



July 03

Volume XXXIII, Issue 6

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631-218-2350
bvanson@aol.com

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Jamboree Chair
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631-722-3850
barbaraleb@aol.com

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631-727-8393

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It's Mars!

Spirit On It's Way To Mars

With Opportunity bringing up the rear

Dateline June 20, 2003 - NASA's Spirit spacecraft, the first of twin Mars Exploration Rovers, performed its first trajectory correction maneuver today.

Dateline July 7, 2003 - NASA's Opportunity spacecraft, the twin to 'Spirit', after a series of delays, successfully lifted off from Kennedy Space Center at 11:18 PM, EST tonight.

For complete coverage of this exciting program of Martian exploration, please visit the Mars Rover Home Page: <http://www.jpl.nasa.gov/mer> . If you have a high speed internet connection and want to view the launch of these 2 intrepid spacecraft, including breathtaking, on board video, *looking back at Earth as it recedes*, please visit <http://www.jpl.nasa.gov/mer> , as well. The links are clearly recognizable.

Mars Quickly Approaching Opposition

Mars will be at its closest approach on August 27, 2003, some 34,650,000 miles away. Earthbound observers won't be the only ones taking advantage of this rare occurrence, however. The 2 rovers speeding towards their Martian rendezvous will also benefit from our sister worlds close approach. Although the twin rovers won't arrive at their destination at Martian opposition, their travel time will be substantially shortened. Please refer to the announcement about the Custer Mars Fest, inside. For complete coverage and the latest updates, please visit the Rovers' home page at: <http://mars.jpl.nasa.gov/mer> .

Stellafane, 2003

The annual 'Mecca' for Amateur Astronomers and Telescope makers alike is scheduled for August 1st and 2nd, 2003. If you plan on attending and this is your first visit or if you're a seasoned veteran, please logon to the official website at <http://www.stellafane.com> . More details inside.

Table of Contents

July 03	Volume XXXIII, Issue 2	1
Executive Board		1
PRESIDENT		1
VICE PRESIDENT		1
TREASURER		1
SECRETARY		1
FINANCE CHAIR		1
DIRECTORS		1
<i>It's Mars!</i>		1
Spirit On It's way to Mars		1
Mars Quickly Approaching Opposition		1
Stellafane, 2003		1
Table of Contents		2
Announcements & General Interest		2
Stellafane, 2003		2
Stargazing 101, A Basic Course		2
Custer Mars Fest		2
Editor's Column		3
Gift Corner & Classifieds		3
HEAVENLY EVENTS TO WATCH FOR July 03		4
WELCOME TO OUR NEW OR RETURNING MEMBERS:		5
PRESIDENT'S MESSAGE		5
The Universe, Past, Present and Future		6

Announcements & General Interest

Stellafane, 2003 <http://www.stellafane.com>

The **68th** Convention of Amateur Telescope Makers on Breezy Hill, Springfield, VT;
Friday, August 1st and Saturday, August 2nd, 2003;
43deg 16' 41" North Latitude, 72deg 31' 10" West Longitude;
Hosted by the *Springfield Telescope Makers, Inc.*

Stargazing 101, A Basic Course

Presented by Custer member and Custer Comment Editor, Tom Madigan, the course will explore innovative ways for both the novice and seasoned observer to explore the heavens. The course begins on August 5th 7:30 PM and concludes on August 14th 9:00 PM. The 6 day course is distributed over 2 weeks, 3 days per week with the first session starting on Aug. 5th and ending on Aug. 7th, the 2nd week on Aug. 12th at 7:30 PM and concluding on Aug. 14th at 9:00 PM. Minimum enrollment is 8, maximum is 20, so make sure you call soon and reserve your seat; first come, first served.

Custer Mars Fest

Saturday August 16th, 2003, 7:00 PM. See flyer included in this issue.

Deadline for submissions to the Custer Journal is Thursday, July 31st. Please see the flyer included in this issue.

