

COLUMBUS
ASTRONOMICAL
SOCIETY

Prime Focus

Volume 58 December 2009

The Columbus Astronomical Society Newsletter

Contents

From the President.....	pg 1
Wired for Astronomy.....	pg 1
What's Up.....	pg 2
Nasa Space Place.....	pg 4
CAS Calendar.....	pg 5



Wired for Astronomy:

Making a wish list is easy if you have a computer and internet access. Some places are obvious: Amazon.com offers not just books, but telescopes and binoculars. You can even build a wish list under your name so your loved ones can shop for you.

Orion Telescopes (<http://www.telescope.com/control/main/>) has almost anything an amateur astronomer wants, at reasonable prices. 'Tis the season, so they also have a gift center!

<http://www.buytelescopes.com/> takes you to Anacortes, another well-known dealer of optical equipment.

As long as we are making a wish list, go to <http://www.obsessiontelescopes.com/> for some nice telescopes. But remember, unless your pockets are deep, this site is for wishing!

Books are also a source of wish lists. Of course, Amazon has plenty of books, but it is not the only source of books. Go to <http://www.willbell.com/> for a great collection of books and astronomy software.

Maybe a Kindle or a Sony reader is in your list. If so, go to http://www.gutenberg.org/wiki/Category:Science_Bookshelf for some interesting historical books you can download for free. You can also download them and read them in your computer!

Maybe an astrocamera made your list...here's a great place to find one...<http://www.hutech.com/AstroCamera.htm>.

Whatever you wish for, I hope your holiday is full of joy and that your wishes come true.

Merry Christmas!

From the President

Greetings fellow stargazers:

The holiday season has finally arrived and our Christmas dinner is just around the corner. We'll gather at Perkins on Saturday, December 12th at 17:00 for our annual festivities. The club will provide the ham. You can bring a side dish or dessert and your loved ones.

Brad offered to host another round of Astro-Jeopardy for our entertainment. We'll need a few volunteers who are willing to endure an hour or so of public humiliation. C'mon out and accept the challenge.

We'll elect the next round of officers and a trustee after everyone has feasted. Clear skies would be a plus.

This is my last letter for the PF as President of the Columbus Astronomical Society. It has been a good ride for me. I've had a few challenges. I survived. It's not that bad, really. Volunteer for an "O" or a "T" spot next year. You may find that you actually enjoyed the experience.

Tom Beck
CAS, President
stargrokker@yahoo.com

What's Up Brad Hoehne

What's Near

The last **winter solstice** of the first decade of the 21st century occurs on December 21 at 12:47 PM, Ohio time when the sun reaches its southernmost point on the ecliptic in the constellation Sagittarius.

It occurs to me that, nearly 10 years in, we as a society haven't yet come to a conclusion on what to call **this decade**. In the 1990s, I recall that we all referred to that decade as "The Nineties". But, at the beginning of this one, after a brief flurry of discussion about what to call this block of ten years, no conclusions, it seems to me, were reached. It was perhaps hoped that time would sort out the confusion. But this doesn't seem to have happened.

So, I believe we should commit ourselves, before this decade is out, of landing ourselves on an appellation and fixing it safely in the history books. What will it be? The "Ohs" seems plausible- but I've heard no one saying it. The "2000s" might work, but the term seems to encompass an entire millennium, or at least a century. It's not specific enough. The "Aughts-" (as those stirring between 1900-1910 referred to their decade) seems too quaint. Get to it!

Early evening sky watchers can still catch **Jupiter** throughout the month of December as it slides towards the western horizon. A **four day-old moon** will pass over the top of it on the night of the 20th. If the night is clear, earthshine should still be visible.

Earth is catching up with **Mars** on its inside-track around the sun. At the end of the month, the red planet will shine full magnitude brighter than it did on December 1 near the front paws of Leo. In scopes, the planet's tiny disk is beginning to swell and reveal details not seen since the last Iowa Caucuses. As of this writing, the frosty southern polar cap of Mars is its most distinct feature when the seeing is steady. This will improve until Mars reaches opposition on January 29, 2010. But it won't improve too much. At opposition, its tiny salmon disk will appear just 14 arcseconds across- a bit more than half its apparent diameter during the August 27, 2003 close pass. That "tad more extraordinary than usual" pass, as you'll recall, resulted in perhaps the greatest number of bogus e-mail alerts of any as-

tronomical event to date.

