Hamilton Amateur Astronomers

Event Horizon

February 2004 Volume 11 Issue 4

WebWatch

Description: Blast off to a Mars Adventure

Site: spaceplace.nasa.gov/mars_rocket.htm

Description: Tails of Wonder (Stardust)

Site: spaceplace.nasa.gov/stardust/index.shtml

Description: Book review by Glenn Muller

Details: Mapping The Sky: The Essential Guide to Astronomy by Leïla Haddad and Alain Cirou.

Site: home.interlynx.net/~mullers/mapping.html

Site: www.astronomy.com

Details: A new way of looking at the Pleiades

Site: home.interlynx.net/~mullers/asterism/

HAA Pins

To commemorate our 10 year anniversary, a special pin has been created.

You can order one of these beautiful pins for $6 at the next meeting or by contacting membership@amateurastronomy.org

WANTED!

An animation created from images of the sunset or sunrise point (on clear evenings or mornings) taken over the course of a whole year. If you are interested in this project, please contact Doug Welch (welch@physics.mcmaster.ca) or Bill Harris (harris@physics.mcmaster.ca) for more information.

Letter to the Editor

Hi everyone,

In my class at Mohawk college last night, I heard from two of my students that had been to Bayfront Park last Saturday for the Saturn Observing. Both of them told about how wonderful the views were and how excited they were to see Saturn. Each spoke of how friendly everyone was (I had told them that everyone would be!) and one mentioned how impressed she was when she asked to see the Orion Nebula and the person at the telescope pointed to the nebula in seconds! Okay, they are all new to this; after all, it is only the beginning of the semester. The other mentioned seeing green colour in the nebula. Each told about how Saturn looked so unreal, like a picture.

It was so nice to hear such positive feedback, and I congratulate everyone who went on a job well done. I wish I could have been there (I was working Saturday night, as I warned Glenn). I wanted everyone to know that obviously your efforts were very much appreciated by those members of the public who attended.

From John Gauvreau

Chair's Report

As proof that only clouds will keep us from our quest, the HAA held it's Saturn Party, last month, on a bitterly cold Saturday night. With the wind chill hitting – 28 C, intrepid members: Ann Tekatch, Rob Roy, Nathaniel Addison, John Addison, Gail Muller, Glenn Muller, Doug Welch, Everett Cairns, Hal Mueller, Anthony Tekatch, and Mike Spicer risked frostbite to bring the ringed planet to the public eye.

Naturally, the bone-numbing cold kept the number of visitors below two dozen but those folks had a genuine interest and, hopefully, will join the club. A reporter from the Spectator also came out and filed a nice write-up which is always good publicity. The next event could possibly be a planet round-up sometime near the first week in April when Mercury, Venus, Mars, Saturn and Jupiter will all be visible at the same time. I've already requisitioned warmer weather for that one.

While we focused on Saturn, the folks in Pasadena were locked onto Mars, and the news from JPL couldn't have been better. Not only did Opportunity make a spectacularly successful landing, but the worrisome condition of its twin, Spirit, was diagnosed to a, fixable, memory problem.

Unfortunately, not all space-tech news is good. Apparently, the lowest common denominator of Washington's new direction for NASA is the Hubble Space Telescope (HSP). After a decade of nearly flawless performance as the Agency's most effective public relations tool, the orbiting icon has been marked for the scrap heap. But it's not about to flame-out in silence. Since that intention became known, in January of 2004, support for the HSP has grown steadily among astronomers.

White House appointed, NASA Administrator, Sean O'Keefe said the decision was a tough one, but many experts are also questioning O'Keefe's vision for space exploration. After a quarter century of (successfully) convincing the public that robotic probes are more cost-effective than astronauts, NASA's change of priority comes suspiciously close on the heels of China's first manned space flight. Though President Bush invited other nations to "share the challenges", those carefully chosen words were scarcely an invitation to co-operate in a mutually beneficial program.

The main argument against the HSP appears to be its scheduled retirement in 2011, at which point the James Webb Space Telescope would take over, but astronomers are reluctant to shutdown a proven, working, instrument until it's replacement is actually in operation.

And an awful lot can go wrong between now and then.

Not that we'd be totally blind without a mirror in orbit. Earth-bound equipment has been advancing in leaps and bounds with x-ray technologies and adaptive optics. Still, with observational astronomy as our most frugal and efficient tool for probing the mysteries of the Universe, it seems economically unwise to shorten the lifespan of a key player. Especially after exciting equipment upgrades have already been built and paid for.

