

National Capital Astronomers, Inc.

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## Was There Life on Mars?

by Andrew W. Seacord, II

This will be the topic of the October meeting of the National Capital Astronomers which will be held Saturday, October 5, at 7:30 PM in the Lipsett Amphitheater located on the first floor of the Clinical Center (Building 10) of the National Institutes of Health (NIH). Our speaker will be Dr. Munir Humayun who is at the Carnegie Institution Washington Department of Terrestrial Magnetism. The title of his talk will be "Was There Life on Mars?"

Dr. Humayun received his Ph.D. in Geochemistry and Cosmochemistry in 1994 from the University of

Chicago. His research interests are the isotopic and chemical investigations of natural materials, including meteorites and samples of lunar soil. His goal is to understand the formation of the solar system and the early planetary history of the Earth, Moon, Mars, and asteroids. He also wants to understand the chemical evolution of the Earth as well as the modern processes in the geologically active Earth.

The recent paper by McKay et al. in the 1996 August 16 issue of *Science* reports evidence for past life on Mars

that has been preserved in the Antarctic meteorite, ALH84001. Dr. Humayun will scrutinize this report. He will present the case for life on Mars and will discuss the evidence from ALH84001 in context with the results from the 1976 Viking Lander mission. He will also discuss the criteria for excluding possible terrestrial contamination in the meteorite and for ruling out an abiotic origin of the evidence on it. Proposals for further experiments to tackle these issues will be presented. Questions from the audience are welcome. ○

## Life on Mars — A Novice's Introspective

by Alisa Joaquin

Published previously in *Star Walks*, 1995 issue, a newsletter created by Alisa and Gary Joaquin. This article has been reprinted with additional information.

*No one would have believed in the last years of the Nineteenth Century that this world was being watched keenly and closely by intelligence's greater than man's and yet as mortal as his own; that as men busied themselves about their various concerns that were scrutinized*

*and studied, perhaps almost as narrowly as a man with a microscope might scrutinize the transient creatures that swarm and multiply in a drop of water. With infinite complacency men went to and fro over this globe about their little affairs, serene in their assurance of their empire over matter. It is possible that the infusoria under the microscope do the same. No one gave a thought to the older worlds of space as sources of human danger, or thought of them only*

*to dismiss the idea of life upon them as impossible or improbable. It is curious to recall some of the mental habits of those departed days. At most, terrestrial men fancied there might be other men upon Mars, perhaps inferior to themselves and ready to welcome a missionary enterprise. Yet across the gulf of space, minds that are to our minds as ours are to those of the beasts that perish, intellects vast and cool and unsympathetic, regarded this Earth with envious eyes, and slowly and surely drew their plans against us. And early in the Twentieth Century came the great disillusionment.*

**The Review of the September Meeting was not available at press time. — Editor**

*The War of The Worlds—H.G. Wells*

*See NOVICE, continued on page 3*

## Calendar of Monthly Events

### The Public is Welcome!

NCA Home Page: <http://myhouse.com/NCA/home.htm>

**Tuesdays, October 1, 8, 15, 22, 29, 7:30 PM**-Telescope making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnall, 202/362-8872.

**Fridays, October 4, 11, 18, 8:30 PM**-Open nights with NCA's Celestron-14 telescope at Ridgeview Observatory; near Alexandria, Virginia; 6007 Ridgeview Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Information: Bob Bolster, 703/960-9126.

**Saturday, October 5, 5:30 PM**-Dinner with the speaker and other NCA members at Positano Ristorante Italiano, 4940 Fairmont Ave., Bethesda, MD. See map and description on back page.

**Saturday, October 5, 7:30 PM**-NCA meeting, will feature Dr. Munir Humayun (Carnegie Institution of Washington, Department of Terrestrial Magnetism). His talk will be "Was There Life on Mars?" More information on Comet Hale-Bopp will also be provided. For directions, see map and description on back page.

**Saturdays, October 5, 12, 19, 26, 7:30 PM**-Telescope making classes at American University, McKinley Hall Basement. Information: Jerry Schnall, 202/362-8872.

**Mondays, October 7, 21, 28, 8:30 PM**-Public nights at U.S. Naval Observatory (USNO), in Northwest Washington, D.C. (off Massachusetts Avenue). Includes orientation on USNO's mission, viewing of operating atomic clocks, and glimpses through the finest optical telescopes in the Washington-Baltimore region. Held regardless of cloud cover. Information: USNO Public Affairs Office, 202/762-1438. Home page: <http://www.usno.navy.mil>.

