



San Francisco Amateur Astronomers

c/o Morrison Planetarium, California Academy of Sciences
Golden Gate Park, San Francisco, CA 94118

President	Toney Burkhart	668-9691
Vice President	John Muhilly	333-9315
Secretary	Irving Hochman	641-0770
Treasurer	Chelle Beard	878-4965
AANC Representative	Nancy Cox	826-2217

BULLETIN FOR JUNE 1988

PLEASE NOTE THE CHANGES IN THE DATE AND PLACE OF THE SFAA MONTHLY MEETING. Beginning with the June 15th meeting and thereafter, meetings will be held at 8:00 p.m. on the THIRD WEDNESDAY OF EACH MONTH in the auditorium of the JOSEPHINE D. RANDALL MUSEUM at 114 Museum Way in San Francisco. Please see the next page for directions and a map.

Date: WEDNESDAY, JUNE 15

Time: 8:00 p.m.

Place: Auditorium, JOSEPHINE D. RANDALL MUSEUM
114 Museum Way, San Francisco



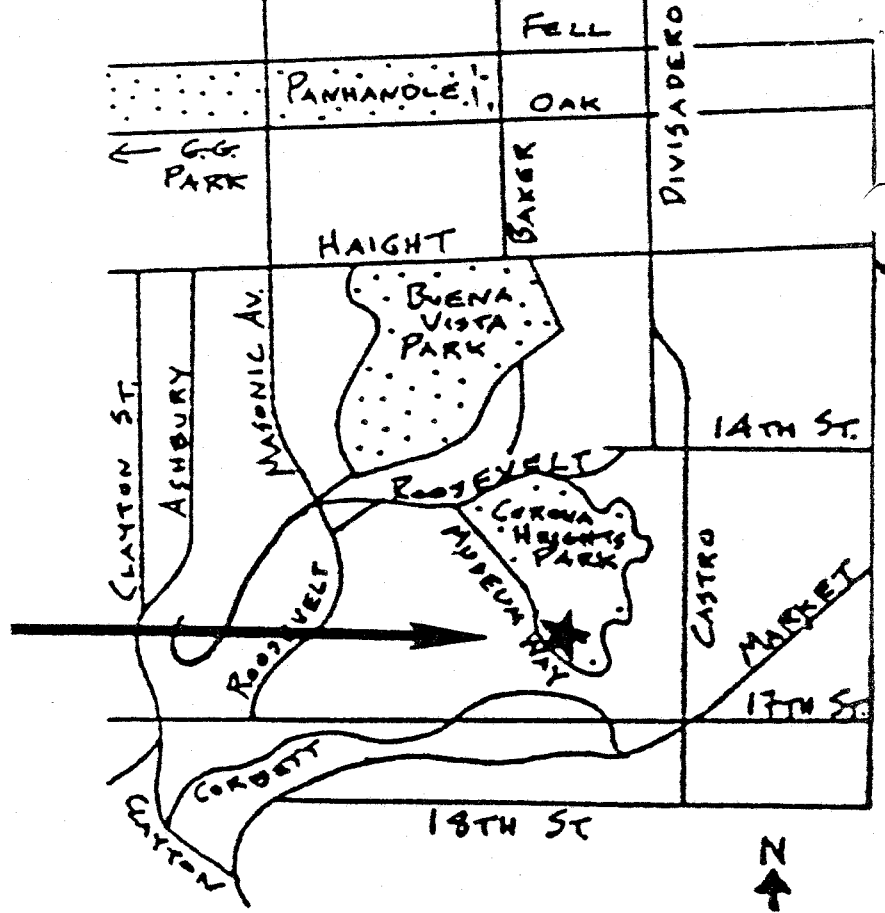
Speaker: Dr. Richard Klein
Professor, Dept. of Astronomy
University of California, Berkeley
Lawrence Livermore Laboratory

Subject: "VIOLENCE IN THE UNIVERSE"

Smile

Beginning with the 1987 supernova in the Large Magellanic Cloud, Dr. Klein will explore the nature of violent cosmic events and their role in the evolution of the universe.

Josephine D. Randall Museum



NEW LOCATION FOR SFAA MONTHLY MEETINGS

The map above shows the new location for the club's monthly meetings on the 3rd Wednesday of each month. The Josephine D. Randall Museum is not far from the intersection of Market and Castro.

From Marin County cross the Golden Gate Bridge and follow Park Presidio as far as Geary. Turn left on Geary and then right on Divisadero. Follow Divisadero until it dead-ends at 14th Street and turn right, following Roosevelt Way onto Museum Way. Continue until you reach the museum parking lot.

From the East Bay and Peninsula the easiest way to the museum is probably to follow Highway 101 to the Fell Street exit. Continue on Fell until you reach Divisadero. Turn left onto Divisadero and proceed as above.

There is ample parking at the museum. The public is invited to attend our monthly meetings and star parties at Mount Tamalpais free of charge.

BOARD OF DIRECTORS MEETING

The next meeting of the SFAA Board of Directors will be on Wednesday, June 8, at 8:00 p.m. in the library of the Josephine D. Randall Museum. All members are invited and encouraged to attend Board meetings. Why not come to the next meeting and contribute your thoughts and ideas?

NEXT SFAA STAR PARTY: ROCK SPRINGS, MOUNT TAMALPAIS

The next SFAA star party at Mount Tamalpais is on Saturday, June 11. We will meet at 7:00 p.m. at the Shoreline Shopping Center in Mill Valley and caravan up the mountain together.

