

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



October, 1990 — Issue #165

October Agenda Officer Nominations and Dues

Be sure to attend the October meeting on the 5th; we have some important business.

First, I'll open nominations for 1991 officers. Here is a rundown of the various positions:

President — presides at all meetings, proposes club policies and goals and executes legal documents.

Vice President — organizes club programs and activities.

Secretary — records the minutes of meetings and handles official correspondence.

Treasurer — proposes the budget, handles club financial matters and organizes magazine and book orders.

Properties Officer — handles all club property and instruments.

We have no incumbents for president and treasurer. But, of course, any member can run for any office. Please give your participation in SAC serious thought.

Second, at the October meeting we will discuss the board's proposal to raise dues. The accompanying table shows our analysis. In summary, with just moderate spending this year we exceeded our dues income by \$350. We have depleted our savings for several years now.

We propose an increase in the dues to \$20 to meet and exceed the anticipated 1991 budget. We compiled this budget knowing that newsletter expenses will rise next year because of copy and postage increases. Also, the proposed 1991 budget would allow us to be in a position to contribute more to the astronomical community and to initiate a more active program if the new administration desires. Finally, the combination of \$20 per member and the proposed 1991 budget allows us to again put money aside for future need.

As one board member noted, \$20 is really a small price to pay for club membership. You have to admit that SAC packs its meetings with interesting talks by both

club members and professionals. —*Pieter Burggraaf, SAC President*

SAC Board's Analysis of Dues

	1990	1991
Actual 1990 dues		
Newsletters only	\$8	
Membership	\$12	
Proposed 1991 dues		
Newsletters only		\$10
Membership		\$20
Dues income:		
Newsletters only (11)	\$88	\$110
Memberships (135)	\$1,620	\$2,700
Total dues income	\$1,708	\$2,810
Expenses (notes):	(1)	(2)
Newsletter	\$1,015	\$1,200
Insurance	\$358	\$400
Honorariums	\$300	\$300
Contributions	\$175	\$200
Miscellaneous	\$110	\$350
Awards & Subgroups	\$55	\$100
Supplies & Equipment	\$0	\$100
Total expenses	\$2,013	\$2,650
Net gain or (loss)	(\$305)	\$160

Notes: (1) Actual as of 9-1990 plus projected through end of year. (2) Projected budget for 1991.

Bits and Pieces

Minutes of the July Meeting

President Pete Burggraaf called the meeting to order at 7:30 PM. A. J. Crayon talked about the Deep Sky meeting. Pete then moved on to new business. First on the slate was upcoming officer elections. Virginia Campbell will run again for vice-president; Phil Dahl will run again for secretary; and Rick Rotramel will run again for properties director. All offices are open for nominations and will be taken at the October meeting. Cathe Becker then gave the treasurer's report. The subject of increasing dues next year was raised by Pete. This and other subjects will be discussed at the board meeting. The board's recommendations will be presented at the next club meeting.

Tom Polakis then described his observations of Jupiter's reemerging Southern Equatorial Band. Phil Dahl read a letter from the Central Arizona Shelter Services thanking the club for its donation made in Maynard Clark's name.

For the Show-and-Tell part of the meeting Pierre Schwaar showed video of the Jupiter occultation by the moon along with views of Saturn. Paul Lind talked about his homemade off-axis guider for astrophotography. Ken Burgess then showed slides of his film test of Scotch 1000. Ken also showed slides of the aurora displays over Northern Arizona the morning of August 26th.

After the break the main speaker was Dr. Peter Wehinger, a research astronomer from the Department of Physics at A. S. U. whose research interests include spectroscopic studies of comets. His talk was on several aspects of the Mount Graham controversy. Dr. Wehinger then presented spectra of several comets highlighting the carbon ratio differences as a way of determining if the comets originated in the solar system. —*Phil Dahl, SAC Secretary*

1990 SAC Meetings	1990 SAC Cloud Parties
October 5	October 13
November 2	November 10
December 8	December 15
— 1991 —	— 1991 —
January 4	January 12
February 1	February 9
March 1	March 9

Directions to SAC Events

SAC General Meetings 7:30 PM at Grand Canyon University, Fleming Building, Room 103 — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.

