

Saguaro Astronomy Club

Metro Phoenix, Arizona

SACNEWS



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The Soviets and Venus

by Larry Klaes

Part 1

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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).

Revolving around a small yellow star between the celestial paths of a crater-scarred world called Mercury and our blue-white Earth lies the planet known as Venus. Named by the Romans after their goddess of beauty and love for its white brilliance in Earth's night sky, Venus resembles our planet in both size and mass. However, while Venus can come closer to Earth than any other planet in our solar system, the second world from the Sun remained one of the more mysterious places in the Universe before the advent of the Space Age.

The relative brightness of Venus is due to the reflection of Sun-light off the planet's enveloping blanket of thick, yellowish clouds. Venus' strange atmosphere was discovered by the Russian scientist Mikhail Vasilievich Lomonosov during a rare transit of the planet across the solar disk in 1761. For two centuries after Lomonosov's revelation, Earth-bound astronomers would find themselves unable to penetrate this dominating feature with their optical telescopes to learn what lay beneath.

Wild speculation about Venus arose from the absence of facts to explain the state of this alien world. Through the first half of the Twentieth Century, Venus was populated with everything from primeval swamps crawling with reptilian creatures to boiling oceans of seltzer and oil. Even such 'basic' planetary information as Venus' rate of rotation was unknown because of the continual cloud cover. Estimates on the length of a Venerean day ranged from twenty-four hours to one Venerean 224.7 Earth days.

Scientists realized that direct measurements were needed to uncover the realities of this moonless world.

Quick Calendar

SAC Meeting

Speaker: Henry Vanderbilt, Space Access Society
7:30, Friday, February 25

SAC Star Party

Buckeye Hills Recreation Area
Saturday, March 5

SAC Meeting

7:30, Friday, March 25

SAC Deep Sky Meeting

Constellation: 25 of 110 Best NGC
7:30, Thursday, March 31

Messier Marathon

New Arizona City Site
Saturday, April 9

Rockets and spacecraft capable of reaching other planets were required for the task.

Competition for the Cosmos

The early years of the Space Age were dominated by two global superpowers, the United States of America and the Soviet Union. Shocked into reality on October 4, 1957 with the launch of the Soviet satellite SPUTNIK 1, these rival nations boldly pushed their ambitions and technologies into the interplanetary realm as part of what was termed the Cold War.

By the dawn of the 1960s, the Soviets had taken a considerable lead in this endeavor: Three of their unmanned space probes had already reached Earth's moon, Luna, completing their programmed missions. Other Soviet vehicles, designed to explore the two planets nearest Earth — Venus and Mars — were rapidly being prepared

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for their destinations.

In the Western Hemisphere, the United States had yet to achieve a single fully successful lunar mission with their series of PIONEER probes. As a form of consolation, PIONEER 5, a scaled-back Venus flyby project, was launched from Cape Canaveral in Florida on March 11, 1960 to investigate the interplanetary medium between the orbits of Earth and Venus. The information from such an expedition was considered vital for the planning of spacecraft which would follow PIONEER's charting course all the way to Venus.

PIONEER 5 became an amazing success: The solar-powered sphere communicated with Earth until June 26, 36.4 million kilometers (22.5 million miles) from home, a record for that time. The probe confirmed the existence of interplanetary magnetic fields and relayed the surprisingly strong effects of various solar forces on the spacecraft. PIONEER bolstered the confidence of both the National Aeronautics and Space Administration (NASA) and the U.S. that they could compete with the Soviets in the exploration of deep space. PIONEER 5 now silently circles the Sun once every 312 days.

Soviet Aims for the Goddess of Love

On the fourth day of the second month in the year 1961, a rocket of the MOLNIYA class roared from a launch pad at the Tyuratam Space Center — more widely known as the Baikonur Cosmodrome — in a remote region of the Soviet Republic of Kazakhstan. Atop this powerful conical booster was a spacecraft designated by its builders as TYAZHELIY SPUTNIK 4, meaning Heavy Fellow Traveler in Russian. In the West, this craft was called SPUTNIK 7.

News of this launch had been kept from most of the world until the mission was well underway. Nearly all Soviet space missions of that era were made government

secrets until successful, so that a failure would not be able to disgrace the Soviet Union's appearance in space. Even when a mission did work as planned, it was often that scant information was released about the craft and its purpose. The ensuing Cold War caused both sides to become paranoid about revealing their technological limits to the other.