Editor's Column

<p>Tom Madigan, Editor Tom Madigan 99 North Summit Ave. Patchogue, NY 11772-2226 tmadigan@optonline.net 631-447-5339</p> <p>Cutoff for submissions is the 15th of the month preceding publication</p> <p>Visit the new Custer Website at http://www.custerobservatory.org</p>	<p>The Custer Comment is published monthly by</p> <p>Custer Institute P.O. Box 1204 Main Bayview Road Southold, NY 11971 631-765-2626</p>
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Please send me your email address so I can include you in our electronic distribution. As part of Custer's entry into the 21st century and the implementation of the Custer Comment in electronic form, we've begun archiving prior issues in PDF format. Until we can normalize the archiving procedure and location, this issue and all preceding issues dating back to the February, 2003 issue can be found at: <http://tmadigan.home.netcom.com/custer>.

Best,
Tom

Tom Madigan, Editor

Gift Corner & Classifieds

<p>Hi All,</p> <p>We are introducing a new factory-modified astronomy ladder, the Star Climber, with convenient, small step spacings for more comfortable observing with any telescope large enough to require a ladder. Sizes range from 6 feet to 14 feet. See the description, photos, and price list at http://www.davidchandler.com/Ladder.htm. This is a solution to a long-felt need. Please pass the word around to your friends.</p> <p>--David Chandler, http://www.davidchandler.com</p> <p>(Also contact us if your astronomy club would like bulk discounts for our unique two-sided low-distortion planispheres, The Night Sky.)</p>	<p>For Sale</p> <p>Super C-8 Telescope, Richfield Finder, Tripod Wedge, Polaris Pointer, Polar Axis Finder, Case liner, Handle, Handbook- \$1307. No-tool knob set for C-8-\$12. Illuminated Reticle ocular assembly for C-8 including 12.5MM ocular rheostat-\$66. 2 inch Premium grade Deep Sky filter and 1 1/4 inch ocular adaptor-\$121. Observer's Chair with adjustable height-\$47. Rubber eyeguards (4)-12. Vernon mounted glass filters- neutral density, blue 80A, violet 47, light red-\$23A, green 58, orange- \$51. Adapter for Celestron 1 1/4 inch non-threaded oculars-\$10.</p> <p>Rich Field Adaptor with TeleCompressor and 20mm Erfle ocular-\$150. 8mm Brandon-\$69. 12mm Brandon-\$59. 2.4X Dakin Barlow-\$59. 25mm Kellner-\$28. 40mm Kelner-\$28. Declination Motor & Accutrack Telescope Drive Corrector, Dual Axis-\$199. Counter Weight set- \$30. Astronomer's Flashlight-\$7. Omni-axis Camera Mount-\$ 50. Accessory tray-\$30. Accessory Case-\$25. Helical Focuser-\$28. Dewcap-\$40. T-adapter-\$20. Eyepiece projection adapter: teleextende-\$20. Best offer or \$1600 for the whole. Original cost \$2468. Contact Bill Richards at 631-957-2032, 98 Laurel Road, Lindenhurst, NY 11757-1705.</p> <p>ASTRONOMY FOR ALL AGES, by Philip Harrington & Edward Pascuzzi just \$20. As an added bonus, copies are signed by Ed Pascuzzi. We also have copies of PARALLAX, the book that was referred to in the recent lecture.</p>
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HEAVENLY EVENTS TO WATCH FOR July 03

“Ruddy planet, out yonder you sway,
Forty million miles away,
Come yield up your secret
To a sister planet’s people.
Schiaparelli, Pickering, and Lowell,
And others who have viewed you well,
Have they interpreted rightly,
Red star that glows so brightly?”

