

# The Custer Comment

★ For The Curious ★

**August 03**

**Volume XXXIII, Issue 7**

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631-218-2350  
[bvanson@aol.com](mailto:bvanson@aol.com)

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## Mars at Opposition!

Living too close to a neighbor may not be very appealing, but when Earth's neighboring red planet moves closer than it's been in 50,000 years, observers expect nothing but acclaim. This August, scientists and amateur astronomers will benefit from the spectacular view of Mars as it appears bigger and brighter than ever before, revealing its reflective south polar cap and whirling dust clouds.

On **August 27, 2003**, the fourth rock from the sun will be less than 55.76 million kilometers (34.65 million miles) away from the Earth. In comparison to the space between your house and your neighbor's yard, that may seem like a large distance, but Mars was about five times that distance from Earth only six months ago. Complete story at:  
[http://www.jpl.nasa.gov/solar\\_system/features/mars-opposition.cfm](http://www.jpl.nasa.gov/solar_system/features/mars-opposition.cfm) .



Earth / Mars comparison courtesy of [NASA](http://www.nasa.gov) / [JPL](http://www.jpl.nasa.gov)

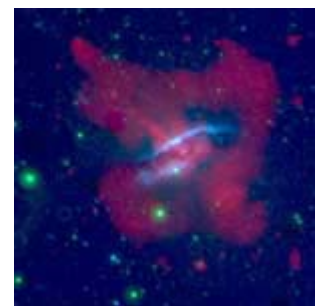
## Intriguing Celestial Images Arrive from Galaxy Mission

July 25, 2003

NASA's Galaxy Evolution Explorer has beamed back revealing images of hundreds of galaxies to expectant astronomers, providing the first batch of data on star formation that they had hoped for.

The recent ultraviolet color images from the orbiting space telescope were taken between June 7 and June 23, 2003 and are available online at <http://www.galex.caltech.edu> and <http://photojournal.jpl.nasa.gov/mission/galex>.

"The images clearly show active star formation in nearby galaxies, and large numbers of distant ultraviolet galaxies undergoing starbursts," said Dr. Christopher Martin, the mission's principal investigator and an astrophysics professor at the California Institute of Technology in Pasadena, which leads the mission. Complete story at <http://www.jpl.nasa.gov/releases/2003/104.cfm> .



Galaxy Centaurus A

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## Editor's Column

### Tom Madigan, Editor

Tom Madigan  
99 North Summit Ave.  
Patchogue, NY 11772-2226  
[tmadigan@optonline.net](mailto:tmadigan@optonline.net)  
631-447-5339

**Cutoff for submissions is the 15<sup>th</sup> of the month preceding publication**

Visit the new Custer Website at  
<http://www.custerobservatory.org>

### The Custer Comment is published monthly by

Custer Institute  
P.O. Box 1204  
Main Bayview Road  
Southold, NY 11971  
631-765-2626

The only ones contributing to this journal have been the regulars and to them I wish to extend a heartfelt and sincere 'Thank You'. It's *your* journal so please contribute. If you're feeling creative, all articles and submissions are most welcome, so take advantage of the opportunity to share you thoughts and ideas with the membership. Thanks to *Bob Chapin* and *Tom Haerberle* for their contributions this month. Please send me your *email address* so I can include you in our electronic distribution. As part of Custer's entry into the 21<sup>st</sup> 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

Hi All,

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.

--David Chandler,

<http://www.davidchandler.com>

(Also contact us if your astronomy club would like bulk discounts for our unique two-sided low-distortion planispheres, The Night Sky.)

### For Sale

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.

**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: telextende-\$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.**

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.

## **Editorial**

### **NASA Has to be Proactive**

Douglas Osheroff, the Nobel Laureate who sits on the board that's investigating the tragic and *quite avoidable* destruction of Space Shuttle Columbia and the complete loss of her crew, fears that the prevailing culture at NASA will prevent any real change in the agency and that another tragedy is waiting in the wings. Osheroff was a student of the late Richard Feynman, another Nobel-winning physicist who was an outspoken NASA critic when he served on the Challenger commission. According to Osheroff, it's not so much the management style or the decision making process, it's the prevailing culture at the space agency that's preventing real change from occurring. With both tragedies, red flags were raised, duly noted or ignored and ultimately dismissed. With the Challenger tragedy, an engineer at Morton Thiokol was summarily dismissed when he raised the red flag about the consequences of a general failure of even one "O" ring on the solid rocket boosters. Even before Columbia left the launch pad that last and fateful launch day, she was doomed. Days and weeks prior to the launch, reports circulated about the foam, some engineers being very uncomfortable with repeated launchings without adequate attention being paid to the foam. A final warning was issued by a mid-level engineer about the foam immediately preceding the launch and again prior to reentry, both times being summarily ignored and dismissed, thus sealing Columbia's fate and that of her crew.

