



SAN FRANCISCO Amateur Astronomers

SHARING THE WONDERS OF THE UNIVERSE

September 1993

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The SFAA Board of Directors meets on the second Wednesday of every month at 7:00 P.M. at the Western Addition Public Library, 1550 Scott Street at Geary. All club members are welcome at Board meetings.

The SFAA Bulletin is a forum in which club members may share their ideas and experiences in astronomy. We encourage you to participate and welcome your letters, sketches and articles on astronomical subjects. Please send your contributions to: SFAA Bulletin Editor, 190 Chilton Avenue, San Francisco 94131. Deadline is the 18th of the month before publication.

Searching for Planets around Other Stars

The San Francisco Amateur Astronomers holds lecture meetings on the third Wednesday of each month at 8:00 P.M. at Morrison Planetarium, California Academy of Sciences, Golden Gate Park. At the next monthly meeting on **September 15**, the speaker will be Geoffrey W. Marcy, Professor, Department of Physics and Astronomy, San Francisco State University (SFSU), and Research Associate, UC Berkeley. His talk is entitled, *Searches for Planets Outside Our Solar System*.

Doctor Marcy received his B.S. from UCLA and his Ph.D. from UC Santa Cruz. In 1983 he was awarded a Carnegie Fellowship at the Mount Wilson and Las Campanas Observatories. He has been associated with SFSU since 1984 and became Research Associate at UC Berkeley in 1991.

His talk will describe the evidence that other stars may harbor planets like those in our own Solar System. This includes recent results about protoplanetary disks encircling young, solar-type stars. Recent observations show that these disks are extremely common and may have enough mass to form planets as large as our Jupiter as well as Earth.

The talk will also describe current research projects in the world today which are designed to detect orbiting planets. Emphasis will be given to the project at Lick Observatory where astronomers at SFSU and UC Berkeley are attempting to measure the wobble of nearby stars caused by the gravitational pull of unseen, orbiting planets.

Mount Tamalpais

The San Francisco Amateur Astronomers (SFAA) holds monthly star parties at Rock Springs on Mount Tamalpais on the Saturday nearest the New Moon. The next SFAA star party is on **September 18**, beginning at dusk. At 8:00 Robert Sheaffer of the Bay Area Skeptics will be speaking in the nearby Mountain Theatre. His talk is entitled, *The UFO Verdict*. Tom Kellogg and Earl Chin are in charge of the September star party.

Be careful where you put your hands in the dark; a live scorpion was found near the restrooms at Rock Springs in June.

Astronomy Workshops

If you can't get enough astronomy by attending our monthly meetings and star parties, here's several more opportunities to fill up those idle evenings. SFAA is sponsoring several workshops where interested members can get together to discuss astronomy related topics, share information and provide mutual assistance.

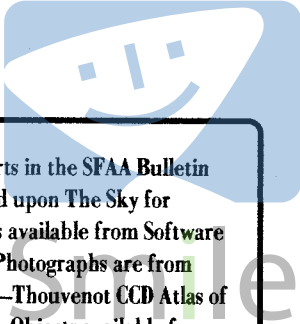
The three workshops that we have set up are:

Astrophotography—discuss various aspects of getting started in astrophotography, what equipment you need, different techniques, etc. First meeting will be Wed., Sept. 22 at 7 PM at the Western Addition branch of the SF library. Contact Dennis Tye at (415) 566-0587 if you have any questions.

Computers and Astronomy—Using a personal computer to enhance the hobby of astronomy, creating star charts, compiling viewing lists, CCD image processing, etc. Meeting place and times have not been set as yet, but contact Toney Burkhart at (415) 668-0691 if you'd like to attend.

New Members/Observer's Workshop— How to get started in the hobby of astronomy, where to go to view the skies, how to select a telescope, how to make and use a telescope, what you can see through a telescope, etc. Meeting place and times have not been set, but contact Barry Hirrell at (415) 282-3759 if you'd like to participate.

These workshop do not require any level of knowledge or experience. We're looking to "spread the wealth" of knowledge around and all members could benefit by attending if any of these workshops cover your area of interest. Hope to see you there.



