Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS

December 1998 — Issue #263

v11.22

Proposed Mars Sample-Return Missions

by Diane Ainsworth

From the "JPL Universe"
November 13, 1998

A new architectural blueprint for international robotic exploration of Mars, resulting in the return of several samples of Martian material to Earth by 2008 and founding of the first permanent robotic colonies by the end of that decade, has been launched by NASA and its international partners in space exploration.

"This plan paves the way for the return of as many as four samples of Martian material from four different sites by 2011, and will lead to the establishment of the first robotic outposts and, eventually, human colonies on Mars," said Norman Haynes, Mars Exploration Program director at JPL.

Under a new plan drafted by NASA and its French, Italian and European counterparts, the consortium of spacefaring nations will begin development of affordable spacecraft and innovative new technologies to obtain in-situ measurements and samples of Martian material in preparation for human exploration of the planet. The plan calls for construction of a fleet of affordable launch vehicles, orbiters, landers, rovers and Mars ascent vehicles designed to wage an all-out effort to begin returning samples of the Martian regolith as early as April 2008.

"This plan lays out the whole framework for our next quantum leap in Mars exploration," said Dr. Charles Elachi, JPL's Space and Earth Sciences Program director and head of the architecture study. "The establishment of the first permanent robotic colonies on Mars, capable of harnessing the planet's natural resources to build a technology base for space flight to and from the planet and biospheres for human settlements well within the lifetimes of our grandchildren, is the most exciting prospect awaiting us as a global community."

The new Mars architecture plan, which is currently being refined by NASA and participating space agencies, underscores the roles and responsibilities of the four space agencies in formulating an integrated, international roadmap for the exploration of Mars.

According to Haynes, the study focuses on robotic surface activities during the early launch opportunities beginning in 2001 through 2011. Many of the early missions will focus on studies of the Martian surface involving science payloads designed to conduct chemical analyses of rocks and soils, obtain rock core samples and tap subsurface water reservoirs and other natural resources that could be used to manufacture propellants to fuel sample-return vehicles.

Work on the architectural redesign began in June. Eight "tiger teams" of experts from the international scientific community, led by Elachi and Dr. Frank Jordan, manager of JPL's Mars Program Planning and Architecture Office, were formed to address issues of spacecraft design, innovative technologies and science goals for missions beginning in 2003, as well as for achieving the overall goals

Quick Calendar

SAC Christmas Party
Pot Luck —Maricopa, AZ
7:30 PM, Saturday, December 5

SAC Star Party
Buckeye Hills Recreation Area
Saturday, December 12

SAC Star Party
Buckeye Hills Recreation Area
Saturday, January 9

SAC Meeting
7:30 PM, Friday, January 29

1999 SAC Officers

President	**Paul Dickson**
Vice President	**Steve Coe**
Secretary	**Jennifer Keller**
Treasurer	**Jack Jones**
Properties	**Ken Reeves**

Dues are Due

See Membership Services Form on the back page.

of the long-range Mars Surveyor Program. Recommendations were presented to NASA Administrator Daniel Goldin on Sept. 24 and, subsequently, approved for implementation.

New requirements for the 2001 Mars missions, brought about earlier in the year by Congressional markups of the fiscal year 1999 NASA budget, prompted the redesign effort. The Mars 2001 project went to work to hammer out a compromise of scientific instruments on the proposed orbiter, lander and rover to meet new budget and spacecraft mass requirements.

Under the current mission architecture, the Mars 2001 lander will be equipped with a robotic arm and descent camera to explore materials buried below the Martian surface. The spacecraft will also carry a panoramic camera and mini-thermal emission spectrometer, which was part of the originally proposed payload, and a Moessbauer spectrometer designed to study Martian materials.

Three human exploration experiments developed under NASA's Human Exploration and Development of Space (HEDS) Enterprise are also included in the lander payload: the Mars Environmental Compatibility Assessment Project experiment, an instrument to investigate potentially hazardous atmospheric conditions that could affect human exploration; a Mars propellant production experiment to explore the feasibility of using atmospheric carbon dioxide to manufacture fuel for return vehicles; and a Mars radiation experiment to detect hazardous amounts of the substance in the Martian atmosphere.

