COLUMBUS ASTRONOMICAL SOCIETY

# Prime Focus

*Volume 58 Number 10 October 2009*
*The Columbus Astronomical Society Newsletter*

## Contents




## From the President

Dear fellow stargazers:

October brings cooler weather and hopefully clear, steady skies before the long gray of November and early December. One of the things I'm planning for October is a Begger's Night telescope campfire for the neighborhood kids to enjoy. I hope my neighbors will figure out that the crazy guy walking down the middle of the street at 1:00 AM with his shirt open and belt undone is actually looking at the sky and not a threat to their children.

On another note, having the A-fair in August and the annual picnic in September this year was a success. We had a good turnout for both events, and the fair produced a significant amount of revenue. Jason Hissong handed a pile of cash over to the Perkins' staff at the end of the event. Everyone who contributed at the fair should be proud.

We are a very lucky organization because of our association with such a fantastic facility.

At the October meeting, Jason Hissong will present ***Computer Aided Observing with SkyTools.***

Tom Beck
CAS, President
stargrokker@yahoo.com

## Wired for Astronomy:

The Hubble repair mission is now a thing of the past, but we are now reaping its fruits. Here is a link to the mission: http://hubble.nasa.gov/

Spitzer telescope is also opening a window to the wonders of the universe. Go to http://www.spitzer.caltech.edu/spitzer/index.shtml for the latest news and images, and view the universe in a wholy different light.

Another satellite in the news is Messenger, studying Mercury and sending some interesting data back to Earth. Here is the web site: http://messenger.jhuapl.edu/.

Cassini-Huygens mission has been a success so far. You can learn more about its accomplishments here:http://saturn.jpl.nasa.gov/

There are several lunar missions, both active and in the works. Here is a list with links to the missions: http://wapedia.mobi/en/list_of_current_and_future_lunar_missions
Three of these missions confirmed the presence of water on the lunar surface.

These and other missions are helping us unravel the mysteries of our universe, and showing us the sheer beauty of the world we live in.

**What's Up**
**Brad Hoehne**

As amateur astronomers, most of us know that 2009 has been named the International Year of Astronomy in celebration of the 400th anniversary of the telescope.

This year is not, as is sometimes thought, the anniversary of the *invention* of the telescope. That likely occurred in Holland sometime in the year 1608. But word spread fast. By early 1609 small three or four power "spyglasses" were becoming commonplace curiosities in the courts and castles of Western Europe. Compared with instruments to come, these devices were little more than toys, and few users apparently saw the potential- scientific or otherwise- of this instrument.

One such user was the English astronomer and mathematician Thomas Harriot first. On July 26th, 1609 he pointed his very crude 6 power telescope at the moon and made what is now thought to be the earliest telescopic sketch of an astronomical body- the first of a half-dozen he was to make over the following month or so. These drawings were not very impressive- just a few jagged lines- and showed very little that could not be otherwise perceived with the naked eye. Harriot did not, it seem, sense the potential of the new plaything that had come into his possession, and filed them away.

Meanwhile, 750 miles to the southeast, Galileo Galiliee (then serving as a mathematician at the university of Padua) worked diligently at perfecting his own instrument. Earlier in the year he had heard rumor that *"…a spyglass had been made by a certain Dutchman, by means of which visible objects, though far removed from the observer, are made to appear nearby."*

He began, at first, to experiment with lenses that he could acquire from spectacle makers- much as the purported inventor of the telescope, Hans Lipperhey, had done. And, like Lipperhey's, Galileo's first spyglass magnified only about three times. Galileo thought he could do better. After some experimentation and careful mathematical reasoning he deduced the properties of the spyglass and decided that spectacle lenses of the day were not curved enough. It was necessary to grind his own lenses specific to the task. He learned quickly and, in a few short months, managed to significantly improve upon the spyglass.