Cont'd on page 3 ...

Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA).

The HAA is an amateur astronomy club dedicated to the promotion and enjoyment of astronomy for people of all ages and experience levels.

The cost of the subscription is included in the $25 individual or $30 family membership fee for the year. Event Horizon is published a minimum of 10 times a year.

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... cont'd from page 2

The problem stems from a self-inflicted timetable. For some reason, the International Space Station must be completed by 2010 which, supposedly, leaves no time for a service call to Hubble. After that, manned missions to the Moon and Mars will take priority. And this is where the strategy falls apart.

Our fore-knowledge of Earth's eventual demise makes the ultimate goal of colonizing other worlds a basic instinct. But planting condo's on inhospitable Mars is not the answer. Our next home lies in another solar system. And, since it will be decades, if not centuries, before we can traverse the great distance to wherever that planet may be, there ought to be plenty of time to finish the ISS, plenty of time for hydroponics on Solis Lacus, and plenty of time to service the main workhorse of the space telescope community.

Will Hubble be denied the dignity of respectable retirement? Perhaps not. The outcry from both professional and amateur astronomers has prompted a promise of re-evaluation. This is a positive sign for Hubble, and also for NASA which has spent the past year soul-searching. Nobody wants another tragedy but, if we aspire to boldly go, we're going to have to get good at fixing things. In Space. Like telescopes.

Glenn invites your comments on these topics or any aspect of the club. He can be reached via chair@amateurastronomy.org

Upcoming Events

Date: Friday March 12, 2004 7:30PM

Event: HAA meeting

Location: The Hamilton Spectator building

QuasarChile Trip

Dear fellow amateur astronomers:

As a representative of your local astronomy club, we request that you forward the enclosed exciting information to your club members and/or include our URL in your next newsletter.

QuasarChile Announces

Expert guided tours to Northern Chile designed for amateur astronomers are now available.

- Indulge your passion to visit one of the planet's premier observatories.
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Sincerely, QuasarChile

Luis Campusano, PhD

ASTRONOMY IN CANADA BEFORE THE CONQUEST PART II - NEW FRANCE

by Rita Griffin-Short

While the English took a break from the search for a northwest passage after Thomas James and Luke Foxes's voyages of 1631-32, the French were establishing themselves in the valley of the St. Lawrence River and the Jesuits were incorporating astronomy as a necessary aspect for fixing settlement locations and distances.

The problem of fixing longitude especially at sea continued to plague navigators, while determining latitude at sea might be miscalculated by 15' of arc, or 15 nautical miles by French and English; the artificial horizon would not be introduced until around 1750. It was all very well to have astronomical tables for calculating positions either at sea or on land, but these had not kept up with improved instrumentation, if the day was cloudy the sun's altitude at local noon could not be determined, i.e its declination, the angular distance above or below the celestial equator. Other problems were refraction, aberration (discovered by the 3rd astronomer royal James Bradley in 1729, proving Copernicus' system), poor instruments and timekeepers.

Better maps and charts as well as better instruments and timekeepers were needed. The pendulum clock available by mid 17th c. was important for terrestrial observations, but hardly so at sea; chronometers would not be available until the 1770's. While many early explorers were aware of the principles of positional astronomy and spherical trigonometry, e.g. William Baffin, they they were at the mercy of inaccurate ephemerides that could throw their calculations off by several degrees.

When Thomas James set off in 1631 to find the northwest passage, sponsored by Bristol merchants anxious to preempt their London competitors who were sponsoring Luke Foxe, they made sure Thomas had state of the art instruments: 4' radius quadrant made of pearwood, divided into minutes of arc; a similar one of 2' radius; a wood equilateral triangle; 3 Jacob's staffs; 6' and 7' cross staffs; Gunter's staff; 2 Davis backstaffs.[1] He also carried several different makes of compasses; Gunter's tables; a meridian line with plumb bobs. In spite of these his astronomical observations were mostly unsatisfactory as Jarrell writes: they were naked-eye instruments, inclined to warp, poorly divided... and even in the most experienced hand, rarely capable of providing accurate readings. [2]

James had also been given instructions for determining latitude and longitude by Henry Gellibrand, professor of astronomy at Gresham College, London. James and Gellibrand were to observe an eclipse of the moon October 29, 1631 with James calculating his longitude on Charlton Island (foot of James Bay) as 78 degrees 30'W (modern value 79 degrees 15' W), a remarkable result, though interestingly this did not transfer to later charts. [3]

Jacques Cartier (1491-1557), sent to find a northern route to the Orient by Francis I in 1534, fared no better than his English competitors. France decided to concentrate on settlement sending Samuel de Champlain (1567-1635) in 1608 to settle Quebec, or Stadacona, its Native name, as his third settlement.[4] Champlain, as one of Henry IV's geographers, carried the best instruments available at the time including the now famous astrolabe that he lost during his 1613 survey of the Ottawa River.[5] He was responsible for keeping records of astronomical phenomena as well as establishing latitudes and longitudes.

