

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



April 1994 — Issue #207

v3.22

The Soviets and Venus

by Larry Klaes

Part 2

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This article is from the February, March, and April issues of the Electronic Journal of the Astronomical Society of the Atlantic (EJASA) (Volume 4, Numbers 7-9).

Testing the Waters

In the months after the premature end of the VENERA 2 and 3 mission, the Soviets regained some of their dominance in space exploration. LUNA 9 and 10 became the first vehicles to respectively soft land upon and orbit Earth's moon in February and April of 1966, racing ahead of similar American attempts in preparation for placing humans on Luna by 1970. By the close of 1966, two more Soviet lunar orbiters and another lander were to follow.

The next launch window to Venus began in June of 1967. Twelve days into the month, a MOLNIYA rocket delivered a spacecraft named VENERA 4 on its way to the Soviets' latest encounter with Venus. Essentially, VENERA 4 was an improved version of the VENERA 3 mission profile. Another possible Venus lander, COSMOS 167, failed to leave the Earth parking orbit it was placed in on June 17 and decayed on the twenty-fifth.

Two days after the launch of VENERA 4, the United States also took advantage of the Venerean launch window with its fifth MARINER spacecraft. Originally the backup vehicle for the MARINER 4 Mars probe, the American entry was modified for a mission to the much warmer vicinity of Venus. Though MARINER 5 carried neither cameras nor an entry capsule, the flyby craft was fitted with a number of instruments for making a thorough analysis of the Venerean atmosphere and surrounding environment. The American probe was scheduled to arrive at Venus just one day after VENERA 4, where the two voyagers' data would later be compared.

Quick Calendar

SAC Meeting

Speaker: Rick Blakley, *Evaluating Telescopes*
7:30, Friday, March 25

SAC Deep Sky Meeting

Constellation: 19 of 110 Best NGC
7:30, Thursday, March 31

Messier Marathon

New Arizona City Site
Saturday, April 9

Public Star Party — REACH 11

Tatum Blvd. & Union Hills
Saturday, April 16

SAC Meeting

7:30, Friday, April 22

Sentinel Star Party

Sentinel, Arizona
Saturday, May 7

The design of the VENERA 4 lander contained some interesting revelations, not only in the level of current Soviet space technology, but also where Soviet scientists stood in their views on conditions at Venus. One of the more interesting features about the lander capsule was its ability to float in a liquid, in case the capsule encountered a Venerean ocean. VENERA 4 was also built to withstand an atmospheric pressure roughly equivalent to twenty times that of Earth's at sea level, or twenty bars.

Despite the information returned five years earlier by MARINER 2 and the subsequent radio telescope scans of the planet, some Soviet scientists remained uncertain as

SAC Officers

President	Bob Gardner	274-5046
Vice President	Susan Morse	934-7496
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Secretary	A.J. Crayon	938-3277
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SACNEWS Editor	Paul Dickson	862-4678
Public Events	Rich Walker	997-0711

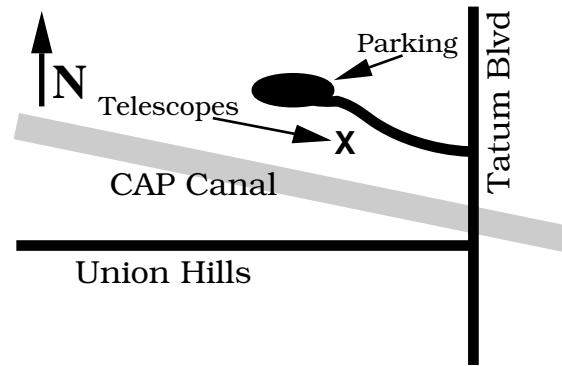
Public Star Party at REACH 11

Saturday, April 16
Sunset to 10 PM*

Observe the Night Sky

Sponsored by
 Phoenix Parks & Recreation Dept.
 Telescopes by Saguaro Astronomy Club
 and other valley clubs

*Club members bringing scopes can
 setup beginning at 6 PM



to exactly what lay beneath Venus' cloud layers. Hope sprung eternal for the discovery of a world beyond Earth that was friendly to life, even in rudimentary form.

After a single course correction in late July of 1967 to ensure an impact, VENERA 4 reached Venus on October 18. The lander separated from the main spacecraft bus upon arrival, both vehicles aimed into the night side of the planet. The bus was destroyed by the heat from air friction with its fast entry into the Venerean atmosphere, but not before returning valuable information on the conditions surrounding Venus. Among the more important data from the bus were a lack of any detectable radiation belts or magnetic fields. A weak corona of hydrogen particles was found circling ten thousand kilometers (sixteen thousand miles) above the planet.