NASA's new lighter, leaner and meaner philosophy seems to be paying off with the Mars rovers ( <http://mars.jpl.nasa.gov/mer> ) appearing to be on course for a successful touchdown in January and the Huygens-Cassini ( <http://saturn.jpl.nasa.gov/index.cfm> ) spacecraft, enroute to the Saturnian system, also on schedule and performing normally. There is a world of difference though between these unmanned robots, complete with state-of-the-art computers and communications technology and repeatedly launching 20+ year-old Space Shuttles. In order for Congress to continue funding the Space Shuttle, an independent oversight committee should be convened after the current investigations are complete and remain there for the entire duration of the Space Shuttle program. A full accounting has to be made. NASA has *to be proactive*, as we cannot afford the loss of another crew or another vehicle. The cost in human lives, prestige and credibility is too great, to say nothing of the setbacks and loss of valuable data and hardware. Recently, a new *environmentally-friendly* foam replaced the foam that had performed adequately for almost 20 years. This new foam was harder and consequently had more of an impact when striking the Shuttle's wing if it became detached during the severe stresses associated with liftoff and acceleration to near-escape-velocity speeds. Even though repeated warnings were made by engineers, the decision was made to use the new foam. This decision to placate the whims of a few environmentalists while risking the lives of 7 courageous astronauts was foolhardy and irresponsible in the extreme and manifests a culture that is more sensitive to political correctness than to safety and real scientific progress. Before another shuttle is launched *this has to be addressed*.

*Tom*

Tom Madigan, Editor.

Next month: **China's Space Warfare Tactics Aimed at U.S. Supremacy**

## HEAVENLY EVENTS TO WATCH FOR August 03

“Mars, world of frost and drouth,  
What mean those parched deserts,  
Those blue green spots and patches,  
Those spider lines we call canals  
Supposed meteoric scratches?”

- W. E. Duckwall

Without a doubt the month of August belongs to MARS this year, for it is this month that we witness its exceedingly close “perihelic opposition”. Mars will come closer to us on the 27<sup>th</sup> than at any previous time in recorded history. No observer with access to a telescope should pass up this chance to explore the various regions on the Martian surface! More on Mars is given below.

MERCURY can be spotted (with the help of binoculars) low over the western horizon a half-hour after sunset during the first half of August. Don’t even bother trying to find VENUS or JUPITER, as both pass behind the Sun during the month. SATURN has entered Gemini, and can be seen rising in the east by daybreak. By month’s end Saturn will rise by 2 AM and will be about 30° up by dawn. URANUS and NEPTUNE both reach opposition this month and are in the sky all night. Charts giving their locations can be found in the “Observers Handbook 2003” and the “Astronomical Calendar 2003”.