- W.E. Duckwall

Binoculars will be the instrument of choice for enjoying the two July planet pairings - one after sunset and the other before sunrise. Around Independence Day JUPITER can be found very low in the west at dusk, setting with nightfall. As the month wears on Jupiter sinks deeper into the twilight and finally pairs up with MERCURY during the last 10 days of July. Mercury’s feeble appearance will require the binoculars except around the 25th when Jupiter will show us where it’s hiding. (A clear view to the western horizon will help.) If you have a clear view down to the eastern horizon as well you can look for VENUS very, very low half an hour

before sunrise, and (especially around the morning of the 8th) binoculars will pick up SATURN very close to Venus. If planet watching by twilight doesn’t excite you, that leaves only MARS, URANUS and NEPTUNE; all three come to opposition in August. Around Independence Day -1.5 magnitude Mars rises in the east-southeast around 11:30 PM and is due south (about 35° high) by 5 AM, well after daybreak. By the end of July Mars, now at -2.3 magnitude, rises at 10 PM and is due south at 3:15 AM. Also, on July 30, it stops its normal prograde (eastward) motion and begins to retrograde back into western Aquarius as the Earth prepares to pass it. Uranus is also in western Aquarius and Neptune is still back in Capricornus; more on them in succeeding months.

- 2 Check the western horizon by 10 PM this evening to find the slim waxing crescent Moon riding atop Jupiter.
- 4 In the early morning hours the Earth is at aphelion, its farthest distance (94 ½ million miles) from the Sun.
- 8 Around 4:50 AM Venus clears the east-northeast horizon. Given clear skies it should be seen quite easily, but use binoculars to spot Saturn just below and to its right. (Venus will be about 40 times brighter.)
- 13 Full Buck Moon rises around 9 PM this evening.
- 17 Mars and the waning gibbous Moon cross the sky together in the early morning darkness. They are particularly close around 4 AM, and in fact Mars can be seen to be occulted from a wide band which extends as far north as Yucatan, Cuba and Bermuda. Though Mars may avoid obscuration by the Moon (as seen from Long Island), the 4.2 magnitude star τ^2 (Tau-two) Aquarii doesn’t. At about 3:59 AM it suddenly appears along the dark lower-right edge of the Moon.
- 25 Around 9 PM Jupiter should still be visible, perhaps with the help of binoculars, very low over the west-northwest horizon. Use the binoculars to find Mercury sitting right on top of Jupiter, less than a moon’s diameter ($\frac{1}{2}^\circ$) separating them. Jupiter is about 4 times as bright as Mercury this evening.
- 26 The thin waning crescent Moon rises before Saturn after daybreak. The view of these two should be lovely around 5 AM. (By now Venus is effectively gone from the dawn sky.)
- 29 The South Delta Aquarid meteors are at their best in the predawn hours this morning, and the Moon obliges by being a new moon! In the moonless dark, lie back and wait for the dozen-or-so per hour (at best) you’ll find fanning away from Mars. Does the red blaze of Mars ruin your night vision? I’d like to know.
- 29 Scan the western horizon a half hour after sunset (around 9 PM) with binoculars and try to find Mercury, with the star Regulus sparkling faintly just to its upper left; or Jupiter below and to Mercury’s right; or the razor-thin crescent Moon, just 18-hours old, off to the right of Jupiter.
- 30 Retrograde begins for Mars today. This retrograde motion (perceived but not real) will last only 60 days.

Prepared by Robert Chapin

WELCOME TO OUR NEW OR RETURNING MEMBERS:

Stephen Milgrim & Susan Hellerer of Southold, NY, the David McCarthy Family of Wading River, NY, Carolyn Taylor of Riverhead, NY and Dennis & Barbara Oldenburg of Jamesport, NY.

PRESIDENT'S MESSAGE

The Annual BBQ and Annual Membership Meeting on Saturday June 14th was a success. Chuck has a great marinade recipe and the steaks were simply terrific, as was all the BBQ food.

The turn out for the Annual Membership Meeting was the best in years. There were no nominations from the floor and the Nominating Committees slate was approved as presented. Town of Southold Supervisor, the Honorable Josh Horton, took time out in his nonstop schedule to stop buy Custer and view our new Telescope. Regretfully he could not stay for the Dedication.

