

# Star Gazer News

*Astronomy News for Bluewater Stargazers*  
*Vol 6 No. 5 May 2012*

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## Venus Passes the Pleiades

The opening credits of the "Honeymooners", show Jackie Gleason as the Man in the Moon. The show ran for 39 episodes as a half-hour sitcom from 1955/56, but there were several years prior to that when Jackie Gleason and the other cast appeared in skits and years afterwards when they appeared in specials. The classic line that has been spoofed ever since, is "One of these Days, Alice! Pow, right to the moon!" spoken by Ralph Cramden when he was upset with his wife.



The show has become a TV icon with several subsequent shows based on the characters created by Gleason. The Flintstones is a stone-age version of the Honeymooners, for example. The graphic above takes both Ralph and Alice to their ultimate destination, the Moon.

The show was a TV hit while it ran and two of its characters received Emmy Awards, - Art Carney alone getting five! It often drew more audience than I love Lucy or the Perry Como Show. Gleason was one of the highest paid actors on TV as a result during its run.

And in a final astronomy connection, two remote-sensing cameras on the *New Horizons* space probe to the dwarf planet Pluto are named "Ralph" and "Alice". It looks like Ralph and Alice will have a look at an object much farther away than the Moon. "Pow Alice! All the way to Pluto!"

Big Bay skywatcher **Steve Irvine** imaged Venus passing M45 on April 2, 2012. Many other images were taken over the same time as well as we had a nice long spell of clear weather. Steve's image data: Canon 50D, Canon EF 200mm lens at f/3.5, twenty-five stacked images at 15 sec. exp. ea., ISO 800, unguided tracking on an HEQ5 mount.

**Disclaimer:** StarGazer News reports the activities of the Bluewater Astronomical Society (formerly Bruce County Astronomical Society) but any opinions presented herein are not necessarily endorsed by BAS. See the BAS website at [www.bluewaterastronomy.info](http://www.bluewaterastronomy.info) for up-to-date details relating to BAS events. The BAS "blog" is temporarily not available. StarGazer News is produced and edited by John Hlynialuk. I am solely responsible for its content. Your original articles, images, opinions, comments, observing reports, etc., are welcome. I reserve the right to edit for brevity or clarity. Errors or omissions are entirely mine although I strive for accuracy in star events, etc. I will not publish your emails or other materials without your specific permission to do so. No part of this publication may be reproduced in any form whatsoever without the editor's consent. However, the Sky Calendar and Feature Constellation pages are free for you to copy. Feel free to forward this issue in its entirety to your friends. Email comments or submissions to [stargazer@wightman.ca](mailto:stargazer@wightman.ca)



## BAS Executive 2011-2013

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## BAS Events Note Change of Venue May 20

|                   |   |
|-------------------|---|
| <b>Apr 28 Sat</b> | <b>Astronomy Day observing ES Fox Observatory @dark</b>   |
| <b>May 2 Wed</b>  | <b>BAS Meeting</b> Grey Roots, multi-purpose room 7:00 pm<br>Speaker from KW Telescopes   |
| <b>May 11 Fri</b> | <b>Night Sky Tour</b> Grey Roots parking lot dusk   |
| <b>May 20 Sun</b> | <b>Annular Sol Eclipse</b> Southampton High Street at Beach<br>8:20-8:45 pm followed by <b>BAS Viewing @ES Fox</b> after sunset |
| <b>May 27 Sun</b> | <b>Huron Fr Birders Star Tour</b> ES Fox Obs 8:15 pm  |
| <b>Jun 5 Tue</b>  | <b>Transit of Venus</b> ES Fox Obs(BBQ?) 6:08 pm<br>to sunset (9:02 pm); <b>BAS Meeting</b> ES Fox Obs 7:00 pm                  |



## The BAS News Page

### Science Fair Kids

The winner of the Astronomy Award in the Sr version of the Bluewater Science Fair was Aidan Ackerman of the Port Elgin area with a project called "Guided by the Stars". Aidan built a simple elevation device to measure the altitude of Polaris to find his latitude and in the process learned to recognize not only the Big and Little Dippers but also Orion.

The Jr Fair Astronomy Award winners were Avryl Bender and Alleesha Ferrier from Dawnview PS who did a lot of research into the factors that determine stars' brightness. It was impressive to hear these elementary children talking about the H-R diagram and discussing the fine points of apparent vs absolute magnitude. Wow!