Star charts in the SFAA Bulletin are based upon *The Sky for Windows* available from Software Bisque. Photographs are from *The Buil-Thouvenot CCD Atlas of Deep Sky Objects* available from Sky Publishing.

Star Party Observations

San Francisco was nestled beneath a thick blanket of fog (usually a sign of excellent conditions on Mount Tam) on the day of our August SFAA Star Party. I spent the afternoon preparing for a grand journey through the heavens. I plotted the positions of the 4 moons of Uranus and Neptune's moon Triton using the August issue of *Sky & Telescope* (S&T) on page 73. I also pulled out the July S&T with the chart of the nova in Aquilla. All systems were go for a blast off to Pluto, then 10,000 times further (@ 6 lt.yrs.) to Barnard's Star in Ophiucus, then a few million times further to M81 to see what's happening with the supernova. I even brought March S&T with the chart of the gravitational double quasar (Q0957+561) in Ursa Major for a view 5 billion lt.yrs. into outer space.

Once I crossed the Golden Gate Bridge and passed through the Rainbow Tunnel the sky opened up to a view of Mount Tam. But above the mountain was a sky full of high clouds. When I arrived at Rock Springs around sunset Gordon Robinson was already setting up his 7" refractor. Gordon is an amateur astronomer (lover of the stars) whose enthusiasm is contagious.

I then walked over to The Mountain Theater to hear Dr. Yvonne Pendleton's talk "We Are Star Dust". Around a hundred people were there for the talk. I had my 11X80 binoculars draped over my neck, ready for observing any unexpected events in the sky. Instead an unexpected terrestrial event occurred for which my binoculars came in handy. Several dozen feet behind the speaker a fox popped out of the woods. It was too dark to see well (I don't think anyone else saw it) so I looked through my binoculars. Sure enough, the big bushy tail and the weightless stride were undoubtedly

that of a fox. It was too dark to see color but its albedo led me to guess it was a grey fox instead of the darker cousin the red fox.

After that I returned to my telescope to start observing. Jupiter and Mars were low in the West, mostly blotted out by clouds. The rest of the sky wasn't much better but I did manage to observe a few objects I'd never seen through holes between the clouds.

By the time the people returned from the lecture Saturn was up in the East. That's where my telescope was pointed for the first hour or so with a continuous stream of observers taking their turn at my eyepiece and filling the air with questions and "WOW"s. Neptune & Uranus remained blocked by clouds as did most of the other objects I'd planned to find.

One object I viewed for my first time was Barnard's Star, the closest star visible from this part of Earth. It's a red dwarf whose luminosity is about 1/2500 that of the sun. It has the largest proper motion and there's recently been a wobble detected in its path indicating a planetary system. The star is about 140,000 miles in diameter and has 16% the mass of the sun which yields a density of 40 times the solar density. Its magnitude is 9.5 so it's just out of reach for my 80mm binoculars but in my 13" Dobsonian its position (a minute south of another 9.5 mag. star) was easy to explain to people looking through the eyepiece.

The second object I viewed for my first time was the galaxy NGC 6207 about 1/2 degree north of M13 in Hercules. Bill McClure asked if I'd seen it so I looked it up in my Uranometria star charts then easily found it in my eyepiece.

Astronomical outings are always unpredictable but it is usually possible to find some worthwhile benefits even when the skies don't cooperate.

—Tom Kellogg

Seeing in the Sierra's

Last year, as new members of SFAA, we were looking for a way to learn Astronomy. We had purchased some texts on the subject but found we wanted something that would provide hands-on experience. Shortly after our membership began, we received a SFAA newsletter with an article on the San Francisco State Astronomy course offered in the Sierra-Nevada mountains.



Ray Cash-Le Pennec's article provided the impetus we needed. As soon as the new course catalog became available we signed up for the course held 15-20 August.

The SFSU field campus is located about 15 miles from Sierra City on highway 49 in or near (I'm not sure which) the Tahoe National Forest Park. The drive to the field campus took us approximately four hours from Marin county. Students staying at the campus are only required to bring a sleeping bag for the tent as shelter and meals are provided by SFSU if you desire. Other plans allow you to bring your own tent and seek sustenance elsewhere. We chose to let SFSU do everything.