Though the weather was not cooperative, so what's new, but the dedication of the Celestron CGE-1400 14" GOTO Schmidt-Cassegrain Telescope with German Equatorial Mount, donated by Frank and Joanne Gumper went off on schedule. Custer presented them with an engraved plaque recognizing their gracious donation and Custer's appreciation. A small plaque, which will be permanently mounted at the telescope, was also presented and shown to the attendees. The telescope will shortly be mounted in the South Bay of the shed so Frank and Joanne can have their own First Light Ceremony.

Mark your calendars for the **August 16th Custer Mars Fest 2003**. Bob Chapin will be doing that evening's presentation and weather permitting; all the observatory's telescope will be trained on Mars for member and public viewing. More information to follow shortly so check our web page: <http://www.custerobservatory.org>.

Bob Vanson

The Universe, Past, Present and Future

A treatise by Thomas J. Madigan

Third installment in a multi-part series.

The Stelliferous Era

Stelliferous means "filled with stars". Pockets have formed in the ever-cooling sea of radiation. The larger pockets will become galaxies and galaxy clusters. At about 1 million years after the big bang, the first stars begin to form. This is the era during which all the objects and events familiar to us all are in the fore. Most of the energy spent is in the form of Hydrogen-Helium fusion with the synthesis of heavier elements occurring in the more massive stars. This era is warm and bright, still young when charted on our logarithmic time line. Hydrogen, the nuclear fuel that sustains normal, main sequence, solar type stars is slowly but inexorably being depleted. As the Stelliferous era winds on, the density of heavier elements increases. Our Sun and its retinue of planets have formed in the second half of this era, approximately 10 billion years after the Big Bang and has been faithfully converting hydrogen into helium ever since. This will change in about 900 million to 1 billion years from now. The sun will have depleted all its hydrogen fuel and will begin helium burning and as a result will leave the main sequence and become a red giant engulfing Mercury and Venus and come harrowingly close to Earth. The Earth will, in all likely hood escape annihilation, due to an ever increasing orbital radius due to Solar mass being depleted through a growing stellar wind commensurate with a star in its later stages of evolution. The Earth will have been sterilized over the billion or so years of ever increasing solar luminosity, unfortunately erasing all traces of the civilization(s) that have inhabited her. Over the eons, galaxies will merge and form clusters and super clusters. A key player in this era will be the red dwarf. The later evolutionary phase of these stars is markedly different than heavier stars.

Instead of expanding, they grow very gradually hotter and brighter, a 0.2 solar mass red dwarf will experience a short lived increase in size, temperature and luminosity approaching that of our Sun.

A galaxy can sustain star formation for only as long as there is a supply of the raw ingredient, interstellar hydrogen. As the Stelliferous era winds down, star formation will slow as the remaining hydrogen becomes locked up in the last stars to ever form. This will occur at approximately 10 to 100 trillion years from the Big Bang. These last stars will be rich in heavy elements containing fuel that has been through many generations of stellar evolution. The Stelliferous era ends when the last red dwarfs fade out and end up as low-mass, helium white dwarfs.

Important Events

1. First stars at about $\sim 10(6)$ years
2. Formation of galaxies $\sim 10(9)$ years
3. Solar System forms at $10(10)$ and will last $10(10)$ years, ending at $2*10(10)$ years
4. Last red dwarfs die $\sim 10(14)$ years

Conventions

When possible, all discussions of time will be based on log, base 10 arguments. As such, I will express the number followed by its base 10 multiplier in parentheses, for example: 1 million would be expressed as $10(6)$ or 1 trillion as $10(12)$. Fractions will also be based on powers of 10 when possible, for example: 1/1000 second will be expressed as $10(-3)$.

Errata: I neglected to include the title in last month's installment. For the June, 2003 issue, this page should have been entitled 'Radiation-Dominated Era'.

Custer Journal

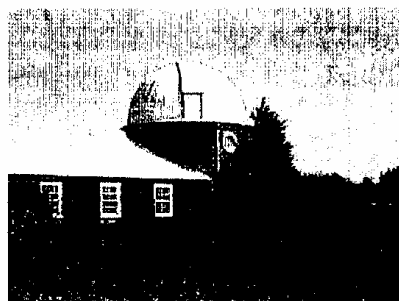
25th Astronomy Jamboree - 75th Custer Anniversary

Custer Institute is seeking support to create a historical journal commemorating the 25th Astronomy Jamboree and the 75th anniversary of Custer Institute. Your donation will help us to document the history of this landmark institution.