BAS provides an annual Astronomy Award at the Bluewater Regional Science and Technology Fair. The award is given in honour of Dr. Herb Coleman, who got BCAS (the Bruce County AS) started building observatories with his donation of a 2 metre dome and an 8-inch Meade SCT. That telescope is still in use at the OEC and the dome is partly refurbished being readied for a possible rebuild of a smaller structure to house our solar telescope. The building that the dome was erected on back in 1991 was a 40-ft trailer and it gradually became less and less serviceable because of mold growing in the woodwork. It was eventually demolished and the equipment inside salvaged. The dome and scope were moved to the OEC with the hope of a rebuild on another base structure.

## Best View of Messier 9 Yet

by JASON MAJOR on MAR 30, 2012  
Universe Today

First discovered by Charles Messier in 1764, the globular cluster Messier 9 is a vast swarm of ancient stars located 25,000 light-years away, close to the center of the galaxy. Too distant to be seen with the naked eye, the cluster's innermost stars have never been individually resolved... until now.



This image from the Hubble Space Telescope is the most detailed view yet into Messier 9, capturing details of over 250,000 stars within it. Stars' shape, size and color can be determined — giving astronomers more clues as to what the cluster's stars are made of.

Hot blue stars as well as cooler red stars can be seen in Messier 9, along with more Sun-like yellow stars.

Unlike our Sun, however, Messier 9's stars are nearly ten billion years old — twice the Sun's age — and are made up of much less heavy elements.

Since heavy elements (such as carbon, oxygen and iron) are formed inside the cores of stars and dispersed into the galaxy when the stars eventually go supernova, stars that formed early on were birthed from clouds of material that weren't yet rich in such elements.

Zoom into the Messier 9 cluster with a video from NASA and the European Space Agency below:

The Hubble Space Telescope is a project of international cooperation between ESA and NASA. See more at [www.spacetelescope.org](http://www.spacetelescope.org).

Image credit: NASA & ESA. Video: NASA, ESA, Digitized Sky Survey 2, N. Risinger ([skysurvey.org](http://skysurvey.org))

The recent solar activity did more than spark pretty auroras around the poles. Researchers say the solar storms of March 8th through 10th dumped enough energy in Earth's upper atmosphere to power every residence in New York City for two years.

"This was the biggest dose of heat we've received from a solar storm since 2005," says Martin Mlynczak of NASA Langley Research Center. "It was a big event, and shows how solar activity can directly affect our planet."

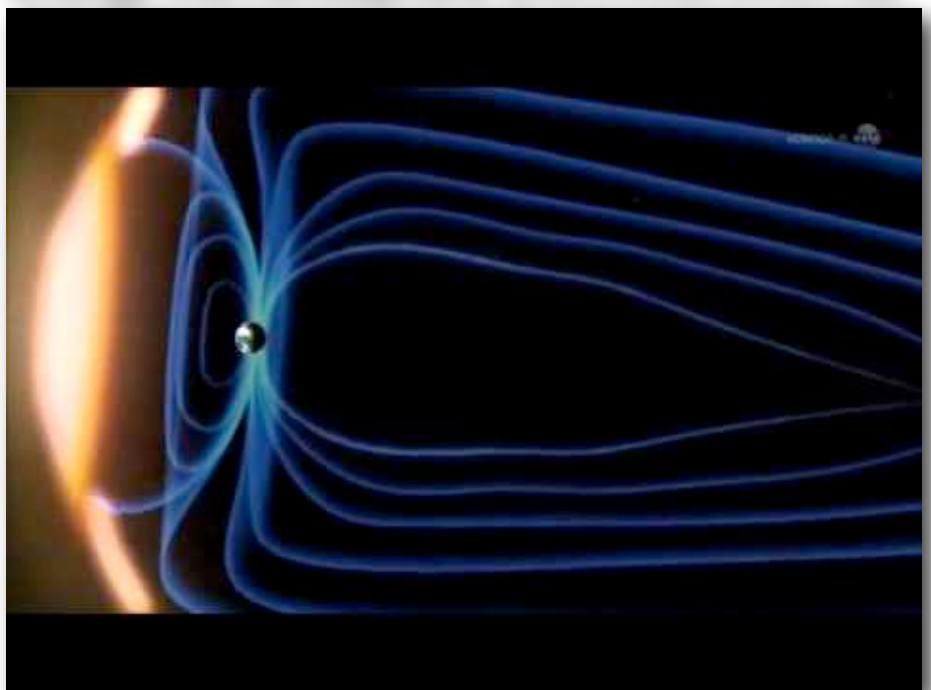
For the three day period, March 8th through 10th, the thermosphere absorbed 26 billion kWh of energy. Infrared radiation from carbon dioxide and nitrous oxide, the two most efficient coolants in the thermosphere, re-radiated 95% of that total back into space.

