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We want your dues!

Just a friendly reminder that it's that time of the year again, our annual dues collection.

It would be appreciated if we could get all the dues in by the end of the month. If you have any questions, please feel free to contact any of the club officers listed in the newsletter. The form for returning your dues payment can be found on page 11 of the newsletter and a return envelope is attached to this newsletter.

The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence

Calendar of Events

KU STADIUM OBSERVING
 Sunday, January 28, 2007
 8:00 — 9:30PM

Spring Meeting Schedule

Friday, Jan . 19
 1001 Malott—7:30 PM
Dr. Keith Ashman
Physics & Astronomy
UMKC

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Observing Clubs

Doug Fay

Volume 33 Number 01

January 2007



Report from the Officers on the December Meeting:

The final meeting of 2006 was a winner, as were the 12 individuals who walked away with a door prize, ranging from an HST 2007 calendar to a GALEX poster to a book. Over two dozen people listened intently to a presentation by Dr. Steve Shawl on the role of polarization studies in astronomy, highlighted by some results from his long-term investigations in this field. Dr. Twarog also provided an update on the ULTRA project, the 1-m lightweight telescope under construction in California. (Telescope technology, old and new, is also the theme of a few articles in this month's issue). Some quality refreshments didn't hurt either.

A key item for the New Year is our annual dues collection which takes place in January. See the attached sheet/form and please return your dues payment in the attached envelope as soon as possible. Thanks, as always, for your continued interest in and support of the club. We hope you feel that you are getting your dues worth from the AAL and believe that, while we are a small club, the public education role that the club fills in acquainting the Lawrence region about the wonders of the sky is of value, as well as fun! Rick and William have a number of ideas about expanding this role in the coming year and new ideas and suggestions (as well as new members) are always welcome .

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Five KU Alumni Earn Distinguished Achievement Awards



The Notre Dame provost, **NASA astronaut Steve Hawley**, a distinguished public administration professor, the founder of a genomic company and an award-winning poet have all been selected as recipients of the 2006-07 Alumni Distinguished Achievement Award from the University of Kansas. KU's College of Liberal Arts and Sciences announced the winners of the award, the highest honor bestowed by the College on its graduates.

"The accomplishments of these award winners are stunning and exemplify the tremendous success that can be launched from a high-quality liberal arts and sciences education from KU," said Dean Joseph E. Steinmetz. "The diversity of professions and accomplishments of the recipients reflect the broad experiences and opportunities available within

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From the Officers, continued

(Continued from page 3)

Our next scheduled public observing session is tentatively scheduled for Sunday Jan. 28, back on our usual sequence of the last Sunday of the month. The time period for the observing is set for 8:00—9:30 PM. If this changes and/or we have an update on the schedule for the remainder of the semester, we will inform you via the newsletter, at minimum, via email, and through the web site. If you are unsure and would like to come by, weather permitting, please check the web site or call the observatory number (864-3166), as usual for a recorded message.

Our first meeting of the new year will be **Friday, Jan. 19**, and our speaker is **Dr. Keith Ashman** of UMKC. Keith was on the faculty of KU and Baker University before joining the Physics department at UMKC, so he has a long list of connections to Lawrence and the region. The exact title of his presentation remains an unknown as this time, but his expertise is in the area of globular clusters as tracers of galaxy mergers, a topic on which he has coauthored a book for the University of Cambridge Press. Keith is also a coauthor with last month's speaker, Dr. Shawl, of a popular introductory textbook. Keith is an excellent public speaker, as well as a first-rate musician, so **mark your calendar and come out for some fun and good company!**



COMING EVENTS: Nationally— The Texas Star Party is now taking reservations for this annual event—the 29th TSP— scheduled for May 13 - 20, 2007. The organization will not be sending out flyers and registration is through the web. If you are interested in attending, please look over their materials and send in your request quickly. The TSP has grown to over 700 people and is now limiting attendance. TSP 2007 Reservations will include both on-site and off-site attendees, so everyone will need to submit a TSP Registration/Reservation Request Form , before **January 20, 2007** which will be processed through a random drawing in late January 2007. This drawing will also include the allocation of all accommodations on the Ranch (camping and covered housing). The web site for the

TSP is <http://www.texasstarparty.org>.