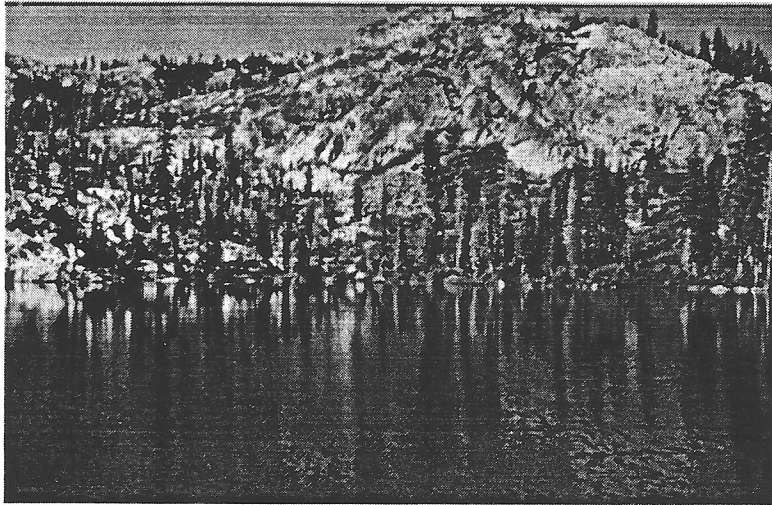
The course began on a Sunday afternoon after a Saturday night arrival. Classes were held for approximately 4 hours and were tailored to the level of the students. This allowed a range of discussions which enabled us to learn the overall picture as well as delving into specific topics. Hands-on exercises were used to reinforce the lecture topics. You have the option to take the class as credit/no credit, for a grade or you can audit it.

After a break for dinner everyone drove about 7 miles to an area known as Packer Saddle. This area is located at about an altitude of 7200 feet and provided a fine area for nightly observing. The weather was clear the entire week with small vestiges of cirrus clouds which dominated the lower part of the eastern sky.

There were a total of 7 telescopes used throughout the class. They included 17.5 inch Dobsonians, a 12 and a 10 inch Dobsonian, plus an 8 inch Schmidt-Cassegrain, and finally, a 4 inch reflector. This gave each student ample opportunity to view a

number of different objects each night and to learn procedures from the instructor and assistants. Each night we tracked the constellations of the summer sky and viewed Saturn and Jupiter. Learning how to star-hop was an invaluable lesson on the first evening and was used more and more successfully as the week progressed. A special bonus was the sighting of Uranus and Neptune not long after they were in conjunction.

The last evening was our final test and no, we did not sit in a classroom with scantrons and fill in bubbles with a No. 2 pencil. Instead, we put our accumulated



knowledge to work by holding a star party for the local population and park guests. For about 4 hours, telescopes slewed from one object to another with each student explaining it's significance. All told, we estimated 150 people were able to enjoy such glorious sights as Jupiter with its four Galilean moons, Saturn, Uranus, Neptune, and a myriad of Messier and NGC objects.

The smiles and comments of those attending was most gratifying to everyone.