Meanwhile, VENERA 4's lander capsule plowed on

into the planet's atmosphere at a speed of ten kilometers (sixteen miles) per second, generating friction heat up to eleven thousand degrees Celsius (19,832 degrees Fahrenheit), twice as hot as the photosphere of the Sun! Thanks to its protective heat shield and sturdy structure, the capsule was able to survive these extremes.

Dropping deeper into the thickening soup of Venus' atmosphere, the capsule was slowed to a velocity of three hundred meters (990 feet) per second. At this point, the lander's top cover was ejected and a braking parachute emerged to arrest the craft even further, down to a speed of ten meters (thirty-three feet) per second. Having served its purpose, the braking parachute then made way for the main parachute, which let the capsule drift towards the surface. Instruments snapped into activity and the capsule began taking the first direct atmospheric readings of

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 same week of the month. The same is true of the club's star parties. Star parties at Buckeye Hills are mostly held on the Saturday of the third quarter moon.

1994 SAC Meetings

Jan. 28
 Feb. 25
 Mar. 25
 Apr. 22
 May 27
 Jun. 24
 Jul. 22
 Aug. 19
 Sep. 16
 Oct. 21
 Nov. 18
 Dec. 17 Party

1994 SAC Star Parties

Date	Sunset	Moonrise
Jan. 8	5:38pm	5:22am
Feb. 5	6:05pm	4:11am
Mar. 5	6:29pm	2:58am
Apr. 9	6:55pm	5:42am
May 7	7:16pm	4:17am
Jun. 4	7:34pm	2:52am
Jul. 2	7:42pm	1:27am
Aug. 6	7:24pm	6:09am
Sep. 3	6:51pm	4:56am
Oct. 1	6:14pm	3:40am
Oct. 29	5:40pm	2:24am
Nov. 26	5:22pm	1:12am

Venus for ninety-four minutes, until the probe's signals abruptly ceased.

At first, Soviet technicians reported that VENERA 4 had transmitted all the way to the Venerean surface. Data on the atmosphere indicated it was composed primarily of carbon dioxide, with only traces of oxygen and water vapor. Nitrogen, previously thought to be a major component of Venus' air, could not be detected. Other data seemed to show that the surface air pressure equaled fifteen to twenty-two Earth atmospheres, with an average temperature of 280 degrees Celsius (536 degrees Fahrenheit).

The next day, America's MARINER 5 flew by the veiled planet from a distance of just 3,991 kilometers (2,480 miles). For twenty-six minutes the craft's flight path took it behind Venus as viewed from Earth. During this time, MARINER's radio signals cut through the planet's atmosphere on their way to Earth, displaying intricate details in the process.

The Data Conflicts

Once the MARINER data were received by its mission controllers and properly analyzed, some surprising discoveries were made which were contrary to the information from VENERA 4. According to the American

Comet Comments

by Don Machholz

(916) 346-8963 CC188.TXT March 9, 1994

One faint returning comet has been recovered. Meanwhile, several comets remain visible, the most interesting being Comet McNaught-Russell, 1993v. As suggested here two months ago, it has brightened rapidly and should be a binocular object in early April as it passes only 0.46 AU from the earth. Additional study shows that 1993v may actually be the same comet that was visible here in the year 574, making its first return since then. This is a good comet to get out to see.

Periodic Comet Wild (1994b): This comet was recovered by J. Scotti and T. Gehrels of Kitt Peak on Feb. 10

at magnitude 20. It has a 6.9-year orbital period and will be closest to the sun at 2.30 AU on July 21. It will not be getting much brighter.

Periodic Comet Schwassmann-Wachmann 2					
Date	RA-2000-Dec	Elong	Sky	Mag	
03-24	08h23.5m	+21° 24'	120°	M	11.6
03-29	08h27.6m	+21° 16'	116°	M	11.7
04-03	08h32.3m	+21° 05'	112°	M	11.8
04-08	08h37.6m	+20° 50'	108°	M	11.9
04-13	08h43.3m	+20° 33'	105°	M	12.0
04-18	08h49.5m	+20° 13'	101°	M	12.1
04-23	08h56.1m	+19° 49'	°98	M	12.2
04-28	09h03.3m	+19° 23'	°95	M	12.3
05-03	09h10.5m	+18° 55'	°92	M	12.4
05-08	09h17.7m	+18° 24'	°89	M	12.5

Periodic Comet Shoemaker-Levy 9 (1993e)					
Date	RA-2000-Dec	Elong	Sky	Mag	
03-24	14h38.1m	-16° 02'	141°	M	13.6
03-29	14h36.7m	-15° 54'	146°	M	13.6
04-03	14h35.0m	-15° 44'	152°	M	13.6
04-08	14h33.2m	-15° 33'	157°	M	13.5
04-13	14h31.2m	-15° 20'	163°	M	13.5
04-18	14h29.1m	-15° 08'	168°	M	13.5
04-23	14h26.9m	-14° 54'	174°	M	13.5
04-28	14h24.6m	-14° 40'	179°	M	13.5
05-03	14h22.4m	-14° 26'	176°	E	13.5
05-08	14h20.2m	-14° 12'	170°	E	13.5