**Saturday, October 12, 7:30 PM**-NCA and National Park Service (NPS) *Exploring the Sky* program, in Rock Creek Park at parking lot nearest Military and Glover Roads NW (near Nature Center). Bring binoculars and telescopes; some telescopes available, thanks to NCA. Volunteers always needed! If cloudy, planetarium program inside Nature Center. No reser-

vations required. Details & Directions: Nature Center, 202/426-6829; Joe Morris (NCA), 703/620-0996. Nature Center Home page: <http://www.nps.gov/rocr/>.

**Sunday, October 13, 6:00 PM**-Open House at Hopewell Observatory. NCA members, families, and guests are invited. (See article on page 6.)

**Saturday, October 19, Dusk**-(Civil twilight ends around 6:50 PM). Sky watching program by Geoff Chester (weather permitting) at Sky Meadows State Park (Paris, VA). Last program of the year. No reservations required. NCA volunteers always needed! Details: Park, 504/592-3556; Geoff Chester, 202/357-1529.

**Tuesday, October 22, Night**-Orionid meteor shower peak. Also good several nights before and after. Active October 2–November 7. If weather's clear, don't miss it!

**Friday, October 25, 7:00 PM**-Moon Madness, Historic Bladensburg Waterfront Visitor Center, 4601 Annapolis Rd., Bladensburg, MD. Details & Directions: Geoffery C. Lane (NCA), 301/927-2163, or 301/927-8166 (fax).

**Sunday, October 27**-Change clocks back one hour, from Eastern Daylight Time (EDT) to Eastern Standard Time (EST).

**Saturday, November 2, 7:30 PM**-November NCA meeting, speaker TBO in next newsletter. Meeting also includes update on Comet Hale-Bopp.

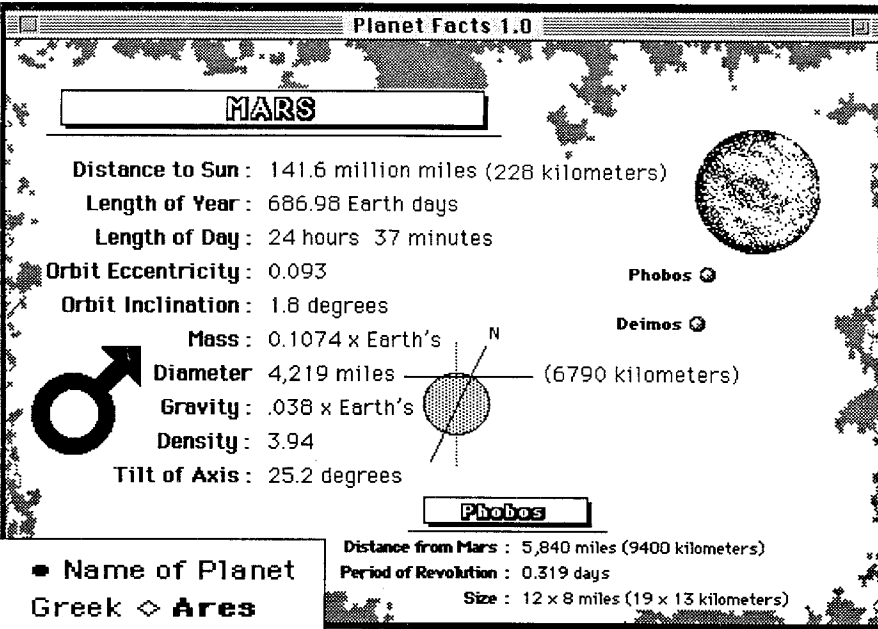
See page 5 for more Washington area astronomical events. Other events too numerous to list in *Star Dust* are listed in the publications *Sky & Telescope*, the *Astronomical Calendar 1996*, the *Observer's Handbook 1996*, in numerous software packages, and other links available on the NCA Home Page (see above for address). NCA members can purchase all these (and much more) at a discount. To join NCA, use membership application on page 7.

During questionable weather, call the IOTA Hotline (Phone: 301/474-4945) for NCA meeting status. The absence of a cancellation notice on the Hotline indicates that the meeting will proceed.