Like Harriot, Galileo was not at first particularly interested in observing the heavens with his device. He set his sights on more Earthy concerns- namely status and money. He hoped that an improved instrument might win the favor of powerful potential sponsors in Padua and Venice who, he surmised, would see the telescope as a great aid in mercantile and military affairs and would lavish him with money and praise to get one. In August 28th, 1609, Galileo demonstrated a 9 power instrument to a large group of members of the Venetian senate and powerful local businessmen. He described his pitch in a letter written the following day:

...I was called to the Doge to whom I had to show it together with the entire Senate, to the infinite amazement of all. And there had been numerous gentlemen and senators who, though old, have more than once climbed the stairs of the highest bell towers of Venice to observe sea sails and vessels so far away that, coming under full sail to port, 2 hours and more were required before the could be seen without my spyglass. For in fact the effect of this instrument is to represent an object that is, for example, 50 miles away, as large and near as if it were but 5.

He had been right about the reaction to his improved instrument. His demonstration won him a doubling of his salary and a lifetime extension of his teaching contract. There was, however, frustrating fine print in that contract: the doubling of salary did not take effect immediately and no further increases were to be made after that. Nevertheless, Galileo caught the attention of the rich and powerful across Italy, many of whom just had to get their hands on one of those things. He made many spyglasses and sent them off to powerful men of Italy. Accompanying them were formal, flattering and florid letters that Galileo hoped might secure him even greater rank and fortune.

Soon after his hearing before then Venetian Senate, Galileo received word that Cosimo II De Medici the Grand duke of Tuscany (likely the richest man in Italy) wished to obtain a spyglass of his own. But not just any spyglass. Cosimo II, like the technophile early adopters of today, wanted the best possible spyglass, and Galileo, who had more diligently than any studied the properties of this instrument, was the man to make it for him.

Galileo immediately sent word (flattering, of course) that he could oblige this request. (Galileo was nothing if not confident in his own abilities.) On September 19th Galileo received glass blanks made to his specifications and he set to work grinding lenses for what was to become a 20 power telescope. He worked hard throughout the month of October perfecting his lens grinding technique, and making a few slight changes to the design of the spyglass.

By the end of November 1609, Galileo had finished this instrument. Before him was a long tube of cardboard and red leather, gilt lightly with gold. It was 32 inches long when collapsed and roughly 40 inches long when fully extended. There was a 35 mm wide convex lens at one end (the objective) and a 29 mm concave lens (the eyepiece) at the other. Both of these lenses were

*(Continued on page 3)*

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stopped down to a fraction of their size to reduce the aberration that was caused by imperfect lenses and the inherent design limitations of this type of instrument. Galileo had discovered the benefits of an aperture mask.

Looking down the tube of this device was like, well, looking down a tube. The tiny, upright, field of view appeared as large as a florin (about the size of a quarter) held at arms length. The patch of sky that it allowed one to see was smaller than the full moon- though it magnified not much more than a good pair of today's large binoculars.

Galileo knew a good thing when he saw it. Rather than sending it off to Cosimo II de Medici right away, he decided to put it through its paces first.

Doing so, he changed the way we look at the universe.

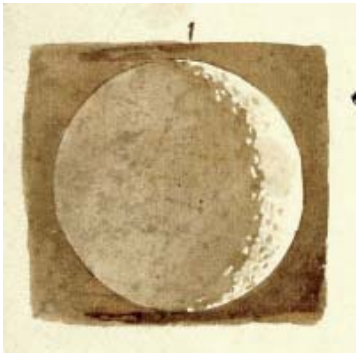
After his first views of he wrote *"… I dismissed earthly things, applying myself to the study of the heavens."* He began on the night of November 30, 1609, pointing Cosimo's gilt tube at the thin crescent moon low in the western sky. Quite soon thereafter, he made a significant discovery:

On the forth or fifth day after conjunction, when the Moon displays herself to us with brilliant horns, the boundary dividing the bright from the dark part does not form a uniformly oval line… but is marked by an uneven, rough, and very sinuous line.

Galileo had discovered that the moon was not, as had been thought, a perfect, smooth, sphere. The heavens, it seemed, were not what we thought they were. Over the course of the following month, Galileo would continue to the moon carefully- making a number of lovely and uncannily accurate sketches in the process.

He would soon devise a 30 power instrument which would enable him to see even more. (No record has been made of whether or not his first 20 power instrument eventually made it into the hands of Cosimo II.)

This month and next you can get a similar view to the one that Galileo had by looking westward right after sunset near the end of the month. This October 23rd, **the moon** will be in a very similar phase to the one that Galileo saw the night of his first observations. On November 25th, the moon will also be in a similar phase, and it will be against the same constellations- on the border between Sagittarius and Capricorn- that Galileo saw those first nights. Look for the Earthshine that Galileo so beautifully captured in the following wash sketch- one of the first he made.