"Unfortunately, there's no practical way to harness this kind of energy," said Mlynczak. "It's so diffuse and out of reach high above Earth's surface. Plus, the majority of it has been sent back into space by the action of CO2 and NO."

For more info, see the [Science@NASA](mailto:Science@NASA) website.

## Recent Solar Storms Pumped 26 Billion KWh of Energy into Atmosphere

by Nancy Atkinson Universe Today



## CODITA: measuring the cosmic dust swept up by the Earth

Royal Astronomical Society press release  
30 March 2012

Although we think of space as being empty, there is more out there than meets the eye - dust, for example, is everywhere. If all the material between the Sun and Jupiter were compressed together it would form a moon 25 km across. Now a new research program will try to see how much of this dust enters the Earth's atmosphere. Metals from the cosmic dust play a part in various phenomena that affect our climate. An accurate estimate of dust would also help us understand how particles are transported through different layers of the Earth's atmosphere. Professor John Plane of the University of Leeds will present the Cosmic Dust in the Terrestrial Atmosphere (CODITA) project on Friday 30 March at the National Astronomy Meeting in Manchester.

CODITA has received a EUR 2.5 million grant from the European Research Council to investigate the dust input over the next 5 years. The international team, led by Professor Plane, is made up of 11 scientists in Leeds and a further 10 research groups in the US and Germany.

The main sources of dust in the Solar system are collisions between asteroids and material evaporating off comets as they approach the Sun. When dust particles approach the Earth they enter the atmosphere at very high speeds, anything from 38 000 to 248 000 kilometres an hour, depending on whether they are orbiting in the same direction or the opposite to the Earth's motion around the Sun.

The particles undergo very rapid heating through collisions with air molecules, reaching temperatures well in excess of 1600 degrees Celsius. At this point they melt and evaporate. Particles with diameters greater than about 2 millimetres give off enough material to produce visible meteors, or "shooting stars". But most of the mass of dust particles entering the atmosphere are much smaller than this, so can be detected only using specialised meteor radars.

"We have a conundrum - estimates of how much dust comes in vary by a factor of a hundred," said Plane. "The aim of CODITA is to resolve this huge discrepancy."

Satellite observations suggest that 100-300 tonnes of cosmic dust enter the atmosphere each day. This figure tallies with the rate of accumulation in polar ice cores and deep-sea sediments of rare elements linked to cosmic dust, such as iridium and osmium. However, measurements in the earth's atmosphere indicate that the input could be as low as 5 tonnes per day. These measurements include meteor radar observations, laser observations of the sodium and iron atoms from evaporating dust in the upper atmosphere, and measurements by high altitude aircraft of meteoritic iron in the lower stratosphere.

"If the dust input is around 200 tons per day, then the particles are being transported down through the middle atmosphere considerably faster than generally believed; if the 5-tonne figure is correct, we will need to revise substantially our understanding of how dust evolves in the Solar System and is transported from the middle atmosphere to the surface," said Plane.



Light scattered by the Zodiacal dust cloud, as seen from Paranal (Chile). This photograph was produced by the European Southern Observatory. Credit: ESO/ Y.Beletsky [http://www.eso.org/public/images/yb\\_zodiacal\\_light\\_paranal\\_cc/](http://www.eso.org/public/images/yb_zodiacal_light_paranal_cc/)

The metals injected into the atmosphere from evaporating dust particles are involved in a diverse range of phenomena linked to climate change.

"Cosmic dust is associated with the formation of 'noctilucent' clouds - the highest clouds in the Earth's atmosphere. The dust particles provide a surface for the cloud's ice crystals to form. These clouds develop during summer in the polar regions and they appear to be an indicator of climate change," said Plane. "The metals from the dust also affect ozone chemistry in the stratosphere. The amount of dust present will be important for any geo-engineering initiatives to increase sulphate aerosol to offset global warming. Cosmic dust also fertilises the ocean with iron, which has potential climate feedbacks because marine phytoplankton emit climate-related gases."