- 3 About 8:22 PM, the 2.9 magnitude double star Porrima,  $\gamma$  (Gamma) Virginis, will disappear behind the earthlighted left edge of the waxing crescent Moon. Around 9:20 PM it will reappear along the lighted lower right edge. This occultation could be interesting because Porrima is a well-known binary pair, and the two 3.5 magnitude components are currently only about  $\frac{1}{2}$  arcsecond apart, too close to split with most amateur telescopes. Will one disappear before the other? How about their reappearances?
- 4 Neptune is at opposition. This 7.8 magnitude gas planet is now located about  $1\frac{1}{2}^\circ$  northeast of the 6<sup>th</sup> magnitude star 19 Capricorni. Because Neptune is also about to cross the ecliptic (on August 11) - which it does only twice during its 164-year trip around the Sun - a (hypothetical) observer with a huge telescope on Neptune (or its moon Triton) could see today a transit of Earth across the face of the Sun! Of course, the Sun’s disk as seen from Neptune is 30 times smaller in diameter than we see it, or about 1 arcminute across, and the Earth’s tiny disk would be about  $\frac{1}{2}$  arcsecond in diameter. Tough challenge for any Neptunian!
- 11 Full Sturgeon Moon tonight.
- 12 Tonight’s Perseid meteor shower is severely degraded by the bright Moon. If you do go out anyway you’ll notice that the Moon is edging eastward toward Mars during the night.
- 14 Mercury is at greatest elongation east of the Sun, but is nearly lost in the evening glow.
- 23 The waning crescent Moon rises before Saturn this morning.
- 24 The 5.7 magnitude planet Uranus is at opposition. You’ll find it just  $\frac{1}{2}^\circ$  southeast of the 5.5 magnitude star 38 Aquarii.
- 27 At 4:51 AM Eastern Standard Time today Mars will be within 34,646,488 miles of Earth (credit: Joe Rao, Farmers’ Almanac 2003.) This is closer than at any other time in recorded history! The sandy glow of Mars will take barely 3 minutes to reach our eyes. At -2.9 magnitude Mars will be brighter than Jupiter can ever be as seen from Earth. Its disk is a generous 25.1 arcseconds in diameter. The June issue of Sky and Telescope and other sources describe what to look for among the surface features of the red planet. BE THERE this morning as Mars nears its absolute closest approach to us.
- 28 Mars is at opposition at 18 hours Universal Time, about 32 hours after its closest approach to us. The day after tomorrow, August 30, Mars will be at perihelion, just 128.3 million miles from the Sun. Truly a perihelic opposition!

Prepared by Robert Chapin

## **PRESIDENT'S MESSAGE**

The new Celestron CGE-1400 14" Goto Schmidt-Cassegrain Telescope with German Equatorial Mount, donated by Frank and Joanne Gumper, is now fully operational and will no doubt be the primary instrument for the **August 16<sup>th</sup> Custer MarsFest 2003**. Of course, several of the other telescopes at Custer will also be trained on Mars. Weather permitting, other Custer Members are encouraged to bring their telescopes and to set them up on the South lawn to share with members and the public.

**Bob Vanson**

## **WELCOME TO OUR NEW OR RETURNING MEMBERS:**

John D'Angelo and family of Southold, NY . Welcome one and all!

## **Announcements & General Interest**

### **Stargazing 101**

Instructor: Tom Madigan

Schedule: All times are from 7:30 PM to 9:00 PM;  
Class begins Tuesday, August 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> ;  
Continued on Tuesday August 12<sup>th</sup>, Thursday, August 14<sup>th</sup> and concludes Friday, August 15<sup>th</sup>. Observing will be provided to augment the instruction when appropriate and practical.

### **Custer Mars Fest**

See flyer included in this issue. Mark your calendars for the **Saturday, August 16<sup>th</sup> Custer Mars Fest 2003**. The event begins at 7:00 PM with Bob Chapin doing the evening's presentation and weather permitting, all the observatory's telescopes will be trained on Mars for member and public viewing. Stay up to date with frequent references to our website: <http://www.custerobservatory.org> .

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

The **68<sup>th</sup>** Convention of Amateur Telescope Makers on Breezy Hill, Springfield, VT began this past Friday, August 1<sup>st</sup> and concluded yesterday, Saturday, August 2<sup>nd</sup>. Let's hope the attendees had better weather than we had here. Look for my full report in next month's issue.

### **Custer's Telescope Mirror Makers**

Kudos to Custer members Sven Steen, Kurt Massey and Steve Orlando for their superb work and excellent progress thus far in producing optics that will be the hearts of 3 great telescopes. Sven has successfully cored the primary for his soon-to-be 10" *Cassegrain*; Kurt is well on his way with a good polish and figure on his 8" and Steve has completed polishing on his 6" and is in the last and most important phase of producing a fine optic, the *figuring* phase.

## **Mars Attacks!**

By Tom Haeberle

This very month Mars will be making its closest approach in some 60,000 years and will reach a magnitude just shy of minus three. It will burn fiery red in the night sky, and one of the best places to see it will be in New York City.

Astronomy magazine columnist Bob Berman noted in the August 2003 issue “you don’t want skies bursting with stars. Mars is more than bright enough to bull-doze through haze; instead you need an image that doesn’t blur or wiggle.” High humidity helps to steady the air and keep temperatures static, which helps prevent the refraction of light, which in turn causes a light source to blur and twinkle.