During the summer months our star parties are well attended by the public. If you enjoy turning people on to astronomy, this is your chance! Why not get out your scope, brush up your knowledge of sky lore and make a few converts.

When you leave the star party, remember to turn on your headlights BEFORE you leave your parking place. SAFETY FIRST!

FIDDLETOWN STAR PARTY WEEKENDS

On weekends near the new moon during the summer months, SFAA members often drive up to the club's observing site near Fiddletown on Friday and spend the weekend. There's plenty of time before sunset for a barbecue and debate about cosmology. The club enjoys access to this superb dark sky site thanks to the generosity of Bob Kestner, who owns the land and observatory there.

If you're interested in deep sky observing at its best, you really should visit Fiddletown this summer. It's a bit tricky to find your way there the first time, so give Jim Shields a call at 585-4088 before you leave. You'll also need a key to the gate.

LEARNING THE CONSTELLATIONS

The easiest way to orient yourself in the June sky is to locate Ursa Major (the big dipper), which will be high overhead to the north in early June. Continue the curve of the dipper's handle southward to the zenith (directly overhead) and you'll come to a bright star. This is Arcturus in the constellation of Bootes (the herdsman). Continue southward. The bright star about halfway to the horizon is Spica in the constellation of Virgo (the virgin). The popular way to remember this is: "Arc to Arcturus; spike to Spica."

Two small but important constellations lie west of Arcturus. Neither is particularly conspicuous, but both are loaded with bright galaxies. The first is Coma Berenices (Berenice's hair), about halfway along an imaginary line between Spica and Ursa Major. Locate this constellation by finding the Coma open star cluster, a loose collection of 5th magnitude stars that is visible to the naked eye. The bright star just to the north is Cor Caroli (Charles' Heart) in the constellation of Canes Venatici (the hunting dogs). This is a nice double star for small telescopes and was named by Edmund Halley in honor of King Charles II of England. Consult the star map later in this issue.

TIPS FOR BEGINNERS - by Jim Shields

If you're just getting started in astronomy, you'll need some basic observing aids to help you learn the sky, whether or not you already own binoculars or a telescope. The comments and suggestions in this article are strictly my own; as you'll soon discover, there is much difference of opinion among amateurs.

If you haven't bought a telescope yet, I recommend that you hold off until you've attended a couple of the Club's star parties at Mount Tamalpais. This will give you a chance to talk to other Club members, have a look through their telescopes, and begin to learn your way around the sky.

The kind of telescope you should buy really depends on what you want to do with it. There is no one kind of telescope that is suitable for all occasions. If you're really interested in the moon and planets, consider a small high-quality refractor. On the other hand, if observing galaxies and nebulae appeals to you most, it's hard to beat (for their price) the large-aperture Dobsonians offered by Coulter Optical. If you have kids that share your interest, consider an Astroscan from Edmund Scientific.

In the meantime I suggest that you subscribe to Sky & Telescope and Astronomy magazines. (Subscriptions to both can be obtained through the Club at discount prices.) Read the articles, many of which are aimed at beginners (especially in Astronomy), and study the advertisements. Write off to the manufacturers for more information about their products.

One thing you should buy right off is a planisphere. This is a simple inexpensive wheel that shows the night sky and can be set for the date and time you're observing. It's a big help in learning the constellations and can be purchased for under ten dollars.

The next thing you'll need is a set of star charts. Edmund Scientific publishes a Mag Six Star Atlas that shows the naked eye stars and brighter deep sky objects. I started out with one of the standards, the Tirian 2000, field edition, a set of 26 unbound charts that shows far more objects. (You may find it a bit confusing at first.) Either set of charts is available for under 20 dollars. Another inexpensive item you might consider buying is the set of Astro-Cards for the Messier objects, which makes star hopping at the telescope much easier.

Knowing something about the objects you're seeing really does make them more interesting. My favorite background reading is Burnham's Celestial Handbook, a massive three-volume work that is crammed full of all kinds of sky lore. It's usually available for a few dollars by joining the Astronomy Book Club. My favorite introductory book on modern astronomy is The Red Limit by Timothy Ferris, available in paperback. Finally, the Atlas of Deep Sky Splendors by Hans Vehrenberg has splendid photographs of all the brighter deep sky objects that you'll be observing.

THE IC4329 GALAXY CLUSTER - by Steve Gottlieb

In the May Bulletin Jim Shields gave an introduction to observing galaxy clusters. In the next few issues I will highlight some relatively unknown rich clusters which are accessible in dark skies. Although an 8" scope will often show the brighter members of rich clusters, to ferret out the multitudes of faint members a 12.5" or larger scope is recommended.

In the southern constellations of Centaurus, Hydra and Antlia is a relatively nearby supercluster, dubbed the Centaurus supercluster. Because of its modest distance, several of its constituent cluster members provide spectacular galaxy fields even to observers at our latitude. In the constellation of Hydra at -27° declination is the Abell 1060 or Hydra I galaxy cluster. Using my 13" at Digger Pines I found 7 NGC galaxies in one field 3 years ago. Farther south in Antlia at -35° declination the NGC 3257-3281 cluster is located. I've explored this region with my 17.5" from the dark skies at Fiddletown and picked up 10 galaxies within a one degree circle.