Copies of the journal will be available for visitors attending lectures, community events, courses and observations at the Institute. Also, additional copies will be located at local libraries, wineries and the Town Hall.

Sponsorship Levels

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<input type="checkbox"/> Galactic Sponsor	\$ 250
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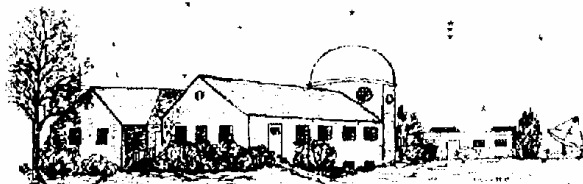
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Please make checks payable to Custer Institute Inc. The Journal will be published by Sept 2003



Custer Institute

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631-765-2626

CUSTER MARS FEST 2003

Saturday Aug 16, 2003
7 pm

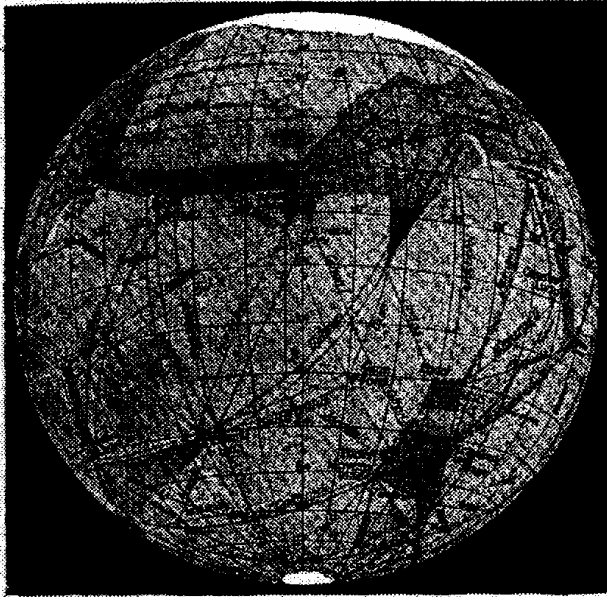


FIG. 2.

Custer Mars Fest 2003

Custer will be celebrating the perihelic opposition of Mars in August 2003. During the last 2 weeks of August 2003, Mars will be closer than has been in more than 50,000 years.

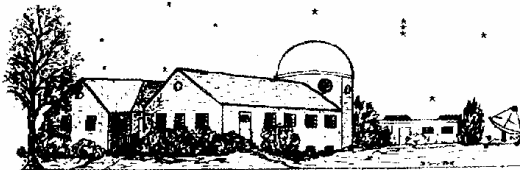
Bob Chapin will be giving a program on historical perspectives on the exploration and observations of Mars. This will be a terrific prelude to the observations of Mars at its closest.

As an added bonus the Persied meteor shower will grace us with its splendid show.

Upcoming Programs

Oct. 24, 25, 26. *** 25TH ASTRONOMY JAMBOREE ***
Begins FRIDAY the 24TH at 7:30 PM with Poetry, Wine Tasting & Music. OBSERVING, weather permitting.
SATURDAY the 25TH starts 9:00 AM. Guest speakers, Workshops, Displays, Solar Observing, Vendors, Raffles, & merriment! Saturday night's Keynote Speaker:
SUNDAY the 26th starts 5:30 at Orient Pt. State Park GREEN FLASH WATCH followed by guided Nature Walk.

Directions: LIE (495) Exit 73 east Route 58 becomes Rt. 25. Follow 17 miles east, make sharp right at Gulf gas onto Main Bayview Rd. Custer is ¼ mile down on left.