So oddly enough New York City with its hot muggy weather may be the ideal place to observe the red planet. The only draw back is finding a place with very little cemented ground that won’t radiate heat into the cooler night air above. “Nothing wrong with watching the strange planet from strange locations”, amuses Berman, “the lawns of mental institutions or cemeteries may be the place to watch Mars.”

At May’s North East Astronomy Forum at Suffern, NY, *Astronomy* Magazine associate editor Michael Bakich gave an excellent talk on Mars with emphasis on how to observe it. He stressed the importance of using color filters and said not to hesitate to pump up the power. Immediately after the talk I went out and purchased a 4mm lens that would give my 8-inch Nextstar scope (2,000mm focal length) the ability to magnify Mars 500 times.

Do use color filters when observing Mars. Eastman Kodak created the Wratten series of color filters for photography but they can be used for Astronomical eyepieces. The orange filter (W21) is the best for Mars contrasting the dark albedo features with the Martian deserts. My favorites are the blue (W80A), green (W58) and my newly purchased pale blue filter (W82A). These are excellent for viewing frost, clouds, fog and the polar caps. What a thrill it is to see clouds over the Tharsis volcanic region and capturing it with a picture or a drawing.

On the morning of July 1<sup>st</sup>, Mars looked fantastic. A large southern polar cap stood out like a lop-sided bulls-eye on its 16.8" disk. I used a pale blue filter to enhance the “snow” cap, and the dark bluish looking band girdling the perimeter of the cap. Astronomer and author of “*Mars and Its Canals*”, Percival Lowell thought the melting of ice-water snow caused this blue band which he called a badge of blue ribbon. What he thought was liquid water draining into the soil was actually frozen carbon dioxide subliming into vapor exposing the dark volcanic rock surface that hides beneath the polar cap.

The morning of July 17<sup>th</sup> brought to bear a conjunction of the Moon and Mars. The pairing displayed a beautiful contrast of colors: the bright orange Mars next to the grayish-white Moon against a dark sky backdrop. Mars came within one-fifth the Moon’s diameter, to the north hanging above in line with the crater Plato. I easily kept the two in the same field of view using 80 times magnification. The polar cap was visibly smaller though not too much surface detail was seen.

Mars has made close approaches before, but this opposition is a hair closer than the one in August of 1924 and will be a little farther away than the one that’s to come in August of 2287. Its quite possible Mars may reach an unprecedented magnitude minus three this year, depending on dust storm activity. The reason for this closer than ever approach is because Earth and Mars orbits are elliptical paths. It’s kind of like that Spirograph drawing toy you had as a kid, those paths actually rotate through space over thousands of years, bringing Earth’s farthest distance from the Sun closer to Mars’s closest approach to the Sun (perihelion). Also Mars’s elliptical orbit has become allot more eccentric or oval over time bringing it closer to Earth during its perihelion.

During the flying saucer craze of the Sixties and the Seventies you could expect an increase in UFO reports when Mars made such close approaches. Not because the Martians have landed mind you, but because the bright planet hangs so eerily in the sky, that some may think a flying saucer is hovering not so far away over the city. It may well be like a page torn from the script of Orson Welles’s radiobroadcast *the War of the Worlds* with the annual Perseid’s meteor shower blazing overhead this month. Meteors seemingly radiating from the direction of Mars over New York City, some might wonder that we’re under attack from Mars!

# CUSTER MARS FEST 2003

Saturday Aug 16, 2003  
7 pm

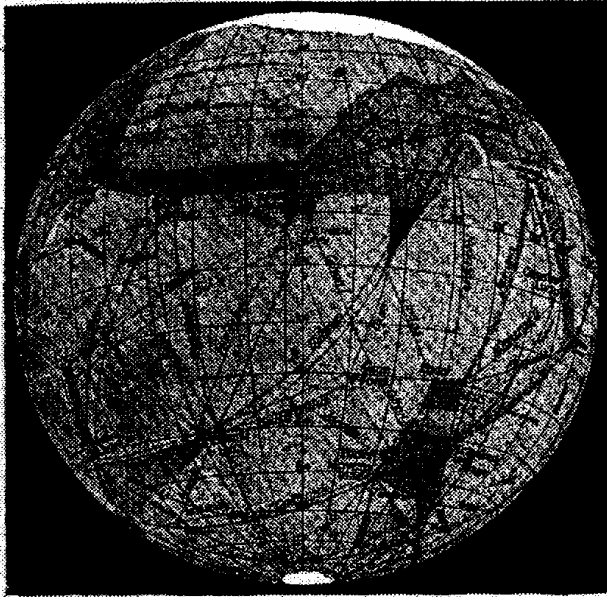


FIG. 2.