If you have any suggestions for talks, speakers, or public events, please feel free to contact us, particularly Rick Heschmeyer (rcjbm@sbcglobal.net), the events coordinator for the club. Hope to see you next month at the next meeting on **Jan. 19**. ALL for now.

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the College.”

Steven Hawley is a veteran astronaut who has flown on five space shuttle missions, including the launch of the Hubble Space Telescope, the second Hubble Telescope servicing mission and the launch of the Chandra X-ray Observatory.

Hawley graduated with highest distinction from KU in 1973 with bachelor's degrees in physics and astronomy. He earned a doctorate in astronomy and astrophysics from the University of California-Santa Cruz in 1977 and was selected as a NASA astronaut in 1978. Hawley is director of astromaterials research and exploration science, leading the space science activities at NASA's Johnson Space Center. His group is involved in robotic exploration of the solar system and was responsible for the recovery of the solar wind and Comet Wild-2 extraterrestrial samples recently returned to Earth by the Genesis and Stardust missions. Hawley's group is also part of the ongoing exploration of Mars with the rovers Spirit and Odyssey. Hawley has received numerous awards including NASA's Distinguished Service Medal, KU's Distinguished Service Citation and the government's Meritorious Executive Award. Steve Hawley is the second Astronomy recipient of the award since it was instituted in 1997. Dr. James Hesser, a 1963 KU graduate with a BA in Astronomy, received the award in 1998.

About the Astronomy Associates of Lawrence

The club is open to all people interested in sharing their love for astronomy. Monthly meetings are typically on the second Friday of each month and often feature guest speakers, presentations by club members, and a chance to exchange amateur astronomy tips. Approximately the last Sunday of each month we have an open house on Memorial Stadium. Periodic star parties are scheduled as well. For more information, please contact the club officers: Luis Vargas at lvargas@ku.edu,

Gary Webber at gwebber@ku.edu, our faculty advisor, Prof. Bruce Twarog at btwarog@ku.edu. our events coordinator, Rick Heschmeyer at rcjbm@sbcglobal.net. Because of the flexibility of the schedule due to holidays and alternate events, it is always best to check the Web site for the exact Fridays and Sundays when events are scheduled. The information about AAL can be found at <http://www.ku.edu/~aal>.

Copies of the *Celestial Mechanic* can also be found on the web at <http://www.ku.edu/~aal/celestialmechanic>

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"Constructing an E-ELT is extremely challenging -- as you scale up a telescope the technical difficulties become much more significant. Scientists and industry will both have crucial parts to play in ensuring that the E-ELT is viable and the UK community will be looking to take leading roles in design and construction of the telescope and its instruments as well as in the eventual scientific work."

The primary 42-m diameter mirror is composed of 906 hexagonal segments, each 1.45 m in size, while the secondary mirror is as large as 6 m in diameter. In order to overcome the fuzziness of stellar images due to atmospheric turbulence the telescope needs to incorporate adaptive mirrors into its optics. A tertiary mirror, 4.2 m in diameter, relays the light to the adaptive optics system, composed of two mirrors: a 2.5-m mirror supported by 5000 or more actuators able to distort its own shape a thousand times per second, and one 2.7 m in diameter that allows for the final image corrections. This five mirror approach results in an exceptional image quality, with no significant aberrations in the field of view.

The site of the E-ELT is not yet fixed as studies are still undergoing with a plan to make a decision by 2008.

"The E-ELT will provide European astronomers with access to a facility that will allow them to do very exciting research projects including looking for Earth-like planets around other stars, a real quest for astronomers," said Richard Wade.

"This is really the beginning of a new era for optical and infrared astronomy," said Catherine Cesarsky.

Extremely Large Telescopes are considered world-wide as one of the highest priorities in ground-based astronomy. They will vastly advance astrophysical knowledge allowing detailed studies of, among others, planets around other stars, the first objects in the Universe, super-massive Black Holes, and the nature and distribution of the Dark Matter and Dark Energy which dominate the Universe. The European Extremely Large Telescope project will maintain and reinforce Europe's position at the forefront of astrophysical research, gained in large part at the turn of the Century through the ESO Very Large Telescope facility.