The CODITA team will also use laboratory facilities to tackle some of the least well-understood aspects of the problem

Plane explained, "In the lab, we'll be looking at the nature of cosmic dust evaporation, as well as the formation of meteoric smoke particles, which play a role in ice nucleation and the freezing of polar stratospheric clouds. The results will be incorporated into a chemistry-climate model of the whole atmosphere. This will make it possible, for the first time, to model the effects of cosmic dust consistently from the outer Solar System to the Earth's surface."



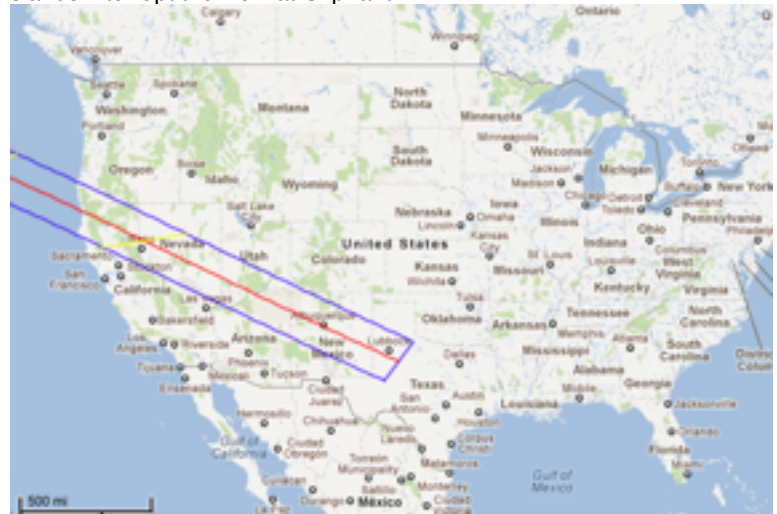
Diagram above (Starry Night Pro 6) shows the sun is almost 5° high at first contact for the local area. Filters may or may not be needed due to horizon haze with sun this low. BUT, be safe, always try the filter first. It is recommended for timing first contact and even for subsequent viewing as the sun sinks lower.

## First North American Solar Eclipse since 2008 visible in part in Ontario

Viewers in North American will experience the first solar eclipse since Aug 1, 2008 (and that one only briefly touched the Arctic). It will not be a total but an annular or ring eclipse because the moon is just at apogee and will not cover the sun entirely -the sun is 32 arc-minutes in diameter while the moon is 3 arc-minutes smaller. A ring of about 1.5 arc-minutes will circle the sun at 23 h 52 min 38.2 s UT at the midpoint of the eclipse. That will be at 7:52:38.2 our time when the sun is over the Pacific. Because of our location at the far eastern edge of the shadow footprint, this is 28 minutes before we even see the silhouette of the moon touch the sun.

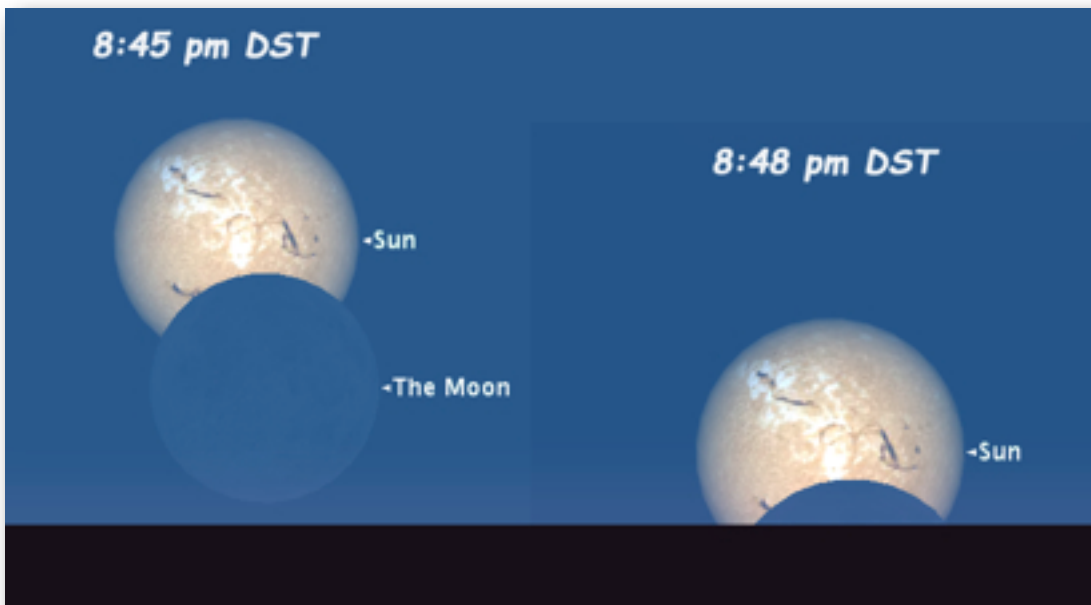
Still, any solar activity is a cause to watch and with an H-alpha scope even more so. If the weather cooperates and we get to see the sun sink into the western horizon, its appearance will be unusual. The diagram below right shows the "horned sun" sinking beneath the horizon from our location here in S. Ontario. It should be quite a sight and with the possibility of a green flash, photographers will need no encouragement to take lots of images during sunset.