In addition, a simpler, lighter-weight rover modeled after Mars Pathfinder's Sojourner rover was chosen to replace the original, more sophisticated and costly roving vehicle. The new rover, nicknamed Marie Curie, will carry an alpha proton X-ray spectrometer similar to the spectrometer carried on the Sojourner rover to study the chemical composition of rocks and surface soils and a second Mars radiation experiment to detect harmful levels of radiation on the Martian surface.

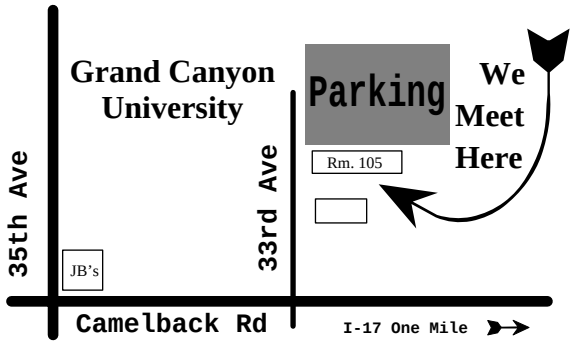
NASA will begin the series of sample-return mission in 2003, with launch of a lander and a rover that will spend several months searching for and collecting rock and soil samples, said Dr. Daniel McCleese, chief scientist and manager of the Office of Strategy and Science Programs for JPL's Mars Exploration Directorate. The roving vehicle will return the sample to a new, low-cost, low-mass Mars ascent vehicle.

Conceived by Brian Wilcox of the JPL Mars Exploration Technology Development Division, the Mars ascent vehicle is the centerpiece of the program's overarching, short-term goal to explore the Martian subsurface robotically. The vehicle is a simple rocket with with a three-stage, spin-stabilized ascent system, solid-rocket motors, minimal onboard guidance and virtually no moving parts. The launcher, which weighs about 100 kilograms (220 pounds) or less than 30 percent of previous Mars ascent vehicle designs, will place soil and rock sample canisters into a low-Mars orbit, where they will await pick-up by orbiters arriving at Mars beginning in 2005.

NASA will also provide a Boeing Delta 3-class launch vehicle and an Earth entry capsule comprised of a

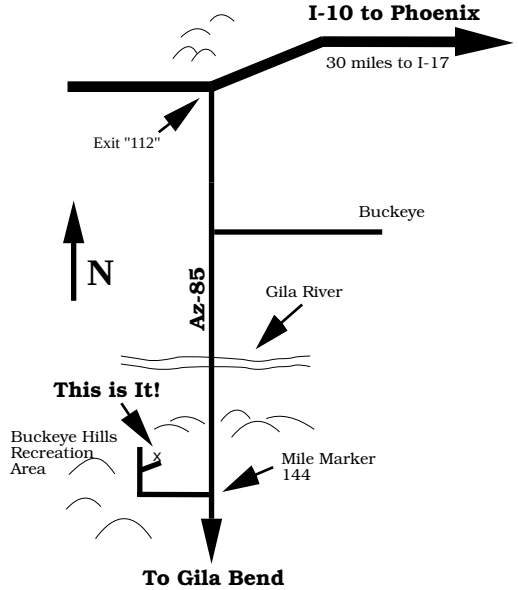
Directions to SAC Events

SAC General Meetings 7:30 PM at Grand Canyon University, Fleming Building, Room 105 — 1 mile west of Interstate 17 on Camelback Rd., north on 33rd Ave., second building on the right.



SAC Deep Sky Subgroup Meeting at John & Tom McGrath's, 11239 N. 75th St., Scottsdale, 998–4661 — Scottsdale Rd. north, Cholla St. east to 75th St., southeast corner.

SAC Star 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.



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. All insertions must be submitted in writing.

For Sale: Celestron CG-11, Losmandy Mount, Digital Setting Circles, Polar Alignment Scope, 2″ diagonal, $f/6.3$ Reducer, Extra Counterweight, sure sharp focus, scope cover and dew shield and two eye pieces — $3,500. 2″ Rear Cell VHC filter by Lumicon fits all SCTs. See the Whole Loop of Veil $199 new, yours for $125. Tuthill 80mm Ulitmate Finder $395 new, — $295. 9x63 Celestron PRO Binocs $95. Jody Humber, 412–2329 or E-mail at `jjhumber@juno.com`.

crescent-shaped heat shield and crushable foam material that will shield the Martian soil and rock samples when they plummet to the floor of a desert in Utah in spring 2008.