Soviet officials claimed that this new SPUTNIK was only a test of their latest Automatic Interplanetary Station (AIS) for launching spacecraft into higher Earth orbits. Western experts believed it to be the Soviet Union's first attempt to send an unmanned probe to the planet Venus, as this was a prime launch "window" for delivering a spacecraft to that world. Whatever the truth, the vehicle never left its parking orbit. The launch platform and alleged Venus probe eventually disintegrated on February 26 upon entering Earth's atmosphere.

Just one week after the launching of SPUTNIK 7, the Soviets placed yet another Heavy Fellow Traveler, TYAZHELIY SPUTNIK 5 (SPUTNIK 8), into Earth orbit on February 12. Within one day of its insertion into space, a small vehicle emerged from the orbital platform and was sent on its way to the second planet from the Sun. The West's belief that the Soviets were ushering in the era of robotic planetary exploration was thus confirmed.

Renamed VENERA 1 ("Venera" is the Russian word for Venus), the first Venus probe acknowledged by the Soviets was a domed, instrument-packed cylinder flanked by two solar panels and a radio antenna shaped like an open umbrella. The entire vehicle weighed 643.5 kilograms (1,418.9 pounds). The primary mission plan for this new breed of spacecraft was stated as a flyby examination of Venus in late May of 1961 at a distance of one hundred thousand kilometers (sixty-two thousand miles). During its flight to the target planet, VENERA 1 would send

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

back data collected on interplanetary gas, dust, magnetic fields, and cosmic rays every five days to its controllers on Earth.

The mission proceeded well until February 22. On that day, VENERA 1 was twenty-three million kilometers (fourteen million miles) from Earth and set to relay its next batch of gathered information. Then, unexpectedly, no signals were received at the appointed time. Attempts to pick up the probe's transmissions were made again on March 4 and 5 with the help of the giant Jodrell Bank radio telescope in Great Britain, but without success. VEN-

ERA 1 drifted off into heliocentric (solar) orbit, no longer of use to those who lofted it into space.

Should VENERA ever be recovered from the depths of interplanetary space, those who retrieve the Soviet probe will find inside the vehicle a small metal representation of Earth. Sealed within this globe is a commemorative medallion identifying the purpose and national origin of the Venus craft. The placing of such artifacts aboard deep space probes was destined to become a tradition with both the Soviets and the United States. They serve as a means of speaking to those future explorers who would

Comet Comments

by Don Machholz

(916) 346-8963 CC187.TXT February 8, 1994

The first comet of the year is a photographic find by an amateur. Meanwhile, several comets remain visible in our skies. Periodic Comet Schwassman-Wachmann 2 is in our sky for nearly the whole night. Periodic Comet Tempel 1 is brightening near opposition. The newly-discovered Comet McNaught-Russell is rapidly moving north, it will pass 0.46 AU from the earth in early April. It may become brighter than predicted here. Finally, Periodic Comet Shoemaker-Levy 9, expected to hit Jupiter this July, is faint but visible for most of the night.

Periodic Comet Kushida (1994a): This comet, the second found by Yoshio Kushida in five weeks, was a photographic discovery on Jan. 8 at magnitude 11. At discovery the comet was near opposition, not far from the star Regulus. He used a 4", f/4 patrol camera and Technical Pan 6415 film. It is now known that this is a periodic comet. It was closest to the sun on Dec. 12 at 1.36 AU and takes 7.2 years to complete each orbit. It is now dimming.

Kushida seems to be conducting the type of search program carried on by the Shoemakers at Mt. Palomar. The Shoemakers have recently retired their Palomar program in favor of one from Arizona where they will pick up fainter objects. This leaves the potential of undiscovered comets of magnitude 11-14 in the region of the ecliptic near opposition.