SAC Cloud Parties at Buckeye Hills Recreation Area — Interstate 10 west to Exit 112 (30 miles west of Interstate 17), then south for 10.5 miles, right at entrance to recreation area, one-half mile, on the right. No water and only pit toilets. Please arrive before sunset; allow one hour from central Phoenix.

Adventures in Wide Field Astrophotography by Chris Schur Part 4

In this fourth article on astrophotography with wide field systems, I will outline step by step the procedure required to obtain top rate results with any piggyback system. All of the methods used in this article have been proven by many of our club astrophotographers and should provide many useful tips.

After mounting the camera lens combination securely as discussed in the previous lecture we can start preparing to take the actual photo. The procedure is to first align the camera in parallel with the main instrument. You may have to offset it a bit as not to include the telescope tube in the bottom of the frame! Next aim the camera at the object and carefully compose it the way you like. With a low power ocular inserted in the main scope, scan around a degree or so until a suitable guidestar appears within the field. You might like to recenter the camera on the subject at this point, but with a wide field lens, this is not usually a concern.

How bright must a guidestar be to be useful? Bright enough to be clearly visible in the guiding eyepiece at the guiding magnification with the reticle suitably illuminated. After a while, you will get a feel for what brightness this star must be. With the guiding ocular installed, and the crosshairs lined up to match East — West and North — South, check the buttons on your drive corrector's hand paddle to make sure the star can be moved in any direction in the guiding field. Center up the guidestar, open the shutter and lock down the cable release. Recheck the guidestar, and start your timer.

Here is a tip for longer exposures: Most individuals find that a suitable exposure is on the order of 30 minutes with a 400 speed film. But after 15 minutes or so, they cannot go on because of fatigue. One solution that works well is to go for that first 15 minutes, then put the lens cap back on loosely or cover the lens with a small dark cloth. Take a five or ten minute break, then recenter the guidestar if needed, and remove the loose lens cap or dark cloth. Then continue on with the exposure for another 15 minutes. This way you can be guiding your second half of the exposure fresh and alert. This technique has allowed many amateurs in our club to go those longer exposures on the finer grained films, and improve their results measurably.

Printing Options

After a long night at the guidescope, the film is ready to be processed. For the home darkroom enthusiast, this can be on the same evening that the astrophotos were taken. More often than not, the development is in the hands of the professional photo lab. For this reason, slide films are best. The lab can do little harm to the color balance of the original shot, and usually the higher contrast of the slides themselves yield more pleasing results. However, since nearly all photo finishers do not know a dark sky background from a poorly exposed terrestrial shot, they may set the automatic cutting and framing machine to chop your hard earned shots to bits!

There are two approaches to saving your evening's work from this terrible fate. First if you specify to the photo finisher only to develop but not mount or cut, then you can do it yourself with easy to use slide mounting kits. An alternative is to take some terrestrial shots at the beginning and end of the roll, and then they will have

something to line up on the cutting machine.

For prints, the problem is multiplied by the printing process itself. In this step the lab tech usually botches up the colors, and nearly always prints them too dark. If you must use print film, a workable solution is to get real friendly with a local one hour photo lab, and work with them into obtaining suitable results. The goal is to achieve a nearly colorless medium dark grey background to your prints, so that the maximum details show through. For commercially processed B&W prints, specify "print for maximum contrast" on the envelope, and this usually works well.

One final approach to getting the prints done at the local one hour photo is to get them to make series of test prints of a typical astronegative with your planned usual film. Pick the best of the test prints and have them match the print density and background in the remaining prints. Now save that test print and tape it onto the envelope you will use later to bring in more astrophotos in. Then they will always have that one standard print to go by in producing more predictable results.

