do as well. At f/10, almost any eyepiece works fine, though we all have our favorites.

The down side of the instrument is minimal. As I anticipated when I bought it, the Intes -- like most Maksutovs -- takes a relatively long time to settle down and start performing when set up at a temperature different from that at which it was stored. Mine begins to work well after an hour or so, when going from room temperature to outdoor temperatures in the 40s or 50s.

I work around the problem by putting the telescope in the back seat or hatch-back storage area of my car for the ride to an observing site, with the case and some windows open. That works for distant sites, but this instrument will probably never be very useful for quick looks from my back yard at objects demanding high resolution.

The two-inch Crayford focuser is quirky at times. Focal travel is limited, though the range is well chosen. Few eyepieces focus without a star diagonal, but I routinely use one anyway. Some of my older eyepieces have mechanical stops (what keeps the eyepiece from falling through the focuser into the tube) at the eye lens rather than at the focal plane, and many of these require an extension tube to focus properly. Also, though the Crayford has an adjustable clutch, some of the big, heavy, modern eyepieces are too much for it -- it tends to creep when I am using them, unless I lock the clutch so tightly that I cannot focus at all.

The big corrector plate way at the front of the tube tends to gather dew. The telescope did not come with a dew cap, but it was no problem to fabricate an effective one from sponge rubber and Velcro.

Finally, although the Intes design appears mechanically robust, I do worry about collimation difficulties. Yet so far, no adjustments have been required.

So as I said above, the Intes 6-inch f/10 Maksutov is an inexpensive portable instrument of uncompromising optical quality. I commend it to you all.

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#### Mars, continued from page 2

opments and with the status of the Mars Surveyor missions, checkout this website. <http://www.jpl.nasa.gov>

I was well entertained by all four speakers and even got my share of photos and posters on the way out. If other SJAA members attended this event, please feel free to compare notes with me at a club meeting. If I hear about this sort of event again, I will get it mentioned in the newsletter.

#### BOB LOOKS UP for January, or "Orions other side" Bob Brauer

For me, January has always been the coldest month for observing. This isn't all bad though, the air is cold and dry which improves the transparency. Cold, dry air also has some important benefits for those of us who like to photograph the skies. It turns out that the dry air tends to draw some moisture out of the films emulsion, which reduces reciprocity failure. You can get a naturally chilled cold camera without having to deal with any dry ice. If you ever wanted to try your hand at astrophotography, why not get out under the cold, dry January skies?

Astrophotographers and observers both look south to Orion this month. The bright expanse of the Orion Nebula draws attention to the southern half of the constellation, but there are several interesting sights north of Orions belt, the other side. Here's a couple to seek out: NGC2022, 5 Hr 39 Min RA, 9 Deg, 3 Min North Declination. A 12th magnitude planetary nebula, diameter 25 arcseconds. This planetary is close to the position of Orions head. 23 ORI, 5 Hr 20 Min RA, 3 Deg, 30 Min North Declination. This easy double star has 5th and 7th magnitude components with 32 arcseconds of separation.

For lunar observers, Gassendi is well lit on the weekend of the 18th/19th. This 110 km wide walled plain forms the northern border to Mare Humorum, the Sea of Moisture. The floor of Gassendi is crossed by numerous clefts and hills. My last observation of the Rima Gassendi system noted 4 clefts, but chart 52 in Rukls 'Atlas of the Moon' shows several more. How many clefts can you find?

#### Periodical Publication Statement

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San Jose Astronomical Association

## Eye on Everything

Lew Kurtz

Mark Wagner has resigned from the Board of Directors. When you see him thank him for his services to the club. Same for Rich Neuschaefer, Ed Erbeck, and Bob Madden.

There have been questions and concerns raised about Mark Wagner's status as a board member between September and his resignation in November. I'll try and explain some of what has happened. First, in July Mark sent a note to all of the other board members announcing that his club membership had expired, but per the new by-laws, he was remaining on the club's board. He also stated his intention to resign at the September board meeting if certain problems weren't corrected.