Periodic Comet Schwassman-Wachmann 2					
Date	RA-2000-Dec	Elong	Sky	Mag	
02-22	08h14.7m +20° 58'	148°	M	11.1	
02-27	08h14.2m +21° 11'	143°	M	11.2	
03-04	08h14.4m +21° 21'	138°	M	11.3	
03-09	08h15.5m +21° 27'	133°	M	11.4	
03-14	08h17.4m +21° 29'	128°	M	11.5	
03-19	08h20.1m +21° 28'	124°	M	11.5	
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	

Periodic Comet Shoemaker-Levy 9 (1993e)					
Date	RA-2000-Dec	Elong	Sky	Mag	
02-22	14h40.8m -16° 23'	110°	M	13.8	
02-27	14h41.1m -16° 23'	115°	M	13.8	
03-04	14h41.1m -16° 22'	120°	M	13.7	
03-09	14h40.8m -16° 20'	125°	M	13.7	
03-14	14h40.2m -16° 15'	131°	M	14.7	
03-19	14h39.3m -16° 10'	136°	M	14.6	
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	

This issue of Comet Comets is now available via electronic mail. You can download it by calling Kingmont Observatory BBS at (916) 652-5920 and requesting file CC187.TXT.

Periodic Comet		Tempel 1		
Date	RA-2000-Dec	Elong	Sky	Mag
02-22	13h29.4m +09° 32'	134°	M	12.6
02-27	13h31.6m +09° 52'	138°	M	12.3
03-04	13h33.2m +10° 16'	141°	M	12.0
03-09	13h33.9m +10° 42'	146°	M	11.7
03-14	13h33.9m +11° 08'	149°	M	11.5
03-19	13h33.0m +11° 35'	153°	M	11.2
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

Comet McNaught-Russell		(1993v)		
Date	RA-2000-Dec	Elong	Sky	Mag
02-22	03h06.5m -38° 31'	69°	E	13.8
02-27	03h15.7m -35° 13'	68°	E	13.4
03-04	03h25.9m -31° 16'	67°	E	13.0
03-09	03h37.2m -26° 27'	66°	E	12.6
03-14	03h49.4m -20° 29'	64°	E	12.2
03-19	04h02.7m -13° 00'	63°	E	11.9
03-24	04h17.0m -03° 43'	62°	E	11.5
03-29	04h32.4m -07° 30'	60°	E	11.3
04-03	04h49.2m -20° 11'	60°	E	11.2
04-08	05h07.9m -33° 15'	62°	E	11.3

follow, to let them know who and what paved the way into the Universe for humanity.

Despite the overall performance of these first two attempts to reach Venus, the VENERA series would eventually become one of the Soviet Union's greatest planetary exploration achievements for the next quarter century. True success, however, would have to wait.

In the meantime, the Soviets were content to finish out 1961 with two major victories in one of the most visible areas of their space program. On April 12, cosmonaut Yuri Gagarin became the first human to orbit Earth aboard VOSTOK 1. Nearly four months later, on August 6, VOSTOK 2 played host to Gherman Titov, the first cosmonaut to spend an entire day in space. By comparison, the United States had sent two astronauts on separate fifteen-minute suborbital flights inside the cramped confines of the MERCURY space vehicle in May and July. The U.S. was hard-pressed once again to impress the world with even more spectacular space missions.

Failures and Triumph

Following the Soviet VENERA missions of early 1961, the next occurrence of a rocket launch window to Venus began in the summer of 1962. These windows are created when Earth and a particular planet are at certain locations in their orbits around the Sun so that the least amount of booster energy can be used to launch the most feasibly massive spacecraft. Such an alignment for Venus and Earth occurs every nineteen months.

The United States made the first grasp for Venus in 1962 with their unmanned MARINER 1 spacecraft. Sent skyward from Cape Canaveral on July 22 aboard an ATLAS-AGENA B rocket, the flight at first appeared to be going well. Then, a rocket guidance programming error suddenly caused the booster to deviate from its planned course. With the ATLAS-AGENA heading towards the shipping lanes of the North Atlantic Ocean, the Range Safety Officer (RSO) was forced to destroy the vehicle with a radio command to an explosive device aboard the rocket. A brief rain of metal debris showered the water. The first American spacecraft meant for Venus instead met its end in the icy depths of the Atlantic.

One month later, the Soviets made their first Venus launch attempt of the year, but their luck was not much better than America's initial try with MARINER 1. The unnamed vehicle came apart in its Earth parking orbit on August 25 and disintegrated upon entering the atmosphere three days later. Two more Soviet Venus probes were conducted into space on the first and twelfth days of September, but neither craft traveled any further than their brief Earth orbits. These failures made it easy to wonder if the two superpowers' current technologies were truly up to the task of reaching another planet through millions of kilometers of deep space.