Note: This story has been adapted from a news release issued by Particle Physics & Astronomy Research Council.

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showings ever. By the end of May Vesta should be an easy naked-eye target, shining at magnitude 5.4 as it slips past the globular cluster M107 in Ophiuchus.

As luck would have it, all the major **meteor showers** reach their peaks in 2007 with the Moon out of the sky. Any of these showers can produce dozens of shooting stars each dark hour leading up to dawn. Mark your calendar to look for the Lyrids on April 23rd, Perseids on August 13th, Orionids on October 21st, Leonids on November 18th, and Geminids on the night of December 13-14. Meteor enthusiasts are keenly awaiting the Geminids in 2007 because their progenitor, the defunct comet Phaethon, precedes them in a flyby of Earth on December 10th.

Pluto will make big news again in 2007, and not because it is or isn't a planet. Pluto is involved in one of the year's most anticipated **occultations** on March 18th, when it passes directly in front of a 14.9-magnitude star for all the major observatories of the American Southwest. They'll train their "big guns" on Pluto, hoping to learn more about its shrinking atmosphere as the star's light fades and then returns into view. Amateurs with telescopes as small as 10 inches can share in this effort.

Also in 2007, asteroid 372 Palma passes in front of the borderline naked-eye star 32 Lyncis on January 26th; see the February *Sky & Telescope*, page 64, for this event's visibility path, which extends clear across the US from coast to coast.

And don't miss some spectacular lunar occultations this year. The crescent Moon occults the Pleiades for northwestern North America on March 22nd. Then on June 18th, a thin sliver of a Moon sneaks up on brilliant Venus for countries of the Middle East. On the next night, June 19th, skywatchers in the southeastern US can see the crescent Moon snuff out the bright star Regulus.



Space Weather for Air Travelers

By Dr. Tony Phillips

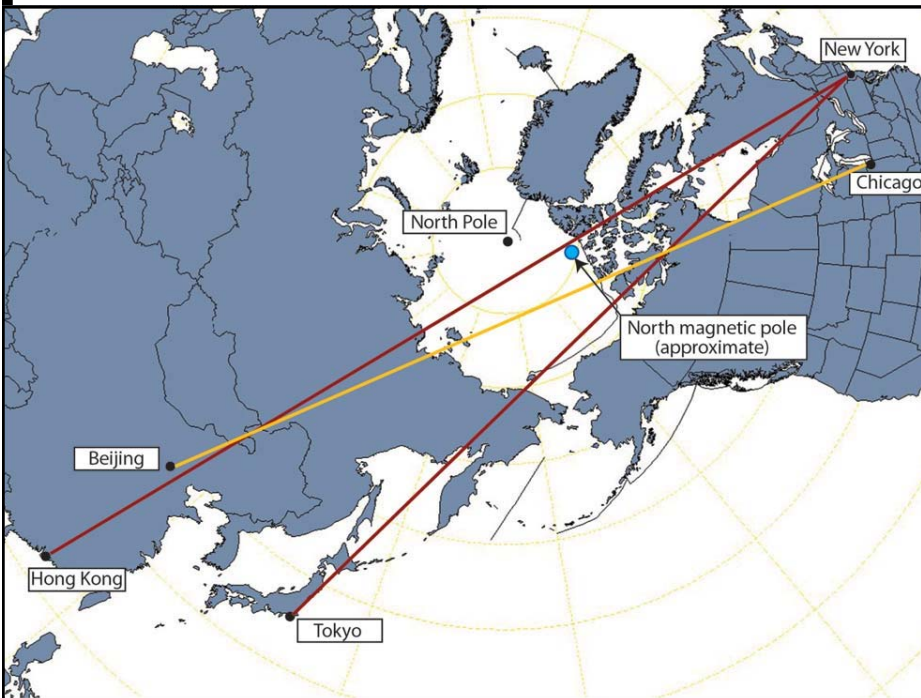
At a time when much of the airline industry is struggling, one type of air travel is doing remarkably well: polar flights. In 1999, United Airlines made just twelve trips over the Arctic. By 2005, the number of flights had grown to 1,402. Other airlines report similar growth.