In late November, 2009, Jupiter will sit roughly in the same patch of sky that Saturn was in in 1609- so one can appreciate how the sky looked in Galileo's time. In that year, Jupiter was rising in the east in the early evening. Not long after his moon studies, Galileo would turn his sights towards that world, and further seal the fate of the old way of looking at the universe.

More on that next month.

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CAS 2009 Picnic
Photos by Charles Sigrist
More photos in the Yahoo Groups photo section

# Spitzer, the Sequel

The Spitzer Space Telescope is getting a second chance at life.

The liquid helium "lifeblood" that flows through the telescope has finally run out, bringing Spitzer's primary mission to an end. But a new phase of this infrared telescope's exploration of the universe is just beginning.

Even without liquid helium, which cooled the telescope to about 2 degrees above absolute zero (-271°C), Spitzer will continue to do important research—some of which couldn't easily be done during its primary mission. For example, scientists will use Spitzer's "second life" to explore the rate of expansion of the universe, study variable stars, and search for near-Earth asteroids that could pose a threat to our planet.

"We always knew that a 'warm phase' of the mission was a possibility, but it became ever more exciting scientifically as we started to plan for it seriously," says JPL's Michael Werner, Project Scientist for Spitzer. "Spitzer is just going on and on like the Energizer bunny."

Launched in August 2003 as the last of NASA's four Great Observatories, Spitzer specializes in observing infrared light, which is invisible to normal, optical telescopes. That gives Spitzer the power to see relatively dark, cool objects such as planet-forming discs or nearby asteroids. These objects are too cold to emit light at visible wavelengths, but they're still warm enough to emit infrared light.

In fact, all warm objects "glow" with infrared light—even telescopes. That's why Spitzer had to be cooled with liquid helium to such a low temperature. Otherwise, it would be blinded by its own infrared glow.

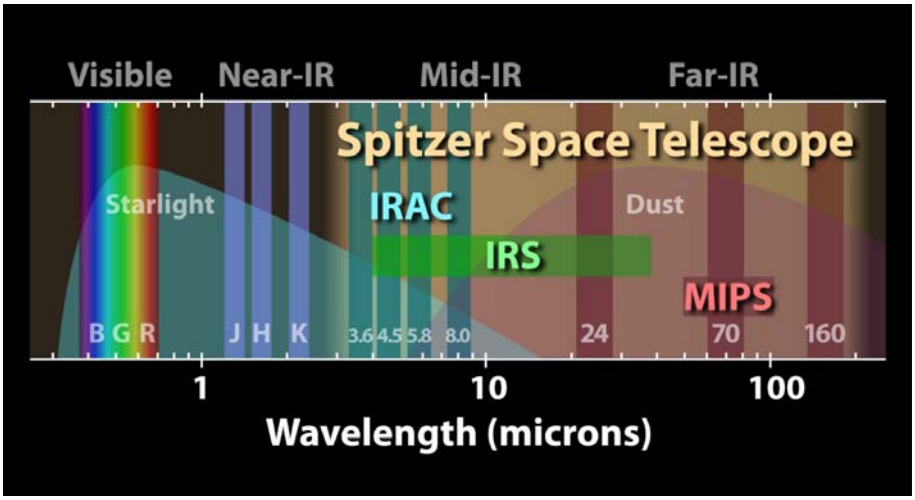
As the helium expires, Spitzer will warm to about 30 degrees above absolute zero (– 243°C). At that temperature, the telescope will begin emitting long-wavelength infrared light, but two of its short-wavelength sensors will still work perfectly.

And with more telescope time available for the remaining sensors, mission managers can more easily schedule new research proposals designed for those sensors. For example, scientists have recently realized how to use infrared observations to improve our measurements of the rate of expansion of the universe. And interest in tracking near- Earth objects has grown in recent years—a task for which Spitzer is well suited.

"Science has progressed, and people always have new ideas," Werner says. In its second life, Spitzer will help turn those ideas into new discoveries.