Periodic Comet Tempel 1					
Date	RA-2000-Dec	Elong	Sky	Mag	
03-24	13h31.2m	+12° 00'	156°	M	11.0
03-29	13h28.7m	+12° 21'	159°	M	10.7
04-03	13h25.5m	+12° 37'	160°	M	10.5
04-08	13h21.8m	+12° 45'	160°	E	10.3
04-13	13h17.6m	+12° 44'	158°	E	10.1
04-18	13h13.4m	+12° 33'	156°	E	9.9
04-23	13h09.2m	+12° 10'	152°	E	9.7
04-28	13h05.3m	+11° 34'	148°	E	9.5
05-03	13h02.0m	+10° 46'	144°	E	9.4
05-08	12h59.5m	+09° 45'	140°	E	9.3

Comet McNaught-Russell (1993v)					
Date	RA-2000-Dec	Elong	Sky	Mag	
03-24	04h17.0m	-03° 43'	62°	E	6.5
03-29	04h32.4m	+07° 30'	60°	E	6.3
04-03	04h49.2m	+20° 11'	60°	E	6.2
04-08	05h07.9m	+33° 15'	62°	E	6.3
04-13	05h29.8m	+45° 24'	64°	E	6.5
04-18	05h56.3m	+55° 38'	66°	E	6.8
04-23	06h29.9m	+63° 43'	69°	E	7.2
04-28	07h14.1m	+69° 44'	71°	E	7.6
05-03	08h11.5m	+73° 49'	73°	E	8.0
05-08	09h22.5m	+76° 06'	75°	E	8.4

Period Comet Mueller (1994a)					
Date	RA-2000-Dec	Elong	Sky	Mag	
03-24	22h44.4m	+01° 25'	22°	M	10.2
03-29	22h48.0m	+00° 37'	26°	M	10.2
04-03	22h51.4m	-00° 12'	30°	M	10.2
04-08	22h54.7m	-01° 03'	34°	M	10.3
04-13	22h57.7m	-01° 55'	38°	M	10.3
04-18	23h00.5m	-02° 51'	43°	M	10.3
04-23	23h03.0m	-03° 49'	47°	M	10.4
04-28	23h05.2m	-04° 52'	52°	M	10.4
05-03	23h07.1m	-05° 59'	57°	M	10.4
05-08	23h08.6m	-07° 12'	62°	M	10.4

The 1994 Arizona Messier Marathon

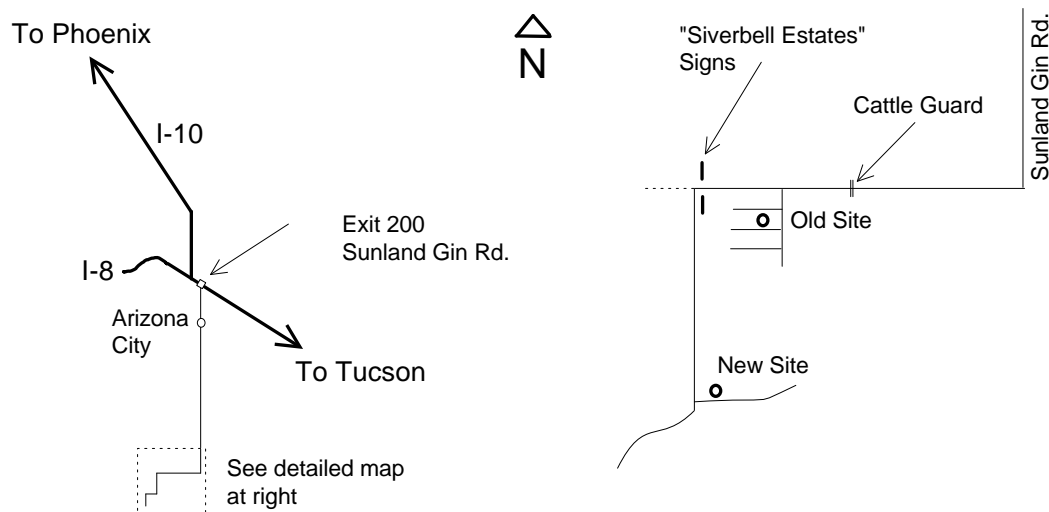
The 1994 Arizona Messier Marathon will be held on **Saturday night, April 9** in place of the monthly SAC star party. The object of the marathon is to view as many of the 110 entries in the Messier Catalog as the night and your observing skills permit.