Plans at this point are for BAS members and anyone interested to watch from the end of High Street in Southampton Beach, NOT at Oliphant as previously announced. The horizon is totally flat at Southampton while islands interrupt the view at Oliphant.



The central path of the annular eclipse will pass over the southwest USA. Anyone within the blue lines will see the entire sun covered (except for a narrow ring) with the sun being higher closer to the coast. Partial coverage of the sun will occur for the rest of North and much of South America with less sun obscured the farther away the observer from the track. If the sun was not setting locally, we would see 60% of the sun covered by the Moon, for ex.

The diagram left (c/o SN Pro 6) shows the local circumstances in the last few minutes before sunset at 8:48 pm. First contact for us will be at 8:20 pm or so (give or take a minute) and we will see about 30 minutes of eclipse before the sun sets totally below the horizon. It is not possible to predict whether there will be enough haze to make the sun safe to look at without filters, but any optical aid like binoculars should be filtered. ALWAYS, if in doubt, USE THE SOLAR FILTER.



## “I am Become Death, the Destroyer of Worlds”

Robert Oppenheimer Quotes “Bhagavad Gita “ Hindu Holy Book, Response to Observing the First Atomic Bomb Test

*“This is the place. Stand still, my steed,  
Let me review the scene,  
And summon from the shadowy Past  
The forms that once have been  
The Past and Present here unite  
Beneath Time’s flowing tide.*

*“A Gleam of Sunshine”*

by Henry Wadsworth Longfellow 1845



As any chemistry teacher will tell you, explosions certainly get a student’s focussed attention. However, chemical explosions are small fry compared to the explosions conjured up by nature. Astronomers really pay attention to these energetic events. High on their list of interesting detonations are supernovae. There are a number of types of supernovae and some of the most energetic ones are designated as Type II supernovae.

A Type II supernova is a rare endpoint in stellar evolution and usually results from the gravitational core collapse of a red supergiant at least 8 times more massive than our Sun. The energy of the expanding shock wave is sufficient to detach the surrounding stellar material. The resulting shock wave and extreme conditions briefly allow the production of elements heavier than iron. Indeed, elements as massive as uranium nuclei can be formed when the high flux of neutrons are sequentially absorbed by middle mass elements such as nickel and iron. The resulting energy release ( $10^{44}$  Joules) is substantial enough to enable the explosion to be detected with modest amateur telescopes across immense intergalactic distances.



*15 minute exposure of SN 2012awP imaged by amateur Mark Walters SBIG STL 11K and PlaneWave CDK 17*

Sometime around March 3rd, 2012, a supernova, designated 2012 awP, detonated in the outer arms of the barred spiral galaxy, M95, located 37 million light-years away in Leo Major. It was shining at visual magnitude 15 on discovery. By the time I saw it in mid-March from ASV, with my TAK TOA 150 and my friend’s C-14, it had brightened to visual magnitude 12.7. The attached photo of this supernova was taken by Welsh amateur, Mark Walters, on March 25th, 2012 using a SBIG STL 11K attached to a PlaneWave CDK 17, as part of the iTelescope network located in Spain. The first 26 supernovae of the year get an upper case letter from A to Z and afterward, pairs of lower-case letters are used, starting with aa, ab, etc. This supernova was designated as 2012 awP because it was the 50th supernova discovered in 2012 and the P designated the slow dimming (plateau) of the supernova after reaching its maximum light.