So, the August board meeting came and went. Events transpired which caused him to change his mind and not resign from the board (he told me that one secondary reason was my request that he not resign, but stay and help correct the problems). The certain problems though, were not corrected.

The September board meeting comes on September 21. Mark has not yet paid his dues. First item of business is an amendment to the by-laws to require all board members be club members. The amendment did not pass (the feeling amongst some of the dissenting members, myself included, was there should be a grace period to allow forgetful board members to pay their dues). At this point Mark puts \$20 on the table. I don't know if he declared that he was paying his dues or not, but it doesn't matter (but it is reasonable assumption). The amendment was modified to provide a grace period of 45 days. The amendment passes unanimously.

More business is attended to. Some time later in the meeting another amendment to the by-laws is offered and passed. This one limits club officers' terms to one year. (When we revised the club's by-laws earlier this year, we had inadvertently left out the membership requirement and term limits. They were both provisions of the ear-

lier by-laws.) I cast the one no vote.

Later in September, or probably October, a majority of the board (myself included) agreed that as a result of the new membership requirement, Mark was no longer a board member (Mark, Rich Neuschaefer, and Ed Erbeck were not aware of this agreement). This could seem unreasonable since he met the requirements in force at the time. The question comes down to whether or not the new requirement is retroactive. There was no expectation that current board members would be grandfathered.

Back, for a moment to the other amendment that was passed. That amendment limits officers' terms to one year. The expectation there was that this amendment applies to current officers from when they were elected to the office (which was probably at the March board meeting).

So, are they both retroactive, or not? Or are they two separate issues altogether? Please call a board member and tell him what you think about this.

Anybody who disagrees with what I have written, or feels that I have omitted important details, please write up an article and I'll run it in the February issue.

That said, board elections are in February. We've been slow in getting a nominating committee set up, but if you are interested in being on the board, call a current board member, and he'll be sure to get your name to the nominating committee. I will publish any statements would-be board members would like to make to the general membership in the February newsletter.

All articles in this edition were written by SJAA members.

## Update on Henry Coe Park

Jim Van Nuland

The ranger told me that he does not intend to move into his new residence until the paving is done, which will be April at the earliest. So we can continue using the usual site until then.

## First light, Astro-Physics 180mm f/9 EDT

Rich Neuschaefer

Last Saturday I used my Astro-Physics 180mm f/9 EDT for the first time. The seeing at Fremont Peak state park (California coast range mountains) was poor early in the evening. You could see the air flowing past Jupiter even with the image infocus. As the evening went on the seeing got somewhat better but it never got as good as it usually is at the Peak. At high power the diffraction rings of infocus stars were dancing in the air currents.

Even with the not so good seeing the images were surprisingly sharp and contrasty. Deep sky objects were very nice. I looked at most of the bright easy Messier objects. M27 really looked 3D, like it was there between you and the stars. The Veil Nebula was very nice with a 35mm Panoptic and UHC filter.

Saturn looked nice but the air was still moving image around. There were some very small moons near one side of the rings.

In the early morning I pointed the 180 at the moon. At 216x (Tak 7.5mm LE) the detail was outstanding. It was like looking at the moon for the first time. I can't wait to try it at 300x or 400x when the seeing is better.

Everything about the scope is heavy duty, even the case. My 800 mount handled the 180mm f/9 very nicely. Astro-Physics made a beautiful OTA.



I also inspected the corral area, which is located in the campground, opposite the parking area at the beginning of the loop road. It's fenced off, and has several parking spaces just north of it. The parking spaces have the western sky blocked. It's a bit small; it would accommodate 5 to 8 scopes if most of the vehicles can be parked outside.

**Notes To Help You Make Better Use Of Comet Comments**  
Don Machholz

**Celestial Calendar - Jan 1997**  
Richard Stanton

Comet Comments is a monthly column that I've been writing since 1978. I started writing it to inform other amateur astronomers of new comet discoveries and to provide information so that they can find the brighter comets. Carried in only one newsletter (the San Jose Astronomical Association's "Ephemeris") for the first two years, the column is now carried in some three dozen newsletters. It also appears on the Internet: America-On-Line displays it in their astronomy department (Keyword: Astronomy), and it can be downloaded from a page located at "members.aol.com/Makewood". Each issue of Comet Comments is written three weeks before the "due" date, giving time for it to be distributed to the editors and placed into the newsletters.