Comet Comments by Don Machholz

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

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

Comet	Levy		(1990c)		
Date	RA-1950-Dec		RA-2000-Dec	Elong	Sky Mag
09-26	15h50.6m	-37°31'	15h53.9m	-37°40'	63° E 5.3
10-01	15h36.7m	-38°23'	15h40.0m	-38°33'	56° E 5.4
10-06	15h25.4m	-39°01'	15h28.6m	-39°11'	50° E 5.4
10-11	15h15.7m	-39°29'	15h18.9m	-39°40'	45° E 5.6
10-16	15h07.1m	-39°50'	15h10.4m	-40°02'	39° E 5.7
10-21	14h59.8m	-40°06'	15h02.7m	-40°18'	35° E 5.8

Comet	Tsuchiya-Kiuchi		(1990i)		
Date	RA-1950-Dec		RA-2000-Dec	Elong	Sky Mag
10-06	11h02.9m	+02°33'	11h05.4m	+02°17'	26° M 7.8
10-11	10h58.2m	+00°36'	11h00.7m	+00°19'	32° M 7.8
10-16	10h52.9m	-01°32'	10h55.5m	-01°48'	37° M 7.8
10-21	10h46.9m	-03°53'	10h49.4m	-04°09'	43° M 7.7
10-26	10h39.8m	-06°29'	10h42.3m	-06°45'	49° M 7.7
10-31	10h31.4m	-09°25'	10h33.9m	-09°40'	56° M 7.7
11-05	10h21.0m	-12°44'	10h23.5m	-12°59'	62° M 7.7
11-10	10h08.1m	-16°31'	10h10.5m	-16°45'	69° M 7.6

Periodic	Comet		Encke	
Date	RA-1950-Dec		RA-2000-Dec	Elong Sky Mag
09-26	09h01.5m	+29°40'	09h04.6m	+29°28' 54° M 9.1
10-01	09h47.9m	+25°02'	09h50.8m	+24°48' 47° M 9.0
10-06	10h31.4m	+19°26'	10h34.2m	+19°11' 41° M 8.9
10-11	11h11.3m	+13°18'	11h13.9m	+13°01' 34° M 8.9
10-16	11h48.2m	+06°58'	11h50.7m	+06°41' 28° M 8.9

Space News by Paul Dickson

There is quite a bit of Astronomy going on outside the Earth's atmosphere and I've been gather information for a long while now. I figure that it's about time that I share a brief outline of what I've gathered. It will have to be brief because if it wasn't this Newsletter could be 40 pages long using most of what I've gathered. Fortunately, most of what I have is redundant or you've already read from other sources. So I'll get started. . .

Pioneer 10

Pioneer 10 has set another milestone. On Sept. 22, it will be 50 AU from the Sun. The farthest any man-made object has reached. It now take 6 hours and 55 minutes for commands to reach the spacecraft and the same amount again for the reply.

Pioneer 10 continues to expand the Sun's heliosphere by not yet finding its boundary. When the spacecraft was first launched March 2, 1972, it was thought the heliosphere only extended to Jupiter. Pioneer 10 is now 10 times farther away and still within it.

The tiny 8-watt radio signal from the spacecraft has now fallen to a signal strength of four billionths of a trillionth of a watt when it finally reaches NASA's Deep Space Network.

Galileo

The Galileo spacecraft is approaching Earth for its first flyby on December 8. On September 13, 1990, the spacecraft was 51.1 million miles from Earth and traveling at a heliocentric speed of 50,110 miles per hour; distance to the Sun was 1.26 AU. Round trip light time was 9 minutes, 14 seconds.

Coming up on November 19-21 is the playback of the Venus flyby which occurred last February. Earth Science data collection will begin on November 8. Three Trajectory Course Maneuvers (TCM-7, TCM-8 and TCM-8A) are scheduled for November 13, November 28 and December 3.

Last August, the Deep Space Network (DSN) initiated a study of the conditions for the first Earth flyby to optimize the tracking procedures and parameters for the short, but critical near Earth pass. High doppler rates and spacecraft antenna switching during the station transfer periods, together with the Galileo Project's desire for 2-way doppler for radio science purpose, present several competing requirements to evaluate.