For kids, The Space Place Web site has a fun typing game using Spitzer and infrared astronomy words. Check it out at spaceplace.nasa.gov/en/kids/spitzer/signs.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*




*The "warm mission" of the Spitzer Space Telescope will still be able to use two sensors in its Infrared Array Camera (IRAC) to continue its observations of the infrared universe.*

# October 2009

*Columbus Astronomical Society Calendar*

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 Mercury and Venus at perihelion | 5 | 6 Mercury at greatest Western elongation | 7 | 8 | 9 Draconids meteor shower | 10 CAS meeting 8PM |
| World Space Week | | | | | | |
| 11 | 12 | 13 Jupiter stationary<br>Moon at perigee | 14 | 15 New Viatas program | 16 | 17 |
| 18 | 19 | 20 | 21 Orionids meteor shower | 22 | 23 | 24 |
| 25 Moon at apogee | 26 | 27 | 28 PF Articles deadline | 29 | 30 | 31 |

# November 2009

*Columbus Astronomical Society Calendar*

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| 1 Dayligh Savings time ends | 2 | 3 Taurids meteor shower peak | 4 | 5 Mercury at superior conjunction | 6 | 7 Moon at perigee |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 CAS meeting 8PM |
| 15 | 16 Sedna's closest approach to Earth (21st mag.!) | 17 Leonids meteor shower peak | 18 | 19 | 20 | 21 |
| 22 Moon at apogee | 23 | 24 | 25 PF Articles deadline | 26 | 27 | 28 |
| 29 | 30 | | | | | |

# Get Crafty: Earth Piñata

## Throw a space party with this smashin' craft!

## What you need:

- - 1 round balloon
- - Newspaper
- - 1 cup flour
- - 2 cups water
- - Blue, green, and brown poster paint
- - String
- - Scotch tape
- - 2 medium bowls
- - Paint Brush
- - Scissors
- - Candy

## Steps:

**1.** Cut the newspaper into long, narrow strips.
**2.** In a bowl, mix the flour and water to make a paper mache paste.
**3.** Blow up the balloon. Then, use the other bowl to rest the balloon on while you are working.
**4.** Dip the newspaper strips into the paste mixture and cover the balloon with at least four layers of strips.
**5.** When you're finished, let it to dry overnight.
**6.** Once it’s dry, pop the balloon by cutting a small hole at the top with scissors. Use one end of the scissors to pop it. You can use that hole to fill your planet piñata with candy once you’re done.
**7.** Tape a piece of string to the top of your new Earth piñata.
**8.** Use your brush to paint the planet’s surface and then hang it somewhere to dry.
**9.** Smash the Earth piñata with friends and family when the paint dries!

http://funschool.kaboose.com/globe-rider/space/crafts/earth-pinata.html

Columbus Astronomical Society
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Columbus, Oh 43216-3004

The Prime Focus is the monthly newsletter of the Columbus Astronomical Society, a not for profit group of amateur astronomers interested in the night sky. Information can be obtained by writing to the address below. Society members build telescopes, observe the splendors of the universe, contribute to scientific research and educate the public at public programs around the city and at Perkins Observatory.
CAS web site - http://www.the-CAS.org/.
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**P.O. Box 163004**
**Columbus, Ohio 43216**

*Must be a club member to qualify for discount magazine subscription rates. If you are renewing a magazine subscription please send your magazine renewal notice from the publisher along with this form and your check to ensure proper credit toward your subscription.

## Columbus Astronomical Society
## Membership Application/Renewal Form

Please indicate whether a [ ] new member [ ] membership renewal [ ] magazine subscription [ ] magazine subscription renewal.

I have checked the class of membership and magazine/s subscription/s desired and enclosed a check made payable to the Columbus Astronomical Society for:

[ ] Annual Regular Membership Fee: $20 _____
[ ] Annual Student Membership Fee: (under 18) $10 _____
[ ] Annual Family Membership Fee: $25 _____
[ ] Annual Patron Membership Fee: $50 _____
[ ] Annual Corporate Membership Fee: $150 _____
[ ] Astronomy Magazine: $34.00/1 year * _____
[ ] Sky & Telescope: $32.95/1 year * _____
[ ] Trial - 3 issues of PRIME FOCUS while I decide: $2 _____
[ ] Tax Deductible Donation: _____
[ ] Send the Newsletter via USPS instead of e-mail ($5.00) _____
Total: _____