The reason for the increase is commerce. Business is booming along Asia's Pacific Rim, and business travel is booming with it. On our spherical Earth, the shortest distance from Chicago to Beijing or New York to Tokyo is over the North Pole. Suddenly, business travelers are spending a lot of time in the Arctic.

With these new routes, however, comes a new concern: space weather.

"Solar storms have a big effect on polar regions of our planet," explains Steve Hill of NOAA's Space Weather Prediction Center in Boulder, Colorado. Everyone knows about the Northern Lights, but there's more to it than that: "When airplanes fly over the poles during solar storms, they can experience radio blackouts, navigation errors and computer reboots—all caused by space radiation."

In 2005, United Airlines reported dozens of flights diverted from polar routes by nasty space weather. Delays ranged from 8 minutes to nearly 4 hours, and each unplanned detour burned expensive fuel. Money isn't the only concern: Pilots and flight attendants who fly too often over the poles could absorb more radiation than is healthy. "This is an area of active research—figuring out how much exposure is safe for flight crews," says Hill. "Clearly, less is better."



The shortest airline routes from the Eastern U.S. to popular destinations in Asia go very near the magnetic North Pole, where space weather is of greatest concern.

To help airlines avoid bad space weather, NOAA has begun equipping its GOES weather satellites with improved instruments to monitor the Sun. Recent additions to the fleet, GOES 12 and 13, carry X-ray telescopes that take spectacular pictures of sunspots, solar flares, and coronal holes spewing streams of solar wind in our direction. Other GOES sensors detect solar protons swarming around our planet, raising alarms when radiation levels become dangerous.

"Our next-generation satellite will be even better," says Hill. Slated for launch in 2014, GOES-R will be able to photograph the Sun through several different X-ray and ultra-violet filters. Each filter reveals a somewhat different layer of the Sun's explosive atmosphere—a boon to forecasters. Also, advanced sensors will alert ground

controllers to a variety of dangerous particles near Earth, including solar protons, heavy ions and galactic cosmic rays.

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The Rise of a Giant: European Extremely Large Telescope Will Probe The Universe

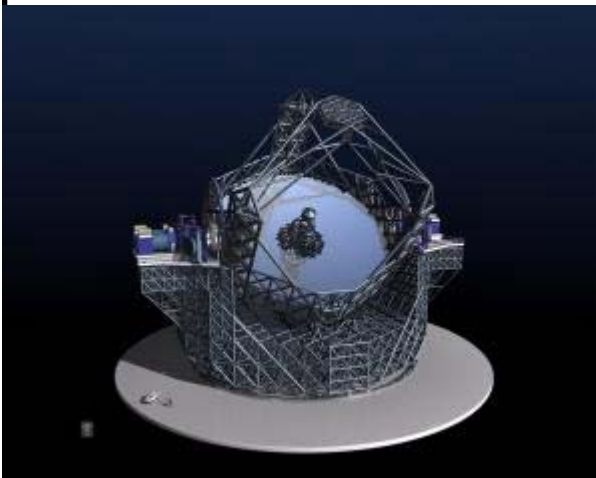
Science Daily

The future of European astronomy is poised to enter a new era of discovery with the decision announced by ESO's governing body to proceed with detailed studies for the European Extremely Large Telescope (E-ELT). This three year study, with a budget of 57 million euro, will prepare the way for construction of the world's largest optical/infrared telescope that will revolutionize ground-based astronomy. Astronomers from the UK have played crucial roles in reaching this decision.

The E-ELT will be more than hundred times more sensitive than the present-day largest optical telescopes, such as the 10-m Keck telescopes or the 8.2-m VLT telescopes and will answer some of the biggest questions about the Universe in which we live.

Professor Gerry Gilmore, University of Cambridge anticipates tremendous new science being made possible saying "The E-ELT is critical to allow the next big advance in understanding our mysterious Universe. We will search for planets similar to the Earth around other stars, discover the nature of matter by mapping the distribution and properties of the dark matter, which is the matter of which Nature is made, not the rather unimportant amount of stuff of which we are made, and investigate the future of the Universe - is time infinite" - by examining the Dark energy which seems to control the fate of space-time."