At the time of the first Earth flyby, Galileo will have traveled 647 million miles to reach the Earth and still have about 1.8 billion miles to go before reaching Jupiter in December 1995. The flyby of Asteroid Gaspra is scheduled for late October 1991.

Magellan

The Magellan spacecraft successfully entered Venus orbit on Friday, August 10, but has since experience several anomalous events.

The first serious of these occurred August 16, after sending the first part of its second mapping run, the spacecraft commenced a scheduled star calibration maneuver to confirm the spacecraft's position and then didn't reappear as planned. On Friday August 17, communication with was regained and lost periodically which meant the spacecraft was in the state of ROM safing and was searching for Earth. By predicting when the spacecraft would be point again at Earth, the controller were able to re-establish continuous contact.

On August 21, while still in ROM safe mode, the controllers lost contact with Magellan again. At that time, little was happening aboard the spacecraft when it disappeared. Analysis of the spacecraft's signal indicated that it had turned away, rather than suffering from power or radio loss.

The following day the spacecraft started coning, the search mode used to find Earth. After several hours, the flight controllers were again able to re-establish continuous communication.

Investigations into what caused the spacecraft to lose contact still have not found a definitive reason. There are a lot of theories, but little data to back them. During the first loss of signal, the spacecraft was actually recording engineering data during the event, but reading this data had to wait until a star calibration can be done so that the high gain antenna can be accurately pointed at Earth. With the medium gain antenna data can be sent at 40 bit per second, the high gain antenna provides at least 1200 bps. During the second loss of signal, attempts were made to send command through the low gain antenna at less than 8 bps. These commands reached the spacecraft, but it is not known if they increased the spacecraft's recovery time.

Another interesting, although unrelated anomaly, is that gyroscope B2 appears to be producing normal channel outputs, rather than being stuck at full scale on both channels before the Venus encounter. The B2 motor current was turned back on automatically during the ROM safing at the end of the first Loss of Signal incident. Later, when the controllers commanded the spacecraft to turn off this gyroscope, the spacecraft acknowledge the command as successfully completed, yet the gyroscope continued to run by all indications. The flight controller are not concerned about this behavior.

The problems faced by Magellan are of extreme interest by the people of the Galileo Project as Galileo and

Magellan share many of the same hardware and software components.

Mapping of Venus began again September 15 and as of Thursday, September 20, had collect 30 orbits of Venus surface radar data.

The Superior Conjunction of Venus will occur November 2. By that time Magellan would have been placed into a safe position and waiting until it receives commands from Earth to continue mapping. The length of this period will depend solar flare activity and margins in the communication links. The mapping of Venus lost during this time will be recovered during July 1991.

Hubble Space Telescope

The HST has been been a major focus of attention lately, so there is less to mention. From a report I saw in the *Arizona Republic* the cause of the spherical aberration was the placing of a support bar in backwards. As with most newspaper scientific articles, this report was so vague that you have as much information as that several paragraph article gave.

The wobble caused when the HST crosses the day-night terminator has a software "fix", but it can't be used. In ground testing the software, it seems that the "fix" uses far too much of the telescope's on-board computer power stabilizing it. As a result, this "fix" will not be sent to the HST.

The HST is in the midst of doing some observing runs in between testing. We should be seeing those pictures in magazines within a month or two.

Ulysses

The Ulysses spacecraft is ready for an October launch aboard the Space Shuttle Discovery. Its flight path will take it to Jupiter before Galileo gets there and then into orbit around the polar regions of the Sun. Let's hope there's no hydrogen leak in Discovery too.

Such-A-Deal

SUCH-A-DEAL is a place to advertise equipment, supplies, and services related to amateur astronomy. This is a free service for SAC members and friends. SAC is not responsible for the quality of advertised items or services.

Telescope—Meade Model 2120, 10" *f*/10 Schmidt-Cassegrain; 3 years old; mint condition; assorted filters; 7mm, 15.5mm & 20mm eyepieces; 2X telenegetive; AC & DC power cords; Minolta T-ring; piggyback bracket; diagonal prism; observer's chair. Price negotiable. Greg Kar, 993-9339.