Astronomy as such did not become an official duty in New France until 1634 when Jean Bourdon (1601-1646) was appointed engineer for Quebec and surveyor general of the colony. Bourdon was a man of many talents: engineer, surveyor, cartographer, developer. The Jesuit Father Jerome Lalement (1593-1673) gave him an astronomical telescope in 1646, a Galilean refractor equipped with compass.[6]

The Society of Jesus, a.k.a. the Jesuits, was founded in 1534 by Ignatius Loyola, a Basque who went to Paris to study at the Sorbonne. The order was a counter to the Reformation, becoming a strong intellectual movement, powerful and ambitious, taking its interest in science and particularly astronomy to many non Christian countries, e.g. China. They were resented by many and suppressed in 1773. They made their headquarters, after they were chosen as the colony's official religious order, in Quebec City. They established the College Royale for mathematics and hydrography at a time when France itself showed little interest in these fields. They made an important contribution to observational astronomy, though less so to positional astronomy. Little has been published about their scientific work here; if they were aware, as they likely were, of Copernicus or Kepler they kept that to themselves. Their reports to France are essential for understanding the history of New France. [7]

In October 1633, Father Paul Le Jeune (1591-1664)

recorded his attempt to establish Quebec's longitude using triangulation; he was off by 19 degrees too much. The following year he observed a lunar eclipse that he knew was expected to begin at midnight in Paris, but that he observed at 6 pm that confirmed his longitude calculation of 1632. In 1635 he recorded another lunar eclipse. In 1637 while giving lessons in physics, one of his pupils, a Huron, asked him why the sky appeared 'sometimes red, sometimes another colour'. Le Jeune gave him a prism, explaining its properties, urging him to hold it up and observe how light is fragmented. The amazed Huron called him 'Manitou'. This before Newton! [8]

The Italian Jesuit, Father Francois-Joseph Bressani (1612-1672), arrived in Quebec in 1642 with degrees in mathematics, literature and philosophy. As he set out in 1644 for Huronia with a group of Christian Hurons, they were ambushed by a band of Iroquois, dragged to their camp, tortured and mutilated over a two month period. All but one of his fingers were cut off, he was given to an old Iroquois women who sold him to the Dutch who arranged for his return to France. The man insisted on returning to Canada where he continued his astronomical work until 1750. In 1746 he observed a lunar eclipse with, as Broughton writes, "an accuracy unmatched in North America for the rest of the century, and equalled at the time only by European astronomers", doing so holding his telescope in his "mutilated hands".[9]

The earliest solar eclipse was timed in 1639 by Father Pierre Chastellain in Huronia, and likely earlier but not recorded. However, the most complete ones were made at Quebec in 1663, 1670, 1679, timed by a "Pendulum exactly adjusted to the movement of the sun", as described by Father Francois-Joseph Le Mercier in the "Relations", had a mean error of 3.3' in the individual times of contact. This was comparable, writes Broughton, "to the errors in the good lunar eclipse observations; however for each solar eclipse the times are paired so that if the beginning was measured too early, the end was too late, and vice versa. Thus the mean error in the mid-time for each eclipse is only one minute....Regrettably, the high quality of the observations exceeded the theoretical capabilities of the time." Had the results been used in conjunction with better tables and modern standards, Quebec's longitude might have been determined with an accuracy of about 10 arc minutes.[10]

In 1645 Father Martin Boutet de St. Martin (c.1616-1683) arrived in Quebec and from 1661 he taught surveying and navigation mathematics. In 1666 he began training pilots a much needed expertise on the river. In 1671 he was appointed professor of hydrography. At the Montreal Seminary, Father Claude Chauchetiere (1645-1709) had also added piloting to the curriculum and a gnomon in the garden.[11]