In partnership with the French space agency, Centre National d'Etudes Spatiales (CNES), NASA will also work toward developing a small "microspacecraft" weighing less than 200 kilograms (440 pounds) for delivery to Mars during this launch opportunity, Elachi said. CNES has agreed in principle to providing a piggyback ride to Mars on its Ariane 5 launch vehicle, which is capable of placing the Martian microspacecraft on a geosynchronous transfer orbit above Earth. If flown, the miniature spacecraft would use its own propulsion and gravity assists from the Moon and Earth to gain enough momentum to reach Mars.

Another collaborative arrangement with the Italian space agency, Agenzia Spatiale Italiana, will add a drill and other robotic elements to the 2003 Martian lander and those following in its footsteps. Additional robotic elements will include radio relay equipment to support the European Space Agency's proposed "Mars Express" orbiter, which will be used for data transmission from landers arriving at Mars in future years. The European Space Agency also plans to supply a sounding radar for the mission.

In 2005, a single Ariane 5 launch vehicle carrying a duplicate of the 2003 lander, rover, Mars ascent vehicle and French orbiter will be launched to Mars. The lander, with its companion rover and ascent vehicle, will land at a different location, collect a second sample of Martian rocks and soils and loft it into low-Mars orbit.

The orbiter will be inserted into a highly elliptical Mars orbit, aerobrake to low-Mars orbit, rendezvous and dock with the 2003 orbiting sample container and then rendezvous and dock with the 2005 sample. After 11 months in orbit, the spacecraft will fire its rocket engines to inject itself and the two Earth entry capsules on an Earth-return trajectory. The orbiter will target the two entry capsules carrying Martian samples onto impact trajectories, deploy them and then deflect its own trajectory so that it does not crash into Earth.

Two options are currently on the table with NASA and the French space agency for inserting the 2005 orbiter into Mars orbit. The first option would be to use propulsive maneuvers to lower and circularize the spacecraft's orbit. The second option would be to use a technique called "aerocapture," which is similar to aerobraking but would slow and directly capture the spacecraft in orbit in one step, rather than gradually slowing and lowering the spacecraft through a series of "walk-in" phases used in the aerobraking strategy. With aerocapture, the orbiter would be able to reach its final, circular mapping orbit within about one week instead of approximately nine months.

If international participation and the budgetary outlook remain stable, a total of six samples from six separate locations on the surface of Mars will have been returned by 2013, Haynes said.

To realize this scenario, another Delta 3-class launch vehicle would be used in 2007, carrying a lander, rover and Mars ascent vehicle. The samples collected would be cached on orbit to await pick-up by the 2009 orbiter. In 2009, two launches using Delta 3-class launch vehicles would follow suit. The orbiter would be the first vehicle to be launched, followed by a second lander, rover and Mars ascent vehicle. A French orbiter would collect the Mars samples from both the 2007 and 2009 landers and deploy them on return trajectories to Earth. If successful, that mission scenario would be repeated in 2011 and 2013.

Dues are Due

It's time to renew your SAC membership for the upcoming year. Dues are still $28 ($42 for the whole family) for the year. **See the Membership Services Form on the backpage of this newsletter.**

Magazine renewals have changed slightly. While *Sky & Telescope* is still $27, *Astronomy* has gone up to $29.

In other news, the 1999 R.A.S.C. Observer's Handbooks have arrived! They will be available at the Christmas party in December and on into 1999 until they run out. They are $12 a copy.

Orders will be taken for the 1999 Astronomy WALL Calendar at the club discount price of $10.00. (We need 10 minimum.)

We will also take orders for 1999 Year In Space DESK calendars at the club discount price of $10.00. It's 172 pages, See at http://www.YearInSpace.com (We need 10 minimum.)