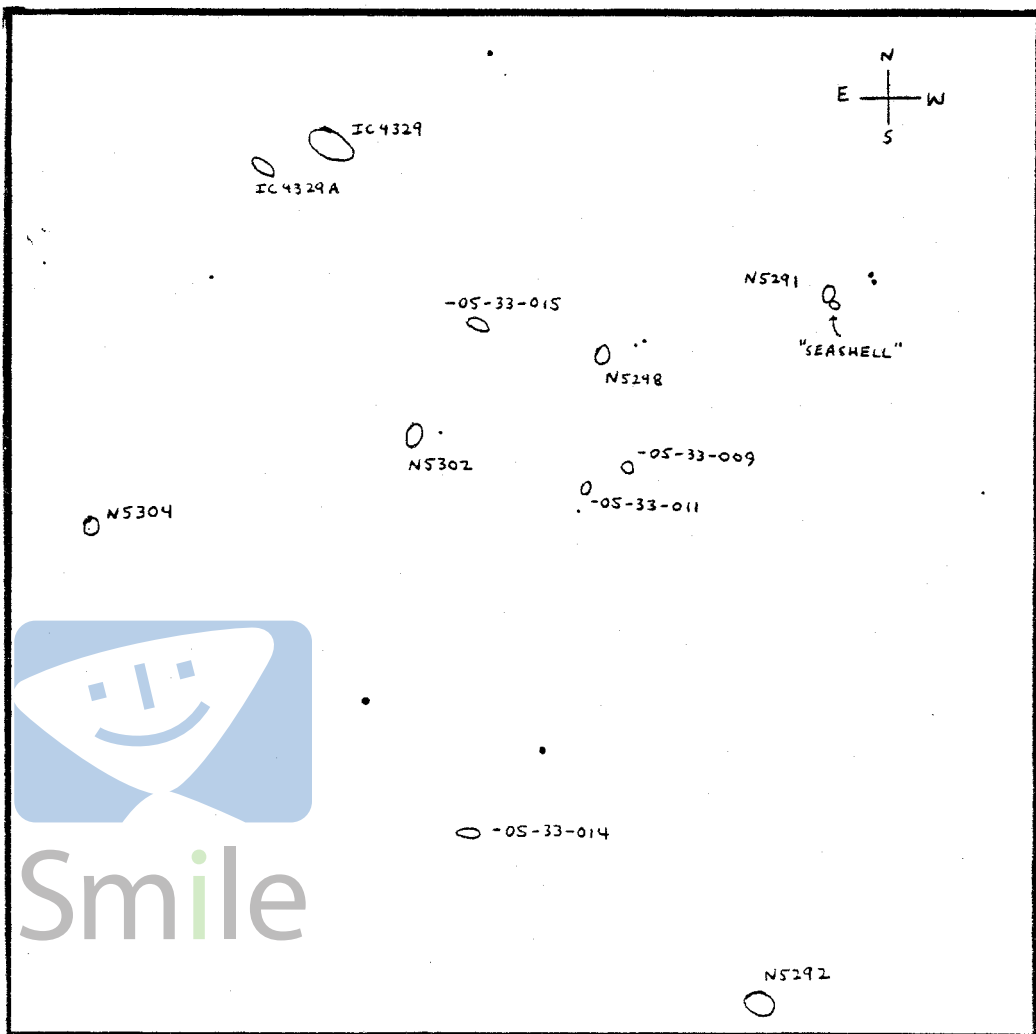
Recently, on March 12, 1988 at Digger Pines, Jim Shields and I examined a third Centaurus supercluster member--the IC 4329 group in Centaurus--in our 17.5" scopes. Its brightest member, IC 4329, is plotted on the Tirion atlas at $13^{\text{h}}46.2^{\text{m}}-30^{\circ}03'$ (2000), a little more than two degrees east of the beautiful M83 galaxy. A stunning ESO photograph and finder chart of the cluster can be found on pages 104-105 in the recently published EXPLORING THE SOUTHERN SKY by Laustsen, Madsen and West. I first became aware of the IC4329 cluster several years ago from a short description in the CATALOGUE OF THE UNIVERSE by Murdin and Allen of two very interesting interacting members--NGC 5291 and its neighbor MCG-05-33-005, better known as the "Seashell galaxy" due to its whelk-like appearance on photographs. Due to the strong gravitational attraction of this close encounter a huge double tail consisting of massive HII knots has been pulled out of this pair, producing a total linear diameter for the system of 600,000 light years! The "Seashell galaxy" has been highly disturbed by the interaction with its massive neighbor and I was looking forward to just glimpsing this unusual mag 15-16 galaxy.

At 220X NGC 5291 appeared fairly faint, small and round with a small, bright core. Nearly attached at its south end was the "Seashell" which appeared extremely faint, very small and round. John Herschel discovered NGC 5291 in his explorations of the southern sky at the Cape of Good Hope with his 18 1/4" reflector of 20-foot focal length but missed the companion "Seashell".

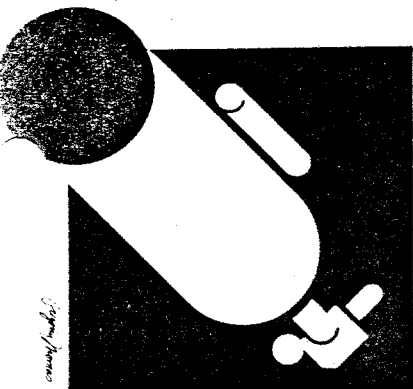
Several other NGC galaxies including NGC 5292, 5298, 5302 and 5304 were located by Jim and I but strangely Herschel bypassed the brightest and largest galaxy member, IC4329. With a total blue magnitude of 12.6, I found this object a moderately bright and large oval extended WSW-ESE. The center contained a bright core and a stellar nucleus. Another highly unusual cluster member is located just 3' east. This spiral, called IC4329A or MCG-05-33-021, contains an unusually bright nucleus with an exceptional energy output. This makes it one of the most energetic galaxies in a class called Seyfert galaxies. With my 17.5" it appeared fairly faint (photographic magnitude of 15), very small and slightly elongated NE-SW. A sharp stellar nucleus is prominent visually.