A brilliant fireball was observed in 1662-63 over Quebec and Montreal and in 1664 and 1665, two comets. The brighter of the two was visible from November until mid January, moving from north to south; the second between the end of March and April 17th that moved from south to north. They observed and recorded in weather so bitter they had trouble with their instruments.[12]

In 1685 Jean Deshayes (fl.1668-1706), a pupil of J.D. Cassini, arrived in Quebec to teach mathematics and navigational methods as the king's royal marine surveyor and engineer. In 1686 he observed a lunar eclipse to fix Quebec's longitude at 72 degrees 13' west of Paris, an error of 1 degree 20'. He was expected to provide new data for Cassini's projected world map. Deshayes conducted hydrological surveys along the St. Lawrence River leaving charts and maps that remained standard until the conquest. He built a large library, some forty volumes of navigation and surveying books and records that he left to the Jesuit College at his death.[13]

The last professor of hydrography during the French period was Father Joseph de Bonnecamps (1707-90). He wanted to erect an observatory on the roof of the College at Quebec at an estimated cost of between 1000 and 1200 francs; nothing came of his request. He also asked for a pendulum clock with second hand, another telescope as well as a quadrant of 3' radius for his expedition to the Ohio River in 1749, but these arrived after he had left. His watch, he reported, was of poor quality and prevented him from fixing longitudes, though he was able to record latitudes. Bonnecamps went to Fort Frontenac (Kingston) to fix its astronomical location in 1752. In Quebec he made new observations to fix its latitude and longitude because he found Jean Deshayes's 'untrustworthy' due to his poor instruments. His revised observations for both were still inaccurate by ca. 3 degrees to great.[14]

Astronomy in New France reached its 'zenith' with Joseph-Bernard, le Marquis de Chabert de Cogolin (1724-1805) who arrived at Louisbourg in 1750 to fix its longitude and latitude using the latest astronomical methods. A pupil of Pierre Le Monnier he was equipped with state of the art instruments: 6 refracting telescopes of 4, 6.5, 8.5, 10.5, 18 feet focal length; a Gregorian reflecting telescope of 3 foot focal length; Hadley actant;

celestial and terrestrial globes; celestial maps and tables by Sennex of London; 3 foot quadrant by de Louville with telescope by de la Condamine. His assistant was M. de Chevalier de Diziers-Guyon. With Louisbourg as his base he travelled to Canso and Sable Island, Port Royal and Newfoundland. Randall Brooks has studied his work thoroughly, arguing that Chabert had a permanent observatory erected at Louisboug. Chabert's observations were meticulous, checking his instruments before and after each measurements and he was able to correct for non- parallelism of the telescopes. His mean value for Louisbourg's latitude based on ten observations was 45 degrees 53'39" (plus or minus 11"). The modern value is 45 degrees 53' 25" as per the 1975 Geodetic Survey Map.[15]

By 1760, the problem of finding longitude at sea remained unsolved but would be by 1771 when John Harrison's chronometer went to sea with James Cook and William Wales.

Notes and bibliography:

1. Henry C. King, "The History of the Telescope". Charles Griffin & Company, London:1955, writes that Regiomontanus (Johannes Muller) improved the 13th c. ephemerides that had been commissioned by King Alphonso of Castile, the so-called Alphonsine Tables, by improving contemporary instruments, including "some of the first weight-driven clocks". He described five types of instrument: cross-staff; Jacob's staff, a modification of Ptolemy's triquetrum; Purbach's geometrical square based on the quadrant; regula for taking altitudes of the sun and moon; the torquetum. (King:14-15)

2. Richard A. Jarrell. "The Cold Light of Dawn: A History of Canadian Astronomy". UToronto:1988. (10-11); Peter Broughton, "Astronomy in seventeenth-century Canada, JRASC". Vol. 75, No. 4, 1981. 175-208.

3. Jarrell: 10-11

4. In 1604 Champlain's first settlements were on Ile St. Croix (this year commemorates its 400th anniversary) and Port Royale where in 1606 he inaugurated the Order of Good Cheer.

5. Champlain's astrolabe was found by a farmer of Renfrew Co. in 1867 in "remarkable state of preservation". Jarrell:13

6. Jarrell:13; "Dictionary of Canadian Biography". Vol. I, Jean Bourdon, 111-113.

7. Important Jesuits include: Christoph Clavius (1538-1612); Athanasius Kircher (1601-80).

8. Jarrell:15-16; Broughton:190 Table ii

9. Broughton:194-95.

10. Broughton:203-04. The 1670 eclipse was observed in Wisconsin by Father Allouez who lacked the clock and instruments for accurate timing. (Jarrell:17)

11. Jarrell:18.

12. The 'Little Ice Age' between 1400's and mid 1800's brought weeks of minus degrees weather. Frost Fairs on a frozen Thames in 1564, 1683, 1780 and 1813, offered horse racing, bull-baiting, fox hunting and hot food to Londoners including kings and queens.