Last year 37 telescopes started at sunset, with the top observer finding 97 entries in the catalog. All this with mostly cloudy conditions. By dawn, there were still 15 telescopes remaining.

At the March meeting, there will be available a handout containing observing tips, suggested observing order, and check-off list.

Awards will be presented in recognition of your efforts. Certificates will be awarded to those observing 50 or more entries. Telescope plaques will be awarded for first, second and third places. Duplicate plaques will be presented in case of ties.

Other Arizona Astronomy Clubs have also been invited. The East Valley Astronomy Club (EVAC) and the Tucson Amateur Astronomy Association (TAAA) have accepted the invitation.



Take I-10 to exit 200 (Sunland Gin Road.) Turn right (south) after exiting the freeway. After about 15 miles, the pavement ends and about one mile further, the road turns sharply to the west. One mile past the road to the old site, the main road will turn south just after the "Silverbell Estates" signs. Continue for another 2.5 miles. The road will veer off to the west. Immediately to the east is the road to the site. About 100 yards down this road are several large, open areas to the left.

space probe, Venus' surface pressure was far greater than recorded by either its Soviet counterpart or from earlier estimates, being roughly equivalent to seventy-five to one hundred Earth atmospheres. The ground temperature was also much higher, a sizzling 527 degrees Celsius (981 degrees Fahrenheit).

MARINER 5 discovered other differences between Venus and Earth: The solar wind was deflected around Venus by its encompassing ionosphere, rather than by any significant magnetic field as happens with Earth. It appeared that Venus' creeping rotation and possible lack of a liquid iron core were major contributors to the absence of a planetary magnetic field. The mass of Venus was refined to 81.5 percent of Earth's. An object weighing forty-five kilograms (one hundred pounds) on Earth would tip the scales on Venus at forty-one kilograms (ninety-one pounds).

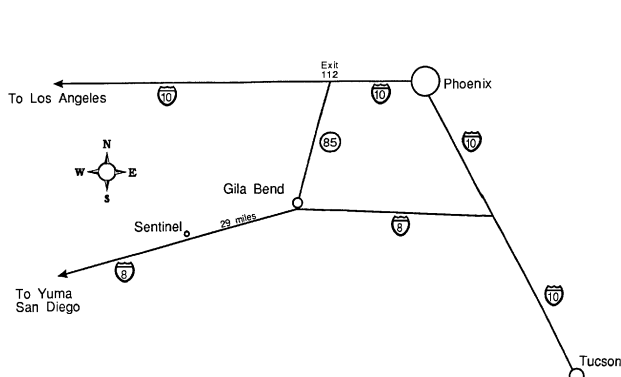
The Soviets initially replied to the conflicting data that VENERA 4 must have landed on the summit of a very high mountain, in order to explain the lower pressure

and temperature readings from their probe. Eventually, though, it had to be concluded that VENERA 4 did not survive its descent to the surface. The capsule was probably crushed at a height of twenty-seven kilometers (sixteen miles) by the increasing atmospheric pressure, with the top of the craft caving in first. Most likely, VENERA 4 did ultimately reach the planet's crust, but only as so much scrap metal. Venus had taught a hard lesson that its surface pressure and temperature were much higher than originally believed.

Although VENERA 4 did not accomplish its main goal of reaching the Venerean surface intact, the on-site atmospheric measurements were priceless to scientists. The high readings of carbon dioxide found by the VENERA probe gave the initial clues as to why Venus is so alarmingly hot. This colorless gas is excellent at trapping the radiation received from the Sun and keeping it from escaping the planet back into space. However, carbon dioxide alone could not hold in such intense heat for long. More missions would be needed to learn what the other key in-

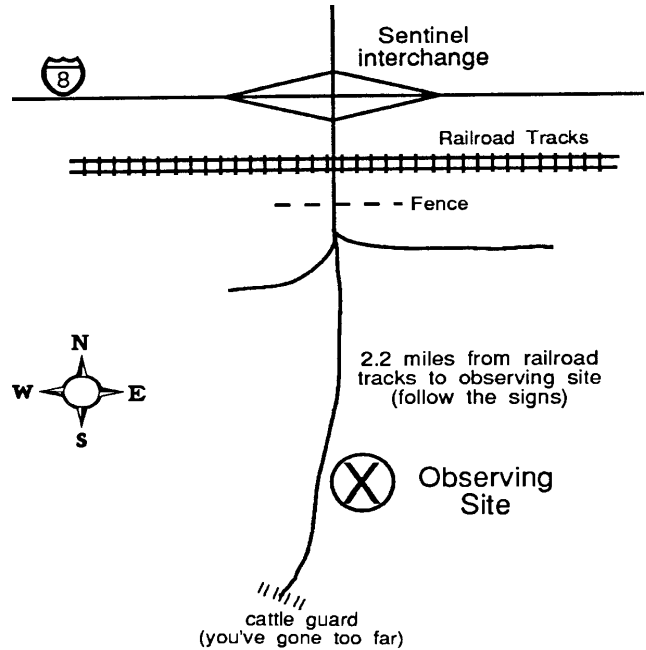
Sentinel Star Party

May 7, 1994



The third annual Sentinel Star Party is taking place at the Sentinel Site on May 7, 1994. Sunset is at 7:16 PM MST and moonrise is at 4:17 AM MST.