Most amateur astronomers know that the chemical elements which comprise our biosphere and our solar system are the by-products of stellar evolution. Elements heavier than iron (like uranium) are produced in supernova explosions. Over 6 billion years ago the first of 10 Type II supernovae seeded our infant solar system with isotopes of Uranium atoms.

It is here that an interesting convergence of science, technology, and politics intersected Paula and me on our journey home from our winter’s stay in AZ. You see, our long 4-day drive home, with the endless expanse of Interstate highway, can border on the monotonous. So, Paula and I have learned to break the homeward journey into two sections with a stop at an interesting scientific, historic, cultural or natural attraction. This year we were lucky that our return coincided with one of only two days set aside each year (first Saturday in April and October) when the Trinity site, location of the first A-Bomb test, is open to the public. We just had to see it!

On Saturday, April 7th, Paula and I joined thousands of others and were admitted directly to the Trinity Site on the White Sands Missile Testing Range. A fascinating day ensued as we stood at ground zero, talked with interpreters, visited the ranch house where the plutonium core was assembled, ate yummy hot dogs and then searched the test area for samples of A-bomb fused desert sand, a new mineral called Trinitite. Paula was especially good at this and she found more samples than every other person added together. After searching for 45 minutes she was told she couldn’t keep them, so, her low-level radioactive Trinitite samples were left among the desert sands.

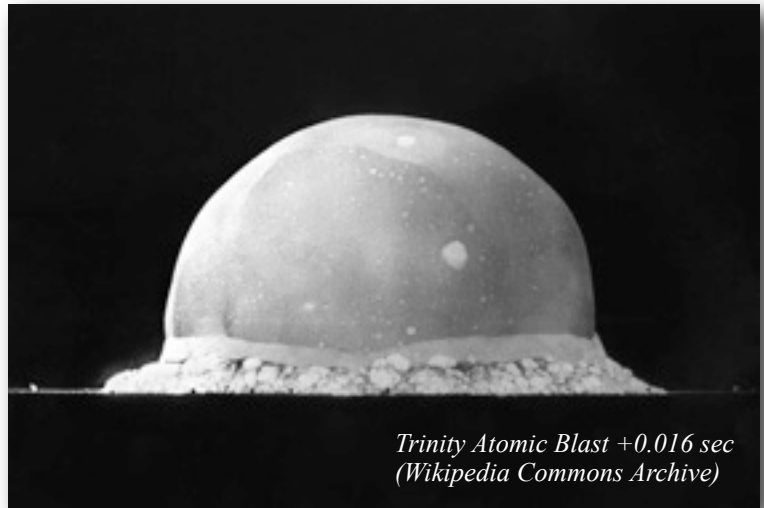
We weren’t glowing so it was time to head home.

*Trinity Site, White Sands Missile Range, NM  
(Cunningham Photo)*



# The Manhattan Project

In the 1930's it became apparent that uranium atoms ( U-235 ) could split when they absorbed a slow neutron and release considerable energy. If you had enough U-235 atoms in one place, called a critical mass, an uncontrolled chain reaction of splitting atoms would produce a super bomb. The problem was that Uranium 235 isotope was present in natural uranium only to the extent of 0.72% and plutonium 239 could only be man- made in a breeder reactor by bombarding natural uranium with neutrons. The Second World War provided the motive and the resulting Manhattan Project's directive was to produce, under the leadership of General Leslie Groves and scientific coordinator Robert Oppenheimer, a fission bomb before the Axis Powers.



Trinity Atomic Blast +0.016 sec (Wikipedia Commons Archive)



Oppenheimer and Groves at Ground Zero after first A-bomb test

Technically the effort involved was immense. U-235 had to be separated from natural uranium, Pu-239 had to be produced in breeder reactors and then separated, and these fissionable elements had to be incorporated into a working bomb design. This project employed more than 130,000 people, cost 25.8 billion in today's dollars, and required the development of new technology at three main locations, Oak ridge in Tennessee, Los Alamos in New Mexico, and Hanford, in Washington. By July 16, 1945, at 5:30AM everything came together for a successful

A-Bomb test in the New Mexican desert at a site located about 56 km SE of Socorro NM called Trinity. The blast released an energy equivalent of 20 kilotons of TNT, the shock wave was felt over 160 kilometres away, and the mushroom cloud reached 12 km in height. The world had entered a new and frightening age.