With a finder chart I was able to locate 13 galaxies in a 40' field including several anonymous galaxies not catalogued in the NGC or IC. Detailed data on the cluster can be found in the Spring '86 DEEP SKY, as well as a sketch of the cluster by Jeff Corder. Be adventurous and give this unusual galaxy cluster a try at the next star party.

FINDER CHART--IC 4329 GALAXY CLUSTER



MARS WATCH '88: A FACT SHEET AND GUIDE FOR OBSERVERS IN THE NORTHERN HEMISPHERE



Mars has intrigued humanity for millenia. Seen from Earth, the planet appears distinctively red, a color long associated with battle, inspiring the Romans to call Mars after their god of war. In more recent centuries, the advent of the telescope enabled observers to detect seemingly Earth-like surface features, giving rise to speculation about life on Mars, perhaps an entire civilization. Even as the *Mariner* and *Viking* missions dispelled the possibility of ancient cities and canals, Mars emerged as a fascinating planet of towering volcanoes, vast canyons, drifting sand dunes, enigmatic channels and pink skies. And 1988 will find it closer to Earth than it has been in 17 years.

FAVORABLE OPPOSITIONS

Mars is closest to Earth when it is both in opposition (the opposite side of Earth from the Sun) and near perihelion (closest to the Sun in its orbit). At its closest approach, Mars comes within 55 million kilometers of Earth and, at its farthest, can be nearly 100 million kilometers away.

Oppositions actually occur every 2.14 years, but since Mars' orbit is more elliptical than Earth's, the distances between the two planets at different oppositions vary. Favorable (or perihelic) oppositions, when Mars and Earth are closest, occur every 15 to 17 years. On September 22, 1988, Mars will be 58.6 million kilometers from Earth, its closest approach until the year 2003 and one of the best oppositions of the 20th century. Actual opposition occurs on September 28, 1988.

Not only will Mars be closer to Earth (and, thus, larger in apparent diameter), it will also be brighter than usual. Like the Moon, the brightness of Mars depends on reflected sunlight. Since Mars will be at perihelion, its closest point to the Sun, it will receive and reflect more light than usual.

SEASONS ON MARS

Like Earth, Mars has four distinct seasons, and since there are 687 Earth days in a martian year, they last about twice as long as our own planet's. (A martian day is about 41 minutes longer than one on Earth.) When favorable oppositions of Mars occur, it is summer in Earth's northern hemisphere but late autumn in the northern hemisphere of Mars. However, since Mars' north pole is tilted away from the Sun (and Earth), observers will have a good view of Mars' southern hemisphere during martian summer.

Summer in the southern hemisphere occurs when Mars is at perihelion, so it receives about 44 percent more radiation than at aphelion, the farthest point in its orbit around the Sun. Consequently, southern summers are hotter than those of the northern hemisphere, resulting in such phenomena as global dust storms and a disappearing polar cap.

Temperatures on Mars vary greatly, from -124 F to +63 F, and since the atmosphere is so thin—less than one hundredth of that on Earth—it has almost no heat capacity. This causes temperatures to rise and fall swiftly, resulting in tidal winds which kick up dust into the atmosphere and cause Mars' famous pink skies. The more dust-laden the air becomes, the more heat it can retain, and that heat will generate yet stronger winds. This cycle is a major cause of the giant dust storms which originate in the southern hemisphere and can blanket the entire planet for weeks during the martian summer.

Seasonal fluctuations in the polar caps also contribute to the temperature changes. Ice caps cover both the north and south poles of Mars. While the residual cap (the portion that remains despite seasonal changes) of the north pole is primarily water ice with some frozen carbon dioxide (CO₂), the southern polar cap is primarily frozen CO₂, the compound which comprises 95.3% of the martian atmosphere. The difference in composition may be due to dust storms carrying water vapor into the northern hemisphere. As the polar caps seasonally recede and grow, ice sublimating into vapor adds CO₂ to the atmosphere while freezing removes it, thus altering the atmospheric pressure and its ability to retain heat.

SURFACE FEATURES

Although Mars is but half the size of Earth, its land mass is roughly equal since Mars has no oceans; it has no surface water at all except for the water ice of the northern polar cap. Martian atmospheric pressure is too low for liquid water to exist on the planet's surface. At such low pressures the boiling point for water is close to the freezing point. Therefore, as soon as ice becomes warm enough to melt, it quickly sublimates into vapor. Evidence indicates, however, that Mars probably had a significantly different atmosphere in past eons, one which allowed water to flow freely on the surface, carving out stream beds and river courses. Such ancient waterways would explain the dry, enigmatic channels winding through the martian plains and valleys.

Geologically diverse, surface features of Mars range from the heavily cratered southern hemisphere to the Tharsis Bulge of the north, from deep chasms to immense volcanoes which soar above the clouds and dust storms.

The Tharsis Bulge, the primary volcanic region on Mars, contains the largest known volcanoes in the solar system. Olympus Mons (Mount Olympus) is the largest of them all. Towering 25 kilometers above the surrounding plain, it would dwarf Earth's Mt. Everest which rises just 9 kilometers above sea level.