In the midst of these little-known Soviet attempts, the United States took their second shot at Venus on the night of August 27. MARINER 2, a 203.6-kilogram (448-pound) spacecraft resembling an oil rig with two so-

lar panels and a high-gain radio dish antenna, made its way into interplanetary space on a risk-filled journey to the shrouded world. Four months later, after a mission punctuated by numerous technical and heating problems, MARINER 2 became the first spacecraft to successfully reach another planet while still in communication with Earth.

Speeding past the yellow sphere of Venus on December 14 at a distance of 34,827 kilometers (21,648 miles), MARINER's two radiometers scanned the planet for thirty-five minutes. From this brief examination many important discoveries were made. One of the most startling was that Venus' global surface temperature averaged 427 degrees Celsius (800 degrees Fahrenheit), hotter than a conventional kitchen oven. Such intense heat was hundreds of degrees above most scientists' previous temperature estimations. It appeared that Venus' clouds somehow kept heat from the Sun bottled in, much like a green-house allows solar radiation to enter but not to escape.

The Venerean clouds floated in an unbroken layer fifty-six to eighty kilometers (thirty-four to forty-eight miles) thick above the planet's baked and arid crust. The dense atmosphere these clouds existed in was thought to exert pressure on Venus' surface twenty to thirty times greater than that of Earth's comparatively thin air at sea level.

MARINER 2 also found no evidence for either magnetic fields or radiation belts surrounding Venus as they do about Earth. In less than one hour, MARINER's encounter with the second planet from the Sun disrupted the decades-old theories of humid swamps and oily oceans, along with almost any hope for the existence of Venerean life as humans would recognize it. Venus was more unlike Earth than most astronomers had ever dreamed.

The American spacecraft's findings led not only to a radically new view of Earth's nearest planetary neighbor, but also to a rearranging of planetary mission priorities for the United States space program. NASA decided that the Red Planet, Mars, would be the next goal for their unmanned explorers. The conditions on Venus required more extensive study by space vehicles with a technical sophistication which was not readily available in the early 1960s. Mars also appeared to be a far more suitable planet for placing manned expeditions upon in the foreseeable future.

The Soviets, meanwhile, pressed on with their missions to Venus. For them, the second world appeared to be an easier spacecraft target to obtain than Mars: Every attempt to reach the Red Planet since 1960 had failed for a variety of mechanical reasons. Many Soviet astronomers were also not entirely convinced of the incredibly harsh environment that had been reported about the veiled planet. Some theorized that the high temperature readings by MARINER 2 may have come from the planet's ionosphere instead of its surface. This view kept alive the hope that the planet might at least harbor simple

organisms. Venus still held many secrets to be unlocked.

The Darkness Before the Dawn

With all the technical troubles encountered by the Soviets from their first Venus and Mars probes, it would have been only logical for the program scientists and technicians to conduct further tests on their planetary vehicles before sending them to those worlds again. A spacecraft launched from Tyuratam into Earth orbit on November 11, 1963, appeared to be the result of such planning.

COSMOS 21, so named due in part to a 1962 United Nations treaty demanding that all spacecraft be given some type of official designation, was shuttled into an Earth parking orbit similar to that used by other Soviet craft preparing for planetary destinations. Though no launch windows were open for either Venus or Mars at that time, Western experts speculated that COSMOS 21 might have been planned for a mission to the vicinity of Venus' solar orbit in a full engineering test of spacecraft systems. If this were the actual scenario, then COSMOS 21 must be considered a failure, as no probe left Earth orbit and the entire vehicle decayed three days later.

Whatever the case with COSMOS 21, Soviet scientists apparently felt confident enough to launch another series of Venus probes when the next window opened in February of 1964. Unfortunately, this confidence did not turn into success that year. Two rocket launches, on February 26 and March 4, apparently failed in mid-flight and their payloads were not even given the COSMOS cover nomenclature. Twenty-three days later, a third Venus probe did attain Earth orbit but went no further. COSMOS 27 lasted just one day in space.