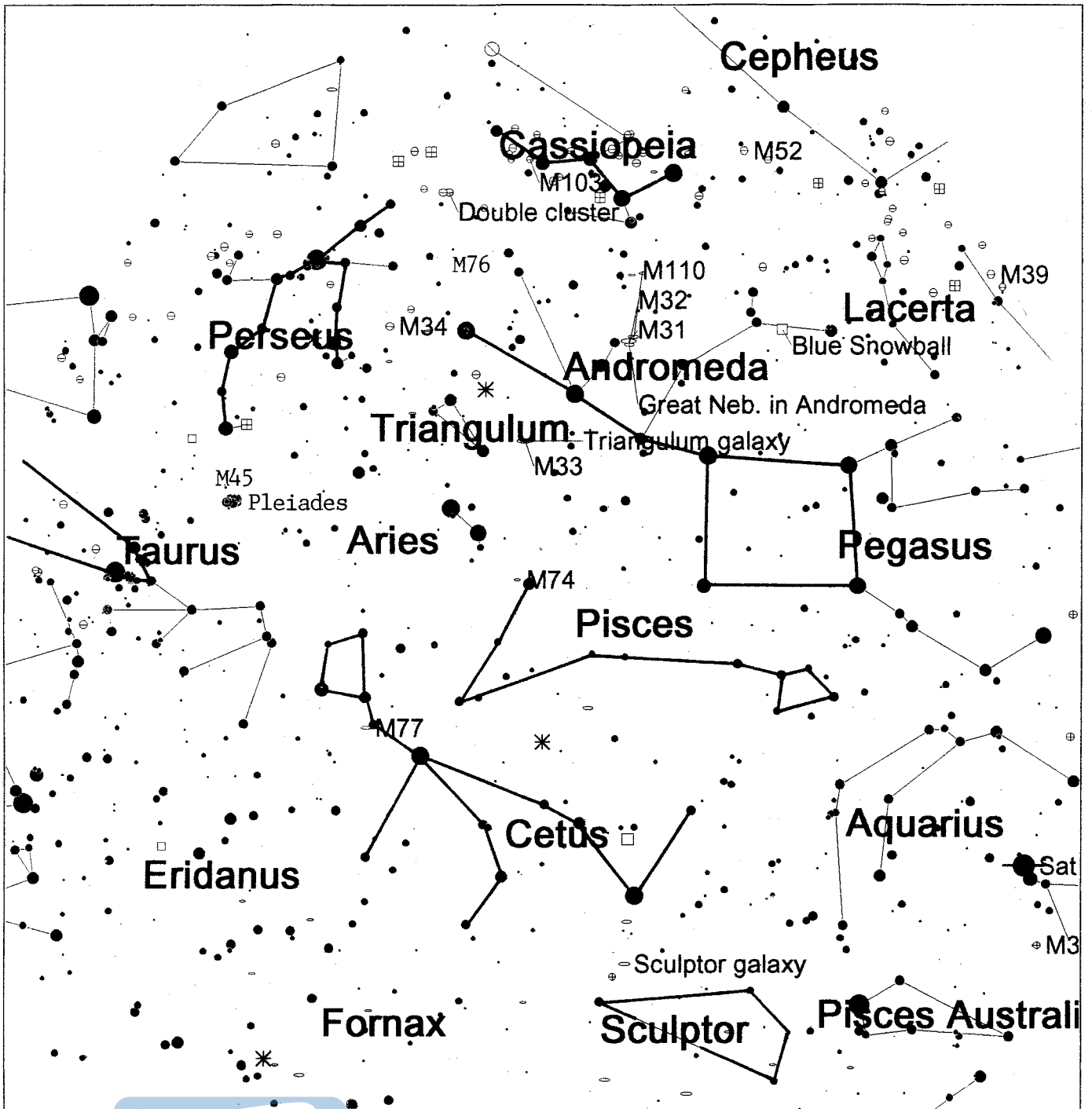
On Friday morning it was time to hand in our homework and enjoy a leisurely drive back to the Bay area.

The experience at the Sierra Nevada campus was a giant step on our road to learning and enjoying Astronomy. Our special thanks go out to Jim Peters, our instructor, and Jim Steele who runs the campus throughout the summer. Last but not least many thanks to the three SFAA members, Jim Shields, Steve Gottlieb and Ray Cash-Le Pennec. Their willingness to share their experiences, telescopes and answer many questions was most appreciated.

If, by reading this article, we have interested you in this course of study I can only say come on along. We're already planning next year's trip!

- Nell and Scott Clausen

Smile



THE AUTUMN SKY

Stars:

- 9.5 • 5.0
- 9.0 • 4.5
- 8.0 • 3.8
- 7.5 • 3.1
- 7.0 • 2.8
- 6.0 • 2.5
- 5.6 • 2.0
- 5.3 • 1.0

NGC Objects:

- Galaxy
- ⊖ Open Cluster
- ⊕ Globular Cluster
- Planetary Nebula
- ◇ Nebula
- ⊞ Cluster+Nebulosity
- Star
- Other NGC Objects

Solar System Objects:

- ☉ Sun
- ♁ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune
- ♇ Pluto
- ☾ Moon
- ☄ Comet
- ♁ Asteroid

Center at: RA: 1h25m Dec: +18d00' Date: 09/18/93, Time: 10:00 PM

Nine in One Night

—Dennis Tye

There's nothing as humbling as having to actually do what you've told everyone is easy to do. (See my article in the May issue of the Bulletin.) That was the case when I decided to do a planetary marathon at Fremont Peak during June.