13. Jarrell:14-15; Broughton:206-07; "DCB". vol. ii.

14. Jarrell:18-19.

15. R. C. Brooks. "M. De Chabert and the 1750 Louisbourg Observatory", "JRASC". Vol. 73, No. 6, 1979. 333-348 Dr. Brooks (Randall) is curator of scientific instruments at the National Museum of Science and Technology, Ottawa.

by Rita Griffin-Short

NASA's Space Place

Flying in Formation

By Patrick L. Barry

You can almost see the tabloid headlines now: "Midwest farmer spies UFO squadron flying in formation!" "First signs of imminent alien invasion," the subtitle will read.

If only this fictional farmer had been keeping up with NASA's Space Place column, he would have known better. The string of white dots moving in formation across the pre-dawn sky were satellites, not alien spaceships.

Beginning next year, a series of challenging, high-precision launches will insert four satellites into orbits with just the right altitude, position, and orbital inclination to follow in lock-step behind NASA's Aqua satellite (launched in May 2002). Scientists have dubbed this squadron of satellites the "A-Train." Along with Aqua, the celestial parade will include Cloudsat, CALIPSO, PARASOL, and Aura.

In April 2004, NASA will launch CloudSat, an Earth-observing satellite with unique cloud-measurement abilities. These measurements will fill an important role in our understanding of global climate change, making long-term climate change scenarios more accurate and dependable.

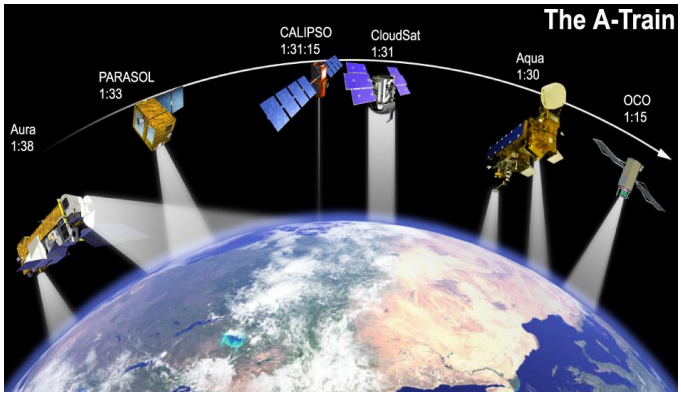
So why bother flying in formation? By passing over the same swath of land within seconds or minutes of each other, the satellites will give scientists snapshots of essentially the same scene using a total of 14 different measuring instruments. CloudSat alone carries only one: a millimeter-wavelength radar sounder.

This sounder-the first of its kind put into orbit-lets scientists see a vertical "slice" of the atmosphere that shows clouds, water, and ice between the ground and 30 km altitude, with a vertical resolution of 0.5 km. Even by itself, this instrument would provide an important and unique view of Earth's atmosphere, since the accurate portrayal of clouds is one of the glaring weaknesses with current simulations of climate change.

But this cloud data is even more valuable when combined with measurements from the other satellites in the A-Train-for example, air temperature, trace gases, and radiation into and out of the atmosphere. Scientists can then see connections between, say, temperature and the resulting behavior of clouds. A better understanding of these connections is one of the most sought-after goals of climate research, because changes to global cloud cover would, in turn, have a feedback effect on global temperatures.

The real story of this satellite squadron may not make the tabloid headlines, but at least there's evidence that the imminent threat of climate change is real, which is a lot more than you can say for alien invaders!

Learn more about CloudSat and the A-Train at `cloudsat.atmos.colostate.edu` . Kids (and grownups) can do interactive cloud picture scrambles and learn "Cloudspeak" (the names of different kinds of clouds) at The Space Place, `spaceplace.nasa.gov/cloudsat_puz.htm` .



CloudSat, to be launched in November 2004, will take its place as part of the "A-Train" of satellites flying in formation to take closely timed snapshots of essentially the same scene using a total of 14 different measuring instruments.