The present concept, estimated to cost around 800 million euro, features as a baseline a 42-m diameter segmented mirror telescope housed in an 80-m diameter rotating dome. It incorporates a large internal mirror able to distort its own shape a thousand times per second. This 'Adaptive Optics' system will help to provide robust telescope operation even in case of significant wind turbulence and will largely overcome the fuzziness of stellar images due to atmospheric turbulence.



Professor Roger Davies, University of Oxford chairs ESO's ELT Standing Review Committee and serves on PPARC's Council. He said "The telescope design incorporates the crucial image sharpening technology in an innovative way that will give the 42m the full theoretical capability an instrument of that size can achieve. It will provide an unprecedented clear view of the distant universe enabling us to probe the origins of planets, stars and galaxies"

"The decision by the ESO Council to go ahead with the design study for a European Extremely Large Telescope is a very exciting one for European astronomy," said Professor Richard Wade, President of the ESO Council and Deputy CEO of the UK's science funding agency, the Particle Physics and Astronomy Research Council.

"At the end of the three year Final Design Study, we will know exactly how everything is going to be built including a detailed costing," said Catherine Cesarsky, ESO's Director General. "We then hope to start construction and have it ready by 2017, when we can install instruments and use it!"

Dr Isobel Hook of Oxford University led the team developing the science case for an E-ELT. "There are a lot of big questions in astronomy that we can't answer with the current generation of telescopes. 42 may not quite be the answer to Life, the Universe and Everything, but it will tell us a great deal more than we know now."

For the past year, ESO has been working together with European astronomers to define the new giant telescope needed by the end of the next decade. This fast pace has also been possible thanks to early conceptual studies (such as the ESO OWL and the EURO-50 studies), complemented by a large mobilisation of European Institutes and high-tech Industries to develop critical enabling technologies in the framework of the so-called ELT Design Study, with ESO and the European Commission as the main funders, as well as with national contributions.

Professor Gerry Gilmore of the University of Cambridge chaired the design study leading up to this decision.

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A Glimpse, a Gasp and Telescope Gold: 400-Year-Old Telescopes Appear in the Strangest of Places--in Museum Storage Rooms. Two Chicago Science Historians Tell How They Followed a Hunch and Connected the Dots.

By William Mullen, Chicago Tribune

Like cell phones or the Internet in recent history, the telescope's introduction in the early 17th Century had a swift and lasting impact on the world. Telescopes revolutionized military strategy and within months showed the father of astronomy, Galileo Galilei, that Earth is not the center of the universe. Until recently, scholars thought only 8 or 10 of these important early telescopes--made between 1608 and 1650 of tightly rolled paper and crudely ground lenses--had survived to the present day.

Then two Chicago historians on a visit to a museum in Berlin this fall had an "aha!" moment. One of the oldest-known surviving telescopes at the German museum gave them an idea of places to look for other undiscovered examples. Their insight apparently was correct. According to Marvin Bolt of the Adler Planetarium, he and his colleague found a previously unreported 1627 telescope in a Dresden museum storage room within 24 hours of their brainstorm. Less than a day later, they found a second, slightly earlier telescope that had lain unnoticed in the storage room of a museum in Kassel.

"This discovery is exciting, because it suggests further places to look for more old telescopes," said Bolt, who made the find with Chicago native Michael Korey, now a museum conservator in Germany. "Two more is extraordinary."

Finding more early telescopes will help scientists and historians better understand who made them and how they evolved and improved over time, said Eugene Rudd, an emeritus University of Nebraska professor of physics who is a world authority on old telescopes. "I've seen the photographs of the two Marvin has located in Germany, and they certainly have the characteristics of the very early ones," Rudd said. "I know of only eight telescopes that date before 1650 that still survive, so to find two more is extraordinary, a remarkable find."