Valles Marineris (Valleys of the *Mariner*) was named after the *Mariner 9* spacecraft which brought the canyons to light through its images in 1971. Stretching over 4,000 kilometers along the martian equator, this series of canyons can be more than 80 kilom-

eters wide and 7 kilometers deep. Valles Marineris probably formed along fault lines in the planet's crust.

MARS WATCH CHART August - October, 1988

SATELLITES

Mars has two moons, Phobos (Fear) and Deimos (Dread), first discovered in 1877 by Asaph Hall who named them after the sons of the god of war. Both are small moons, much smaller than Earth's Moon and many of the known satellites of the other planets in the solar system. Phobos and Deimos are very irregular in shape and are heavily cratered and cracked by meteorite impacts.

The Soviet Union's *Phobos* mission, scheduled to launch in July 1988, will send two spacecraft to orbit Mars and hover over the surface of Phobos. Each spacecraft will carry two landing craft for the martian moon, a Long-Term Automated Lander to carry out experiments on Phobos and a Hopper which will literally "hop" about the moon exploring the surface.

EXPLORATION

Beginning with *Mariner 4*, which flew by Mars on July 15, 1965, and culminating with *Vikings 1* and 2 sending landers to the planet's surface in 1976, twelve spacecraft from the United States and the Soviet Union have visited Mars. Now, both countries are resuming martian exploration with such missions as the *Phobos* spacecraft from the USSR launching this year and NASA's *Mars Observer* mission scheduled to launch in 1992. Both nations are also seriously considering sending humans to Mars in the first decades of the 21st century.

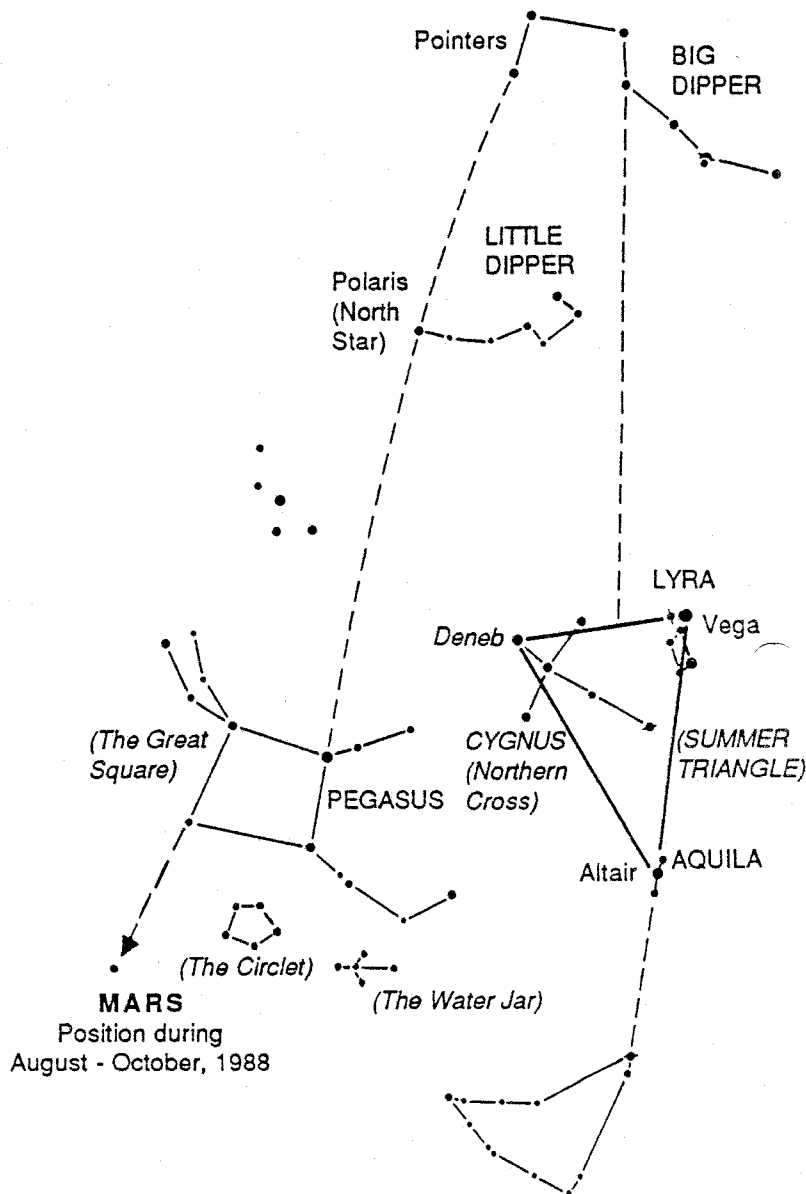
OBSERVATION

Since Mars will be closest to Earth on September 22 this year, the best viewing period will be during the weeks directly preceding and following that date. Rising at sunset, the planet will be easily visible all night long, a brilliant crimson spark in the evening sky.

To locate Mars, use the Big Dipper and the North Star (Polaris) as reference points. The Big Dipper will be low in the northern sky in September. In the Big Dipper locate the two stars that make up the side of the bowl opposite of the handle (the Pointers). Imagine a straight line five times as long as the distance between these two stars leading down out of the bowl of the Big Dipper. You will hit a fairly dim, isolated star. This star is Polaris, the North Star.

Extend the line further, about twice as far as the separation between the Pointers and Polaris. This brings you to the Great Square of the constellation Pegasus. Find the opposite side of the Great Square and follow that side the distance of 1 1/2 of its lengths as your eye moves further away from Polaris. There you will find a lonely, bright orangish pinpoint of light: the planet Mars.