Sentinel is 2 hours southwest of Phoenix; there are no facilities there. Plan for cold weather and large insects — letting us have a chance of getting neither.



gradients were.

One could not call the VENERA 4 mission a failure, despite its premature demise. The very fact that the Soviets had attempted to land a vehicle on another planet just ten years after they had placed the first satellite into Earth orbit was an astounding accomplishment in its own right. Most importantly, VENERA 4's tandem investigation of Venus with MARINER 5 gave their parent nations a good indication of how much valuable information could be learned about space through mutual cooperation.

The Final Steps

Since the launch window of 1961, the Soviet Union had not passed up a single attempt at a mission to Venus. The window of 1969 was to be no exception. However, enough had been learned about the shrouded world in those eight years to prove that Venus was quite hostile to an invading spacecraft from Earth. Any future expeditions to Venus had to be fortified against crushing pressures and melting temperatures, amongst a host of unknown factors.

The relatively short period since the 1967 Venus launch window did not allow the Soviets enough time to develop a vehicle that would be tough enough. Instead, they opted to send one more mission with their existing VENERAs to venture further into the planet's dense atmosphere before the inevitably destructive end above Venus' broiling surface. A VENERA which could survive on Venus' rocky face would have to wait for the next window.

Just seven months before the United States would deliver the first astronauts to the surface of Earth's moon with the historic flight of APOLLO 11, the two latest entries in the Soviet exploration of Venus were launched into deep space. VENERA 5 lifted off from Tyuratam on January 5, 1969, followed by VENERA 6 five days later. For the first time, a multiple Soviet Venus probe mission did not lose any known spacecraft members during launch or in Earth orbit. This success would not be duplicated again until 1975.

After one mid-course correction each during their five-month interplanetary journeys, VENERA 5 and 6 arrived at Venus just one day apart. On May 16, VENERA 5 injected its lander capsule into Venus' atmosphere. The capsule plunged in at a greater speed than did VENERA 4's lander two years earlier. These newest VENERA capsules were given some modifications against the planet's harsh environment. Among the changes were smaller parachutes, which helped the landers drop faster towards the Venerean surface.

VENERA 5 returned atmospheric data to Earth for fifty-three minutes, descending for thirty-six kilometers (twenty-two miles) until being flattened by the surrounding pressure just twenty-four to twenty-six kilometers (fourteen to sixteen miles) above the hot landscape. The VENERA 5 data was extrapolated to indicate that the surface temperature and pressure beneath the spacecraft's descent path was 530 degrees Celsius (986 degrees Fahrenheit) and 140 Earth atmospheres, respectively. The capsule also carried a photometer device to examine the

amount of light below Venus' clouds. One light reading of twenty-five watts per square meter was recorded just four minutes before the lander ceased transmitting.

VENERA 6 came upon the scene the next day, releasing its capsule from the main bus some twenty-five thousand kilometers (fifteen thousand miles) from Venus. The VENERA 6 lander lasted for fifty-one minutes in the dark of the planet's night side, eventually collapsing just as its twin probe did, but at an improved altitude of between ten and twelve kilometers (six and eight miles) from the ground. Though the atmospheric constituents relayed by both landers generally agreed with the data from VENERA 4, traces of nitrogen were detected this time.

The temperature and pressure readings returned by VENERA 6 were puzzling, however. The robot's measurements seemed to indicate that the crust below was just four hundred degrees Celsius (752 degrees Fahrenheit) warm and pressed down by an atmosphere only sixty times greater than Earth's, much lower than previous readings. For a while Soviet scientists tried the same "high mountain" excuse for the contrasting information that they used with the VENERA 4 lander data. This hypothesis was soon rejected in favor of the possibility that VENERA 6 had suffered some sort of instrument malfunction during its operation, thus the inconsistent readings.

Later explorations of Venus have since shown that the region the two Soviet probes were aimed for, Tinatin Planitia, lies just below the planet's mean radius, discrediting the high mountain hypothesis.