Custer Institute

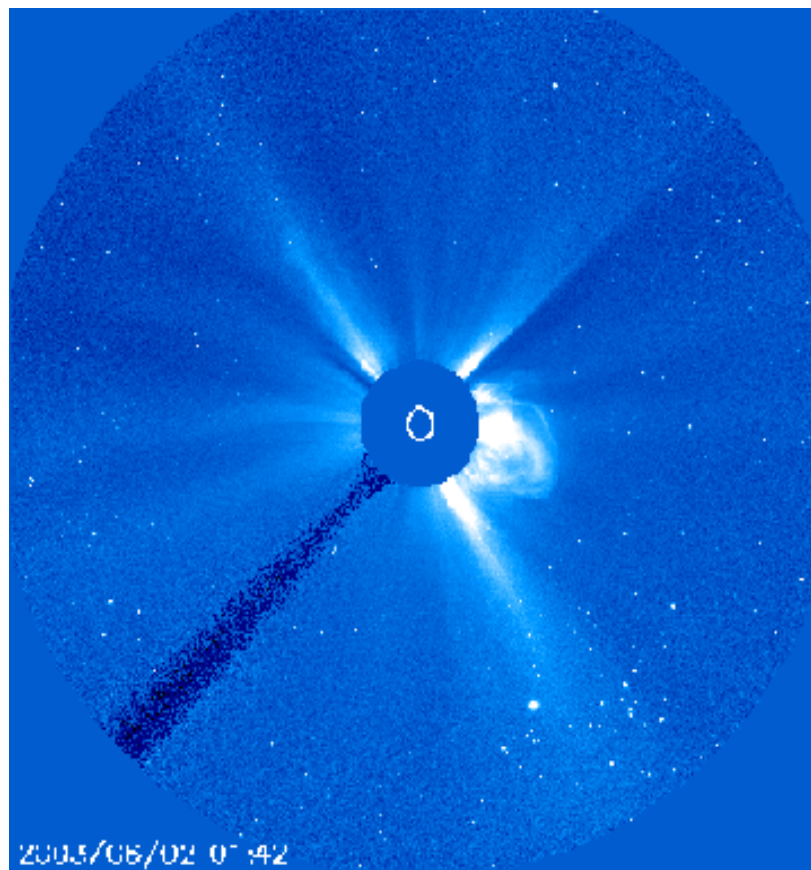
Main Bayview Rd.
Southold, NY 11971
631-765-2626

We spotlight **The SOHO** (The Solar and Heliospheric Observatory) this month.

The following real-time image was taken by the orbiting Solar and Heliospheric Observatory (<http://sohowww.nascom.nasa.gov>). Orbiting at the Earth / Sun L1 Lagrangian point, 1.5 million kilometers sunward, the SOHO mission is to provide a continuous, uninterrupted view of the sun at specific spectral designations. If you have an internet connection, a screen saver (<http://sohowww.nascom.nasa.gov/freestuff>) is provided that will provide the latest, real-time images from SOHO displayed on your computer desktop.

The Solar and Heliospheric Observatory (SOHO) is helping us better understand the interactions between the Sun and the Earth's environment better than has been possible to date. Its legacy may enable scientists to solve some of the most perplexing riddles about the Sun, including the heating of the solar corona, the acceleration of the solar wind, and the physical conditions of the solar interior. It will give solar physicists their first long term, uninterrupted view of the mysterious star that we call the Sun.

The following stunning image, taken with SOHO on June 2nd, 2003, shows a huge Coronal Mass Ejection with the sun traveling through Taurus, the Bull. Note Aldebaran at 5:30 with the Hyades immediately to the right.



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CUSTER EVENTS CALENDAR

OBSERVATORY DUTY

Any staff on hand will be more than glad to assist in the operation of the telescope.

AT THE INSTITUTE

Public observing every Saturday night, weather permitting; July 5th 12th 19th and 26th.

The Custer Comment

TOM MADIGAN, Editor

CUSTER COMMENT

99 North Summit Avenue

PATCHOGUE, NY

11772

FORWARDING AND ADDRESS CORRECTION REQUESTED

FIRST CLASS