For careful observers, a four-inch diameter telescope will show surface detail and atmospheric clouds on Mars for about 2 1/2 months on either side of opposition. Six-to 10-inch telescopes extend the viewing period to 6 months on either side of opposition, and larger telescopes lengthen the period further yet.



THE PLANETARY SOCIETY
65 North Catalina Avenue
Pasadena, California 91106
(818) 793-5100



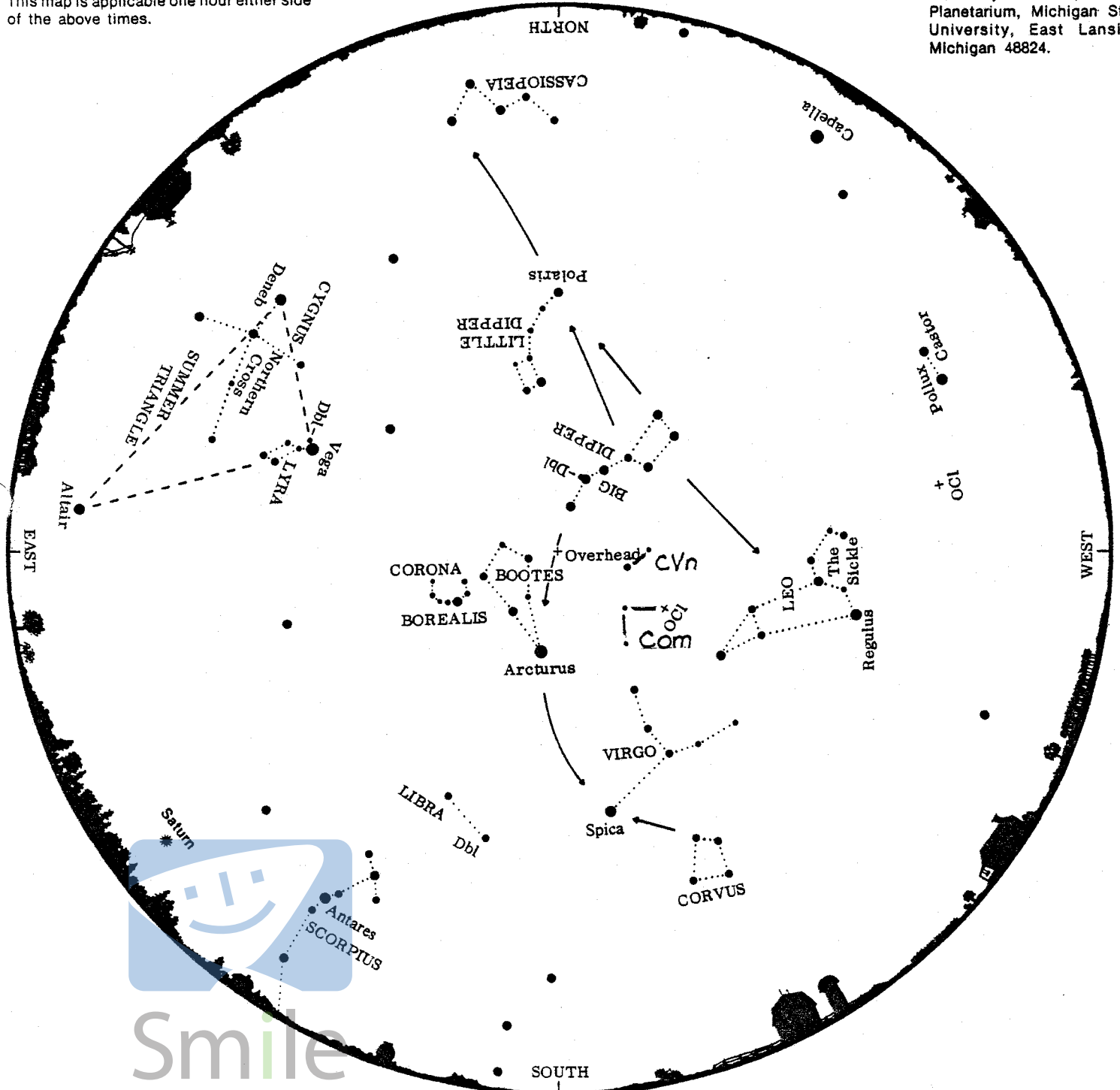
June Evening Skies

This chart is drawn for Latitude 40° north, but should be useful to stargazers throughout the continental United States. It represents the sky at the following local daylight times:

Late May	11 p.m.
Early June	10 p.m.
Late June	9 p.m.

This map is applicable one hour either side of the above times.

©Abrams Planetarium
 Subscription: \$6.00 per year, from *Sky Calendar*, Abrams Planetarium, Michigan State University, East Lansing, Michigan 48824.



The planet Saturn is plotted for mid-June, 1988. At chart time 10 objects of first magnitude or brighter are visible. In order of brightness they are: Arcturus, Saturn, Vega, Capella, Altair, Antares, Spica, Pollux, Deneb, and Regulus. In addition to stars, other objects that should be visible to the unaided eye are labeled on the map. The double star (Dbl) at the bend of the handle of the Big Dipper is easily detected. The double in Libra is more challenging. Much more difficult is the double star near Vega. The open or galactic cluster (OC) known

as the "Beehive" can be located between the Gemini twins (Pollux and Castor) and Leo. Coma Berenices, "The hair of Berenice," is another open cluster (OC) between Leo and Bootes. Try to observe these objects with the unaided eye and binoculars.