A fourth and final Soviet try at Venus came the following month. On April 2, the 'barrier' of Earth orbit, which had stopped all Soviet Venus vessels save VENERA 1, was finally breached by ZOND 1, a spacecraft with a most non-specific cover name. "Zond" is the Russian word for probe. As with COSMOS, the name was designed to hide the craft's true destination, should it end up succumbing like the previous robotic explorers and thus bring further embarrassment to its creators. Though little was revealed about ZOND 1, it was probably meant to either flyby or impact on Venus in July of 1964, taking measurements of interplanetary space in the process.

The ZOND 1 mission proceeded well until after the last communication session on May 14, 1964, when the craft was suddenly fallen by the same fate as VENERA 1 three years earlier: It ceased transmitting to Earth. The Soviets' caution in giving the vehicle a generic name appeared to be a wise move for their prestige after all, though Western space experts were aware of the spacecraft's basic intentions.

ZOND 1 was the first and last ZOND mission to Venus. All future ZOND probes would be targeted for missions to Luna and Mars. Soviet space scientists now had another nineteen months to make up for the Venus project failures of 1964.

Stranger and Stranger

By the middle 1960s, new knowledge about Venus was still being obtained from the vantage of Earth. Various radio telescopes around the globe had penetrated the planet's thick cloud mask and returned to scientists the first radar images of Venus' equatorial regions, indicating a number of mountains and plateaus.

As a bonus from these observations, Venus' true rotation rate was finally learned. The information only served to add to the planet's growing reputation for possessing 'bizarre' conditions: One Venerean day (one complete rotation around the planet's axis) equaled 243.1 Earth days, nineteen days longer than its solar year! No other known world in the solar system rotated so slowly.

Venus was also discovered to spin on its axis in a retrograde fashion (clockwise as seen over the north pole), opposite to most of the other planets. To a person standing on an 'alternate' Venus—one with skies free of clouds—the Sun would appear to "rise" in the west and "set" on the eastern horizon 116.8 Earth days later. Why Venus behaved in this contrary manner remained a mystery.

So Close, Yet Still So Far

The year 1965 was a very fruitful one for American lunar and planetary efforts. The last two members of the RANGER series successfully completed their brief photographic missions to Luna, making way for the SURVEYOR fleet of unmanned lunar landers. Deeper into the solar system, MARINER 4 became the first spacecraft to flyby the planet Mars and return to Earth close-up images of its surprisingly barren and cratered surface.

The Soviets, on the other hand, were not accomplishing the showcase space missions they had presented in earlier years. Their numerous attempts to soft land an unmanned vehicle on Earth's moon finished either in solar orbit or as wreckage in the lunar dust. The lone Soviet Mars mission of that year, ZOND 2, suffered a major power drop and ceased communications just four months before its planetary encounter in early August.

On the plus side, the robot vehicle ZOND 3 took several dozen images of Luna's hemisphere hidden from Earth in July of 1965, the first such pictures since the Soviet LUNA 3 mission six years earlier. ZOND 3 then headed out to the orbit of Mars for a series of spacecraft system tests in 1966. There was now only one feasible goal left for the Soviet space program to regain some true prestige in the arena of planetary exploration: Venus.

The first space probe to be given the official VENERA designation since 1961, VENERA 2 was successfully launched on its way to Venus on November 12, 1965, followed by VENERA 3 four days later. The two probes were the most ambitious Soviet expeditions to the second world from the Sun yet created. VENERA 2 would attempt to flyby Venus in late February of 1966 and return the first close-up images of the planet. VENERA 3 was designed to achieve another space first for the Soviet Union: The actual soft landing of a vehicle on the Venerean surface.