The Surface at Last

Nineteen Seventy was a golden year for the Soviet Union and their growing space program. In Earth orbit, the cosmonaut crew of SOYUZ 9 broke the two-week manned space endurance record held by the crew of America's GEMINI 7 since 1965. Earth's moon was the location of several more major Soviet accomplishments: On September 24, LUNA 16 returned to its home world with the first lunar soil samples taken by an automated probe. Two months later, LUNA 17 carried the first unmanned rover, LUNOKHOD 1, to the lunar surface. The multi-wheeled robot spent the next year exploring the Sea of Rains.

The shining planet Venus was also remembered during that year. On August 17 and 22, two MOLNIYA boosters placed identical payloads into Earth orbit. The first one went on to the second planet from the Sun and became known as VENERA 7. The second payload failed to leave the vicinity and was called COSMOS 359, where it remained until atmosphere entry on November 6, 1970.

VENERA 7 was the hardest of the Soviet Venus probes yet built. Its creators wanted this vessel to land on the planet's surface in working order. As a result, the spacecraft became much heavier than its predecessors. The entry capsule alone weighed about five hundred kilograms (1,100 pounds), due to modifications based on information supplied by VENERAs 4 through 6. The VENERA 7 lander could withstand temperatures up to 540

degrees Celsius (1,004 degrees Fahrenheit) and pressures equal to 180 bars for at least ninety minutes.

The egg-shaped capsule was to be kept cooled at minus eight degrees Celsius (17.6 degrees Fahrenheit) by a refrigeration system in the main bus until its release at the planet, to guard against Venus' intense heat for as long as possible. A smaller parachute was made to quicken the capsule's fall through the turgid Venerean air. Shock absorbers were added to cushion the impact with the alien soil. There were fewer external openings and more insulation on the small vehicle, and its instrument compartment was hermetically sealed.

VENERA 7 performed two mid-course corrections during its flight through space — another first in the Soviet Venus program — before arriving at the veiled planet on December 15, 1970. Unlike the earlier VENERA entry profiles, the VENERA 7 lander did not break from the main bus until both craft were entering the atmosphere, probably to extend the capsule's cooling period.

Sixty kilometers (thirty-six miles) above the planet, the vessel's main parachute popped free and the probe began transmitting information about the thick night air around it. Then, thirty-five minutes later, VENERA 7 suddenly went silent. Without any warning, something had apparently destroyed the capsule.

Soviet controllers back on Earth were shocked. They had thought for certain that this time every possible contingency about Venus had been accounted for with room to spare. Fortunately the controllers had kept tracking and recording the mission even after the apparent signal loss. Several weeks later, a very pleasant discovery was made during a search through the recording tapes: VENERA 7 had reached the Venerean crust intact and continued to send data for twenty-three minutes from the southwestern section of Tinatin Planitia.

It seems the capsule had somehow been knocked over upon landing, causing its transmitter antenna to point in an unfavorable direction. The lander's signal strength was only one percent of what it was during the descent through the atmosphere. The lander's transmissions became almost indistinguishable from the regular background radio noise.

While it may not have been very graceful, VENERA 7 had achieved yet another victory for the Soviet Union: The first successful landing of a functioning vehicle on another planet.

In addition to its historical accomplishment, VENERA 7 confirmed the numerous analyses of Venus' environment from previous Soviet and American explorations during its brief lifetime. The temperature at Tinatin Planitia was reported to be 475 degrees Celsius (887 degrees Fahrenheit), give or take twenty degrees. A bare chunk of lead placed on the planet would melt. Air pressure ninety times greater than Earth's at sea level (give or take fifteen atmospheres) engulfed the small probe. Existing on Venus was equivalent to being 990 meters (3,300 feet) under the oceans of Earth, only much warmer and

drier. No other member of the terrestrial family of planets held such high surface temperatures and pressures.

The second planet from the Sun, once thought to be a goddess of beauty from its brilliant appearance in Earth's night sky, was finally revealed to be a world more like the fire and brimstone vision of Hell from Christianity. Instead of invoking fear, however, there was now even greater curiosity and will to learn why a planet so similar to Earth in many fundamental ways could also be so radically different at the same time.

Continued next month...

About the Author

Larry Klaes, EJASA Editor, is the recipient of the ASA's 1990 Meritorious Service Award for his work as Editor of the EJASA since its founding in August of 1989. Larry also teaches a course on Basic Astronomy at the Concord-Carlisle Adult and Community Education Program in Massachusetts.

Newsletter Deadline

Mail items at least two weeks before the end of the month. Items arriving too late for an issue will be included in the next newsletter.