Comet Comments

by Don Machholz

(530) 346–8963 CC243.TXT October 7, 1998
http://members.aol.com/cometcom/index.html
DonM353259@aol.com

88P/Howell

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	20h23.7m	−23°07′	57°	E	10.9
12–03	20h40.3m	−22°04′	56°	E	11.1
12–08	20h56.4m	−20°57′	55°	E	11.2
12–13	21h12.0m	−19°46′	54°	E	11.3
12–18	21h27.1m	−18°32′	53°	E	11.4
12–23	21h41.8m	−17°15′	51°	E	11.6
12–28	21h56.0m	−15°57′	50°	E	11.7
01–02	22h09.7m	−14°37′	48°	E	11.8

Comet Williams, presently our brightest comet, enters the morning sky. In the evening sky **Comet Meunier-Dupouy** passes by **Periodic Comet Howell** (still in outburst) on November 29 and **Periodic Comet Giacobini-Zinner** two weeks later. Finally **Comet LINEAR (C/1998 M5)** steadily brightens while **Comet LINEAR (1998 U5)** passes by earth at a distance of only 45 million miles in mid-November. Watch this one for a possible outburst.

C/1998 T1 (LINEAR): Picked up on October 2 by the Lincoln Laboratory Near Earth Asteroid Research Team, it was first thought to be an asteroid. This comet is presently magnitude 15 but is still nearly a year from perihelion, and in a retrograde orbit. It should be visible in binoculars next summer as it passes 50 million miles south of us.

C/1998 S1 (LINEAR-Mueller): Jean Mueller at Palomar found this three weeks after the LINEAR picked it up as an asteroid. The comet was closest to the sun at 2.5 AU last summer and remains faint. The orbital period is 9.1 years.

C/1998 U1 (LINEAR): Found on Oct. 18, this comet remains faint at a distant perihelion distance of 4.0 AU.

C/1998 U2 (Mueller): Found on Oct. 22, this faint comet remains between Mars and Jupiter with a period of 8.8 yrs.

C/1998 U3 (Jager): Amateur Michael Jager of Austria used a 10-inch Schmidt and film to pick this up on Oct. 23. It is now at its brightest (magnitude 12) and will soon be dimming.

C/1998 U4 (Spahr): Timothy Spahr of Arizona used a 16" Schmidt with a CCD when he found this on Oct. 27 as part of the Catalina Sky Survey. It remains faint at magnitude 16 with an orbital period of 13 yrs.

C/1998 U5 (LINEAR): This comet was found Oct. 30, has a high retrograde orbit, and is visible in our northern sky.

COMET HUNTING NOTES: Williams, Jager and Tucker are all now eligible for the Wilson Comet award. Each amateur used a different methods to find "their" comets: visual, photographic and CCD.

21P/Giacobini-Zinner

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	21h06.1m	−17°05′	69°	E	8.9
12–03	21h33.4m	−19°06′	70°	E	9.0
12–08	22h01.1m	−20°48′	70°	E	9.1
12–13	22h28.9m	−22°09′	70°	E	9.2
12–18	22h56.4m	−23°08′	71°	E	9.4
12–23	23h23.3m	−23°44′	72°	E	9.6
12–28	23h49.4m	−23°59′	73°	E	9.9
01–02	00h14.3m	−23°55′	74°	E	10.1

C/1998 U5 (LINEAR)

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	22h20.4m	+41°42′	105°	E	11.0
12–03	22h51.4m	+34°11′	94°	E	11.3
12–08	21h35.4m	+28°51′	84°	E	11.6
12–13	21h25.6m	+25°03′	77°	E	11.9
12–18	21h19.3m	+22°16′	70°	E	12.2
12–23	21h15.1m	+20°10′	64°	E	12.4
12–28	21h12.2m	+18°32′	58°	E	12.6
01–02	21h10.1m	+17°16′	53°	E	12.9

C/1997 J2 (Meunier-Dupouy)

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	21h11.0m	−16°08′	70°	E	13.1
12–03	21h14.0m	−16°40′	65°	E	13.2
12–08	21h17.3m	−17°08′	61°	E	13.3
12–13	21h20.7m	−17°33′	56°	E	13.3
12–18	21h24.3m	−17°56′	52°	E	13.4
12–23	21h28.1m	−18°16′	48°	E	13.5
12–28	21h32.0m	−18°34′	43°	E	13.6
01–02	21h36.0m	−18°50′	39°	E	13.6

C/1998 M5 (LINEAR)

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	18h45.5m	+36°13′	68°	E	9.9
12–03	18h46.0m	+36°31′	66°	E	9.8
12–08	18h46.9m	+36°58′	65°	E	9.8
12–13	18h48.3m	+37°33′	64°	E	9.6
12–18	18h50.1m	+38°18′	64°	E	9.6
12–23	18h52.1m	+39°12′	64°	E	9.5
12–28	18h54.5m	+40°17′	64°	E	9.5
01–02	18h57.1m	+41°34′	65°	E	9.4