If we're lucky with the weather, this year's **Geminid meteor shower**, which peaks on the night of Sunday, December 13, should be a good one. It is unmarred by moonlight. The best advice I've seen with regard to watching this meteor shower is this: Treat it as you would a display of 4th of July Fireworks- if the fourth of July had been moved to the bitter nadir of winter and the display was held up until after midnight. Lawn Chairs. Comfortable blankets. No optics and, thankfully, no bug spray needed.

What's Far

Out beyond the solar system, amateur astronomers point to a wide dusting of distant sources of light, glittering and fuzzy, clear and faint. Many of the best and most well-known of these have been can be found in the **Messier** (or "M") **Catalog**. When any sort of list- a list being a mean by which we organize the universe- is compiled, it is natural to assume that the process of its compilation was clear and systematic. In the case of this most popular of sky catalogs, it was anything but.

While Charles Messier (1730-1817) did discover the largest plurality of the objects (45 of them, to be exact) in the 110-strong "M" catalog we know today- that list is far from the work of a single person. The celestial wonders it encompasses were discovered by 22 original observers spread over thousands of years. Messier (and a few others) merely brought them all together.

Historically, the earliest known objects in the Messier Catalog were the naked eye objects M45 (the Pleiades) and M44 (the "Beehive"). The naked-eye star cluster, M45 has been known about since stories have been told. In historical times the grouping has been associated with realms of ancient mythology and observation. Ancient cultures from the Baylonians who called it *MUL.MUL* ("Star of Stars"), to the Maori- who called it *Matariki* ("the eyes of God") to the Aztecs (*Tianquiztli*- "The Marketplace") to Japan (*Subaru*, a traditional unisex Japanese name) have folded lore of this celestial gem into their traditions. M44 is associated with similar, though much less numerous, traditions. The Greek poet and philosopher Aratus (310-240 BCE) made reference to *Prae-*

sepe in his philosophical poem, *Phaenomena*,

In 964, the Persian Astronomer Al-Sufi noted M31 (The Andromeda Galaxy) and referred to it as "The Little Cloud" or, sometimes, the Little Fish.

In the telescopic era, many "M" objects were discovered prior to Messier including them in his catalog. In 1610, not long after the Galileo's revolutionary (pardon the pun) observations, a crude telescope fell into the hands of French astronomer/mathematician Nicolas-Claude Fabri de Peiresc who made the first instrumented observation of M42, the Orion nebula, with it. (Several ancient cultures, most notably the Maya, may have also recognized this object.)

Nine Messier objects- M6, M8, M33, M34, M36, M37, M38, M41 and M47 were first noted by the relatively unknown Giovanni Batista Hodierna. Hodierna lived from 1597-1660 and was one of the first great catalogers of the night sky. His list, which included some 40 objects (many of which cannot be identified from his descriptions) was published in 1654 but was lost to history until the 1980s. Hodierna also made the earliest known sketch of M42.

Edmund Halley was the first to note the non-stellar nature of M13, the "Great Hercules Cluster," in 1714, though a few star catalogs from earlier times note it as a faint star of the sixth magnitude. In 1731, French geophysicist Jean-Jacques d'Ortous de Mairan reported seeing "*a small star surrounded by nebulosity in Orion*" which came to be known as M43. Many other "M" objects- such as M11, M57 and M46- yielded to the scans of a host of lesser-known observers.

Messier's first noted observation of an object that was to appear in his catalog occurred in 1757. The object was M32, the small companion to the Andromeda galaxy.