Bits and Pieces

Coming Events

Star Parties

Messier Marathon	Apr. 9
Sentinel	May 7
R.T.M.C.	May 28-29
Grand Canyon	Jun. 4-11
All-Arizona	Oct. 7 & 8

Public Star Parties

REACH 11	Apr. 16
Thunderbird Park	May 14
Thunderbird Park	Fall — TBD

Deep Sky Meeting

The Deep Sky Group is made up of people that like to observe celestial bodies out past the far reaches of our Solar System. These bodies include stars, nebula and galaxies. If you are interested in sharing your observations, or knowing what they look like in telescopes — then by all means come join us at the next meeting. We will discuss 19 Deep Sky objects of the 110 Best of the NGC. The meeting will be held at John McGrath's house; directions are here in the newsletter.

You don't need to RSVP, we don't extend special invitations to anyone — ourselves included. If you are interested show up, we'd love to have you.

The Deep Sky meeting will take place on Thursday, March 31 at 7:30pm.

Minutes of the February Meeting

President Bob Gardner opened the meeting at 7:30 PM. A call for visitor introduction produced 3 first time visitors. Carol Lee, treasurer, gave the treasurer's report. The president announced the next SAC Start Party and meeting. See elsewhere in the newsletter for dates.

A.J. Crayon reported on Deep Sky events. He finally got out that the next Deep Sky meeting would be March 31 and about 20 objects from the 110 Best NGC would be discussed. See elsewhere in the newsletter for the list. This procedure would be followed for the next 6 meetings. The messier Marathon was announced for April 9. Handouts were available for interested parties.

Steve Coe announced and discussed the Sentinel Star Party which is scheduled for May 7. He also acted for Rich Walker and announced two Public Star Parties for April 16 and May 14. They will be held at REACH 11 and Thunderbird Park, respectively.

Turning to old business, Susan Morse was voted in as the 1994 SAC Vice President. Thank you Susan!

It was pointed out that the May 27 SAC meeting conflicts with Riverside Telescope Makers Conference. A proposal was made to reschedule the meeting to May 20. After a short discussion the proposal was tabled and will be voted on at the next meeting.

For the Show-'N'-Tell, Leon Knott discussed Historical Telescopes. He specifically covered a 3 1/2" f/10 brass refractor made by W. & D. Mogyey around 1910. As the story unfolded, Leon and his cohorts — Jerry Belcher, Don Wrigley, and Art Zarkos — conspired to restore the gem and unveiled it at the meeting. If you missed this meeting you missed seeing an excellently restored telescope in working order. Leon promised to try and have it available for the Messier Marathon.

After the break the new elected Vice President, Susan Morse, introduced the speaker for the evening. He was Henry Vanderbilt, Executive Vice President of the Space Access Society. His company is one of the many involved in attempting to make near space access available to the general public. They are pushing for reusable space vehicles to reduce costs. Though they may not look a lot like passenger planes, they would be almost as reusable.

—A.J. Crayon, SAC Secretary

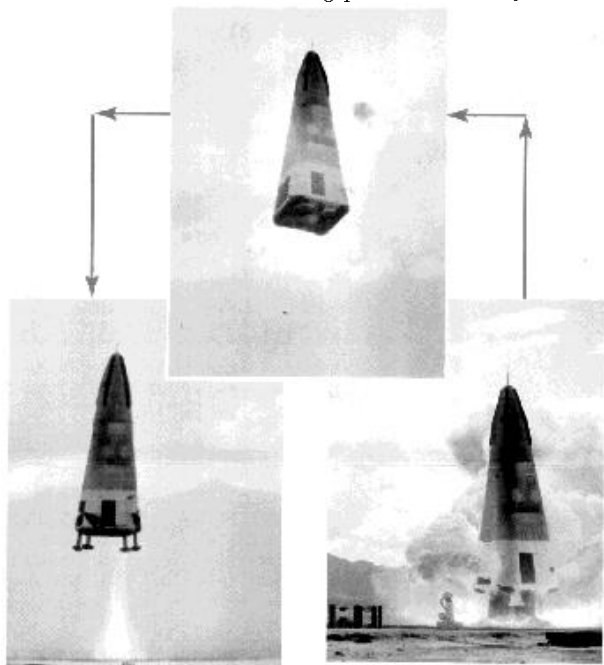
Observing...

The star party on Saturday, Mar. 5 saw 12 people show up at Buckeye Hills. The weather predicted for the night was slightly questionable, with a storm building over California to arrive the next day. Saturday started clear, but high clouds increasing throughout the day. By night-fall, these clouds were moving in groups, with large clear spaces in between them.

The worse part of the night had nothing to do with the sky. There was a new mercury vapor light (it is not known if it is permanent) set just over the small hill

towards the northwest. There was some sort of social event occurring which included an auction and concert. Throughout the night there was traffic on the road past the observing site with both high-beams and large quantities of dust stirred into the air. And worst of all, we had at least four vehicles drive directly into the observing site with their head-lights on.