C/1998 P1 (Williams)

Date	RA-2000-Dec		Elong	Sky	Mag
11–28	13h20.7m	−18°03′	41°	M	9.1
12–03	13h18.4m	−16°42′	47°	M	9.2
12–08	13h15.6m	−15°13′	53°	M	9.2
12–13	13h12.0m	−13°33′	59°	M	9.2
12–18	13h07.4m	−11°39′	66°	M	9.3
12–23	13h01.8m	−09°29′	73°	M	9.3
12–28	12h54.6m	−06°57′	81°	M	9.3
01–02	12h45.7m	−03°59′	89°	M	9.3

Orbital Elements

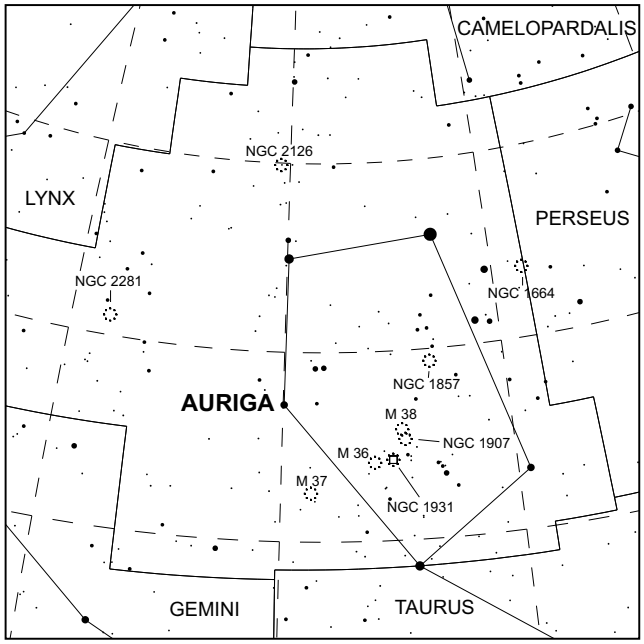
Object:	Giacobini-Zinner	Meunier-Dupouy	Howell	Williams	LINEAR (M5)	LINEAR (U5)
Peri Date:	1998 11 21.32107	1998 03 10.4365	1998 09 27.19738	1998 10 17.838	1999 01 24.5733	1998 12 21.7737
Peri Dist:	1.0337095 AU	3.051186 AU	1.404878	1.14674 AU	1.742213 AU	1.23192 AU
Arg/Peri (2000)	172.54569°	122.6864°	234.8593°	294.473°	101.2873°	051.4478°
Asc Node (2000)	195.39930°	148.8467°	057.65738°	156.379°	333.3766°	066.6606°
Incl (2000):	031.85856°	091.2706°	004.39961°	145.730°	082.2285°	131.9990°
Eccentricity:	0.7064344	1.001019	0.5531119	1.0	1.0	1.0
Orbital Period:	6.61 years	Long Period	5.57	Long Period?	Long Period?	Long Period
Reference:	NK 629	MPC 32410	MPC 31205	MPEC 32410	MPC 32410	IAU Cir. 7044
Epoch:	1998 11 21	1998 07 06	1999 08 10	1998 10 17	1999 01 22	1998 12 22
Absol Mag/"n":	9.0/6.0	4.0/4.0	7.7/4.0	6.5/4.0	5.5/4.0	11.0/4.0

Fuzzy Spot

by Ken Reeves

Auriga December 1998

Look north in the early Winter skies, and you'll see a bright star. This is Capella, the Goat Star, and is the nearest first magnitude star to the north celestial pole. Look to the south-southwest from Capella for a steep triangle of stars, these are the Kids. The asterism of the Goat and Kids form part of the great Winter Milky Way constellation Auriga, the Charioteer. This constellation contains many nice open clusters and some pretty good nebulae. The showpiece is M 37, one of the richest open clusters in the skies. So pull out your scope and start rambling through Auriga.



NGC 1664 (04h51.1 +43°42′) On the Perseus/Auriga border, this open cluster is pretty large, somewhat bright, somewhat poor, and somewhat loose. There are a few strings of stars in this cluster, and a bright star on the ESE. Discounting the bright star, there are 2 levels of stars with some possible haze in the background. I counted about 40 stars with most of stars grouped in 3's and 4's. This cluster is so loose it's hard to tell where the edge is.