*NOVICE, continued from page 1.*

That passage begins a tale which when told on the radio one night, would frighten millions of people. Some tuned in late, not knowing that the story was just that—only a story. Today we know better. With the first spacecraft Mars 1 (USSR) in 1962 and thereafter, Mars became less a planet of unknown possible alien life forms (little green men) and more like our lifeless Moon. Though the earlier Mars (USSR) spacecrafts only took images from orbit, Viking was the first to land and give us the first real views of a Martian landscape. Rustic in color, it seemed that Viking confirmed that the Red Planet was indeed “red”, not only in the land but in the sky as well. With the landing of Viking 2, scientists still speculated whether life existed or did exist at one time. Soil samples taken from Mars’ surface seemed to point that the planet was lifeless and always had been. But is Mars lifeless?

Gary Joaquin (my husband and co-editor) and I went to the National Science Teachers Association Convention in March 1995. We listened to a lecture by Christopher McKay sponsored by The Planetary Society. He speculated that there could be evidence of life deep underground or in some frozen lake bed. He compared Mars’ development with our own planet, and observed that Mars and Earth were like twins. Both planets were developing on the same time-line. Chemical chain reactions to form life were happening, except Mars took a different turn after a certain period. McKay examined such facts as the nature of plate tectonics and showed how Mars was made up of one plate while Earth has several plates. He showed how certain elements were recycled through plate tectonics to get the chain reactions to produce life. Earth was able to recycle such elements like carbon dioxide (CO<sub>2</sub>) through the shifting of plates while Mars could not do that because Mars has only the one plate covering the planet. Without those plates Mars cooled instead of continuing to develop. McKay showed illustrations speculating how Mars must have looked during its early stages of development. Mars also was covered with water but because the planet had no plate movement to recycle its sediments



**MARS**

Distance to Sun : 141.6 million miles (228 kilometers)  
Length of Year : 686.98 Earth days  
Length of Day : 24 hours 37 minutes  
Orbit Eccentricity : 0.093  
Orbit Inclination : 1.8 degrees  
Mass : 0.1074 x Earth's  
Diameter : 4,219 miles (6,790 kilometers)  
Gravity : .038 x Earth's  
Density : 3.94  
Tilt of Axis : 25.2 degrees

Phobos  
Deimos

**Phobos**

Distance from Mars : 5,840 miles (9,400 kilometers)  
Period of Revolution : 0.319 days  
Size : 12 x 8 miles (19 x 13 kilometers)

- Name of Planet
- Greek ◊ **Ares**
- Roman ◊ **Mars**
- The God of War.

*Planet Facts 1.0 is a Hypercard Stack for novices on the Mac.*

and its CO<sub>2</sub> atmosphere the way Earth did, Mars’ development was arrested. This was the first real scientific hypothesis that made sense.

Christopher McKay discussed how he and a team of other scientists explored the deepest and coldest areas of the Antarctic to prepare for a search for life on Mars. He described how the team dug deep down into one of the frozen lakes into areas which seemed devoid of life. The ice was as much as 20 feet thick but there was water below that. Within the water they found the most primitive of life forms.

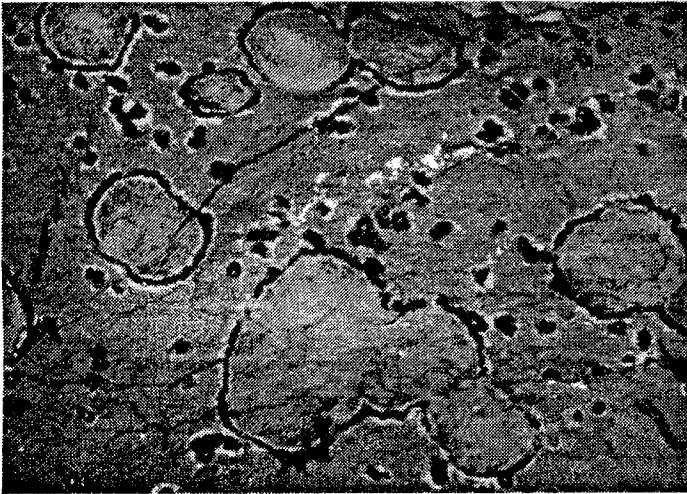
It’s amazing to think of the possibilities that life could and may still exist on a neighboring planet deep within it’s underground or underwater surface. If we do find life, the possibilities of life being on yet other worlds becomes more real. And yet, some people will argue that it isn’t life like us. What the average person wants to find is some form of evidence that there is intelligent life.

Even if we do find that life exists and it’s only as primitive as what is down in Antarctica, that still doesn’t take away the mystery, splendor, and the awe of Mars.