Bolt is a technology historian at the Adler, which boasts the largest and finest collection of old scientific instruments in the Western Hemisphere, including an exquisite leather-covered, trumpet-shaped device made in Italy around 1630. Korey, who grew up in Skokie, is a conservator at the Mathematisch-Physikalischer Salon in Dresden. The museum has one of the world's oldest and most renowned collections of historic scientific instruments. Through an American Association of Museums program sponsored by the U.S. State Department, Korey visited the Adler collection last summer, working in areas in which Bolt lacks expertise. Then, late in September, Bolt flew to Dresden to help Korey with his museum's collection of late-17th Century and 18th Century telescopes.

"I also wanted to visit some other museums that have the really old telescopes," Bolt said, "hoping I might learn some things that might tell me more about our old telescope. We know very little about it."

On Oct. 2, he and Korey visited Berlin's Decorative Arts Museum to see a well-known telescope dating to 1617. It had been part of a collection of 17th Century scientific instruments found in a finely crafted cabinet built for a royal family to display scientific instruments--a kunstschrack. Such cabinets were important status symbols in wealthy 17th Century households. The idea was that, by owning a kunstschrack and its contents, the owners showed they were learned and knowledgeable as well as generous sponsors of scientists and their work. Seeing the 1617 telescope and the elaborate cabinet it came from, Bolt said a bell went off in his head. Probably there were other old cabinets scattered around Europe that nobody had ever looked into for old telescopes.

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"GOES-R should substantially improve our space weather forecasts," says Hill. That means friendlier skies on your future trips to Tokyo.

For the latest space weather report, visit the website of the Space Weather Prediction Center at <http://www.sec.noaa.gov/>. For more about the GOES-R series spacecraft, see http://goespoes.gsfc.nasa.gov/goes/spacecraft/r_spacecraft.html. For help in explaining geostationary orbits to kids—or anyone else—visit The Space Place at http://spaceplace.nasa.gov/en/kids/goes/goes_poes_orbits.shtml.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract

2007 Sky Preview

Roger W. Sinnott, *Sky & Telescope*

The starry heavens unroll with the seasons, as they do every year, while our solar system provides ever-changing sights closer to home. Here's a taste of special events to watch for in 2007. Keep your browser pointed our way, and watch *Sky & Telescope* magazine for further details.

The year opens with a question mark about a **comet**. Discovered early last August on an in-bound trajectory, Comet McNaught (C/2006 P1) has been lost in the solar glare since early December, so no one really knows how it's been brightening. It reaches perihelion on January 12th, well inside Mercury's orbit, but then what? It *could* become as bright as magnitude 0 around mid-January, when it *might* be visible as a speck of light shortly after sunset, very low the twilight glow. Toward month's end this comet will draw away from the Sun and into view for Southern Hemisphere observers, but by then it will have lost its luster.

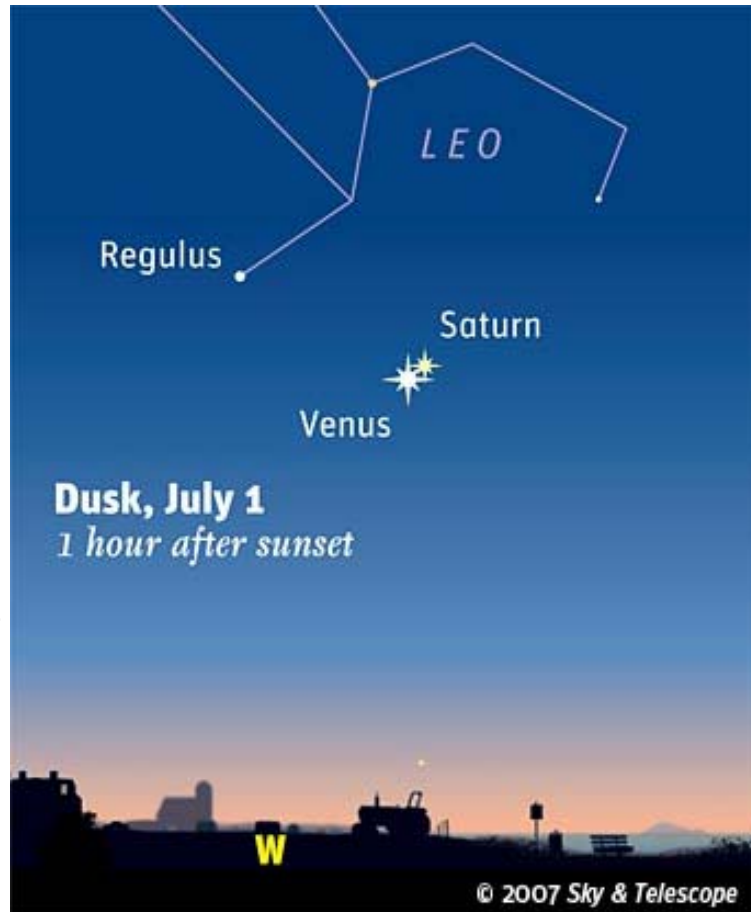
Four **eclipses** take place this year, but not all are visible from any one place. First comes a total eclipse of the Moon on the night of March 3-4, best seen from Europe or Africa; eastern North America can see some of this spectacle. On August 28th, another total lunar eclipse is visible from all Pacific Rim countries, including most of the US and Canada. Both of these *lunar* eclipses are followed, two weeks later, by partial *solar* eclipses. That of March 19th can be seen from China, and that of September 11th from southern South America.

Skywatchers along the North American West Coast have a chance to spot an extremely young crescent **Moon** on April 17th (see February's *Sky & Telescope*, page 65). The following month there will be new debates about what constitutes a Blue Moon. For Americans, the Moon becomes full twice in May (on the 2nd and 31st). For Europeans, it does so twice in June (on the 1st and 30th).

Of the major **planets** in 2007, Saturn leads the parade. During January this ringed planet is a splendid sight in telescopes, visible all night every night, and it stays high in the evening sky for another four months. Venus is the brilliant Evening Star through July, passing through its stunning crescent phase, and in late August it enters the morning sky. Mercury makes its best evening appearance at the end of May for Northern Hemisphere observers, and again in the morning sky during the first half of November. Mars grows in size to become a fine telescopic sight in December, its disk hovering between 15 and 16 arcseconds across all month.

In the 200th year since its discovery, Vesta, the brightest of all **asteroids**, makes one of its best

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"In a decorative arts museum," he said, "curators aren't aware of the history of telescopes, and if they have one belonging to one of these cabinets, they regard it more as a beautiful object rather than an example of early technology. "On the other hand, I don't think any technology historians had ever thought of a decorative arts museum as a place to hunt for early telescopes."

He and Korey excitedly began thinking about canvassing museums that might own the cabinets. That night, while attending the opera back in Dresden, Korey noticed a poster advertising the loan of a 17th Century kunstschränk from Dresden's own decorative arts museum to a Budapest museum. The following morning Korey and Bolt visited the Dresden museum director who had loaned out the cabinet. Why yes, the director said, there was an artifact belonging to the cabinet that might have been some sort of looking device, but it was in such poor shape that it was not being displayed.

"In an early inventory of the cabinet's contents, it simply listed a 'perspective glass,'" not a telescope, Korey said. Under Bolt's guidance, a technician at Korey's museum took the paper-tube telescope apart and found the lenses wadded up in balls of paper inside. Bolt spent until 1:30 the next morning examining the glass and the grinding techniques to estimate their age.

"Michael knew the year of construction of the cabinet the telescope came out of, but he wouldn't tell me, as a sort of double-blind test of how accurate my age estimate might be," Bolt said. "I finally guessed the lenses dated to the 1620s or the 1630s." The cabinet is positively dated to 1627. At 5 that same morning, he and Korey boarded a train for a museum in Kassel devoted to scientific instruments, including many old telescopes, though none that were thought to date to pre-1650. It was Bolt's last full working day in Germany before returning home, and he wanted to study several unique telescopes there.

"About mid-afternoon, I mentioned what I had seen the night before and characteristics of really early ones," Bolt said. "One of the curators said he thought they had something like that in storage, and they took me there to show it to me. There it was on the shelf--a beautiful early one, dating around the 1630s, in much better shape than the one in Dresden. It had decorative gold fleur de lis tooling on the leather covering of the barrel, suggesting it was Italian or French-made."

Bolt will return to Germany next year to do more research on the old Kassel telescope, evaluating its lenses and investigating if it, too, originally was made to equip a kunstschränk. Eager to see how technology evolved, science historians have missed important information by ignoring what roles the early telescopes played in society at the time they were built, especially as status symbols for the rich, Bolt said.

"Nobody has looked at them as cultural objects," he said. "We're going to continue to explore this genre, because it has the potential to offer so much information. If we find one associated with a well-known piece of furniture, it gives us a specific date for when it was made and possibly accurate information on who made it, where it was made and who owned it."

Such information on the known early telescopes is hard to come by, he said. Historians even disagree about how many are known to have survived. Some say there are 10, counting two telescopes in Florence thought to have been used by Galileo. Others don't count those two, believing they were made after more sophisticated lenses were developed in 1650. "If you only have 8 or 10 examples of them," Bolt said, "it's not a large enough sample size to know all the characteristics of the early ones."

Nobody knows for certain who invented the telescope, but an obscure Dutch spectacle maker, Hans Lipperhey, is generally credited with demonstrating the first working model, at the court of Prince Maurice in the Netherlands in September 1608. It was the middle of the savage Eighty Years' War. Maurice and his realm were in the Protestant camp that fought throughout Europe against Roman Catholic partisans led by Spain.

Lipperhey's telescope caused a sensation, as Maurice and his courtiers saw it as a miraculous military tool to spy on enemy troops from long distances. Unfortunately, Maurice talked so freely about the astounding new technology that the Spanish found somebody to build working telescopes almost immediately. Lipperhey never got the royal patent he had been seeking.

"The telescope is one of those revolutionary ideas that spread like wildfire," Bolt said. "Just months after Lipperhey showed off his device, you could buy telescopes in Paris." Early that same year, Galileo began building his own after having read descriptions. By the end of 1609, he had pointed them into the night skies and discovered that other planets had orbiting moons. That profoundly shattering news would eventually tear apart scientific and theological dogma holding that the rest of the universe rotated around Earth. Humans began to see they live in a tiny corner of a vast cosmos rather than at the center of things.

Planet-finding telescope blasts off

NewScientist.com news service

The COROT space telescope, designed to search for planets not much bigger than Earth, launched into space at 1423 GMT on Dec. 20 from the Baikonur cosmodrome in Kazakhstan. The mission is expected to provide a better understanding of planets smaller than Saturn, of which only a small number of examples are known so far.

The vast majority of the more than 200 extrasolar planets found to date have been detected from the ground by watching for the slight gravitational tug they exert on their parent stars, called the radial velocity technique. Most of these planets are similar in mass to Jupiter or even heavier, because these 'gas giants' are the easiest to detect. But the new telescope, called CONvection ROTation and planetary Transits (COROT), will be able to detect much smaller planets.

The satellite will use its 27-centimetre telescope to search for dips of light due to planets passing in front of their parent stars in events called transits. It will monitor different patches of the sky that each span the width of about six Full Moons, staring at each for 150 days at a time.

The mission is capable of detecting tiny drops in light of only 300 parts per million, which is good enough to detect planets as small as two or three times the size of Earth. Only a handful of relatively small planets have been found, so it is not clear how common they are. COROT will help pin down the proportion of stars orbited by the small, rocky worlds.

The COROT mission is led by France's Centre National d'Etudes Spatiales (CNES) with participation from the European Space Agency (ESA). It will be put in a circular orbit 900 kilometres above Earth.

COROT will start its scientific observing campaign around the end of January 2007, after mission managers have tested its instruments to make sure everything is working properly. The entire mission is scheduled to last 2.5 years.

Astronomy Associates of Lawrence

ANNUAL DUES FORM: Please Return by Jan. 31, 2007 Dues
for 1 year: Regular Members/Families: \$12

Students: \$ 6

Checks should be made out to: KUEA ←

REVISIONS ONLY

If the information in your address label on the reverse side of this sheet is incorrect or if you wish to update any of the info, please fill in the appropriate line below with the revision and return this form with your dues. Thank You!

Name _____

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Celestial Mechanics January 2007



AAL

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