This monthly calendar is available with membership in the Astronomical Society of the Pacific, 390 Ashton Ave., San Francisco CA 94112.

ABRAMS PLANETARIUM SKY CALENDAR JUNE 1988

An aid to enjoying the changing sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	
<p>North is up. Circular field is 3° across. June 14: X Sgr to Saturn 7 1/4°; Uranus 1.4°</p> <p>• μ (Mu Sagittarii, mag 3.8)</p> <p>Uranus finder chart. Tracks show their motions June 7-21, when moon is less than half full. Planets are moving west (left to right). See June 8, 9, 19, 26.</p> <p>5 Morning (midnight): SE to SSE.</p> <p>Mars* O Moon</p> <p>This week, Mars' disk is 11" (arcseconds) across and appears at minimum phase, 85% full.</p> <p>12 Mercury and Venus both pass inferior conjunction (nearly between Earth and Sun) this evening.</p> <p>Morning: Beautiful sight for binoculars!</p> <p>Pleiades* Moon * Jupiter ENE</p>	<p>58 Oph. (mag 4.9)</p> <p>Uranus finder chart. Tracks show their motions June 7-21, when moon is less than half full. Planets are moving west (left to right). See June 8, 9, 19, 26.</p> <p>6 Morning: It is early spring in Mars' S hemisphere. S polar cap appears large and bright.</p> <p>Moon</p> <p>Mars' S pole now tilted 23 1/2° toward Earth and 12° toward Sun.</p> <p>13 New Moon (5:14 a.m. PDT). Will anyone in continental U.S. see tonight's extremely young moon? Age 30 min after sunset from East Coast, 15:16 hr; W Coast 18:19 1/2 hr; Hawaii 20 1/2 hr. Using 'scope, look for breaks in crescent.</p> <p>20 Have you seen Venus 1/2 hour before sunrise? Jupiter* ENE</p> <p>Solstice 11:57 p.m. EDT. Summer begins in Earth's northern hemisphere.</p> <p>Telescope shows Saturn's rings 42° across and inclined 26 1/2° from edge-on.</p> <p>27 Evening: Antares* Moon O</p> <p>Tonight Saturn occulted, the 2nd of their parts triple conjunction in 1988.</p> <p>central & SW U.S.</p>	<p>On chart at left, 10-pointed star and dot on planet tracks show positions of Saturn & Uranus on June 14. Tracks show their motions June 7-21, when moon is less than half full. Planets are moving west (left to right). See June 8, 9, 19, 26.</p> <p>7 Morning: It is early spring in Mars' S hemisphere. S polar cap appears large and bright.</p> <p>Moon</p> <p>Mars' S pole now tilted 23 1/2° toward Earth and 12° toward Sun.</p> <p>14 New Moon (5:14 a.m. PDT). Will anyone in continental U.S. see tonight's extremely young moon? Age 30 min after sunset from East Coast, 15:16 hr; W Coast 18:19 1/2 hr; Hawaii 20 1/2 hr. Using 'scope, look for breaks in crescent.</p> <p>21 Have you seen Venus 1/2 hour before sunrise? Jupiter* ENE</p> <p>28 Evening: Antares* Moon O</p> <p>Tonight Saturn occulted, the 2nd of their parts triple conjunction in 1988.</p> <p>central & SW U.S.</p>	<p>June 1, 2 1/2 hours after sunset: Saturn Southernmost Moon λ Sgr.</p> <p>8 Saturn-Uranus now 1 1/2° apart, near left end of tracks on finder chart above. Chart is oriented correctly as planets pass south, now about 2 a.m. local daylight time and 1/2 hour earlier each week. Other times: Turn until line from λ Sgr to Saturn on map matches sky. Field of 7× binocs is 6°-7°, twice as large as circle shown.</p> <p>15 Evening: Moon easy for unaided eye!</p> <p>Pollux • Castor Moon</p> <p>22 As a morning "star", Venus is easy to see in daytime. Just find it before sunup & keep track of it until sun rises. That's a good time to view its crescent with 'scopes & binocs. Venus now 55" (arcseconds) across, 3 percent shrinks to 50° and waxes to 9% full.</p> <p>29 Evening: Neptune at opposition to Sun and in conjunction with Moon. Not a good night to see Neptune!</p> <p>Full Moon λ Sgr SE</p>	<p>Thursday June 2, evening (midnight): Procyon</p> <p>9 As seen from Sun today, the planet Saturn overtakes Uranus. According to Jean Meeus, the next time this happens will be in July 2032, after Saturn orbits 1 1/2 times around the Sun. Earth overtakes both planets June 19; see that date.</p> <p>10 Thursday, June 16, evening: Moon has passed the Gemini Twins. Watch for Pollux, Castor, and Capella each evening. On what date will you last see each star? From lat 44° N and northward, Capella is circumpolar and does not set.</p> <p>Pollux • Castor Moon</p> <p>23 Evening: Spica • O Moon in SSW</p> <p>Morning: Pleiades</p>	<p>Saturday June 4, evening: Castor</p> <p>Mercury (too faint to be seen) WNW</p> <p>Venus * W</p> <p>10 Saturday June 11, morning: Besides Jupiter, look for the other planets—Mars well up in SE, and Saturn low in SW. Compare June 30.</p> <p>Jupiter * Pleiades# ENE</p> <p>Saturday and Sunday evenings, June 18 and 19: Moon, ♃ • Regulus Sunday June 19 ♃ Moon in west, Sat June 18</p>	<p>Saturday June 4, evening: Castor</p> <p>Mercury (too faint to be seen) WNW</p> <p>Venus * W</p> <p>10 Saturday June 11, morning: Besides Jupiter, look for the other planets—Mars well up in SE, and Saturn low in SW. Compare June 30.</p> <p>Jupiter * Pleiades# ENE</p> <p>Saturday and Sunday evenings, June 18 and 19: Moon, ♃ • Regulus Sunday June 19 ♃ Moon in west, Sat June 18</p>	<p>At sunset binocs show crescent Venus 56" across, 2% full.</p> <p>Venus WNW setting</p>