The VENERA 3 craft held a ninety-centimeter (35.4-

The 1994 Arizona Messier Marathon

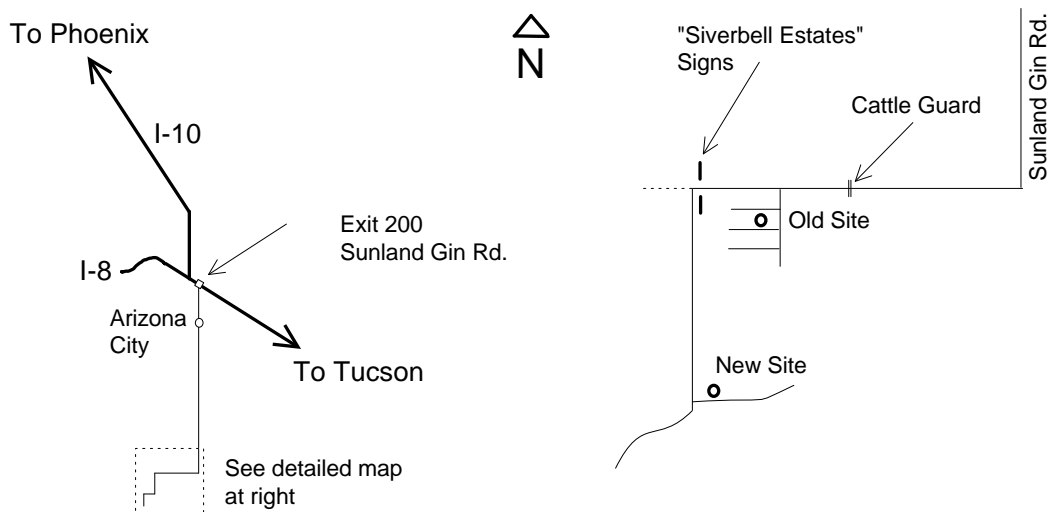
The 1994 Arizona Messier Marathon will be held on Saturday night, April 9 in place of the monthly SAC star party. The object of the marathon is to view as many of the 110 entries in the Messier Catalog as the night and your observing skills permit.

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.

inch) lander capsule weighing 383 kilograms (844 pounds). Once entry into the planet's dense atmosphere had been accomplished, the spherical probe would analyze the surrounding air while descending to the surface dangling beneath a parachute. On the ground, the lander would relay the first direct measurements from Venus' crust back to Earth for the life of its batteries.

A third member of the series, possibly a second lander, exploded in its Earth parking orbit on November 23 and decayed sixteen days later. What would have been VENERA 4 was subsequently designated COSMOS 96 and kept out of the public spotlight, like so many other Soviet space failures.

VENERA 2 and 3 glided to their alien destination through the first months of 1966, taking measurements of the interplanetary environment along the way. Then, on February 27, just before its closest approach, VENERA 2 reported a rapid increase in temperature and went per-

manently silent. None of the planned planet images were returned. VENERA 2 sailed past Venus 23,950 kilometers (14,370 miles) from the planet's center to join its fellow spacecraft in heliocentric orbit.

Two days later, VENERA 3 arrived on the scene, aimed almost directly for the heart of the veiled world. As the vehicle neared its time to separate the lander from the cylindrical flyby bus, communications were suddenly lost. Apparently the heating problem which had ended the counterpart craft's usefulness also brought about VENERA 3's demise.

It is not known if the lander ever broke away from the main bus. It is likely that the entire vessel entered Venus' atmosphere. Though it is also unknown if the probe actually reached the planet's surface or was destroyed from heat friction with the atmosphere, VENERA 3 is generally credited with being the first spacecraft to land on another planet. In commemoration of this event, the probe carried

a traditional metal globe of its home world, Earth.

The theory that VENERA 2 and 3 succumbed to overheating is not very surprising. Venus averages forty-two million kilometers (twenty-six million miles) closer to the Sun than Earth and receives twice the amount of solar radiation as does our planet. MARINER 2 was almost lost several times during its journey in 1962 due to the Sun's magnified heat.

Although the VENERAs were kept from completing their main tasks, the probes did prove that the Soviets could at least deliver working spacecraft to the vicinity of Venus. Additionally, Soviet plans for exploring the nearest planet were revealed to be far advanced over contemporary projects from the United States.

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.

E-Mail Roster

Here is another update to the e-mail addresses of SAC members and friends.

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Paul Maxson	maxson@gc.maricopa.edu 72117.1372@compuserve.com	Mike Willmoth	mwillmoth@bix.com 76170.1037@compuserve.com m.willmoth@genie.geis.com

Minutes of the January Meeting

President Bob Gardner opened the first meeting of 1994 promptly at 7:30 PM.

Carol Lee gave the Treasurer's report and announced that there were some 1994 Observer's Guides and name tags that were available.

The following announcements were made:

A.J. Crayon described the next Deep Sky meeting which will cover the constellations Gemini and Lupus. Also the 1994 Arizona Messier Marathon [April 9] and the Sentinel Star Party [May 7] were announced.