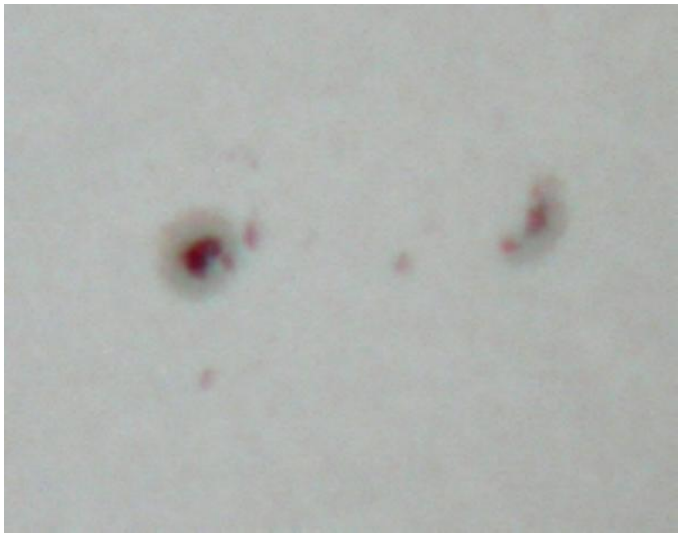
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

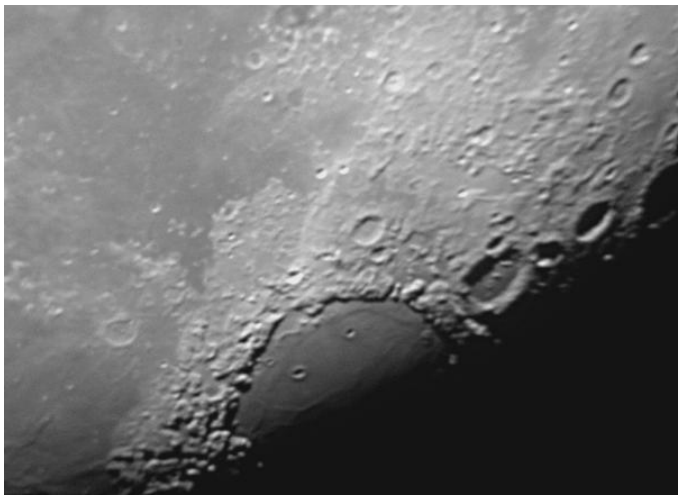
Council meetings

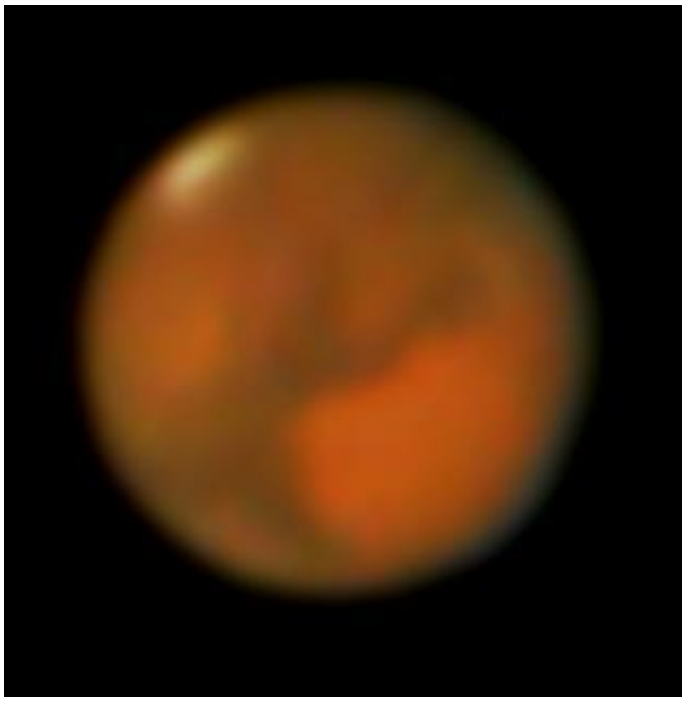
All club members are welcome to attend the council meetings. Contact `info@amateurastronomy.org` for details.

Eye Candy

Photos by Clyde Miller







March 2004

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7	8	9	10	11	12 **HAA General Meeting** **Hamilton Spectator**	13
14	15	16	17 St. Patrick's Day	18	19 **Observing Night**	20 **Observing Night**
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For observing info, call
Stewart Attlesey
827-9105, Rob Roy
692-3245, Glenn and Gail
Muller 945-5050,
http://amateurastronomy.org/events.php

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