NGC 1857 (05h20.2 +39°21′) This cluster is dominated by a bright yellow central star which is a close double. The rest of it is somewhat small and pretty faint except for a couple of stars. I saw 4 levels of stars with some possible haziness. Using averted vision, I counted 38 stars. Just to the N of the cluster is a nice triangle of stars. The grouping of 1857 and the stars to the N form cluster Cz-20.

NGC 1907 (05h28.0 +35°19′) This is the companion cluster to M 38. It is somewhat bright, somewhat small, somewhat rich, and very condensed. At 140X, I saw about 30 stars in 3 levels over some haze. There are 2 bright stars to the S which are probably not part of the cluster.

NGC 1912 (05h28.7 +35°50′) **M 38** is the first of the three Messier objects we will look at in Auriga. At 70X, it is somewhat large, pretty bright, rich, and somewhat condensed. There is a single star in the middle, then a dark area, then a good scattering of stars with a real nice string of stars to the N. Outside of this concentrated area is a looser scattering of stars, almost like a tight cluster within a larger loose cluster. There are 4 or 5 levels of stars with 85 stars counted in the concentrated part, and about 175 stars if you include the loose outer part. The stars roughly form a "K" with the central star at the center of the K. Take your time to analyze this cluster, there is so much to see.

NGC 1931 (05h31.4 +34°15′) This nebula is pretty small, somewhat bright, and possibly elongated E/W. Using averted vision helps bring it out a little, but there is no response to the UHC filter. Look at the central star, it is a nice close triple star.

NGC 1960 (05h36.1 +34°08′) This is the second Messier cluster in Auriga, **M 36**. It is very large, very bright, pretty rich, but not very condensed. I saw 3 levels of stars, with a real nice double in the middle and with some stars showing some red and blue color. I counted about 55 stars. It is a nice bright cluster with some interesting strings, although not one of the richer Messier clusters.

NGC 2099 (05h52.4 +32°33′) The last Messier cluster in Auriga, **M 37**, is one of the greatest clusters in the sky. At 70X, it is very large, pretty bright, very condensed, and very rich. The stars form a triangle pointing E, with dark areas along the edge of the triangle, then more stars. The dark areas form an "A". I counted about 120 stars in 3 levels, including a bright yellow star in center. Using averted vision, there are probably around 200 stars. This is a real nice cluster whether looking at it from in town, at a fair site, or from a real dark site.

NGC 2126 (06h03.0 +49°54′) Getting back to Herschel 400 objects, this cluster, located SW of a bright star, is somewhat big, somewhat faint, pretty poor, and loose. I saw about 25 stars in 3 levels, not including the bright star.

NGC 2281 (06h49.3 +41°04′) The last cluster of the month is very bright, somewhat large, somewhat poor, but what is there is fairly condensed. The central section contains 4 real bright stars with 2 of these having faint companions, and several strings of stars leading away from this central section. There are 3 levels of stars, and I counted 37 stars, 28 of these in central concentration. This is a nice cluster, out away from Milky Way so the background stars don't swamp it out.

Herschel 400 Objects
1664, 1857, 1907, 1931, 2126, 2281

SAC's 110 Best of the NGC Objects
1907, 1931

Bits and Pieces

Minutes from the November Meeting

President Paul Dickson called the meeting to order at 7:30 by knocking on the table. He invited any guests to sign the guest book and if so inclined, to introduce themselves of which 9 people did.

Jack Jones gave the treasurer report. He also mentioned that the 1999 Observers Handbook are in and to pick them up from him at the break. He also asked for people who were interested in the 1999 Astronomy calendar and the Year in Space calendar to see him.

No one was available to talk about public star parties, but Rick Tejera mentioned that there were 4 scopes available for the Garden Lakes School party.

Steve Coe, filling in for AJ Crayon, mentioned the upcoming Deep-Sky meeting at the McGrath's house. He also talked about the new Observers Guide Books that will be coming out, and gave some history of the Observers Guide magazine from which the books were compiled. He then presented a Herschel 400 award to yours truly, awarded by the Ancient City Astronomy Club and the Astronomical League. Finally, he talked about the very successful novice star party at Buckeye Hills, and mentioned that the next one will probably be next year.