Recently, new evidence has come to light. Discovery of possible nanoscopic life in a rock the size of a squash possibly originating from Mars gives me more hope that there must be

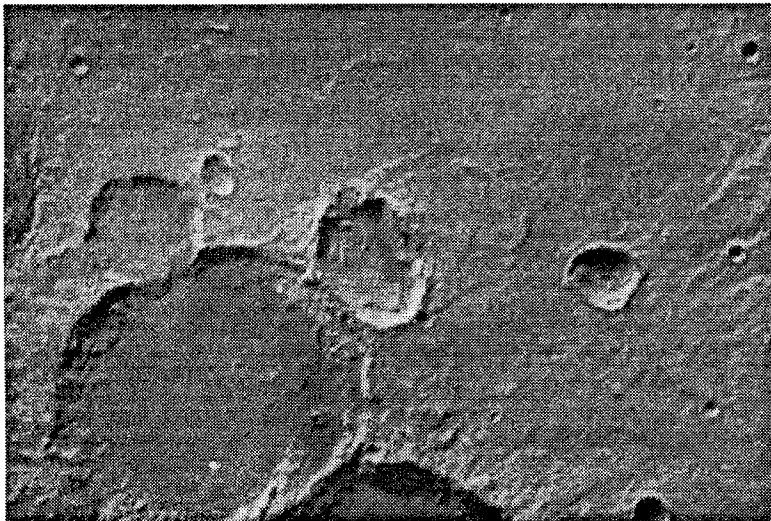
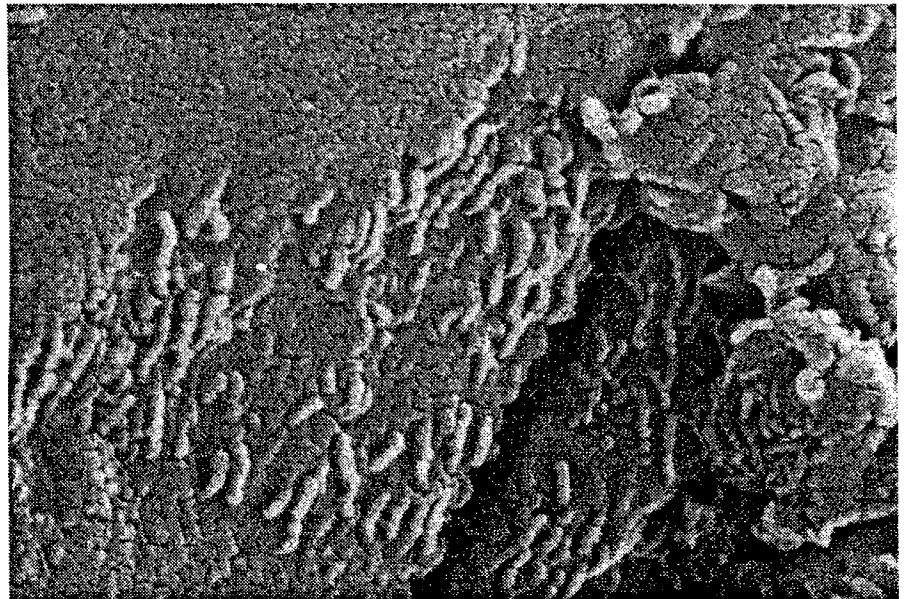
life elsewhere in this Galaxy. It is even more phenomenal to think how that rock could have landed on our world after 16 million years. I could write about what was found, the chemical composition, the similarities to primitive bacterial life on Earth from what I have read, but I would just be repeating what everyone else has written. I would rather think about what should be done. In this instance, the path is clear. If possible, we who support scientific exploration should do our best to see that Mars expeditions get funded. Whether they be done by robots or people. I believe that without it, what we know or don’t know treads a very fine line. *War of the Worlds* gave us one view that there was life on Mars though fictionalized; and those life forms weren’t very friendly. It did give us, however, the opportunity to dream of the possibility. It took many years before our dreams could be tested. Now we may be discovering that life may have existed without the need to travel to Mars. Still, to know for sure, more studies must be done and eventually, someone will have to go out there. I wish and I hope I will see it in my lifetime. So, lets continue to broaden our perspectives by keeping exploration alive and making another dream come true, and go where no one has gone before during this life time. Let’s go and explore Mars. ○

## Life Images From Our Neighboring Planet?



*The carbonate "globules" (surrounded by dark rings) in ALH 84001, in which may exist evidence for life, are no more than 250 microns (0.25 millimeter or .001 inches) across. Their round forms are rimmed with minerals rich in magnesium (black) and iron (white). Courtesy Science and NASA.*