The Messier observers have their Messier Marathon, so why not a planetary marathon where you attempt to observe all nine planets in one night? This is definitely an achievable goal, given a suitable site and equipment.

As with Bingo, the first one is free—just look between your toes for your first planet—Earth. The other eight require a bit more planning. Four of the planets are visible most of the year—Venus, Mars, Jupiter and Saturn. However, more surface detail is visible on some of the planets during opposition (when the earth is between a planet and the sun).

Mercury alternates between the morning and evening skies every three months. For those of you who prefer not to get up at dawn, that means Mercury is an evening star at three month intervals. Pluto, Uranus and Neptune are located in the spring constellations of Serpens and Sagittarius. Therefore the best time to conveniently observe all nine planets would be during the spring or early summer, depending upon the timing for Mercury.

This year, Mercury had its greatest elongation in June and the new moon fell on the 20th which made that weekend ideal for a planetary marathon. I scheduled myself for the 30" telescope at Fremont Peak since I wanted as much aperture as possible to attempt Pluto at 13.7 magnitude. Earl Chin, his wife Michelle & sons and I arrived right at sunset to set up for the evening's observing.

Right after dusk I located Mercury about 20 degrees above the western horizon. I was able to discern a disk but the image was not that great due to the low angle at which I had to observe. Mercury is very easy to spot if one knows when and where to look, so it's surprising that so few people have seen Mercury (and known what they've seen). The trick is planning to observe Mercury during one of its easterly or westerly elongations.

Mars was the next planet, located in the constellation of Leo close to the bright star Regulus. Mars is quite distant this time of year so little surface detail was visible other than the southern polar cap. At 5.0" Mars was smaller than Mercury.

Jupiter, in Virgo, was next. It is always a beautiful sight and tonight all the more interesting due to the fact that two of its moons were undergoing a transit across the face of the planet. With the 30" I could go up to 400x or higher and still retain a good image. We could make out the shadow of the transiting satellites across the surface of Jupiter.

Pluto, the piece-de-resistance, was the next target. To even attempt Pluto you need a good finder chart. The astronomy magazines usually publish such charts in the spring for those planning to view the planet. You need a chart which isolates the planet showing its movement against the background stars over the course of the time you plan to observe. The chart should show stars down to 14th magnitude. I used the chart from the May 1993 issue of *Astronomy*.

I'm not too familiar with star-hopping, but the chart was right on as far as narrowing down the star field to get to Pluto. After about 30 minutes I had just about found Pluto when

the 30" telescope grounded out on the floor of the observatory. RATS!! After flipping the telescope over and another 15 minutes star-hopping back to the right star field, with Earl doing the heavy work of moving the 30", I was pretty sure I had located Pluto. Even with the largest telescopes and the highest magnifications, Pluto is still a point source, so it is difficult to be ABSOLUTELY certain that one has found it except by observing it over the course of a couple of days to confirm movement.

To locate Pluto does not require much magnification. In fact low power (75x) is better for identifying the surrounding star field. After locating the planet I switched to higher power (225x) to darken the sky and enhance the contrast a bit. Even then, with the 30", Pluto doesn't jump out at you. After finding Pluto in the 30" I located the same star field in my 10" Meade, but I was not able to make out the planet in the smaller telescope.

With Pluto done, it was time to move on to Uranus and Neptune. These two planets are within about one degree of each other. Uranus, at 5.6 magnitude, should be an easy target, but it is located in eastern Sagittarius toward the center of the Milky Way. Unless you have a good idea of where to look, there are a lot of stars out there to go through to find Uranus. A finder chart would have been handy, but I did not have one, so I used my LX200 to locate the planet. Once you have found Uranus it is easy to confirm the fact. Under moderate to high magnification (175-300x) Uranus shows

up as a pale blue disk, easily distinguishable from the surrounding stars.