Comet Comments contains information about new comet discoveries. This is followed by comet news and observing tips for the comets currently visible. Next I provide ephemerides (predicted positions) for bright comets (usually all those brighter than magnitude 11) so that amateurs can find them. This is how to read these tables:

**Date:** This is the Universal Time for the comet's position. The positions are for 00 hr UT. The United States is a few hours earlier than this, so for a comet viewable in the evening, look for it on the night preceding the indicated date. For morning viewing the comet has already passed the position indicated for 00hr UT position, so the comet has passed that point and moved on.

**RA. and Dec:** Right Ascension and Declination in 2000 equinox coordinates. These can be plotted on a star chart and found by star-hopping, or by using setting circles.

**EI:** The elongation of the comet- the number of degrees it is from the sun as seen from the earth.

**Sky:** Morning (M) or evening (E) sky.

**Mag:** The predicted magnitude or brightness of the comet. The brightness of a comet is difficult to predict so this is only a guess based upon past performance and comet theory.

The last item I include is the elements of the orbits. This information can be entered into most comet orbit computer programs to further project the comet's positions.

**Peri. Date:** The date the comet is closest to the sun. Year is followed by month and day.

**Peri. Dist:** The distance from the comet to the sun at perihelion in Astronomical Units.

**Arg/Peri, Asc. Node, Incl:** These define the angle of the comet's orbit. Arg/Peri is the Argument of the Perihelion, Asc. Node is the Ascending Node- if this figure is under 180 the comet reaches perihelion north of the ecliptic. Incl is the Inclination of the comet's orbit. If it is under 90 degrees indicates the comet is in a direct orbit, while over 90 degrees means it is in a retrograde orbit.

**Eccentricity:** This is the shape of the orbit. "1.00" is a parabola, "0.00" is a circle. An eccentricity greater than 1 is a hyperbola orbit-the comet will never return.

**Orbital Period:** The length of time it takes for the comet to orbit the sun.

**Reference:** The source giving the elements. MPC indicates Minor Planet Circulars by the Smithsonian.

**Epoch:** The time for which the orbit is most accurate. The orbit is generally accurate enough for visual location of the comet for several months on either side of this date.

**Absol. Mag/"n":** This is the absolute magnitude- the brightness of the comet if it were 1 AU from both the earth and the sun. The average comet is about 7.0. The "n" value is the rate of brightening as the comet nears the sun, or dimming as it leaves the sun. The average is 4.0. The "n" value presented here may have to be multiplied by 2.5 to enter into some computers.

Lunar Phase	time (pst)	date	rise	trans	set
LQ	17:47	01	23:58	05:44	11:46
NM	20:26	08	06:37	11:51	17:07
FQ	12:03	15	11:39	18:18	00:25
FM	07:11	23	17:49	00:02	07:05
LQ	11:41	31	00:17	05:55	11:28

Mercury	Dist: 0.87 AU			Mag: -1.7	
date	rise	trans	set	RA	Dec
07	06:23	11:19	16:16	18:23.0	-20:02
17	05:44	10:38	15:32	18:18.3	-21:03
27	05:48	10:38	15:29	18:56.8	-22:07

Venus	Dist 1.59 AU				Mag -4.0	
07	05:57	10:45	15:33	17:44.4	-22:52	
17	06:13	11:00	15:47	18:38.9	-23:03	
27	06:23	11:15	16:06	19:33.0	-22:04	

Mars	Dist 1.00 AU			Mag -0.5	
07 22:56	05:08	11:18	12:09.0	+02:03	
17 22:28	04:38	10:46	12:18.6	+01:15	
27 21:56	04:05	10:11	12:25.0	+00:49	

Jupiter		Dist: 6.11 AU		Mag: -1.9	
07	08:00	12:53	17:47	19:55.1	-21:09
17	07:29	12:24	17:19	20:05.0	-20:42
27	06:57	11:54	16:51	20:14.8	-20:13