The end of the year SAC party was announced to be at Steve Dodder and Rosie Cruz's place south of Maricopa on the 5th of December. Directions will be in the December newsletter. The pot luck party starts at 7:30 and there will be a board meeting at 7:00. Members of the board from both 1998 and 1999 should attend the board meeting.

Speaking of board members, nominations were completed with one person in each position. Club members voted with 1 opposed and all others in favor. The officers for 1999 are as follows:

President	Paul Dickson
Vice President	Steve Coe
Secretary	Jennifer Keller
Treasurer	Jack Jones
Properties	Ken Reeves

Paul Dickson mentioned that he had copies of all three observers logbooks available for sale.

For show and tell, Pierre Schwaar had several short videos, including the transit of Ganymede on Jupiter, the superior conjunction of Venus near the sun, Saturn, and Comet Hale Bopp using his image intensifier.

Chris Schur had 10 slides of areas of Cygnus and Cephus taken with the Schmidt Camera. Some of these were taken with 3 negatives stacked.

At the break, 56 people were counted.

After the break, Vice President Gerry Rattly introduced speaker Mark Buie from Lowell Observatory, who is an expert on Pluto. He provided a nice history on the discovery of Pluto, and much detail on the orbit of the planet, with respect to Neptune and the rest of the solar system. He then provided a mapping of the surface of Pluto as best known using images from the Hubbell Space Telescope and by applying mapping techniques. His main point of the presentation was the possibility of a space probe to Pluto, which, if approved, would fly by the planet in about 2014. The imaging would take place in about 15 minutes, but it would take about a year to send all the information back to Earth. For more information, see his Pluto web page at www.lowell.edu/users/buie/pluto. He closed off his presentation by clearly staring that Pluto is a planet!

Paul adjourned the meeting at 10:10, after which 12 people continued the informal meeting at JB's

—*Ken Reeves, SAC Secretary*

Crown King Skies

by Margie Williams

margewms@netzone.com

I am still up to repairs with my new cabin, plumbing, stonework, planting, painting. It will take more than one year to get it in shape.

If any club members would like to try their telescope at 6,000 feet at my cabin and/or 7,000 at the tower, I would welcome a visit. I can sleep 11 people in 6 different sleeping areas. Just bring your scope and I will have bed and food for you. I'm always cooking and the beds are lying there unusued.

Give me a call or email: 944–6752 home, 227–0509 pager, 375–1403 work, or (520) 632–8012 at Crown King.

I usually go up twice a month, Thursday night through Monday afternoon.

The I-17 turn-off to Crown King is exit 259, Bloody Basin. (McDowell Road is milepost 200 and the north Phoenix limit is milepost 225.) Then go about 25 miles to the west to Crown King on a dirt road. I can send a map to all interested. It takes two hours, generally speaking to get there, one hour on the highway and one hour on the dirt road.

If you happen to be there, not having contacted me previously, and want to stay the night, ask at the Crown King General Store if I am there and ask for the directions to my cabin which is a mile to the northwest on Moss Road (#4) or call me on the phone using my Crown King number. Be sure to let the phone ring a lot of times because my yard is an acre long.

[Margie sent me this message in September, but it got buried. —Paul]

Newsletter Deadline

Mail items for Such-a-Deal at least two weeks before the end of the month. Articles that need to be published in a timely fashion must be submitted or the newsletter editor notified of the article at least 6 weeks before month they are published. Items arriving too late for an issue will be included in the next newsletter.

December 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Mercury at inferior conjunction (moves into morning sky) **1**	Tomorrow Full Moon 8:20 A.M. **2**	**PAS Meeting** Brophy Prep. Physics Lab **3**	**TAAA Meeting** (Tucson) **4**	**SAC Party** (See Page 7) **5**
6	**7**	Edwin Hubble born 1889 **8**	**EVAC Meeting** (SCC: Rm. PS172) **9**	Last Quarter Moon 10:54 A.M. **10**	**11**	**SAC Star Party** Buckeye Hills (members&guests) **12**
Geminid Meteors Peak: 10 P.M. Z.H.R.: 100 ! **13**	**14**	**15**	**16**	Tomorrow Sun enters Sagittarius 8 A.M. **17**	New Moon 3:43 P.M. **18**	Tomorrow Mercury at greatest elongation 22° (morning) **19**
20	Winter Solstice 6:56 P.M. **21**	**22**	**23**	**24**	**25**	First Quarter Moon 3:46 A.M. **26**
27	**28**	**29**	**30**	**31**	All Times are Mountain Standard Time	