*Could the elongated forms in this image, enlarged some 100,000 times, be microscopic fossils of past life on Mars? They bear a strong resemblance to simple organisms that were widespread on Earth nearly 3 billion years ago, though their terrestrial analogs were 100 times larger. Courtesy Science and NASA.*



*Did the formation of this 23-by-15-km (14-by-9 miles) crater on Mars fling rocky debris out into space and ultimately to Earth? Maybe! Courtesy Calvin J. Hamilton, Los Alamos National Laboratory.*

## Washington Metropolitan Area Astronomical Events

Free Lectures at the Einstein Planetarium  
National Air & Space Museum

202/357-1550, 202/357-1686, or 202/357-1505 (TTY)

Home page: <http://www.nasm.edu>

(Outside observing follows each lecture, weather permitting.)

**October 2, 7:00 PM**—"Smithsonian Follows the Sun: From Solar Constant to SOHO," lecture by Shadia Habbal The Harvard Smithsonian Center of Astrophysics, Cambridge, MA.

**October 5, 9:30 AM**—"The Season of The Witch" lecture by Geoff Chester.

**October 9, 7:00 PM**—"From MMT to Keck and Beyond: The Renaissance in Large Optical Telescopes,"

lecture by Fred Chaffee. Multiple Mirror Telescope Observatory

**October 16, 7:00 PM**—"The Cool Sky: Infrared and Submillimeter Astronomy," lecture by Paul Ho, The Harvard Smithsonian Center of Astrophysics, Cambridge, MA.

**October 23, 7:00 PM**—"From Einstein to AXAF and After: Exploring the X-Ray Sky" lecture by Harvey Tananbaum.

### Other Area Astronomical Events

**October 5, 9:00 PM**—University of Maryland (UMD—College Park, MD) Observatory Open House and lecture, "The Constellations & Mythology" by Mark Houashelt. Outside observing follows (weather permitting). Details: 301/405-3001. UMD Home page: <http://www.astro.umd.edu>.

**October 7, 7:30 PM**—Arlington Planetarium (Arlington, VA) lecture, "Stars Tonight for October." Outside observing follows (weather permitting). Details & Cost: 703/358-6070.

**October 11, 18, 7:30 PM**—"There's No Place Like Home" by Howard B. Owen. Science Center (Lanham, MD) planetarium presentation. Details: 301/918-8750.

**October 12, 7:00 PM**—"Goddard At Night" sky watching program at Goddard Space Flight Center (GSFC—Greenbelt, MD) Visitors Center. Bring binoculars, tele-

scope, or look through ones there. If cloudy, then presentation on astronomical topic. Details: 301/286-8981 (TDD 301/286-8103). Visitors Center Home page: <http://www.pao.gsfc.nasa.gov>.

**October 20, 9:00 PM**—UMD Observatory Open House and lecture, "Maryland's Radio Telescope," by Berkeley-Illinois-Maryland Array (BIMA) team. Outside observing follows (weather permitting).

**October 27, 1:00 PM**—"Compton Gamma Ray Observatory" by Niel Gehrels. GSFC Visitors Center.

**October 29, 6:30 PM**—"MicroElectroMechanical Systems (MEMS): It's the Little Things in Life that Keep You Going" by Susanne Arney. (Includes how MEMS will transform space travel.) Carnegie Institution of Washington. Details: 202/328-6988. Carnegie Home Page, <http://www.ciw.edu>.

#### A Note

Don't forget to send in your money for the Curaçao Total Solar Eclipse Trip. Deposit and 1st payments are due by

November 1996. Mail To: NCA, P.O. Box 2509, Laurel, MD 20709. Make Checks out to Greenbelt Travel.

## "Deep Night" Periods For Star Viewing

October 13, 14, and 15 (Sunday, Monday, and Tuesday) at dusk will be an excellent night for viewing the stars. A young (waxing) crescent Moon with Earthshine, will be conveniently situated for observation and enjoyment. It will be easily visible with the unaided eye, even from light polluted areas. For details, call on the above dates: 202/357-2000.

There is no better place to experience the Universe than at a dark-sky site during "deep night" periods. For many, Saturday nights represent the most convenient times to do that. Daniel Costanzo and Jay Miller have prepared a list of these dates. Several relatively dark-sky sites area available for NCA members' use in Maryland, Virginia, and West Virginia. Information: Daniel Costanzo, 703/841-4765.