## 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.

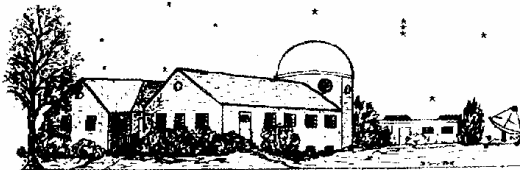
Bob Chapin will be giving a program on historical perspectives on the exploration and observations of Mars. This will be a terrific prelude to the observations of Mars at its closest.

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

# ***The Universe, Past, Present and Future***

A treatise by Thomas J. Madigan

## **The Degenerate Era**

Fourth installment in a multi-part series.

Now, as at the beginning, our science is becoming more speculative. We are only beginning to understand the current processes at work in the present era, those processes that can be studied and observed. What of those processes that we cannot observe or study. Our speculations concerning the nature of the Universe in this era and the 2 remaining eras will be extrapolations of our current understanding of the visible, observable Universe.

The term used to define this era on our Cosmological time line refers to a quantum mechanical state of matter. All of the mass that once fueled a bright and beautiful Universe is now locked up in stellar remnants as white dwarfs, brown dwarfs, neutron stars and black holes. Brown dwarfs are failed stars, having insufficient mass to initiate thermonuclear, hydrogen fusion. White dwarfs are the cold embers of most of the main sequence stars, their population being roughly equal to the population of stars of the bygone era. Stars with a mass of about 8 solar masses will complete their life cycle in a cataclysmic event we know as a super nova. All that will remain from an event such as this is a rapidly spinning neutron star, an object about the size of the earth composed exclusively of neutrons, where the density is so great that a teaspoon of its matter is about the weight of the Earth. A star with a mass greater than 8 solar masses may end up as a black hole instead of the neutron star, an object where even light has insufficient escape velocity; hence the name "black" hole.

During this era the Universe is cold and black, with no stars to light the eternal night, to warm the long frozen planets or to endow the galaxies with the radiance they have today. The cosmic temperature will be a minute fraction above absolute zero. Close, random encounters will strip stars of their planets that become adrift in the endless black. During the cosmological decade spanning  $10(19) \sim 10(20)$  years, most of the stellar remnants will be adrift in intergalactic space, having been ejected from their galaxy. [A rare spark of light will be the chance collision of two brown dwarfs, causing the formation of a low mass red dwarf with possibly a family of planets that will shine for trillions of years, a blink of an eye when compared to the Cosmological decade under consideration.](#) Every trillion years or so, the galaxy will experience a supernova as 2 massive white dwarfs collide and merge. The resulting brilliance will be stunning against a dying and depleted galaxy. As the galaxy loses its organization, these chance stellar encounters become more frequent. More massive components may even initiate the formation of Solar mass stars and a family of planets.

Protons were once believed to live "forever", like electrons. It is now believed that even they have a finite lifetime. Some theories put the life time of the proton between  $10(30)$  and  $10(40)$  years. It is important to bear in mind that the protons' lifetime has not been experimentally measured and that the margin of error is enormous.

With each passing Cosmological decade our Universe is becoming more and more bizarre as is our science giving way more and more to speculation. Since protons are a fundamental component of all matter, their decay would cause the elimination of all matter. This is where the Degenerate era ends and the Black hole era begins.

### Important Events

1. Red Dwarfs die  $\sim 10(14)$  years.
2. Most planets detach from stars  $\sim 10(19)$  years
3. Most stars leave galaxies  $\sim 10(20)$  years
4. Protons decay  $\sim 10(38)$  years, matter evaporates

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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; Aug 2<sup>nd</sup>, 9<sup>th</sup>, 16<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup>.

**The Custer Comment**

**TOM MADIGAN**, Editor  
**CUSTER COMMENT**

99 North Summit Avenue  
PATCHOGUE, NY

**11772**

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