That same year Messier had come across a small nebula while searching for the predicted return of Comet Halley. This task had been given to him by his mentor and employer Joseph Nicolas Delisle, the French astronomer of the Navy, who had calculated where to look. Though Messier he did not encounter Halley's comet, he did manage to discover several others and a curious comet-like object which did not move like a comet. Messier took note of its position for future reference. In the first edition of his catalog, he described it as follows:

The Comet of 1758, on August 28,

(Continued on page 3)

(Continued from page 2)

1758, was between the horns of Taurus, I discovered above the southern horn, & little distant from the star Zeta of that constellation, a whitish light, elongated in the form of the light of a candle, which didn't contain any star. This light was of almost the same as that of the Comet which I observed at that time; yet it was a bit more vivid, more white & a bit more elongated than that of the Comet which to me had always appeared almost round in its coma, without the appearance of a tail or beard... I determined the position of this nebula, its right ascension is 80d 0' 33", & its declination 21d 45' 27" north...

It turns that Messier had made an independent discovery of what would come to be known M1- which had been observed in 1731 by English Astronomer John Bevis, but whose observation was not well known at the time. (Note the odd precision which Messier gives to his positional measurement, far greater than would be possible at the time- indeed, far greater that would be necessary for such an extended object as M1.)

Delisle, as it turns out, had erred in his comet Halley calculations, which led Messier to into a long not-so-fruitless (as it turns out) scan of a good chunk of sky. A few years later, he bumped into what would later come to be called M2. This was a repeat observation of a 1746 discovery made by the French Jean-Dominique Maraldi. Perhaps, had Delisle made a better prediction, Messier's task would have been prematurely completed and his observing career would not have taken the turn it did.

In 1764, Messier, while on a scan for more comets (Comet Halley had returned, as predicted, in 1758, but not along Delisle's plotted course), bumped into his 3rd nebulous object, M3- his first true discovery. It was this event, apparently, that gave Messier the idea to perform a more systematic scan of the skies. Over the next few years Messier would independently discover the objects he would dub M9, M10, M12, M14, M18, M19 M20, M21, M23, M24, M26, M27, M28, M29, M30, M39 and M40. He would make independent searches for and observations of many others.

The first "Messier Catalog" was published in 1771 as part of the *Memoirs of the French Academy of Sciences for 1771*. It contained the 45 objects we now refer to as M1 through M45. By 1780,

his list had grown to 68 objects. The following year the final revision of his lifetime expanded the list to 103 objects. It "officially" remained at this level until 1921. That year a Messier Catalog that included M104, an object that Messier had discovered and noted in his personal copy of his own catalog, was published by Camille Flammarion.

By the 1950s the 104 object Messier catalog had become a popular fixture of the rapidly growing hobby amateur astronomy. In 1953, astronomer Owen Gingerich repeated in *Sky and Telescope* the suggestion of British Astronomer Helen Sawyer Hogg of including a number of observations that Messier's protégé and collaborator, Pierre Mechain, had discovered and forwarded to Messier with the intent of including them in a proposed future edition of the catalog. (Mechain had been responsible for 25 of the discoveries that appeared in the 1781 edition of the catalog, including a number of the "M" galaxies in the Virgo cluster.) That final catalog had never come to be. It may have been that by the time of Mechain's discoveries a flood of reported observations from the talented, diligent, and optically much-better-equipped William Herschel was making his notes redundant.

Gingerich's suggestion was eagerly taken up by a number of popular writers, and, by the end of the 1950s, most published versions of the list included 109 objects. One exception was in the 1967 book "Amateur Astronomy" by Patrick Moore. Moore harkens back to the 1921 list, but includes M105-M109 in an appendix. By the 1980's, however, the list of 109 objects, of which 22 were discovered by Mechain, was more or less universal (pardon the pun). For good measure, M110- a second small satellite galaxy of M31 noted by Messier but not cataloged- was, more often than not, thrown into the list.

Given this list's long history, it is not surprising that it a number of errors and confusions have popped up. The first, M40, is an error only in that it the object to which it refers, in a list of extended objects, is a simple double star. Messier included it because it appeared close to the reported location of a nebulous object that had been described by Johan Hevelius in the 1640s. Messier probably figured that the star had nebulosity that he, with limited instrumentation, could not see. Or, perhaps, he was "padding" to make his list longer for publication- as he has been ac-

cused of doing with his inclusion of such "non-comet-like" objects like M45. Though the M40 Messier describes is a real object, and is noted in the correct position in his catalog, publishers of Messier's catalog have been wary of including it. Throughout the years have many have skipped it, called it "missing," or left it in with a stern disclaimer.

The second object, M102, is truly lost. Mechain's description is as follows: "*Nebula between the stars Omicron of Bootes & Iota of the Draco*]: it is very faint; near it is a star of the sixth magnitude." Messier, in his handwritten notes, gives the position 14h 40m, +56. The problem, however, is that there is no object at Messier's location. Exactly 5 degrees to the east, however, is NGC 5866, which vaguely matches Mechain's description, but Mechain himself, recognizing the error, claimed that it had been a duplicate observation of somewhat nearby M101. This, however, seems implausible.

Over the years, in various catalogs, a number of objects have occupied M102's slot, including NGC 5789, NGC 5907 and NGC 5908. Three other "mistaken" objects have been convincingly "found." M47, was reported by Messier in the wrong location when he calculated its location in the wrong direction from the star 2 Puppis. An object matching the description of M48 was charted roughly 2.5 degrees north of its true position. Finally, M91, was misplaced when Messier calculated its position as if he had measured its distance from M58, when, in fact, he had measured it relative to M89.

M1, M31, M32, M34, M35, M36, M37, M38, M39, M42, M43, M44, M45, M78, M76, M110 and many others are well placed in the winter constellations for our evening observations. The brightness, beauty, complexity, and diversity of these objects rewards countless revisits. Though a mere collection of disparate objects- that is, inclusion in this list means almost nothing, scientifically- it is likely that Messier's bodged together collection of fuzzy objects in the night sky is one of the most important lists in the history of science, for admiration of the wonders it contains has inspired generations of Astronomers. May you be one of them.

A Cosmic Crash

by Patrick Barry and Dr. Tony Phillips

Two small planets hurtle toward each other at 22,000 miles per hour. They're on a collision course. With unimaginable force, they smash into each other in a flash of light, blasting streams of molten rock far out into space.

This cataclysmic scene has happened countless times in countless solar systems. In fact, scientists think that such collisions could have created Earth's moon, tilted Uranus on its side, set Venus spinning backward, and sheared the crust off Mercury.

But witnessing such a short-lived collision while pointing your telescope in just the right direction would be a tremendous stroke of luck. Well, astronomers using NASA's Spitzer space telescope recently got lucky.

"It's unusual to catch such a collision in the act, that's for sure," said Geoffrey Bryden, an astronomer specializing in extrasolar planet formation at NASA's Jet Propulsion Laboratory and a member of the science team that made the discovery.

When Bryden and his colleagues pointed Spitzer at a star 100 light-years away called HD172555, they noticed something strange. Patterns in the spectrum of light coming from nearby the star showed distinctive signs of silicon monoxide gas — huge amounts of it — as well as a kind of volcanic rock called tektite.

It was like discovering the wreckage from a cosmic car crash. The silicon monoxide was produced as the high-speed collision literally vaporized huge volumes of rock, which is made largely of silicon and oxygen. The impact also blasted molten lava far out into space, where it later cooled to form chunks of tektite.

Based on the amount of silicon monoxide and tektites, Bryden's team calculated that the colliding planetary bodies must have had a combined mass more than twice that of Earth's moon. The collision probably happened between 1,000 and 100,000 years ago — a blink of an eye in cosmic terms.

The scientists used the Spitzer space telescope because, unlike normal telescopes, Spitzer detects light at invisible, infrared wavelengths.

"Spitzer wavelengths are the best wavelengths to identify types of rock," Bryden says. "You can pin down which type of rock, dust, or gas you're looking at."

Bryden says the discovery provides further evidence that planet-altering collisions are more common in other star systems than people once thought. The "crash-bang" processes at work in our own solar system may indeed be universal. If so, Spitzer has a front row seat on a truly smashing show.

See Spitzer Space Telescope's brand new Web site at <http://spitzer.caltech.edu/>. Kids can learn about infrared light and see beautiful Spitzer images by playing the new Spitzer Concentration game at <http://spaceplace.jpl.nasa.gov/en/kids/spitzer/concentration>.

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



Artist's rendering of cosmic collision involving two objects whose combined mass was at least twice that of our Moon. Discovered using the Spitzer Space Telescope in the planetary system of a star called HD 172555 100 light-years away.

January 2010

Columbus Astronomical Society Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
January 7th is the 400th anniversary of Galileo's discovery of Jupiter's four largest moons.					1 Moon at perigee	2
3 Quadrantids meteor shower	4 Earth at perihelion Mercury at inferior conjunction	5	6	7 	8	9 CAS meeting 8PM
10	11 Venus at superior conjunction	12	13	14 Perkins New Vistas program	15 Annular solar eclipse (Africa and Asia) 	16 Moon at apogee
17	18	19	20	21	22	23
24	25	26	27 Mercury at greatest Western elongation	28 Mars closest approach to Earth	29 Mars at opposition	30 Moon at perigee
31						

February 2010

Columbus Astronomical Society Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13 CAS meeting 8PM
14	15	16	17	18	19	20
21	22	23	24 PF Articles deadline	25	26	27
28						

Make Your Own 2-D Flying Nanosat!



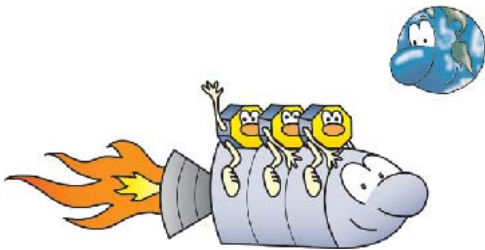
Something whizzes past your ear. You turn, leap, and snatch the disk from the air. It's a Frisbee! Frisbees flying through the air are fun to catch and watch. One young Frisbee fan, Pete Rossoni, watched them fly and dreamed of spacecraft flying past planets and stars.

Pete took those dreams and his Frisbee with him to college. At college he studied to become an engineer. Pete wanted to design cars, airplanes and spacecraft. After finishing school, Pete got a job at NASA. "Sometimes your dreams do come true," he says.

At NASA, Pete is working on launching satellites like he used to throw Frisbees. These satellites are small, about the size of a birthday cake. "This wouldn't work with big satellites or heavy spaceships like the shuttle," he says.

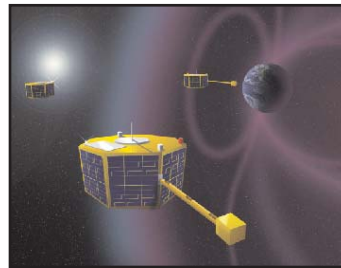
Pete has a special name for these cake-sized satellites. "Nano" means tiny, so he calls them "nanosatellites" or "nanosats" for short.

Nanosats are a new idea. Usually satellites are big and they cost a lot of money. Sometimes scientists have to save their money for a long time before they can send a satellite into orbit. Nanosats are much cheaper. Because they are so small, one rocket can carry many of them into space. Nanosats ride piggy-back on the rocket. When they reach space, they are flung from the rocket and go spinning into orbit.



This is where Frisbee meets science. Pete has invented a gadget that can fling a nanosat from a rocket. "It's a lot like throwing a Frisbee," explains Pete. "You need to spin the satellite and release it cleanly—all in fraction of a second."

NASA hopes to launch the first nanosats into Earth orbit in 2004. This mission is called Space Technology 5. Three 8-sided nanosats will ride to space on the back of a rocket, and Pete's invention will throw them off. The nanosats will gather data for scientists about Earth's magnetic field. But this is just extra-credit.



The Space Technology 5 nanosats will test their miniaturized technologies as they study Earth's magnetic field.

Their main mission is to answer some questions: Can nanosats fly in formation? Will their tiny computers (nano-computers!) work? Is Frisbee tossing as much fun in space? NASA plans to find out.

You can make your own 8-sided flying "nanosat" disc out of paper. It also doubles as a "Ninja" 8-pointed star! Instructions are on the next page.

Learn More: Books:

Northern Lights (Nature in Action), by D.M. Souza (ages 4-8), ISBN 0876146299. (The Northern Lights are caused by Earth's magnetic field, which Space Technology 5 will study.)

Aurora: A Tale of the Northern Lights, by Mindy Dwyer (ages 4-8), ISBN 0882405497.

Web Sites:

Ask the Space Scientist: Earth's Magnetic Field and Auroras— image.gsfc.nasa.gov/poetry//ask/aearth.html

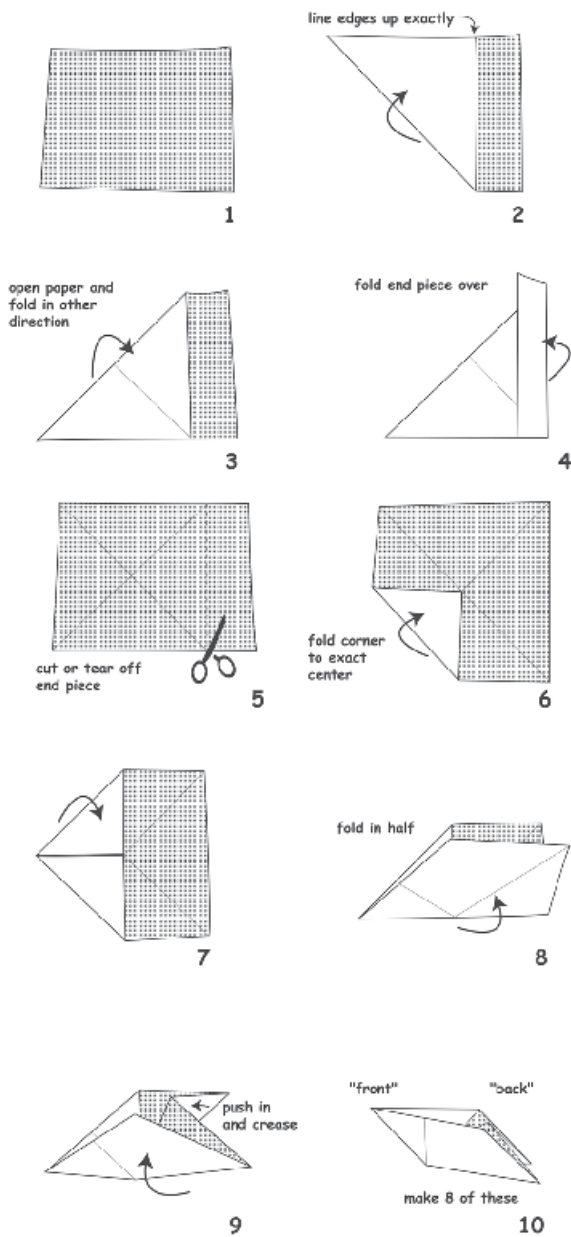
The Space Place: Play the Nanosat Flingman Game! spaceplace.nasa.gov/st5/flingman.htm

Space Technology 5 Web site: nmp.nasa.gov/st5

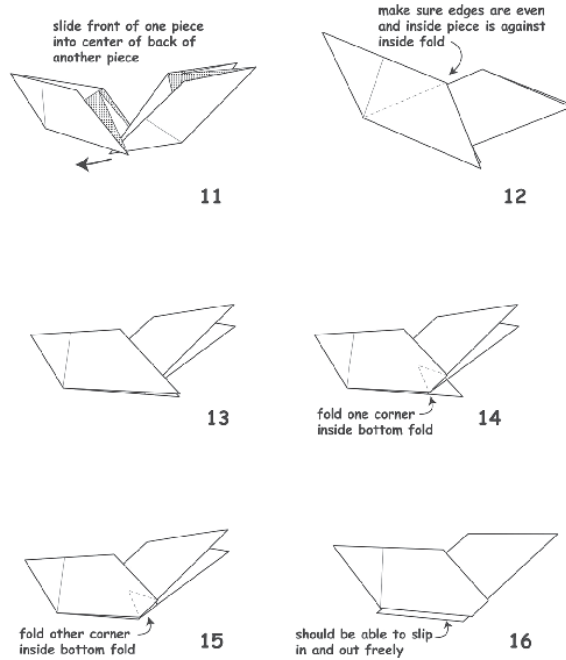
How to Make Your Flying Nanosat and Star

All you really need are 8 sheets of plain 8-1/2x11-inch paper. Recycled photocopy or printer paper is fine. To make a smaller "Nanosat," you can use 4 sheets of paper, cutting each one in half width-wise first to make 8 smaller sheets. (Where the drawing below shows scissors cutting off one end of the paper, you can crease the paper a few times, then carefully tear off the end piece.)

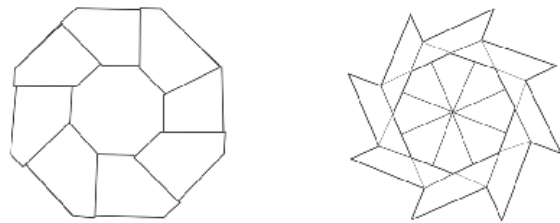
Fold each of the 8 sheets carefully as shown in these pictures. Fold on a table or desk and make those creases sharp!



Connect the 8 folded sheets like this:



When all the folded sides are connected, you will end up with an 8-sided disk. If you push in on opposite sides, the points slide out and you can also have an 8-pointed star!



Have fun spinning the "Nanosat" and the star just as the Space Technology 5 nanosats will be tossed into space like Frisbees.

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

Columbus Astronomical Society
PO Box 163004
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/>.
 For Advertising info contact the editor.

President: : Tom Beck
 stargrokker@yahoo.com
 Vice president: Jason Hisson
 jhisson1@columbus.rr.com
 Secretary: Byron Winchell 937-981-7046
 Bwinch@yahoo.com
 Treasurer: Jim Schoultz
 Jschoultz@att.net 614-267-9009
 jhisson1@columbus.rr.com
 Prime Focus Editor: Joanne Konst 614-276-2911
 jfkonst@columbus.rr.com

Mail to: **Columbus Astronomical Society**
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

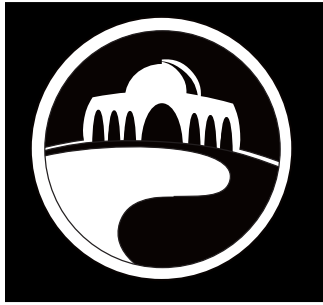
Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ (E-Mail) _____

Today's Date _____



NIGHT)TIMES

The Newsletter of Perkins Observatory Dec. 2009

NEW VISTAS IN ASTRONOMY for 2010

This mini-course in astronomy will allow you to learn about the latest discoveries by astronomers and (if we can arrange a clear night or three) to observe a variety of celestial objects with the 32-inch Schottland reflecting telescope. Unless otherwise noted, all presenters are from Ohio State University's world-class Department of Astronomy. Please use the order form on the back to order a season pass or tickets for individual nights.

SCHEDULE

All programs are on Thursdays and begin at 8 P.M.

14 January (Thursday) 8 P.M.

Galaxy Clusters: Evolution without Elbow Room by Paul Martini

18 February (Thursday) 8 P.M.

The New, Improved Hubble Space Telescope by Bradley Peterson

11 March (Thursday) 8 P.M.

Planets in Distant Parts of our Milky Way Galaxy by Andrew Gould

8 April (Thursday) 8 P.M.

Quasars: The Quest Continues by Matthias Dietrich

13 May (Thursday) 8 P.M.

What Galaxies Do, How Galaxies Work by Todd Thompson

10 June (Thursday) 8 P.M.

The Biggest Unsolved Problems in Astronomy by Donald Terndrup

15 July (Thursday) 8 P.M.

How to Make a Planet by David Ennis

12 August (Thursday) 8 P.M.

Do We Know What the Sun is Made Up Of? by Anil Pradhan

16 September (Thursday) 8 P.M.

The Rise and Fall of the Infinite Universe by Barbara Ryden

14 October (Thursday) 8 P.M.

Archaeoastronomy in the Southwestern United States by Barbara Andereck,
Ohio Wesleyan University's Department of Physics and Astronomy

11 November (Thursday) 8 P.M.

Einstein's Elevator: A Brief Introduction to General Relativity by Robert Harmon,
Ohio Wesleyan University's Department of Astronomy and Physics

9 December (Thursday) 8 P.M.

The Multi-Object Double Spectrograph on the Large Binocular Telescope by Richard Pogge

'Tis the Season . . .

When we need your help the most. Please contribute to Perkins Observatory in any way you can. Buy a season pass to the New Vistas lectures above. Become a member of the Friends of Perkins Observatory so that you can attend any or all of the Friday, clear-night programs throughout the year. Make a contribution to our Operating or Endowment funds. Become a Point of Light. Donate your gently used, relatively recent computers and astronomical equipment. Volunteer your telescopic skills at our public programs.

It's no secret that the "O" faces many challenges in the coming year, not the least of which is the life-threatening possibility that the golf course that surrounds us might be developed for other purposes. All of those who love Perkins, myself included, are resolved to do whatever it takes to keep the "O" a real, functioning, public observatory that shows everyone the stars in all their glory. As William Faulker once said, "We will not just endure. We will prevail." But we need your help. Please do whatever you can.

Taurus

The Bulletin Board

Our public activities couldn't happen at all without the support of our parent institution, Ohio Wesleyan University, thousands of kind donors, and our hard-working volunteers, most of whom come from the Columbus Astronomical Society. Our heartfelt thanks to all!

- ★December 2 (Wednesday) 7 P.M.
Barrington Elementary 1st-2nd graders.
- ★December 3 (Thursday) 7 P.M.
Barrington Elementary 1st-2nd graders.
- ★December 4 (Friday) 8 P.M.
Guest Night. Sold out!
- ★December 5 (Saturday) 12 P.M.
CAS Amateur Telescope Making and Radio Astronomy groups.
- ★December 7 (Monday) 1:30 P.M.
OWU Science Writing class.
- ★December 8 (Tuesday) 7 P.M.
Barrington Elementary 1st-2nd graders.
- ★December 9 (Wednesday) 7 P.M.
Barrington Elementary 1st-2nd graders.
- ★December 10 (Thursday) 10 A.M.
Rainbow Childcare preschoolers.
- ★December 10 (Thursday) 8 P.M.
New Vistas in Astronomy featuring Barbara Ryden on "How the Telescope Changed Astronomy."
- ★December 11 (Friday) 8 P.M.
Guest Night. Sold Out!
- ★December 12 (Saturday) 6 P.M.
CAS holiday party.
- ★December 15 (Tuesday) 6 P.M.
West Holmes High School.
- ★December 16 (Wednesday) 10 A.M.
Wickliffe Elementary 1st graders.
- ★December 18 (Friday) 12:30 P.M.
Clintonville Women's Club.
- ★December 18 (Friday) 8 P.M.
Guest Night. Some tickets available.

Lots of Ways to Reach Us

Phone:

(740) 363-1257

Mail:

P. O. Box 449, Delaware, OH 43015

Email:

perkins@owu.edu

Web site:

www.perkins-observatory.org

Fax:

(740) 363-1258

New Vistas in Astronomy Ticket Order Form

Series Passes

_____ passes @ \$60 each = _____

For tickets to individual nights, please use the box at the right.

Single-Night Tickets

PROGRAM DATE _____

_____ tickets @ \$7.00 each = \$_____

Please print your name, address, city, state, and zip code in the box below. The box will become your mailing label, so print carefully.

Phone: _____

Total enclosed \$_____

Please mail to Perkins Observatory, P. O. Box 449,
Delaware, OH 43015.
Please make checks payable to Perkins Observatory.

Yes, I want to make a donation to the Perkins Endowment.

Amount enclosed: _____

Yes, I want to donate to the Perkins Operating Fund

Amount enclosed: _____

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 _____

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

2,000 Points of Light

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 letter 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 enclosed "adoption" form or 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. If you become a Point of Light, Perkins can continue its public stargazing sessions for many years to come.