Most of the observers hung-on until after midnight. By then the temperature started dropping and thicker waves of clouds were darkening parts of the sky.



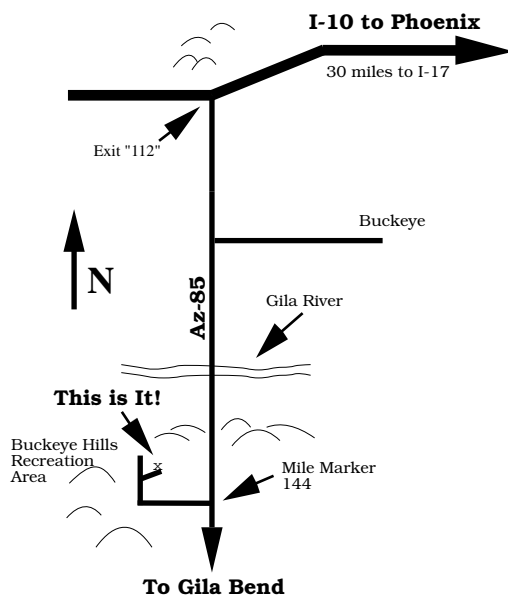
At the last SAC meeting the speaker, Henry Vanderbilt, offered a video tape of the DC-X flights and background info. For those of you who didn't buy one at the meeting or get an order form, the tape is \$20. Send the checks to: Space Access Society, 4855 E Warner Rd #24-150, Phoenix, AZ 85044.

—Paul Dickson, SACNews Editor

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 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.

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.

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.

Wanted—Looking for people to come speak/show slides to the Prescott Astronomy Club. Contact Paul Comba, (602) 771-9209.

For Sale—Meade SN8 — 8" *f*/4 schmidt newtonian with dual axis LX3 drive \$750. Call Bill, 561-9370 (after 5 PM).

For Sale—Celestron Powerstar C8-PEC. 8" *f*/10 C8 with periodic error correction. Storage foot locker/carrying case. Asking \$1200 or best offer, call Jim, 893-0198 after 6 PM or 554-8789 8:00 to 5:00 PM.

For Sale—Three Meade modified achromatic eyepieces. All brand new 25mm, 12mm, 9mm \$75. Contact Doug Allen 877-1529.

April 1994

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						Last Quarter Moon 7:55 P.M. 1 2
3		5	6	PAS Meeting 7	Gemini 1 Launched 30 years ago 8	Messier Marathon Arizona City 9
New Moon 5:17 P.M. 10		Venus 1.0°S of Moon 4 P.M. 12		Christian Huygen's 365th Birthday 14		Public Star Party REACH 11 16
17	First Quarter Moon 7:34 P.M. 18			Lyrid meteor shower 21	SAC Meeting 22	
24	Full Moon 12:45 P.M. Jupiter 3°N of Moon 10 P.M. 25		EVAC Meeting 27		Jupiter 2°N of Moon 4 P.M. 29	Jupiter at opposition 30

Magazines & Discounts

Club members may subscribe to astronomical magazines at reduced rates through the club Treasurer. See the Member Services Form on the back page of this newsletter. Furthermore, club members are encouraged to align their subscriptions with the Jan.-Dec. calendar year. This eases the burden both on the Treasurer and the Publisher by permitting a single Group Renewal to be placed in the autumn for the upcoming calendar year.

Those members who experience problems with their subscriptions to *Astronomy* magazine may call Kalmbach Publishing Customer Service at (800) 446-5489.

Those members who experience problems with their subscriptions to *Sky & Telescope* magazine may call Sky

Publishing at (800) 253-0245.

Besides the club discount on *Sky & Telescope* magazine, Sky Publishing offers club members a 10% discount on all other Sky publications. This means books, star atlases, observing aids, Spotlight prints, videos, globes, computer software, and more.

Club members who subscribe to *Sky & Telescope* through the Club Discount Plan may order Sky publications directly, at the above toll-free number, without going through the club Treasurer. Simply mention the Club Discount Plan and give the Saguaro Astronomy Club name to receive the discount. Sky Publishing will check their records to verify that you are eligible to receive the discount.

Saguaro Astronomy Club Member Services Form

Membership

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

- \$20.....Individual Membership
- \$30.....Family Membership (one newsletter)
- \$100.....Business Membership (includes advertising)
- \$4.....Nametag for members
- \$10.....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 treasurer to renew your subscription.

- Sky & Telescope.....\$20.00 for one year
- Astronomy.....\$18.00 for one year

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

Make checks payable to SAC.
Mail the completed form to:
Carol Lee
SAC Treasurer
3314 N 68th Street, #205-W
Scottsdale AZ 85251



SACNEWS

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

Stamp

First Class Mail