DECEMBER 1999

MOUNT WILSON OBSERVATORY ASSOCIATION

REFLECTIONS

MOUNT WILSON ANNIVERSARIES

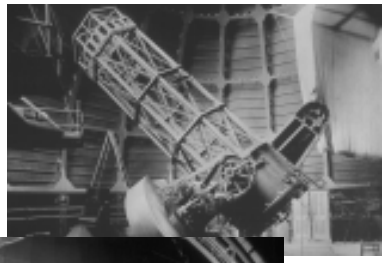
DEC. 20, 1904

FOUNDING OF MOUNT WILSON SOLAR OBSERVATORY by George Ellery Hale. The word "solar" was dropped when the 100-inch telescope was completed in 1917. The visionary Hale is credited with building the world's largest telescopes four times — at Yerkes, Mount Wilson (twice), and Palomar Mountain.

DEC. 7, 1908

THE 100-inch MIRROR BLANK arrives in Pasadena — it is 101 inches across and 13 inches thick, weighing more than 4-1/2 tons. Initially the disk was rejected, but polishing began months later when a replacement blank broke during annealing in France. After six years of polishing, the first disk was finally ready in 1917.

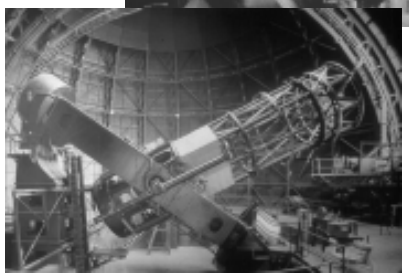
DEC. 8, 1908



FIRST LIGHT for the 60-inch telescope. The largest in the world at the time, the 60-inch retained that distinction until the 100-inch was built in 1917. The 60-inch remains in active use today.

FIRST LIGHT for the 100-inch Hooker telescope. Mount Wilson was home to the largest telescopes in the world until the 200-inch reflector on Palomar Mountain was dedicated in 1948. Adaptive optics on the 100-inch yield the sharpest views in visible wavelengths of any ground-based telescope in North America.

NOV. 2, 1917



DEC. 13, 1920

FIRST STELLAR DIAMETER (Betelgeuse) measured by Francis Pease and Albert Michelson using a Michelson interferometer atop the 100-inch telescope. The interferometer — a 20-foot-long steel beam with moveable mirrors — is being refurbished for the new stellar interferometry museum at Mount Wilson.

NOV. 23, 1999

FIRST FRINGES! A new observing era begins on Mount Wilson. Astronomers with the six-telescope CHARA (Center for High Angular Resolution Astronomy) stellar interferometer combined light from two telescopes in the first demonstration that the array will function as designed. The pair of telescopes was pointed at the bright stars gamma Eridani, alpha Canis Majoris (Sirius), and alpha Hydrae.

2000 Winter/Spring Lecture Season

Upcoming MWOA Lectures

★ Lectures will take place at the Altadena Library on the following dates (all are on Sundays at 2:30 P.M., with refreshments at 2:00 P.M.): January 23, February 27, March 26, April 30, June 25 (there is no lecture in May). Lectures July through October will be at the Museum at Mount Wilson.

CALENDAR

ABOUT MWOA

The Mount Wilson Observatory Association (MWOA) is a support group made up of friends of the Mount Wilson Observatory. MWOA is a nonprofit California corporation, independent of the Mount Wilson Observatory and the Mount Wilson Institute, which operates the Observatory. MWOA's goals include increased public awareness of the Observatory's unique history and continuing scientific contributions, as well as improvement of the quality of public access at Mount Wilson.

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For the use of historical photographs of Mount Wilson, MWOA thanks the Observatories of the Carnegie Institution of Washington; the Huntington Library, Art Collections, and Botanical Gardens; and Don Nicholson.

PAGE ONE BANNER PHOTOGRAPH

Edwin Hubble at the Newtonian focus of the 100-inch telescope, circa 1922.

MWOA Notes

Be Y2K-Ready with the Mount Wilson Historical Calendar

Nobody is fully Y2K-compliant without — you guessed it — the Mount Wilson Historical Calendar for the year 2000! The Calendar is now available for purchase by mail order. As in the past, the calendar contains 12 historic photos related to astronomy on Mount Wilson, plus historical dates of interest and astronomical events for the coming year. To order, make your check payable to Mount Wilson Institute (*not* MWOA) for $12 per calendar. The price includes shipping, and $8 is tax-deductible as a contribution to the Mount Wilson Observatory. Mail your check for the Mount Wilson Historical Calendar 2000 to: *Mount Wilson Institute, Hale Solar Laboratory, 740 Holladay Road, Pasadena, CA 91106.*

MWOA Volunteers Prepare Exhibit for New Museum

Those of you who have been to Mount Wilson recently may have noticed a brand-new building just east of the 100-inch dome. In addition to housing the administrative offices for the new Georgia State interferometer, this handsome terra-cotta brick structure will be the site of what is believed to be the world's only museum devoted exclusively to the history and practice of stellar interferometry.

The centerpiece of the museum will depict Albert Michelson's landmark use of the 100-inch Hooker telescope for the first direct measurement ever made of a star's diameter. The museum will contain the actual interferometer used by Michelson, consisting of a 20-foot-long steel beam with moveable flat mirrors, mounted on the 100-inch's prime-focus cage.

In 1920, this interferometer made headlines worldwide when Michelson and Mount Wilson astronomer Francis Pease announced that they had succeeded in measuring the diameter of the red giant star Betelgeuse. After diameters of six other giant stars were measured, the interferometer was disassembled and the 20-foot beam was stowed in the 100-inch dome's basement, where it lay abandoned for eight decades. The prime-focus cage, no longer needed for observing, was left outside the 100-inch dome.

When the decision was made to mount the beam atop the prime-focus cage for the new museum, a team of MWOA volunteers — led by Bill Ramsey and including Gale Gant and Scott Landry — went to work to paint and clean up this historic equipment. Painting of the cage has been completed, and cleanup work on the beam is now in progress.

A membership form may be found on page 8.

MWOA Membership Benefits

Associate, $20 — Includes *Reflections* plus participation in MWOA member events such as tours, star parties at Mount Wilson, and lectures.

Family, $30 — Permits family members in your household to participate in MWOA events.

Sustaining, $100 — Includes all of the above, plus invitations to participate in special events, including observing nights on the 60-inch telescope.

The Practical Guide

Visual Observing on the 60-inch Telescope

SCOTT W. TEARE & COLLEEN GINO

The 60-inch telescope is regularly used for visual observations by many diverse groups and individuals. From time to time we have the privilege of using this 91-year-old telescope for our research and helping out with visual observing nights. This article evolved out of our experiences using the 60-inch telescope for visual observing and is a selection of our usual responses to those who wonder if they can see the latest 22nd-magnitude comet, 18th-magnitude supernova, or their favorite object, Eta Carinae, through this telescope.

In spite of its large aperture (compared with most amateur telescopes), the objects that look good in a small telescope are most likely the ones that will look best in the 60-inch. The difference when working on the 60-inch is the improved quality, scale, and color of the image it provides. Many of these benefits are due to the telescope's long focal length (approximately 24 meters). Pick the right object and the view will be beyond belief — using the 60-inch for visual observing is a rare treat and an opportunity not to be missed!

Selecting Objects to Observe

Here are some short answers to the question "What objects look best in this telescope?"

- The selected object to be viewed should be located at 1 hour east of the meridian and be between –10 and 70 degrees declination. When selecting objects, check the local sidereal time at the hour you will be observing and choose an object with a right ascension 1 hour more than the sidereal time (RA = LST + 1).
- Stellar objects (globular and open clusters, double stars, etc.) should have stars brighter than 15th magnitude.
- Extended objects up to about 3 arcminutes in size (nebulas, planetary nebulae, galaxies, etc.) should be brighter than 9th magnitude photographic. Considerably brighter magnitudes are required for larger extended objects.
- Select a double star to observe at the start of the observing session and then look at another one after midnight or anytime you think the seeing may have changed.

Justifications and Related Factoids

Many visual observers are not aware of the effects of air mass on the quality of the image that can be seen when using a large

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THE VIEW FROM MOUNT WILSON

Robert Jastrow
Director,
Mount Wilson Institute

Mount Wilson Observatory's first adaptive optics system, installed at the Cassegrain focus of the Hooker 100-inch telescope in 1995, is reaping a rich harvest of scientific results. Called "ADOPT," this system uses a computer-controlled deformable mirror to compensate for the distortion caused by Earth's atmosphere, resulting in image clarity comparable to that achievable by a telescope in space.

A second adaptive optics system, which uses an ultraviolet laser to produce an artificial "guide star," is expected to become operational on the Mount Wilson 100-inch in the near future. With its ability to resolve very faint and distant galaxies, it will bring the study of cosmology back to the Mount Wilson Observatory.

According to Dr. Sallie Baliunas, an astronomer with the Harvard-Smithsonian Center for Astrophysics and Deputy Director of the Mount Wilson Institute, the ADOPT system has already produced significant research results in such diverse areas as the mineralogy of asteroids, the search for satellites orbiting asteroids, the search for planets orbiting stars, the behavior of binary (double) stars, the nuclei of comets such as Hale–Bopp, and studies of Io and other Jovian satellites.

In asteroid mineralogy studies, the ADOPT system was able to distinguish the rock minerals feldspar, pyroxene, and olivine on the asteroids Vesta and Juno. Information on the mineral content was obtained through use of filters that can distinguish the specific wavelengths of light reflected by each mineral. Prior to the Mount Wilson adaptive optics observations, the disk of Juno had never been resolved before.

Knowledge of these minerals reveals information on the collisional history of large asteroids. Asteroids like these are believed to be the building blocks out of which Earth-like planets form. Are "Earths" rare or common in other solar systems? The Mount Wilson studies shed light on that key question.

The ADOPT system is also used to search for satellites orbiting asteroids. The discovery of a satellite orbiting the asteroid Ida has led to speculation that many asteroids may have their own small moons circling them in orbit. This discovery has important implications. If an asteroid has a moon, from that moon's orbit we can calculate the asteroid's mass, which is otherwise difficult to determine. The mass is important because, when combined with observations of the asteroid's size and volume, it yields the asteroid's mass density, which in turn yields information on its bulk composition. And that in turn yields information on the primordial composition of the Earth when it was a young planet in the process of being formed out of Juno-like asteroid building blocks.

OBSERVING ON THE 60-INCH — FROM PAGE 3

telescope. With a small telescope, many observers commonly view objects that are less that 45 degrees from the horizon. This should never even be considered with the 60-inch. The following guidelines will help in selecting objects that are both favorable to the best performance of the telescope and for providing optimal views for observers.

The images seen in the eyepiece of the telescope are sharpest when the object selected is just approaching the meridian as you are looking through the least amount of atmosphere and over the least amount of ground. When there are several observers to view the object, it should be viewed starting when it is about 1 hour east of the meridian. Earth's rotation will bring this object up towards the meridian naturally over the next hour. This provides a 2-hour window for viewing by a number of observers while the object is in a prime location. Once an object is more than an hour west of the meridian, it is time to move on to the next object.

Objects should be selected with declinations between –10 and 70 degrees. Many observers have difficulties reaching the eyepiece of the 60-inch telescope when it is below –10 degrees, as one has to lean out over the telescope to see through the eyepiece. At low declinations, the telescope sits between the supports for the Newtonian platform, which requires that the telescope operator turn on the dome lights at regular intervals to check the position of the telescope, making retention of night vision difficult. Also, there is considerably more air mass at the lower declinations, which degrades the quality of the image.

The visual sky brightness is about 19 magnitudes per square arcsecond. This means that, for visual observing, objects should be selected such that point sources are brighter than about 15th magnitude and extended objects (no more than a few arcminutes across) better than 9th magnitude. Outside this range, many objects appear as only the faintest shadows to some — and many individuals will not be able to see anything at all.

The suggestion to observe a close double star (say, with 1- to 3-arcsecond separation) is to evaluate the atmospheric seeing. This is a measure of the absolute resolution that you are getting through the telescope. If you are able to see the separation between a 1-arcsecond pair, it may be a good night to try some of the more difficult objects to observe visually with the 60-inch, like a galaxy. If you can't separate a 1-arcsecond pair, then you can pretty much scratch all galaxies and any faint objects off your list.

As a rule of thumb, when making your observing list, plan on viewing only one object per hour, but select three objects for every planned viewing hour. For each hour, identify, using the above criteria, a globular cluster (or open cluster), a nebula (or planetary nebula), and a galaxy (or double star). Under most observing conditions, you will be able to view at least one of the selected objects in each hour. Most galaxies are difficult to observe, so alternate between galaxies and double stars every other hour to ensure that you have something to view should there be air transparency issues or thin clouds. ❑

For a list of "best object" picks, visit — *http://www.astro.uiuc.edu/~teare/sixtyinc.htm*

Dr. Scott Teare is an astronomer with the University of Illinois developing the laser guide star adaptive optics system on the 100-inch telescope, and Colleen Gino is a Solar Observer at the 150-foot solar tower operated by UCLA, at Mount Wilson.

When you become a MWOA Sustaining Member, you can select from several observing nights at the 60-inch. See page 2 for information.

Those Lucky Kids ...

Christmas on Mount Wilson

During the twenties and early thirties, my family often spent the Christmas holidays at the Kapteyn Cottage on Mount Wilson. Those were festive occasions and with a little luck we might get snowed in and miss a few days of school. Part of the ritual was cutting and decorating the Christmas tree. My sisters and I would start sometime in the previous summer scouting the mountaintop for the ideal specimen. We usually found one somewhere in the area northwest of a line between the Museum and the 100-inch. Maybe it would have been on a ridge above the old site of Strain's Camp.

When the holidays finally arrived, and with Dan Tracey, the resident ranger, conveniently looking the other way, we headed with Dad for the tree. After quickly cutting it, we brought the tree to the cottage. There it was decorated under the supervision of my older sister, after which it filled a large part of the small, but still the largest, room in the cottage.

— *Don Nicholson*

The 1920 Christmas on Mount Wilson

It was Christmastide 1920 and my parents, Drs. Hannah and Edison Pettit, had recently come out to Pasadena from Yerkes Observatory, where they had both earned their Ph.D.'s. Edison had joined the

TO PAGE 6

Astronomer Profile

The Nicholson Legacy

DON NICHOLSON

While he is best known for his research at Mount Wilson on solar phenomena, my father, Seth Nicholson, maintained a lifelong interest in orbital mechanics and planetary science. This interest began while he was a undergraduate student at Drake University where he, with help from another student who later became my mother, computed the orbit of an asteroid. While a graduate student at the University of California at Berkeley, he had the good fortune to study under Professor A. O. Leuschner, who was a leading expert in the field of orbital mechanics. His Ph.D. thesis, under Leuschner's guidance, was the computation of the orbit of the ninth satellite of Jupiter, which he had discovered while photographing the eighth satellite with the 36-inch Crossley reflector at Lick Observatory. After joining the staff of the Mount Wilson Solar Observatory in 1915, he turned his greatest attention to the study of the Sun. He never forgot his earlier interest in orbital mechanics and planetary science, however.

In the early 1920s, he and Edison Pettit undertook a major program of measuring with a thermocouple on the 100-inch telescope the surface temperatures of most of the principal objects of the solar system as well as a number of stellar objects. The rate of change of the temperature of the Moon's surface at lunar sunrise and sunset was an important part of this program. Interestingly, this same study was repeated some 40 years later with a 24-inch telescope in an effort to prove that the depth of dust on the Moon's surface was not great enough to prevent a landing there. Had the investigators checked the Nicholson–Pettit records,

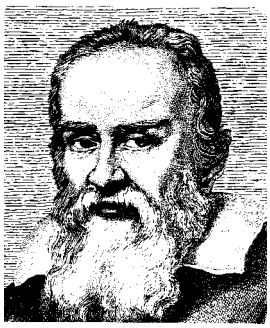
Seth Nicholson making sunspot drawing at the 150-foot solar tower while newsreel crew prepares to shoot (1931).

they would have found the data they needed. Mount Wilson came out ahead, however, since that same 24-inch telescope has been reinstalled at Mount Wilson and is now the centerpiece of the Telescopes in Education (TIE) program.

When Pluto was discovered in 1931, there was a scramble in the astronomical fraternity to compute its orbit. By searching the plate archives at the Santa Barbara Street offices of the Observatory in Pasadena, Nicholson and Nicholas Mayall found a plate taken in the early twenties by Milton Humason that contained an image of Pluto. With data now covering a large time span, they were able to compute a very accurate orbit.

The ninth satellite of Jupiter is very remote from the planet, and its orbit continuously changes under the influence of the gravitational attraction of the Sun. To keep track of these changes, Nicholson would, from time to time, rephotograph the satellite with the 100-inch and recompute its orbit. While conducting such a program in 1938, he discovered the tenth and eleventh Jovian satellites, and in 1951 the twelfth. He thus joined Galileo as the discoverer of four satellites of Jupiter. An unusual aspect of Jupiter's satellites is that the eighth, ninth, eleventh, and twelfth satellites have retrograde orbits. They move in a clockwise direction around Jupiter, opposite to the others. These four are the remotest of the known Jovian satellites and may well be captured asteroids.

In the late 18th century, the mathematician Lagrange called attention to the special problem of three bodies that arises when a planet and an asteroid of small mass move around the Sun in the same plane in circular orbits with equal periods. Under these conditions, the asteroid will occupy a place in orbit 60 degrees ahead of or behind the orbit of the planet. These places are called the Lagrangian points. Nicholson became very much interested in the orbits of such asteroids that orbit the Sun with the same period as Jupiter. A number of them have been discovered and they are members of a family of asteroids called "Trojan Asteroids." Because the orbits of these asteroids and that of Jupiter are not exactly circular and are perturbed by other planets, especially Saturn, the Trojan Asteroids oscillate about the Lagrangian points and may come close enough to Jupiter on occasion to be captured as satellites. Conversely, remote satellites of Jupiter could be perturbed by other planets and become Trojans. The study of the orbits of Jupiter's Trojans became a sort of hobby with Nicholson, and he enjoyed very much studying their characteristics. If only he could have had the power of today's personal computers to model the behavior of these unusual planetary bodies! ❑



The other discoverer of four Jovian satellites.

CHRISTMAS — FROM PAGE 4

Mount Wilson Observatory staff, where he stayed for the next 40 years. Their first Christmas in sunny California was to be spent with their infant daughter, Helen, in the Kapteyn Cottage "on the mountain." Like the Donner Party, they were unaware of the then-unpredictable winter weather in the Sierra Madres.

It chanced that everyone else associated with the mountain had gone down the primitive toll road to Pasadena, leaving them alone. Well, it snowed and it snowed and it snowed. When it finally stopped, they were snowbound. When their food was gone and hope was fading, a relief team reached the Observatory. Strong arms helped Edison carry Hannah and her baby across the face of the mountain, down a trail, and out to safety. Although this happened before I was born, my parents often told me the story, and I tell it now to you so that it will not be forgotten.

— Marjorie Pettit Meinel

A Mount Wilson Christmas Remembered

I lived in the cottage directly below the 6-inch instrument with my parents, Milton and Helen Humason, from 1917 to 1921. Dad and I found a Christmas tree near the trail that led to Strain's Camp (where the Observatory wells are located). On Christmas morning, Dad (then the 60-inch night assistant) returned from work by way of the cottage roof where he tramped about and shook some sleigh bells. I was convinced that it was Santa Claus for sure! Not wanting to scare Santa away, I waited a few minutes before jumping out of bed. There, under the tree was my present — a little steam engine with a boiler and alcohol burner that really ran. In the afternoon we went sledding on Jones' Hill (in back of the 100-inch). A fellow just doesn't forget a Christmas like that.

Because the tree was too large for our cottage, Dad cut it off some 4 feet above the ground. From this 4-foot remainder, two symmetrical shoots developed and grew vigorously. I was janitor at the Observatory during the summer of 1933 and recall noting this substantial double tree at that time.

— Bill Humason

A Christmas Gift from Dr. Stromberg

The Observatory never closed for holidays, not even Christmas. If it was the dark of the moon, my father, Roscoe Sanford, would be scheduled for a five- or six-night shift. However, he never spent Christmas Eve or Christmas night observing because Dr. Stromberg (who had no children) would take those nights so that Dad could spend Christmas with us five kids. Winter nights were some of the best for observing. If there was a winter snowstorm and it was Dad's turn to observe, he would take the stage (the truck that delivered supplies) as far as it could be driven up the toll road (there were no snowplows) and then he would hike in the snow to be at the Observatory for the excellent viewing conditions that would occur after the storm. In those days, they did not have the nice winter gear that is available now, nor did he have cross-country skis or snowshoes to make his hike easier. I vaguely remember being up at the Kapteyn Cottage when it snowed and from somewhere Dad found a sled and pulled me around on it. I was probably 3 or 4 years old.

— Jane Sanford Lewis

Christmas at the Monastery

While I cannot remember that anything very special was made of Christmas for the observing staff at the Monastery, I am sure that the basket of food taken to the galley for midnight lunch on Christmas Eve was something a little out of the ordinary. I do remember one particular Christmas when my mother and stepfather, Norma and Arthur Wright, who ran the Monastery in the early thirties, let me wrap my own presents. I was given a number of boxes of miniature animals and the temptation to peek into the boxes before they were wrapped was irresistible.

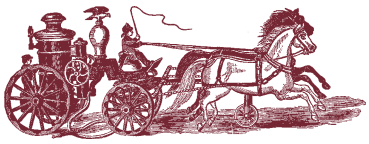
The Monastery after the blizzard of 1907.

We lived then in the small, but comfortable, quarters next to the kitchen. There was a bulletin board with places for the observing staff to put notices to my parents indicating their needs for meal service for the day — whether they would be present for breakfast, lunch, or dinner. If they ever asked for any special Christmas meals, I do not remember.

All this was after my stepfather had to give up his position as night assistant on the 60-inch because of severe asthma. In retrospect, life was pretty quiet for a young girl on the mountain.

It did have its rewards, however, and while it was far from a Christmas experience, the wonderful pool at the Hotel was a great summer attraction.

— Jeanne Wright Zavick



These accounts are reprinted from the December 1994 MWOA Newsletter.

Bulletins

Programs and Events of General Interest
Across the Science/Technology/Astronomy Spectrum

★ Compiled by Laura and Bob Eklund

LECTURES

• Fri., Dec. 3, 7:30 P.M., monthly meeting of South Bay Astronomical Society: "The Past, Present, and Future of the Sun," by Sallie Baliunas, Deputy Director, Mount Wilson Institute. El Camino College Planetarium, Manhattan Beach Blvd. 1 block west of Crenshaw Blvd., Torrance. Free. Info: (310) 377-9834.

• Fri., Dec. 10, 8:00 P.M., Santa Monica College: "Star of Wonder," by Jon Hodge, SMC Planetarium Director, in John Drescher Planetarium, Technology Bldg., Rm. 223. $4. Preceded at 7:00 P.M. by "The Night Sky Show," $4 or $7 for both shows. Info: (310) 434-4223.

• Thurs., Dec. 16, 7:00 P.M., JPL von Kármán Auditorium (repeats Fri., Dec. 17, 7:00 P.M., at The Forum, Pasadena City College): "The Earth Observing System: Studying Radiation Absorbed and Reflected by Earth's Surface and Atmosphere." Free. Info: (818) 354-5011.

• Fri., Dec. 17, 8:00 P.M., Santa Monica College: "California's Spaceport" (Vandenberg Air Force Base), by Brian Webb, NPR reporter. Science Bldg., Rm. 140. $4. Preceded at 7:00 P.M. by "The Night Sky Show" in John Drescher Planetarium, Technology Bldg., Rm. 223, by SMC Planetarium Director Jon Hodge, $4 or $7 for both shows. Info: (310) 434-4223.

STAR PARTY

• Sat., Dec. 11, 2:00–11:00 P.M., Griffith Observatory lawn. Info: (323) 664-1191.

MEETING

• Tues., Jan. 11–Sat., Jan. 15, American Astronomical Society Winter Meeting, Hyatt Regency Hotel, Atlanta, Georgia. Hal McAlister will open the meeting with an invited talk: "Georgia State's CHARA Array on Mt. Wilson." Fees: $100–$245 by Dec. 8; $125–$295 after Dec. 8. Info: www.aas.org or (202) 328-2010.

TELEVISION (specials)

• *Space Station* — KVCR (Channel 24): Part 1: "The Journey Begins," Tues., Dec. 14, 8:00–9:00 P.M.; Part 2: "The Next Step," Tues., Dec. 21, 8:00–9:00 P.M. (repeats in entirety Sun., Dec. 26, 4:00–6:00 P.M.); KCET (Channel 28): Fri., Dec. 17, 9:00–11:00 P.M.

• *NOVA*: "Cracking the Ice Age" (did the Himalayas cause the Ice Age?) — KVCR (Channel 24): Tues., Dec. 14, 9:00-10:00 P.M.

• *The World of National Geographic*: "Cyclone!" — KVCR (Channel 24): Tues., Dec. 28, 8:00–9:00 P.M.

• *NOVA*: "Chasing El Niño" — KOCE (Channel 50): Wed., Dec. 29, 7:30–8:30 P.M.

• *PBS Millennium Day Broadcast* — KCET (Channel 28): Fri., Dec. 31, 1:45 A.M. to Sat. Jan. 1, 3:05 A.M.; also on KVCR (Channel 24) starting at 1:55 A.M.

TELEVISION (ongoing, every week)

• *Real Science* (science careers for teens) — KLCS (Channel 58): Mon. 11:30 A.M.–noon

• *Newton's Apple* (science for all ages) — KLCS (Channel 58): Tues. 2:30–3:00 P.M.

• *Universe: The Infinite Frontier* (astronomy course, partly shot at Mt. Wilson) — KOCE (Channel 50): Thurs. 5:00–6:00 P.M. (repeats Sat. 8:00–9:00 A.M. except Dec. 25)

• *Jack Horkheimer: Stargazer* (what's up in the night sky) — KVCR (Channel 24): Sat. 9:55–10:00 A.M. (repeats Sun. 11:30–11:35 P.M.)

RADIO (ongoing, every week)

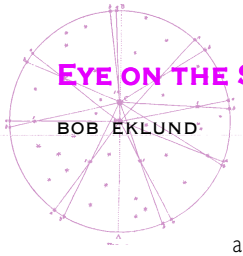
• *Stardate* (daily dose of astronomy) — KPCC (89.3-FM): 8:55–9:00 A..M.; KNX (1070-AM): 8:55–9:00 P.M.

• *Larry Mantle's Air Talk* (interviews) — KPCC (89.3-FM): weekdays 4:00–7:00 P.M. (science segment is Wed. 6:00-7:00 P.M.)

• *Exploration* (science news) — KPFK (90.7-FM): Thurs. 2:00–3:00 P.M.

• *Talk of the Nation: Science Friday* (science news) — KPCC (89.3-FM): Fri. 11:00 A.M.–1:00 P.M.

• *Hour 25* (science and sci-fi) — KPFK (90.7-FM): Fri. 11:00 P.M.–midnight



Watching for Canopus The star Canopus is the most southerly object we can see from Los Angeles, and it's interesting to try and pick it out this time of year as it briefly rises and sets (last year my wife, Laura, and I first saw it toward midnight on December 24, so it was our "Christmas star"). Canopus is the second-brightest star in the sky (Sirius is the brightest), and it's so far south that if you were at Cape Horn it would pass directly overhead. In Los Angeles, at 34 degrees north latitude, Canopus rises to a maximum of 3-1/2 degrees above the southern horizon — a challenge to the city-bound observer, but not too difficult to see if you know when and where to look. It is almost directly below Sirius, the bright "dog star" in Canis Major, which is just east of Orion. Wait till Sirius is slightly east of due south, then draw a line to the horizon. If you have a fairly unobstructed southern horizon, you should see Canopus a little to the right of your vertical line. But if you live north of Santa Cruz, forget it — that's the most northerly place where Canopus can be seen. At the end of December, your viewing "window" should be centered near 11:30 P.M. It will get earlier (by about four minutes) each night, and by the end of January you should see it at roughly 9:30 P.M. Watch for a very low but bright and twinkling star — and good luck!

Mount Wilson Observatory Association
P. O. Box 70076
Pasadena, CA 91117

DIRECTIONS TO MOUNT WILSON

From the 210 freeway, follow the Angeles Crest Highway (State Highway 2 north) out of La Cañada/Flintridge for 14 miles to Red Box–Mount Wilson Road; turn right, and go another 5 miles to the Observatory gate, marked Skyline Park. Walk in on the Observatory access road (far left side of parking lot) about 1/4 mile to the Observatory area. The Museum is opposite the 150-foot solar tower. The Skyline Park–Observatory area is open to the public only on weekends. The U.S. Forest Service requires those parking within the Angeles National Forest to carry a "Forest Adventure Pass." It can be purchased for $5 (one day) or $30 (season) at Clear Creek Ranger Station or Red Box Ranger Station, or at major sporting goods outlets such as Sports Chalet.

Membership Benefits – see page 2

JOIN THE MOUNT WILSON OBSERVATORY ASSOCIATION

Has Your Membership Expired?

MWOA membership renewals were due September 30, 1999, for all members — unless your mailing label shows "00/09."

To Renew or Begin a New Membership —

Detach and mail this form with your check (payable to MWOA) in the amount for an Associate, Family, or Sustaining membership.

Name Telephone

Address (Street/City/State/Zip)

Type of Membership (check one) ◯ Associate ($20) ◯ Family ($30) ◯ Sustaining ($100)

Make your check payable to MWOA, and mail to MWOA, P. O. Box 70076, Pasadena, CA 91117.