## "Sky Watch"

Look for the "Sky Watch" column in *The Washington Post* "Style" section on the first Wednesday of each month. It lists many current events for the month.

## Newsletter Deadline for November *Star Dust* October 15, 1996

\*\*\*DO NOT BE LATE!!!\*\*\*

Send Submissions to Alisa & Gary Joaquin, at 7821 Winona Ct., Annandale, VA, 22003, Leave a message on voice mail 703/750-1636. Text files or graphic files in .GIF or .TIFF may be sent via E-Mail to [ajglj@erols.com](mailto:ajglj@erols.com) or fax submissions to 703/658-2233. **No submissions will be accepted after the 20th.** There will be no exceptions. We need a reasonable amount of time to design, edit, and review this newsletter. During this last several months, our personal and professional workloads have increased significantly, including dealing with illness in our family. Though we have adequate time and resources to publish this newsletter, it is even more important this year to receive submissions on time. We would appreciate everyone's help in this matter. Thank you.

# Comet Hale-Bopp Countdown

by Daniel Costanzo

This past Summer saw the incoming Comet Hale-Bopp (officially designated C/1995 01) become faintly but definitely visible to unaided eyes a full year after its serendipitous discovery. I was able to view this frozen visitor from afar without any optical aid on a scrumpulously clear July night at Virginia's Sky Meadows State Park, an hour's drive beyond the Beltway. And I possibly again saw Hale-Bopp with the unaided eye on a mostly clear August night at West Virginia's Blackwater Falls State Park.

As of September 20, Hale-Bopp was holding its own, and continuing to slowly "cook" under increasing warmth from the Sun's fusion fire. Larger telescopes showed it bristling with jet activity, plus possessing a "stellar" central point, both good omens for a bright visual spectacle early next year. It is already a 6th magnitude puff visible in

the sky just after dark. That should continue placing it throughout October within easy reach of both binoculars and the smallest of telescopes at dark-sky sites, and even at some suburban locations.

As October begins, Comet Hale-Bopp will be found steadily chugging Sunward, eating up almost two million kilometers a day of its comet-to-Sun distance. But at 2.9 Astronomical Units (AU) — 430 million kilometers — from the Sun, a distance corresponding to roughly the middle of the Asteroid Belt proper, Hale-Bopp still has quite a way yet to go before reaching "perihelion" (closest approach to the Sun) of 0.9 AU during prime viewing time early next April. (The AU is the common unit of Solar System measurement, where 1 AU is Earth's mean orbital distance from the Sun, or 149,597,870 kilometers. So 0.9 AU is just inside Earth's

orbit, or about 135 million kilometers from the Sun.) However, due to the geometry of our viewing this comet from a moving platform, during most of October, Hale-Bopp's distance from Planet Earth will actually increase. But by month's end that will stop, with the comet 3.0 AU from Earth (and 2.5 AU from the Sun). From then

on, the comet-to-Earth distance will slowly decrease as Hale-Bopp begins a long slide towards "perigee" (closest

approach to Earth) or 1.3 AU late next March.

October is about the last month to conveniently view Hale-Bopp in the evening sky before it starts getting a little on the low side and eventually temporarily swallowed up in twilight's glow come December. Throughout October, with the arrival of dark, the comet can be found high up, about one-third of the way up in the southwestern sky. Best viewing nights are in Moon-free skies during the first two weeks or so of October and the very last nights of October.

Thanks to NCA, there's no reason why you should be kept in the dark about this promising comet. Instead, we can put you in the dark watching it. If you wish more information on Hale-Bopp, consult *Sky & Telescope* magazine, especially its high quality finder charts. (*Sky & Telescope* is available to NCA members at a discount.) For further information via telephone recordings, call *Sky & Telescope* "Skyline" (617/497-4168). Via the World Wide Web, go to NCA's home page (<http://myhouse.com/NCA/home.htm>). Bob Bolster (NCA) can also give expert, practical advice on viewing, photography, and electronic imaging. Bob offers free viewing opportunities to members through NCA's Celestron-14 telescope during open nights (Phone: 703/960-9126, E-mail: 73257.507@compuserve.com). Bob can also provide customized listings and charts of comet positions, viewing times, etc.

Information and data for this article was obtained from Walter Nissen and Bob Bolster, and from "Skyline" for 1996 September 6, 13, and 20. ○



Hale-Bopp, captured by Bob Bolster September 2 using NCA Celestron-14 telescope.