Neptune should be a short hop from Uranus, provided you have a star chart with the planets marked. Without a chart it's not so easy to find this 8th magnitude planet amidst all those stars. And Neptune with a 2.3" disk is hard to spot except at high magnification. I got lucky hunting around at 400x and spotted the planet. It looks similar to Uranus—a pale blue disk—only smaller.

Well, all the tough planets were done. Now to reward myself with Saturn. The ringed planet rose after midnight in the constellation of Aquarius. By this time (3am) it had risen high enough in the sky to clear the turbulent air in the east. What better viewing can one ask for than Saturn on a clear, dark night at high power through a 30" telescope—Cassini's Division, the shadow of the rings on the planet's surface and some surface bands.

Now it was just a matter of staying awake till 4am for Venus to rise in the east. After it cleared the trees I had to stop down the telescope to 1/4 aperture. Otherwise it was like staring into a spotlight, even with Venus half illuminated. Naturally no surface details were visible due to its perpetual cloud cover.

Well, that was it—all nine planets in the course of a single night's observing. I confirmed the Pluto sighting the next night. I have seen individual planets under better conditions but seeing all of them in one night is something to remember.

Last Call for SFAA Watches

Order now if you'd like a logo watch with the SFAA telescope emblem on the face, as shown in the July issue of the Bulletin. The watches feature deluxe battery-powered quartz movements and water-proof cases, and are priced at \$23.40 each. Send your check to Treasurer, San Francisco Amateur Astronomers, 1414 Terra Nova Blvd., Pacifica 94044. Be sure to specify men's or women's size.

Fireworks or Fizzle?

—Joel W. Goodman

Periodic Comet Shoemaker-Levy 9 had a close encounter of the destructive kind with Jupiter in July, 1992 and, as a consequence, was torn into at least 21 fragments by the massive planet's gravity, appearing like a string of pearls in high resolution images from the Hubble Space Telescope. It's altered orbit now makes collision with Jupiter around July 21 of next year a dead certainty, according to scientists at JPL, setting the stage for what could be some sensational celestial fireworks. Just how sensational depends on the size of Shoemaker-Levy's chunks, about which there is, as might be anticipated, substantial speculation accompanied by a wide divergence of opinion.

In early June, researchers were waxing optimistic about a truly spectacular event, with energy release in the range of billions of megatons, prompting Clark Chapman of the Planetary Science Institute to extravagantly predict "the most spectacular astronomical event ever to be witnessed in the heavens during recorded history". This degree of enthusiasm was prompted by estimates that the largest fragment of the comet might be about 10 kilometers in diameter, comparable to the body that impacted Earth about 65 million years ago, forming the 180 kilometer crater in the Yucatan that likely contributed to the demise of the dinosaurs. However, Hubble images of Shoemaker-Levy obtained on July 1 have lowered expectations of the size of the nuclei to perhaps 4-5 kilometers for the largest, which translates to an 8-10 fold reduction in mass and, hence, in impact energy. Further refinements may be made by later Hubble observations of the comet, but if the size holds near 5 km, the 216,000 km/hr impact should still be noteworthy. A planetary physicist at Cal Tech has calculated that a 5 km body moving at that velocity would be vaporized by atmospheric pressure and frictional heat perhaps 100 km below the tops of Jupiter's clouds, creating a 25 million megaton explosion that would blow a hole in the atmosphere. The accompanying 150 km fireball could loft a 1000 km-wide plume that would gradually spread along the top of the cloud layer, creating a "disturbance" that would, in all likelihood, be visible in amateur telescopes. The smaller cometary nuclei would also contribute in some degree to the spectacle.

Unfortunately, the impact itself is expected to occur on the backside of Jupiter, rendering the explosions themselves invisible to earthbound observers, who will have to wait for the planet's rotation to swing the event earthward. However, our various spacecraft deployed around the solar system (the Voyagers and Galileo) may well glimpse the explosions and transmit the findings to us. Furthermore, the rendezvous of Shoemaker-Levy with Jupiter will happen after the scheduled in-orbit repair of Hubble, which, if all goes well, will be at optimal efficiency for high resolution imaging of the cataclysmic display.