SAC Information

Area Code (602)

President & SACNEWS Editor	Paul Dickson	Ans. & FAX: 841–0509 dickson@primenet.com
Vice President	Gerry Rattley	892–5698
Treasurer	Jack Jones	944–5488 looka.fuzzy@mcione.com
Secretary	Ken Reeves	878–9460 ken.reeves@cas.honeywell.com
Properties	Adam Sunshine	780–1386 asunshine@netzone.com
Public Events	Rich Walker	997–0711 rhwalker@aztec.asu.edu
Public Events	Wil Milan	8am–6pm: 996–8329 wmilan@airdigital.com
Deep-Sky Group	A.J. Crayon	938–3277 acrayon@primenet.com

E-Mail Mailing Lists

SAC-mls is a mailing list for club announcements and quick notification of astronomical events.

SAC-Board is for SAC business. All club members are welcome to participate.

AZ-Observing is a fairly general mailing list about observing in Arizona. Where the star parties are and who's going, as well as what's up.

To join, send E-mail with the `Subject: subscribe` to the "`-request`" mailing address at `psiaz.com`. For example, you would send the request for AZ-Observing to `AZ-Observing-request@psiaz.com`.

SAC Web Sites

`www.accessarizona.com/groups/group_access.html`
`www.primenet.com/~dickson/sac.html`

Saguaro Astronomy Club Member Services Form

Membership

Memberships are for the calendar year and are prorated as follows: Jan - Mar 100%, Apr - Jun 75%, Jul - Sep 50%, Oct - Dec 25%.

- ❑ $28.....Individual Membership
- ❑ $42.....Family Membership (one newsletter)
- ❑ $100.....Business Membership (includes advertising)
- ❑ $4.....Nametag for members
- ❑ $14.....Newsletter Only

Subscriptions

The following magazines are available to members. Subscribe or renew by paying the club treasurer. You will receive the discounted club rate only by allowing the club treasurer to renew your subscription.

Sky & Telescope.....$27.00 for one year ❑

Astronomy.....$29.00 for one year ❑

Write your name, address, phone number, and E-mail address in the space below.

Make checks payable to SAC. Mail the completed form to:

Jack Jones
SAC Treasurer
2313 W Sierra St
Phoenix AZ 85029

SAC and SAC Meetings

Saguaro Astronomy Club (**SAC**) was formed in 1977 to promote fellowship and the exchange of scientific information among its members — amateur astronomers. **SAC** meets monthly for both general meetings and star parties, and regularly conducts and supports public programs on astronomy.

SAC meetings are usually held on the Friday nearest the full moon. This means that over the course of the year, meetings are not held on the same week of the month. The same is true of the club's star parties. Star parties at Buckeye Hills Recreation Area are mostly held on the Saturday of the third quarter moon.

1998 SAC Meetings

Jan. 9
Feb. 13
Mar. 13
Apr. 10
May 8
Jun. 12
Jul. 10
Aug. 7
Sep. 11
Oct. 2
Nov. 6
Dec. 5 Party

1998 SAC Star Parties

Date	Sunset	Moonrise
Feb. 21	6:18PM	3:40AM
Mar. 21	6:39PM	2:23AM
Apr. 18	6:59PM	1:08AM
May 16	7:19PM	11:54AM
Jun. 20	7:37PM	3:27AM
Jul. 18	7:34PM	2:10AM
Aug. 15	7:12PM	12:57AM
Sep. 12	6:37PM	11:45PM
Oct. 10	6:00PM	10:32AM
Nov. 14	5:27PM	3:48AM
Dec. 12	5:22PM	2:35AM

SAC General Meetings: 7:30 PM at Grand Canyon University, Fleming Building, room 105 — one mile west of Interstate 17 on Camelback Rd, north on 33rd Ave., second building on the right. See inside for a map to the meeting location.

SACNEWS
c/o Paul Dickson
7714 N 36th Avenue
Phoenix AZ 85051

Stamp

First Class Mail

Inside: