

SIDEREAL TIMES

*The Official Publication of the
Amateur Astronomers Association of Princeton*

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M31, the Great Galaxy in Andromeda, with M32 at upper left.

Photo by RA Parker using Tak FC-76 refractor at f/8 and SBIG ST-10XME.

From the Director

Exciting Events Mark AAAP's 35th Season. The AAAP is entering its 35th season of providing great astronomy lectures and scientific presentations, once again being held at Peyton Hall on the Princeton campus. This year we will be featuring some new speakers not seen before. These include novel, cutting edge science and engineering presentations through connections our new Program Chair, Dr. Ken Kremer, has established in his work with the Planetary Society and JPL. I am personally very excited about the upcoming series (see below for Sept) and urge you all to mark your calendars for each of the AAAP regular meetings (second Tues of the month at 8:00). The 2005 program agenda can be found elsewhere in Sidereal Times and with speaker hyperlinks on the club's website (princetonastronomy.org).

The AAAP Observatory at Washington Crossing will be an active center this fall for observing deep sky objects and especially the

impending Mars Opposition. Despite the usual excessive hype in the lay press, the Mars viewing promises to be about as good as it gets, in part because Mars attains a much higher elevation (decl +15 deg) than in the 2003 opposition, although it will be smaller in angular diameter (about 20 arc-sec). Stay tuned to the Sidereal Times and Website for planned club and public events at the observatory.

AAAP Regular Meeting Sept 13 (8:00 PM). The Sept AAAP program will feature Stephen Gorevan of Honeybee Robotics, located in Manhattan. He is the leader of the engineering team that developed some of the sophisticated planet exploration tools on NASA's current Mars Rovers. The twin Rovers are both equipped with the **Rock Abrasion Tool (RAT)** designed, developed, and operated by **Honeybee Robotics**. Paraphrasing from Stephen Gorevan's website (link on the AAAP site), rocks are central to the debate about ancient life on the Red Planet. The Rock Abrasion Tool is enabling some of the most important discoveries the Rovers are making. For more information see elsewhere in this issue and our

website.

Plans Underway for an Observing Weekend in Northwest Jersey. The weekend of Oct 1 has been selected for a club dark skies getaway to Stokes State Forest near High Point NJ. Bunkhouse accommodations are being arranged at the Montclair State University facility in the forest. Please contact Don Monticello for more information—this trip will be discussed at the Sept 13 meeting.

Early Fall Observing and CCD Imaging. With summer winding down, observing conditions improve. Among the great objects which culminate in the fall, the Andromeda Galaxy M31 stands out as a beacon to observers regardless of instrument used. Relatively "nearby" at 2.3 million light years distant, M31 is often more visually impressive in small telescopes with wide fields than in large light buckets. With a diameter of 130,000 light years it is very large even by galactic standards, and its large angular size coupled with low contrast make it a challenging photographic

Science Outreach and Exploration Update

Robotic Mission Exploration Update

Mars Reconnaissance Orbiter (MRO): NASA's newest mission to Mars was successfully launched from the Kennedy Space Center on August 12 on the first commercial Atlas 5 rocket. MRO's suite of 6 advanced science instruments are the most capable ever sent to Mars and will collect more science data than all previous Mars missions combined. They include ground penetrating radar to search for subsurface water and the largest telescope (20 inch primary mirror) ever sent beyond earth orbit, which will resolve objects as small as 4 feet across like the MER rovers. Other instruments will study water-related minerals, the climate and atmospheric composition. The powerful antennae will permit a 10 fold increase in the data transmission rates compared to current/past missions, 34 terabits expected over the first 2 years. That's 5.6 megabits per second, compared to a few thousand bits now. After cruising for 7 months and a critical orbital insertion rocket burn in March 2006, the spacecraft will use aerobraking to circularize its highly eccentric initial orbit over the following 6 months. Other goals will be to search for landing sites for Phoenix in 2007 and Mars Science Lab in 2009 and serve as data relays for Spirit and Opportunity.

Deep Impact: Science data continues to pour in from the flyby spacecraft, as well as from numerous ground based telescopes around the world and observatories based in space. An immense plume of gas and extremely fine dust was released when the Impactor struck Comet Temple 1 at about a 25 degree angle. The outburst lasted several days and extended for about 200 miles right after impact on July 4. First science results are now being publicized.

Professor Mike Ahearn, Principal Investigator of Deep Impact, told me by telephone that his first scientific publication on the results of the mission is scheduled to appear in SCIENCE magazine in September. He also said that the team is just at the start of time consuming data analysis, with 4 of the 2000 spectral data sets interpreted so far. Best estimate of the water content of Temple 1 ranges widely from 10 to 50%, pending further data refinement. As is usually the case, the scientists have different opinions on what the data means. The size of the impact crater has not yet been determined, he said, due to the vast quantity of dust released. So, all bets remain on hold, 17 days after the encounter, on July 21, a rocket on the flyby spacecraft was fired to retarget the spacecraft for an earth flyby on Dec 31, 2007. The maneuver allows NASA to preserve options for future use, such as a potential rendezvous with Comet Boethin.

Spirit and Opportunity on Mars: Over 1100 total Sols of Exploration !!! Spirit and Opportunity continue to amaze. As I write this, Spirit is less than 20 vertical feet from the summit of Husband Hill and should reach it by late August. Breathtaking new vistas of the plains with mesas, hills and the Gusev crater rim in the background have been revealed. Once at the summit, Spirit will reveal for the first time, the long awaited view down the south side of Husband Hill towards a basin and possibly layered terrain. Reaching the summit is a monumental achievement for the rover team, who never dared to dream of such an accomplishment even after the successful landing in January 2004. The long trek up though the hills began over 1 year ago, in June 2004.

There are actually two summits. Summit 2 was long thought to be higher and thus the initial target. However, the team has just determined that summit 1 is higher and has therefore redirected the rover since there are no obvious impediments.

A dramatic new movie of Martian dust devils, which includes a backdrop of the distant hills, can be viewed here at an amateur astronomers website:

<http://radio.weblogs.com/0111737/2005/08/12.html#a2401>

Since escaping from "Purgatory Dune", Opportunity is making good progress traveling south though the vast sand dunes and is currently about 600 feet away from Erebus crater. The driving should get easier now that Opportunity has apparently entered the "Etched Terrain" and found large quantities of scientifically interesting bedrock.

An excellent book by the principal scientific investigator, Steve Squyres, has just been published and is titled "Roving Mars: Spirit, Opportunity and the Exploration of the Red Planet. BREAKING NEWS; SPIRIT AT SUMMIT: Spirit has just arrived atop the summit of Husband Hill on Sol 582. The spectacular images reveal a view of distant Thira crater for the first time with large dust devils scooting across the plains. Steve Squyres and team and now planning for "The Mother of all Pans", a 360 degree color view showing around the Gusev Crater rim, plains and hills in all directions. More in the next issue.

Mars Express (ESA): A water ice lake was discovered at the base and south rim of a crater, 22 miles wide and 1.2 miles deep, near to the north pole of Mars (70.5° N). The white ice patch is present all year round.

The first data from the recently deployed MARSIS radar experiment, which is searching for subsurface water, has been collected and transmitted back for analysis. Science operations commenced on July 4 and include studies of the ionosphere.

Cassini/Huygens (NASA/ESA): The intriguing moon Enceladus has become even more so following the flyby within 109 miles on July 14. An unexpected hot spot was found near the south pole, which was previously thought to be the coldest spot. Internal heating is believed to be responsible for this and means that Enceladus is probably geologically active today, like Io. Active ice volcanoes are now being sought. These volcanoes may be the source of the thin atmosphere of water vapor around the moon as well as Saturn's tenuous E ring. Enceladus is covered by a thin layer of highly fractured water ice.

The next moon encounters occur at Titan on Aug 22 and Sept 7. Click on the Cassini websites below for flyby movies of Enceladus (10 meter resolution) and Hyperion. Also, check out the top pictures and discoveries from the 1st year in orbit.

Messenger (Mercury Orbiter): Successfully flew around Earth on Aug 2, (1458 miles over central Mongolia) in a gravity assist maneuver, snapping pictures and collecting Earth/Moon science data along the way. After 5 more slingshots past Venus and Mercury, arrival in 2011 is planned for this first spacecraft to orbit Mercury. Launch occurred one year ago, on 3 August 2004, for a 5 billion mile voyage across the inner solar system.

(Update, continued on page 3)

(Update, continued from page 2)

Mars Phoenix Lander: NASA has approved this mission to continue with preparations to land in the North Polar region of Mars after launch in 2007.

Venus Express Orbiter (ESA): The spacecraft has arrived at the Baikonur Cosmodrome, Kazakhstan for final testing after shipment from Toulouse, France. Launch of this first ever ESA mission to Venus is scheduled for October 26. It was based on the design of the ESA Mars Express probe to shorten development time and minimize the cost and risk.

SMART-1 Lunar Orbiter (ESA): New high resolution images show the Hadley Rille, landing site of the Apollo 15 manned lunar landing in 1971.

Hayabusa (Japan): Formerly known as Muses-C, this asteroid mission is on course to rendezvous with and study a 600 meter wide near earth Asteroid in September. It will also attempt to collect about a 1 gram sample into a capsule for return to earth. Landing is set for 2007 in the Australian outback.

Astro-E2 (Japan/US): This international X-ray observatory was successfully launched on July 10. It was intended to replace the original Astro-E, destroyed in a launch failure of a Japanese M-5 rocket. However, an unexplained malfunction with the dewar system in late July resulted in complete venting of the liquid helium cryocoolent essential for operation of the main X-ray spectrometer. Two other X-ray science instruments continue to function.

More News

10th Planet Discovered: In late July, Astronomer Mike Brown of Caltech announced the discovery of what appears to be the 10th planet of our solar system. He estimates the diameter at about 2000 miles, 1½ times the size of Pluto. It has been designated 2003 UB 313, is inclined 44 degrees and orbits at a distance currently about three times that of Pluto. This has reignited the debate on what constitutes a “planet”. There is no scientific definition of the term and a working group of The International Astronomical Union has not yet reached a consensus.

Space Shuttle Return to Flight (STS-114): The space shuttle Discovery was successfully launched on July 26 and docked with the International Space Station. Shuttle Commander Eileen Collins and the seven person crew landed safely on August 9 after testing new tile repair techniques and off loading supplies to the space station crew. Further missions are on hold until the issue of debris falling from the External Tank is resolved. Although the amount of falling foam was vastly reduced, a nearly 1 pound piece detached from the PAL ramp for unexplained reasons.

Websites for daily updates/perspectives:

<http://marsrovers.jpl.nasa.gov/home/index.html>

http://www.esa.int/export/SPECIALS/Mars_Express/index.html

<http://saturn.jpl.nasa.gov/home/index.cfm>

<http://www.esa.int/SPECIALS/Cassini-Huygens/>

<http://deepimpact.jpl.nasa.gov/>

<http://www.planetary.org/>

The Planetary Society: 50% off New Membership

Discount offer until 30 Sep 2005: includes free nebula poster.
Email: ken@princetonastronomy.org

Please contact me for schools, museums or community groups interested in science outreach presentations.

Email: ken@princetonastronomy.org

Outreach for AAAP, JPL and The Planetary Society

Ken Kremer

From the Program Chair:

The upcoming lecture season is filling up and all are encouraged to please send me your suggestions for speakers, with contact/topic information, and consider volunteering to help on the program committee.

The September 13 speaker will be Dr. Stephen Gorevan of Honeybee Robotics, located in Manhattan. He is a Mars Rover Scientist and designed, developed and operates the Science Drill, which is still in operation today on the Mars Rovers: “Spirit and Opportunity”. The drill, also known as the “RAT”, has functioned long past its design lifetime. Opportunity drilled a RAT hole this month into bedrock on the Meridiani Plains and Dr Gorevan will tell us the story from inception to working on Mars and beyond.

On October 11, the speaker will be Craig Covault, Journalist and Senior Editor from Aviation Week and Space Technology Magazine.

On November 8, the speaker will be Dr. Mario Livio: Senior Scientist at the Space Telescope Science Institute.

On December 13, the speaker will be Dr Kimberly Weaver: X-ray Astronomer at NASA Goddard Spaceflight Center and author of “The Violent Universe”

Email: ken@princetonastronomy.org

Ken Kremer

(Director, continued from page 1)

object. On a recent clear night I coupled my CCD camera to my 3-inch Tak fluorite refractor and gave it a try. The result was striking (image below), with dark lanes between spiral arms clearly seen. As a challenge over the next month, test your ability to see M31's features visually (for example, M32 at the upper left in the image below) with your own telescope, or better yet with the equipment at the AAAP's Washington Crossing Observatory.

Dark Skies! -- Rex

From the Treasurer

The Treasury balance stands at \$XXXX.

Annual membership Dues (\$40) are now due, please mail your check to our Post Office box or bring it to the September meeting.

AAAP, Inc.
PO Box 2017
Princeton, NJ 08543

Ron Mittlestaedt

Minutes of the
Board Of Directors
Amateur Astronomy Association of Princeton
August 18, 2005

Director Rex Parker called meeting to order at 7:30 PM.

Officers present were Rex Parker (Director), John Miller (Assistant Director), Ron Mittelstaedt (Treasurer), and Ludovico D'Angelo (Secretary). Ken Kremer (Program Chair) was absent.

Other members present and representing various committees were: Vic Belanger (Sidereal Times), Lary Kane (Archivist/Librarian), Gene Ramsey (Observatory), Brian VanLiew (Observatory/Public Outreach), and Ralph Marantino

A quorum of the Board was present.

Rex indicated that we received a letter from Rush Holt in response to our petition concerning government funding for the Hubble Space Telescope repair.

Report of Committees:

Programs: Ken Kremer was absent from the meeting, but did email a request for funds for the first two speakers for September and October. The money will cover travel expenses. Fifty dollars was requested for the September speaker and \$150 for October. Ludy D'Angelo motioned to approve the funding, seconded by Ron Mittelstaedt.

Membership: There are 115 paid up members.

Observatory Committee: Gene Ramsey reports that the drainage pipe that the last work party installed is a great success. All the water is being channeled away from the observatory as planned. Another work party is being planned for October to replace the lower roof and any rotted wood on the section of the roof that covers the bathroom and computer room. Ralph Marantino will donate a finder scope to the club for the 6" refractor.

Brian VanLiew reports that he recoated the columns supporting the roof runners. The columns were coated with stucco, which was falling off. The old stucco was removed and a new coating material was put on. This will prevent the columns from being damaged by water and/or ice. He also indicated that he would set a schedule for keyholder training to start again. Also, the telrad finders on both telescopes were taken to be repaired and should be on the scopes again soon.

Jenny Jump Observatory: Ron reports that there is very little to no use of the Jenny Jump observatory. The facility there houses a 12" Newtonian scope that is very old. The Jenny jump site is maintained by the UACNJ (United Astronomy Clubs of New Jersey), which the AAAP is a member club. Our club has an observatory there on the site, which is 1-½ hours away from Princeton. There was discussion as to whether we should close the site, move the equipment, or donate the equipment to another institution. This matter was tabled for further discussion.

Additional Items:

Stokes Star party for members: The AAAP member star party will be the first weekend in October and will cost \$7 per person; guests of members are also invited. Don Monticello was not at the meeting to give any details on sign ups so far.

Library/Archive: Larry Kane reports that he is looking for

sources to build up the library and is looking for acquisitions. He is also planning on getting a Star and Telescope online archive subscription, which should add to the library significantly.

Sidereal Times: A discussion was presented about the continuing costs of mailing the Sidereal Times to the membership and a suggestion was made that we send the Times electronically in PDF format. The benefits would be quicker delivery, easily stored for future reference, more content, color pictures, and cost savings to the club. A request will be put in the September Times to ask members who would prefer to receive it electronically. Ludy will email the membership asking their preference also. All board members and those in attendance at this meeting preferred to go with the electronic version. (25 of the 115 current members do not have an email address listed on the member roster)

There was a consensus of the Board that the club needs more publicity and that we need to communicate to newspapers and radio stations upcoming events and speakers. All of this communication must be made electronically through email.

There was a discussion about Mars viewing during October public nights with an additional one or two public nights in November. This would be publicized in October. Vic Belanger's Intro to Astronomy classes will be during the Month of October (7th, 16th, 23rd, and 30th). Extra teams would be needed if we have extra sessions for Mars viewing.

The annual picnic may or may not happen this fall but may happen in the spring 2006. This will be under further discussion. Ludy D'Angelo encouraged a picnic for this fall. Other attendee's were hesitant since there is no coordinator for the event. There will be further discussion about the picnic.

Member dues will stay at \$40 per member. All checks for renewal or new members should be sent to the club's PO box. Dues are due in October for the 2005-06 membership year. This will be announced at the next few meetings and in the Sidereal Times.

The Lawrenceville proposal for soccer fields was raised as a concern. The Mercer County Freeholders will be holding a meeting in September to decide on the use of the Mercer County Park located between Lawrenceville and Hopewell. Lawrenceville has requested soccer fields for the southwest corner of the park. We would ask that if that were to happen that there would be no field lamps which would contribute to light pollution. Larry Kane will research the proposal and some suggestions will be made. The board ruled out the possibility of proposing an observatory there, but we will encourage the use of the park as an observing location. There was a suggestion, which may end up as a proposal, that the park provide level cement pads to set up tripods and scopes.

There was a Motion to adjourn the meeting, which was seconded. The meeting adjourned at 10:43 PM.

Respectfully Submitted,
Ludovico D'Angelo

For sale, "The Sky, Version 6" Serious Astronomer Edition by Software Bisque, new and unopened, \$75.00. This is the latest version of the software (Version 5) which we also use at the Simpson Observatory for driving our 14-inch telescope. Contact Vic Belanger (609) 448-8598 or email: vic@apink.com.

From the Editor

A discussion was presented about the continuing costs of mailing the Sidereal Times to the membership and a suggestion was made that we send the Times electronically in PDF format. This has been discussed before but probably some years ago. At that time wideband internet connections were not as common as they are today and make it possible to transmit large files quickly and efficiently. The benefits would be quicker delivery, easily stored for future reference, more content, color pictures, and cost savings to the club.

Currently, reproduction and mailing costs run between \$1,300.00 and \$1,400.00 per year, offering the opportunity to make a significant reduction in the club's annual expenses. It is not anticipated that the club would make this mandatory since not everyone has a wideband connection and it is important that every member receive our newsletter monthly.

Production of the Sidereal Times is a multi-step process involving many volunteers. All the club officers email their contributions to the Editor as well as contributions by the general membership before the published deadline date. Editing is done in a page-layout program and then it is converted to a ".pdf" file which is easily transmitted electronically and is readable by all computers with a free program; Adobe Acrobat, which can be downloaded from the Internet at www.adobe.com, click on "Get Adobe Reader." The ".pdf" file is sent to the Publisher, Bryan Hubbard who gets it printed commercially. Bryan also receives a file of addresses of current members from our Secretary, Ludy D'Angelo so that he can mail it to all members.

What has been proposed is that anyone interested in participating in the electronic distribution with its many advantages and cost saving to the club, send an email to Ludy (Dronetone@aol.com) requesting email distribution. Ludy will send it to you as soon as it is published, usually a week before you would otherwise receive it and he will remove your name from the list he sends to Bryan. Thank you for participating.

Introduction to Amateur Astronomy Wayne, in the Nature Center at Washington Crossing State Park and I have set up the dates for our Fall course offering, "Introduction to Amateur



Astronomy." It is scheduled for five consecutive Friday evenings starting September 9, and concluding on October 7. The first session will start at 6:30 PM to take advantage of daylight, each

subsequent session will start at 7:30 PM. After the first session, and if the weather is clear, the group will come over to the Simpson Observatory at about 8:30 PM to be introduced to the sky. Our course has always been well received and resulted in attracting new members to our club.

The course is open to interested persons from 8th grade through adult and may not be just for beginners. It is an excellent opportunity for school teachers and even experienced amateur astronomers that have considered teaching a course like this themselves. Contact the Nature Center to sign up (609) 737-0609, there is a \$5 fee to cover the cost of handouts. Enrollment is limited to 25 persons.

Letters to the Editor

Cassini Site Here's a site you may not have seen - <http://ciclops.org>.

It is hosted by Dr. Carolyn Porco, Cassini Imaging Team Leader. (Her bio can be found at http://www.edge.org/3rd_culture/bios/porco.html).

The high resolution images are, of course, wonderful. There are numerous links to close-ups of various moons, also the team members.

Bryan Hubbard

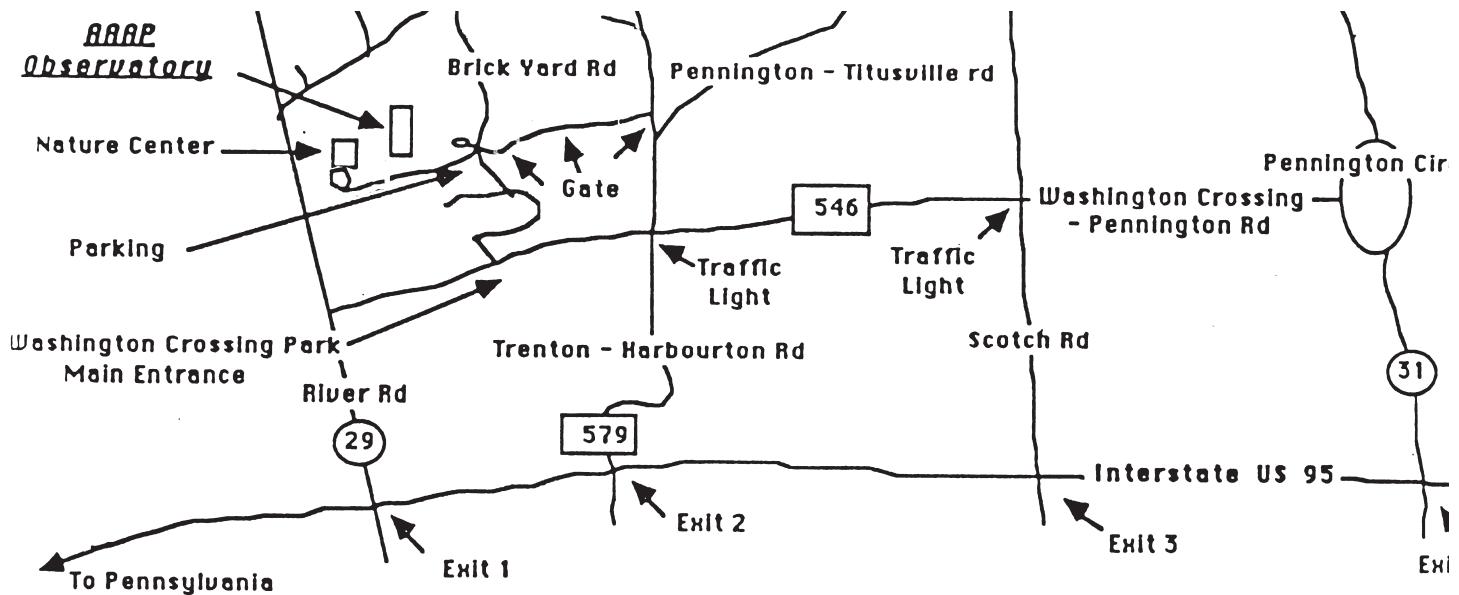
Any address, email, or name changes should be communicated to the Secretary AAAP: Dronetone@aol.com

Thanks, Ludy

Annual membership Dues (\$40)
are now due
please mail your check to our
Post Office box
or bring it to the
September meeting.

AAAP, Inc.
PO Box 2017
Princeton, NJ
08543

For voluntary email delivery of the Sidereal Times send your request to Ludy D'Angelo:
Dronetone@aol.com
(See Editor's Column Above)



The best way to get to the observatory is to take Interstate 95 South towards Pennsylvania. Then take Scotch road at Exit 3 and proceed north (this amounts to right). Then, at the third traffic light take a left onto the Washington Crossing-Pennington road (County Route 546). Take this road to the first traffic light and take a right onto Trenton-Harbourton road (County Route 579). Take this road to the first driveway on the left, this is the Phillips Farm/Soccer Field entrance to the park. There is a series of three gates with club combination locks. If the gates are not open, you will need the lock combination to open the gate or be accompanied by a Keyholder member.

See us on the Web: www.princetonastronomy.org