## Open House at Hopewell Observatory

NCA members, families, and guests are invited to an open house at Hopewell Observatory on October 13th, to observe the autumn sky, numerous Messier objects, and Hale-Bopp (if possible). If you wish, come any time after 6:00 pm and bring your picnic dinner. Coffee, tea, and cocoa will be provided by the Hopewell Corporation. Bring warm clothing, flashlights with red film, and telescopes.

### Directions:

(1) From the Beltway (I-495) go west on I-66, 25 miles to Exit 40 at Haymarket onto U.S. 15. (2) Turn left on U.S. 15 at the end of the exit ramp. (3) Go 0.3 miles to traffic light, turn right onto Va. 55. (4) Go 0.8 miles to Antioch Road (Rt. 681) and

turn right. (5) Go 3.2 miles to the end of Antioch Road and turn left onto Waterfall Road (601). (6) Go one mile and bear right onto Rt. 629. (7) Go 0.9 miles on 629 to narrow paved road at right with an orange pipe gate. (Directly across from an entrance gate with stone facing.) (8) Turn right through pipe gates, go 0.3 miles to top of ridge, and around the microwave station. (9) Continue on dirt road through the white gate and woods a few hundred feet to the observatory. (10) Park among trees along the road short of the buildings. Do not block road.

The event will be cancelled if it is raining or hopelessly cloudy. For further information call 703/960-9126 or 301/320-3621.



## National Capital Astronomers, Inc.

### SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a non-profit, membership supported, volunteer run, public-service corporation dedicated to advancing space technology, astronomy, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. All are welcome to join NCA. For information: 301/320-3621 or 703/841-4765.

### SERVICES & ACTIVITIES:

**Monthly Meetings** feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. See monthly *Star Dust* for time and location.

**NCA Volunteers** serve as skilled observers frequently deploying to many parts of the National Capital region, and beyond, on campaigns and expeditions collecting vital scientific data for astronomy and related sciences. They also serve locally by assisting with scientific conferences, judging science fairs, and interpreting astronomy and related subjects during public programs.

**Discussion Groups** exchange information, ideas, and questions on preselected topics, moderated by an NCA member or guest expert.

**Publications** received by members include the monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

**NCA Information Service** answers a wide variety of inquiries about space technology, astronomy, and related subjects from the public, the media, and other organizations.

**Consumer Clinics** on selection, use, and care of binoculars and telescopes, provide myth-breaking information, guidance, and demonstrations for those contemplating acquiring their first astronomical instrument.

**Dark-Sky Protection Efforts** educate society at large about the serious environmental threat of light pollution, plus seek ways and means of light pollution avoidance and abatement. NCA is an organizational member of the International Dark-Sky Association (IDA), and the National Capital region's IDA representative.

**Classes** teach about subjects ranging from basic astronomy to hand-making a fine astronomical telescope. NCA's instructors also train educators in how to better teach astronomy and related subjects.

**Tours** travel to dark-sky sites, observatories, laboratories, museums, and other points of interest around the National Capital region, the Nation, and the World.

**Discounts** are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

**Public Sky Viewing Programs** are offered jointly with the National Park Service, the Smithsonian Institution, the U.S. Naval Observatory, and others.

**NCA Juniors Program** fosters children's and young adults' interest in space technology, astronomy, and related sciences through discounted memberships, mentorship from dedicated members, and NCA's annual Science Fair Awards.

**Fine Quality Telescopes** up to 36-cm (14-inch) aperture are available free for member's use. NCA also has access to several relatively dark-sky sites in Maryland, Virginia, and West Virginia.

### YES! I'D LIKE TO JOIN THE NATIONAL CAPITAL ASTRONOMERS

Enclosed is my payment for the following membership category:

Regular

*Sky & Telescope* and *Star Dust*. (\$51 per year)

*Star Dust* only (\$24 per year)

Junior (Only open to those under age 18) Date of birth: \_\_\_\_\_

Junior members pay a reduced rate.