Saturn	Dist: 9.83 AU			Mag: +1.0	
07 11:09	17:07	23:06	00:10.1	-01:27	
17 10:31	16:30	22:30	00:12.5	-01:09	
27 09:53	15:54	21:55	00:15.41	-00:48	

SOL Star Type G2V	Intelligent Life in System ?
07	07:23 12:14 17:06 19:14.2 -22:21
17	07:20 12:18 17:16 19:57.4 -20:42
27	07:15 12:21 17:27 20:39.5 -18:24

Astronomical Twilight	Begin	End
JD 2,450,455 07	05:50	18:38
JD 2,450,465 17	05:49	18:47
JD 2,450,475 27	05:45	18:56

Sidreal Time				
Transit Right	07	00:00	=	07:00
Ascension at	17	00:00	=	07:39
Local Midnight	27	00:00	=	08:18

Darkest Saturday Night:	04-Jan
Sunset	17:03
Twilight End	18:36
Moon Rise	02:30
Dawn Begin	05:50



**COMET COMMENTS, Dec 1996**  
Don Machholz

**Comet Hale-Bopp** passes north of the sun and into the morning sky on Dec. 31. Observers with a low eastern horizon should be able to pick it up again by the third week of January.

In the past few weeks stories of "mysterious" objects in the vicinity of the comet have circulated. The most popular- a Saturn-like Object (SLO) imaged on Nov. 14 by an amateur astronomer- turned out to be nothing other than an 8.5 magnitude star. Other similar objects that I've seen on Internet images appear to be out-of-focus images of bright stars. In all respects Comet Hale-Bopp is behaving as an average comet. It is bigger than perhaps any comet we have seen, but its variable brightness, tails and jets are normal. If anything mysterious truly appears, you will find it reported in the mainstream press, and in most cases be able to go outside and see it yourself through your telescope.

Meanwhile, **Comet Tabur** dims in our morning sky. Its magnitude has been unpredictable lately. **Periodic Comet Wirtanen** is returning. The Hubble Space telescope imaged it in August 1996 and "measured" the nucleus' diameter to be 1.16 km. Finally, **Periodic Comet Wild 2** should be visible for several months.

**Ephemerides**

**C/1995 O1 (Hale-Bopp)**

Date	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
12-28	18h36.7m	+03°51'	27°	E	3.1
01-02	18h44.0m	+05°01'	28°	M	2.9
01-07	18h51.7m	+06°18'	29°	M	2.7
01-12	19h00.0m	+07°45'	31°	M	2.5
01-17	19h08.9m	+09°22'	32°	M	2.2
01-22	19h18.5m	+11°11'	34°	M	1.9
01-27	19h29.0m	+13°13'	36°	M	1.7
02-01	19h40.5m	+15°29'	38°	M	1.4
02-06	19h53.4m	+18°01'	40°	M	1.1
02-11	20h07.8m	+20°50'	41°	M	0.7

**C/1996 Q1 (Tabur)**

Date	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
12-28	16h11.8m	+14°07'	50°	M	11.8
01-02	16h13.8m	+13°02'	53°	M	12.0
01-07	16h15.4m	+12°05'	56°	M	12.2
01-12	16h16.4m	+11°13'	59°	M	12.4
01-17	16h16.9m	+10°27'	62°	M	12.6
01-22	16h16.9m	+09°47'	66°	M	12.8
01-27	16h16.2m	+09°11'	70°	M	13.0
02-01	16h14.7m	+08°39'	75°	M	13.1
02-06	16h12.5m	+08°11'	80°	M	13.3
02-11	16h09.5m	+07°46'	85°	M	13.4

**46P/Wirtanen**

Date	R.A.	Dec	EL	Sky	Mag
00 UT	2000				
12-28	22h34.1m	-19°11'	57°	E	12.6
01-02	22h45.5m	-17°40'	55°	E	12.4
01-07	22h57.4m	-16°02'	53°	E	12.2
01-12	23h09.8m	-14°19'	52°	E	12.0
01-17	23h22.6m	-12°30'	50°	E	11.8
01-22	23h35.9m	-10°34'	49°	E	11.6
01-27	23h49.7m	-08°33'	48°	E	11.4
02-01	00h03.9m	-06°26'	47°	E	11.2
02-06	00h18.7m	-04°13'	46°	E	11.1
02-11	00h34.0m	-01°54'	45°	E	10.9