And amateurs everywhere should dust off their telescopes in preparation for what could be a once-in-a-lifetime show next July.

WOMEN IN ASTRONOMY

August 1 was the birthday of Maria Mitchell who was the first woman astronomer of the United States. She was born in 1818 and educated chiefly by her father. In 1847 she spotted a comet and calculated its exact position. Unfortunately, her discovery was not universally well-received. Male astronomers around the world were chagrined that they had been eclipsed by a woman with a tiny two-inch telescope. The king of Denmark, however, didn't care about her gender and fulfilled his promise to give a gold medal to anyone who discovered an unknown comet.

Following that, her professional opportunities suddenly skyrocketed. She was drafted by the American Academy of Arts and Sciences as their first female member in 1848 and the American Association for the Advancement of Science soon followed suit. By 1865 she was recruited to serve as the star of Matthew Vassar's science department in his newly founded Female College.

In spite of this acclaim many professional peers viewed her as an anomaly, a curiosity rather than a colleague. Her lectures often conveyed a frankly feminist message. "We are women studying together," she would say to her Vassar students. "We cannot accept anything as granted beyond the first mathematical formulae. Question everything else."

Twenty-five of her students were eventually to find their names listed in Who's Who in America.

Maria Mitchell stayed at Vassar until her death on June 28, 1889.

—Irving Hochman

WANT ADS

Members' advertisements for astronomy gear are free and will run three times. Just send your ad to SFAA Bulletin Editor, 190 Chilton Avenue, San Francisco 94131. Please notify the bulletin editor if an item is sold so that it may be deleted. This service is provided to club members only on a space-available basis.

- ◆ FOR SALE—8" f/4.5 Odyssey telescope in excellent condition. \$250. 9 mm Nagler. \$150. Call Steve Gottlieb at (510) 525-7968.
- ◆ FOR SALE—Orion 10X70 giant binoculars, complete with new carrying case, tripod bracket and mint copy of Phil Harrington's *Touring the Universe through Binoculars*. \$150. Call Jim Shields at 585-4088.

Lecture Series at Morrison Planetarium

- 28 September - "Dark Matter and the Origin and Fate of the Universe",
Dr. Joel Primack, Professor of Physics, U.C. Santa Cruz.
- 19 October - "Fingerprinting the Universe: Discovering Diamonds in Space", Dr. Scott Sandford, Astrophysicist, NASA/Ames Research Center.
- 09 November - "The Origins of Life on Earth", Dr. Sherwood Chang, Chief, Planetary Biology Branch, NASA/Ames Research Center.
- 14 December - "Exploring Mars with Robots, Virtual Reality and Humans", Dr. Carol Stoker, Center for Mars Exploration, NASA/Ames Research Center.
- 25 January - "The Big Bang and the Judaic-Christian Idea of Creation", Dr. George V. Coyne, S.J., Director, Vatican Observatory.

Ticket Order Form - (tear off)

Please send this form, your check payable to Morrison Planetarium and a self-addressed, stamped envelope to:

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- ★ Seeing in the Sierras
- ★ Nine in One Night
- ★ Fireworks or Fizzle?
- ★ Lecture Series at the Planetarium

Features

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

**San Francisco
Amateur Astronomers**

SAN FRANCISCO AMATEUR ASTRONOMERS

MEMBERSHIP APPLICATION

Name: _____ Telephone: _____

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Select one category:



- \$20 enclosed, individual membership
- \$20 enclosed, foreign membership
- \$25 enclosed, family membership
- \$25 enclosed, institutional membership
- \$5 enclosed, youth membership (under 18)

Make checks payable to **San Francisco Amateur Astronomers** and mail to:
Treasurer, San Francisco Amateur Astronomers, 1414 Terra Nova Blvd., Pacifica, CA 94044.

Founded in September 1952, the San Francisco Amateur Astronomers (SFAA) is an association of people who share a common interest in astronomy and other related sciences. Our membership consists of people from all walks of life, educational backgrounds and ages. Many SFAA members own their own telescopes; some have been made by hand in local telescope-making classes and vary in size from 6 to 25 inches diameter.