**Please Print**
Name_____
Address_____
City _____State _____ Zip _____
Phone _____ (E-Mail) _____
Today's Date _____

# NIGHT TIMES

The Newsletter of Perkins Observatory Oct. 2009

## October at the "O"

In Central Ohio, October is reputed to be one of the clearest months of the year, which makes it a great time to bring your friends and family to Perkins Observatory. The leaves are already beginning to turn, making our 16 acres a lovely backdrop for a bit of astronomy and stargazing. Friday night programs start at 8 PM, but come early and enjoy the outdoor, daytime views, as well.

On a clear night, we should be able to give you a wondrous view of Jupiter's cloud bands and its four brightest moons lined up around the planet. Better hurry, though. Jupiter will soon be too low in the southwest to see.

Some of the more spectacular summer objects are still hanging in there: the Ring Nebula, the blue and gold double star called Albireo, and even the Great Globular Cluster in Hercules.

Stick around, and we'll observe the best objects of autumn: the Wild Duck star cluster, the Andromeda Galaxy, the Double Cluster in Perseus, and the globular cluster M15 in Pegasus. October is the perfect time to come to stargaze at Perkins.

Cloudy nights aren't so bad, either. We'll show you how to find all those glorious objects using a pair of binoculars from your own back yard and give you a tour of the "O," So come on down. Please reserve your tickets soon by calling (740) 363-1257.

As always, members of the Friends of Perkins Observatory are admitted free. Please call ahead to make sure that spaces are available on any given night.

## Observatory Angels

You too could be an Observatory Angel. Consider joining the Friends of Perkins Observatory or renewing your membership. Members attend all of our weekend programs at no extra charge. See the reverse for a handy membership form.

You can also support our public activities by participating in our "2,000 Points of Light" program or by contributing to our operating fund or the Perkins Observatory Endowment, a gift that will help ensure that we will still be engaging in our public activities for the next generation of stargazers and amateur astronomers.

This month, the Ballantyne family from Columbus gave $50 to our operating fund.

Jim Pace made his ongoing $40 monthly gifts to the Endowment and the Operating Fund. Please benefiting from his example. If we had just 30 people who made a similar monthly contribution, the long-term existence of our public activities would be permanently ensured.

Thanks to all. Keep those cards and letters coming in, folks.

## Ways You Can Help

We're always looking for late-model computers to replace the aging computers we use for our exhibit area in the library. Many of them have gone to the great computer heaven in the sky lately.

I must confess that I dream of some day writing this very newsletter on one of the more modern, speedier Macintoshes.

Thus, if you have a computer, Mac or PC, that runs at one gigahertz or better and you're planning on replacing it (or even if you're not), you can help us quite a lot by donating it to the "O" and letting the next generation of young people experience the digital universe.

## Another Way You Can Help

The cost of mailing this newsletter to you has increased dramatically. You can help us meet our budget and provide more funding to continue our public activities at Perkins by receiving NightTimes by email. Just send an email to <perkinsw@owu.edu> (note the "w" after "perkins") and we'll email you a copy of the newsletter every month. Not only will you get it faster, but you'll help to preserve Ohio's premier public venue for stargazing and astronomy.