**81P/Wild 2**

R.A.	Dec	EL	Sky	Mag
00 UT	2000			
12-28	08h21.7m	+16°49'	153°	M 11.7
01-02	08h19.9m	+17°02'	158°	M 11.6
01-07	08h17.4m	+17°18'	164°	M 11.4
01-12	08h14.3m	+17°38'	170°	M 11.2
01-17	08h10.6m	+18°01'	176°	M 11.0
01-22	08h06.5m	+18°27'	177°	E 10.9
01-27	08h02.3m	+18°54'	172°	E 10.8
02-01	07h58.2m	+19°22'	166°	E 10.6
02-06	07h54.3m	+19°49'	159°	E 10.5
02-11	07h51.1m	+20°16'	154°	E 10.4

**Orbital Elements**

Object	Hale-Bopp	Tabur	P/Wirtanen	P/Wild 2
Peri. Date	1997 04 01.13453	1996 11 03.52688	1997 03 14.14299	1997 05 06.62789
Peri. Dist (AU)	0.9141030	0.8398272	1.0637469	1.5826156
Arg/Peri (2000)	130.59083°	057.40724°	356.34322°	041.77000°
Asc. Node (2000)	282.47069°	031.40177°	082.20387°	136.15458°
Incl (2000)	089.42936°	073.35813°	011.72255°	003.24276°
Eccen	0.9950969	0.9989006	0.6567490	0.5402220
Orbital Period (yrs)	~4700 years	Long period	5.46 years	6.39 years
Reference	MPC 28052	MPC 28052	MPC 27080	MPC 28272
Epoch	1997 03 13	1996 11 13	1997 03 13	1997 04 22
Absol. Mag/"n"	-2.0/4.0	9.5/4.0	9.0/6.0	7.0/6.0

## Astro Ads

**Celestron 5 Telescope:** Excellent Celestial Photography, special coatings, 12 & 25 mm oculars, tripod, wedge, case, Camera Adapter, Spotting Scope. Makes excellent 1300mm Camera lens, paid \$1400 in 1987, new with these options is over \$2000, Asking \$850.  
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## Telescope Loaner Program Status

Paul Barton

No.	Scope Description	Borrower	Due Date
1	4.5" Newt/P Mount	available	
3	4" Quantum S/C	Stephen Shoop	01/23/97 note 4
6	8" Celestron S/C	Glen Yamasaki	01/06/97
7	12.5" Dobson	Tim Sanstrom	01/09/97 note 4
8	14" Dobson	available	note 1
9	C-11 Compustar	Paul Barton	see note2
15	8" Dobson	available	
16	Solar Scope	Jack Peterson	indefinite note 3
18	8" Newt/P mount	Ram Saxena	01/12/97 note 4
19	6" Newt/Polar mount	Steve Wurzburg	12/03/96
21	10" Dobson	Ravi Tembhekar	01/23/97 note 4
23	6" Newt/P mount	Mike Bennett	01/06/97 note 4
24	60mm refractor	Sridhar Lakshmikanthan	01/25/97 note 4
26	11" Dobson	Alex Crichton	01/01/97 note 4
27	13" Dobson	Bob Bart	01/26/97 note 4
28	13" Dobson	Doug Snyder	01/04/97 note 4
29	C8 Super Polaris	Robert Dannels	02/09/97 note 4
30	7" f/9 Newt/pipe mount	available	

### Notes:

1. Upgraded, easier to assemble
2. Need a regular operator able to go to two or three SJAA star parties per month.
3. Available for special occasions, call.
4. Call In. Report how you are doing. Date extended.

### Waiting List:

1. Rudy Norvelle C8
2. Gary Flint #19, 6" Newt/Polar mount

All scopes are available to any SJAA member. Call Paul at 377-0148.

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