Rich Walker, Public Events Director, announced Public Star Parties for 1994. Two are planned for Spring [April 16 at Reach 11 and May 14 at Thunderbird Park] and one for Fall.

Turning to old business, the president opened nominations for Vice President. Tom Polakis gave an overview of the responsibilities for the office. There were no takers. The president promised to bug the membership until we get one.

Gene Lucas described a publication outlining the contributions of the late Cliff Holmes to Astronomy. His major achievement was to organize the highly popular Riverside Telescope Makers Conference. His contributions will be missed.

For the first Show-'N'-Tell, Pierre Schwaar had 2 "short features." The first was a video of the November lunar eclipse and the second a slide show. The eclipse video captured the lunar occultation of a very close double star and showed it to wink out in 2 distinct steps. Nice job Pierre!

Tom McGrath did the second Show-'N'-Tell. He showed the club some breathtaking slides from the serviced Hubble Space Telescope. Images from the Wide Field/Planetary Camera can best be described in one word—WOW! The pictures are available in GIF (Graphical Image Format) file from the internet host "seds.lpl.arizona.edu".

After the break, Tom Polakis and Chris Schur described their journeys to Chile and Australia.

Tom and Brian Skiff spent 2 weeks at Las Campanas Observatory in Chile. He described the "incredible" observing conditions and how his telescope was modified into

an 102 pound 13" dobsonian.

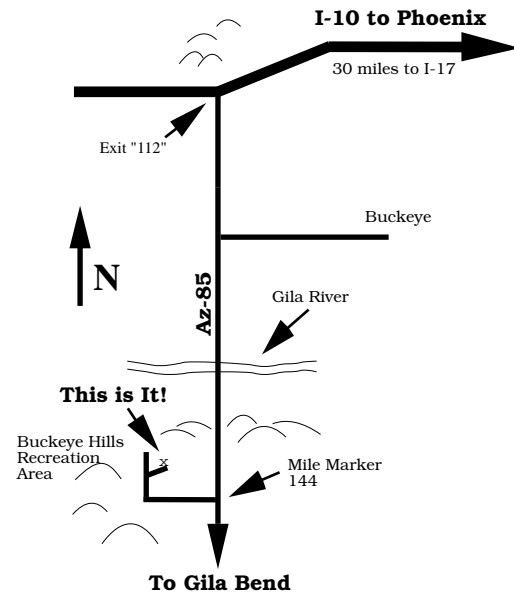
Chris showed slides taken from his observatory with a 50mm lens; with and without an Interference Filter. Exposure time was 3 hours and the filtered pictures showed nebulosity not seen on the other slides. His schmidt slides, from Australia, took about 3 minutes.

—A.J. Crayon, SAC Secretary

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.

March 1994

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			Jupiter 2°N of Moon 9 A.M.	PAS Meeting	Last Quarter Moon 9:53 A.M.	SAC Star Party Buckeye Hills (members & guests)
		1	2	3	4	5
6	7	8	9	10	11	New Moon 12:05 A.M. Moon is less 18 hours old at sunset
	Mars 0.4°N of Saturn 3 A.M.					
13	14	15	16	17	18	19
First Quarter Moon 5:14 A.M. Equinox 1:28 P.M.					SAC Meeting	Mercury 4°N of Mars 6 P.M.
20	21	22	23	24	25	26
Full Moon 4:09 A.M.		Jupiter 2°N of Moon 4 P.M.	EVAC Meeting	SAC Deep Sky Meeting	All Times are Mountain Standard Time	
27	28	29	30	31		

Telescope Maintenance Sessions

Sundays, March 6, 13, and 20 — 1:30 to 4 PM

Has your Newtonian accumulated enough dirt on the primary to start a farm? Do you want to learn how to columnize your scope's optics? Is it really "columnize" or "columnate"? Or do you already know how to fix your telescope but prefer not to do it alone.

Leon Knott is hosting sessions about how to maintain your telescope. Everyone is invited. Admission is a snack or soda to share with others. For more information, call

Leon or Fannie Knott at 461-1758.

Leon and Fannie live at 1021 S. Revere. From Southern and Alma School Rd. (just north of the Superstition Freeway) go east on Southern to Extension. From Extension, go north two blocks to Emerald (first traffic light) and turn right. Revere is the first street, turn right again and go south. Leon's house is the last house on the left before the next street.

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