Calendar diagrams show sky in midtwilight, except June 1, 5, 14, 21, as noted, and Uranus finder chart. Magnitudes: Venus (June 1-7) -4.1 to -3.9; (June 19-30) -4.0 to -4.4; Jupiter -2.0 to -2.1; Mars -0.2 to -0.8; Saturn +0.1 to 0.0; Mercury (June 28-30) +1.6 to +1.3; Uranus 5.5; Neptune 7.9. Motions: Sun goes 29° E, from Taurus into Gemini June 20. Mercury and Venus both pass inferior conjunction June 12, switching from evening to morning sky. But Mercury is lost in twilight all of June, except possibly at month's end, when it is 20° W of Sun. Using binoculars nearly 1 hr before sunup June 30, look 5° lower left of Venus. On same date, Aldebaran is 5° to Venus' upper right (see diagram). Venus, as evening "star", is 16 1/2° E of Sun June 1, shrinking to 8° E of Sun by June 7. As morn-

ing "star", Venus increases its angular distance W of Sun from 10° on June 19 to 25° on June 30. Mars goes 17° E in Aquarius, ending south of the Circlet of Pisces. Jupiter goes 6 1/2° E, from Aries into Taurus, ending 6° from Pleiades. Saturn and Uranus retrograde (go west) 2.2° and 1.2°, respectively, both remaining within 6°-8° WNW of 3rd-mag Lambda Sgr, the top of the Teapot; see finder chart on this calendar, and June 8, 9, 19, 26. Note brightest part of the Lagoon Nebula M8 is very near the 6th-mag star 9 Sgr shown on the chart. Neptune, also in Sgr, is 2° NNE of globular cluster M22 in mid-June. Telescopic views of planets: See June 4, 6-7, 10, 20, 22.

Robert C. Victor, Jenny L. Pon, Robert D. Miller
ISSN 0733-6314
Extra Subscripti... 80 per year, starting anytime, from Sky Calendar, Abrams Planetarium, Michigan State University, East Lansing, Michigan 48824.

BULLETIN EDITOR

For the next three months, Jim Shields has volunteered to serve as Bulletin Editor, for which we are all very appreciative. The deadline for submission of articles and notices remains the 18th of each month. Address all material to: SFAA Bulletin, c/o Jim Shields, 190 Chilton Avenue, San Francisco 94131.

In the meantime, the quest for a permanent editor continues. If you would like to help out, please call Toney Burkhart at 668-9691 or Irving Hochman at 661-0770.

NEW MEMBERS

The SFAA extends a hearty welcome to four new members this month. They are Loretta Botta, June Gregg, Pascual Miramonte and Ray Cash Le-Pennec. We hope to see you often at meetings and star parties and invite you to participate actively in the affairs of the club.

BUMPER STICKER KICKERS

So far, we've gotten a bunch of very interesting and original (wierd, funny, loony) slogans for the SFAA bumper stickers which we are planning to produce. But we need more, more you hear? Get your thinking caps on and send in your best and wittiest, to Toney Burkhart, 744 35th Avenue, San Francisco 94121. DO IT!

SFAA MEMBERSHIP BENEFITS

Membership dues of \$15 per year include the monthly SFAA Bulletin and free entry to all club activities, such as lecture meetings, star parties, summer picnics, etc. In addition, you may obtain subscriptions to SKY & TELESCOPE, ASTRONOMY, DEEP SKY and TELESCOPE MAKING (any or all) at greatly reduced rates. For more information please contact Chelle Beard, SFAA Treasurer, 32 Penhurst Avenue, Daly City 94015. Phone: 878-4965 evenings.

Your dues are the lifeblood of the club. Please pay them on time to ensure uninterrupted receipt of the Bulletin and the magazines.

FOR SALE: Celestron 11-inch Schmidt-Cassegrain telescope, Starbright Optics, drive corrector, off-axis Guider Star Trap. \$3000.00 - call Charles Stifflemire, (415)946-0830. (2)

FOR SALE: Bausch & Lomb "Criterion" 6000, a 6" Schmidt-Cassegrain with electric clock drive, mounting forks, 2 regular eyepieces (18 and 30 mm), plus Star Diagonal eyepiece. Compact telescope comes in a handsome storage trunk (included) and weighs only 20 pounds. Rarely used, perfect condition. \$500. Call Vivian Edwards, (415) 431-4157. (3)

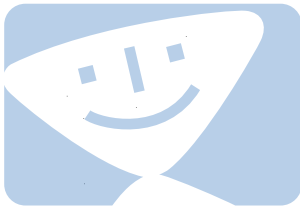
Members' ads are free and will run three times. Please notify us if an item is sold so we may delete the ad. This service is provided monthly on a space-available basis.

CLASSIFIED ADS



San Francisco Amateur Astronomers

c/o Morrison Planetarium, California Academy of Sciences
Golden Gate Park, San Francisco, CA 94118



Smile