## Taurus
## The Bulletin Board

### Programs galore at the "O"!

Teachers, spaces for autumn and winter field trips are filling up fast

★October 2 (Friday) 8 P.M. Guest Night. Sold out!
★October 3 (Saturday) 12 P.M. CAS Amateur Telescope Making SIG.
★October 6 (Tuesday) 9:30 A.M. Eli Pinney Elementary 5th graders.
★October 6 (Thursday) 9:30 A.M. Eli Pinney Elementary 5th graders, Round 2.
★October 9 (Friday) 8 P.M. Guest Night. Sold out, but check a few days before the program to see if tickets have become available.
★October 10 (Saturday) 12 P.M. CAS Amateur Telescope Making SIG.
★October 10 (Saturday) 8 P.M. Monthly meeting of the Columbus Astronomical Society.
★October 13 - 18 (Wednesday - Sunday) Tom is out of town.
★October 15 (Thursday) 8 P.M. New Vistas in Astronomy featuring Kris Stanek on "Gamma Ray Bursts: The Biggest Explosions Since the Big Bang."
★October 16 (Friday) 8 P.M. Guest Night. Some tickets available, but they're going fast. Call ASAP.
★October 17 (Saturday) 12 P.M. CAS Amateur Telescope Making SIG.
★October 21 (Wednesday) 7 P.M. Tom is at the Cincinnati Observatory risking his life discussing the reasons that astronomers have reclassified Pluto as a "dwarf planet."
★October 22 (Thursday) 9:30 A.M. St. Joseph Montessori School, 1st - 3rd graders.
★October 23 (Friday) 8 P.M. Guest Night. Plenty of tickets still available.
★October 24 (Saturday) 12 P.M. CAS Amateur Telescope Making SIG.
★October 27 (Tuesday) 9:30 A.M. Wyandot Elementary.
★October 29 (Thursday) 9:30 A.M. Wyandot Elementary, Round 2.
★October 30 (Friday) 8 P.M. Guest Night. Plenty of tickets still available.
★October 31 (Saturday) 12 P.M. CAS Amateur Telescope Making SIG.

**Phone us: (740) 363-1257**

# 2,000 Points of Light
## Perkins Observatory Needs Your Help

On any given night of the year from a dark, rural location, 2,000 stars light up the sky.

You can light up the sky over Perkins Observatory in the same way. Rising costs have made it increasingly difficult for its small but dedicated staff to engage in its public mission: to show the people of Central Ohio the wonder and majesty of the universe they live in.

Over the years, we have reduced our staff to the bare bones. With the switch of our Building Superintendent to part-time status, Perkins no longer has a single full-time employee. Despite those reductions, we have managed to increase our public activities and the number of people, especially children, we serve.

Those of you who love the night sky have been extraordinarily generous with both your time and financial help, and we thank you. Now, we need your help one more time.

If 2,000 people, 2,000 Points of Light, will contribute $200 each, we can continue our mission unimpaired.

Half of your gift will go into the Perkins Endowment, the interest on which will keep us open for decades to come. The other $100 will be used to make building repairs (including much- needed repairs to our roof), build new exhibits and displays, and help with ongoing costs.

To show our gratitude, we will associate your name (or the name of any honoree you pick) with one of the over 2,000 stars on our large, publicly-displayed star map. (Sorry, we get to pick the star). We will also send you a certificate honoring your help, mention your contribution in this newsletter, and add you to the monthly newsletter mailing list at your request.

Families, corporations, and fraternal organizations need not limit themselves to a single Point of Light. Why not honor several -- or many -- members of your group by making them a "star" on our map?

You can mail your contribution by using the handy form on the back or by writing 2KPL and the name of your honoree on the memo line of your check. Please mail to

Perkins Observatory 2KPL
PO Box 449
Delaware, OH 43015

Or give us a call at (740) 363-1257 and schedule a trip to one of our weekend public programs. We'd be honored to receive your gift in person.

Please don't lay this newsletter aside. We need you help today. If you become a Point of Light, Perkins can continue its public stargazing sessions for many years to come.

### Friends of Perkins Observatory

Membership in FOPO entitles you to attend any or all of our weekend public programs.

___ Yes, I want to be a member of the Friends of Perkins Observatory. Enroll me at the level of sponsorship checked below:

___ Individual ($50) ___ Sponsor ($100) ___ Family ($90) ___ Family Sponsor ($200) ___ Corporate ($300)

Name _____

Names of family members (for family memberships) _____

Address _____

City _____ State _____ Zip Code _____ Phone: _____

(Please mail to Perkins Observatory, P. O. Box 449, Delaware, OH 43015. Make checks payable to "Perkins Memorial Observatory.")

___ **Yes, I want to be a Point of Light (@ $200 per "Point").** Amount enclosed: _____

___ Yes, I want to donate to the Perkins Endowment. Amount enclosed: _____

___ Yes, I want to donate to the Operating Fund. Amount enclosed: _____

Name _____

Honoree(s) for "2,000 Points of Light" _____

Address _____

City _____ State _____ Zip Code _____ Phone: _____

(Please mail to Perkins Observatory, P. O. Box 449, Delaware, OH 43015. Make checks payable to "Perkins Memorial Observatory.")