*Sky & Telescope* and *Star Dust*. (\$42 per year)

*Star Dust* only (\$15 per year)

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First name	Middle	Last name	Telephone
_____	_____	_____	_____
Street or Box	Apartment	City	State Zip

If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old: \_\_\_\_\_

**Note:** If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$22 when it expires.

Make check payable to: **National Capital Astronomers, Inc.**, and send with this form to:

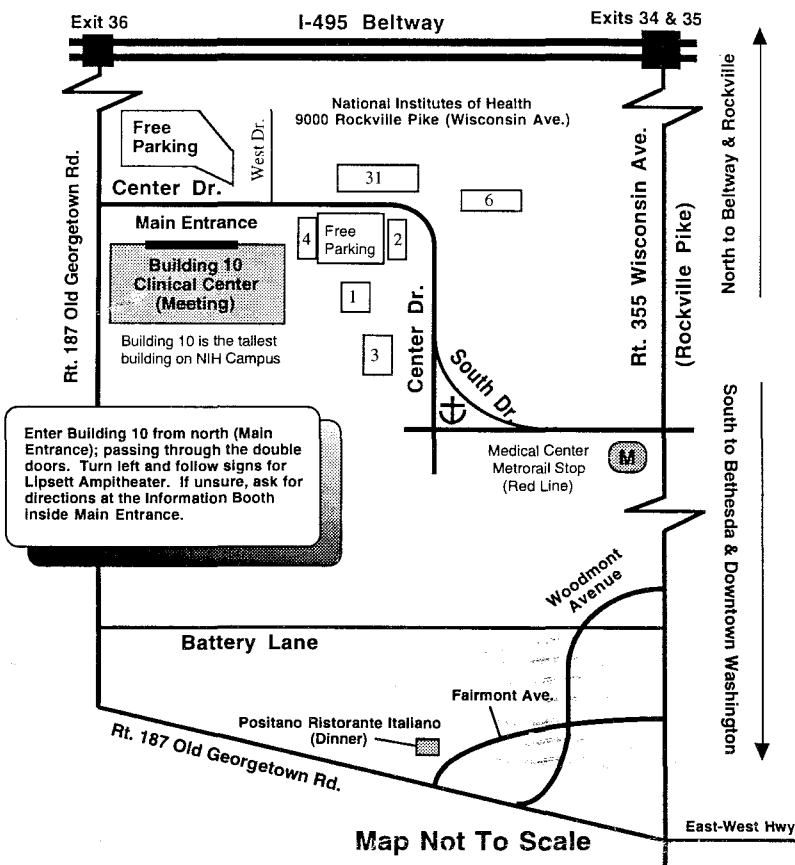
**NCA c/o Jeffrey B. Norman, 5410 Connecticut Avenue, NW, Apt. #717, Washington, D.C. 20015-2837.**

The following information is optional. Please indicate briefly any special interests, skills, education, experience, or other resources which you might contribute to NCA. **Thank you, and welcome to NCA!**

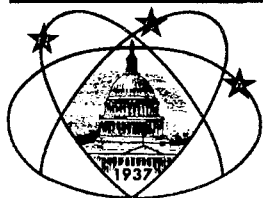
# Getting to the NCA Monthly Meeting

**Metrorail Riders** - From Medical Center Metro Stop: Walk down the hill, pass the bus stops and turn right at the anchor onto Center Drive. Continue uphill to Building 10 (walking time about 10 minutes), the tallest building on campus. Also, the J2 bus line connects the Bethesda (7:16 PM) and NIH (7:23 PM) Metro stops with Building 10 (7:25 PM).

**To Positano Ristorante Italiano** - Take Wisconsin Avenue to Woodmont Ave., and then to Fairmont Avenue. Or you can get to it directly from Old Georgetown Road (Rt 187). It is located three "houses" from the corner of Old Georgetown Rd., and Fairmont Ave. There will be valet parking. The address is 4940 Fairmont Ave., Bethesda, MD.

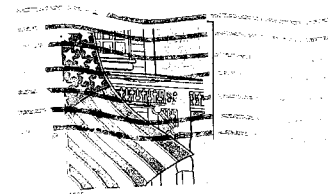


*Star Dust* is published ten times yearly (September through June) by the National Capital Astronomers, Inc. (NCA), a nonprofit, astronomical organization serving the entire National Capital region, and beyond. NCA is the astronomy affiliate of the Washington Academy of Sciences and the National Capital region's representative of the International Dark-Sky Association. NCA's Phone Numbers: 301/320-3621 or 703/841-4765. President: Harold Williams, 301/565-3709. Deadline for *Star Dust* is the 15th of the preceding month. Editors: Alisa & Gary Joaquin, 7821 Winona Ct., Annandale, VA 22003, 703/750-1636, E-mail: [ajlj@erols.com](mailto:ajlj@erols.com). Editorial Advisor: Nancy Byrd. *Star Dust* © 1996 may be reproduced with credit to National Capital Astronomers, Inc.



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