Plutonium Bomb on Tower



The A-Bomb or "Gadget"



Paula with Her Collection of Trinitite A-Bomb Fused Desert Sand

## Vesta Gives up Some Secrets

Europlanet press release Oct 2011

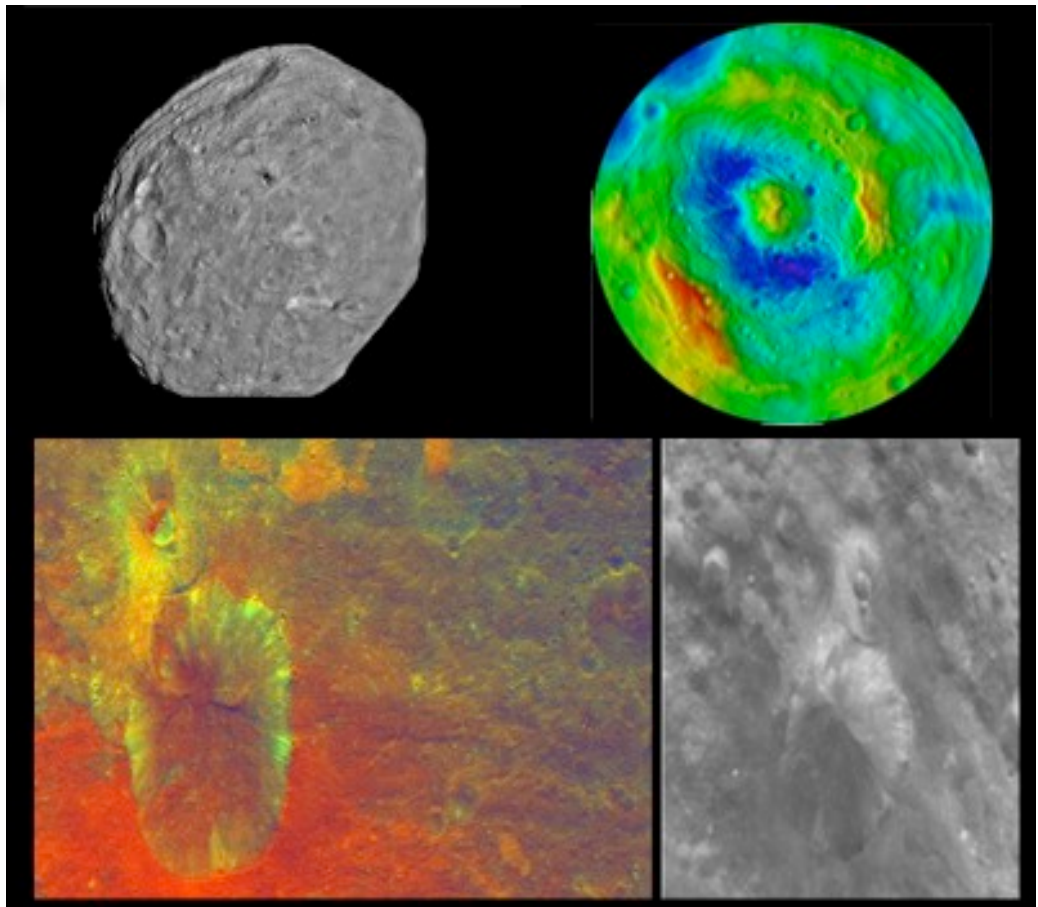
NASA's Dawn mission, which has been orbiting Vesta since mid-July, has revealed that the asteroid's southern hemisphere boasts one of the largest mountains in the Solar System. Other results show that Vesta's surface, viewed at different wavelengths, has striking diversity in its composition particularly around craters. The surface appears to be much rougher than most asteroids in the main asteroid belt. Preliminary results from crater age dates indicate that areas in the southern hemisphere are as young as 1-2 billion years old, much younger than areas in the north. The findings are being presented today at the EPSC-DPS Joint Meeting 2011 in Nantes, France.

"We are learning many amazing things about Vesta, which we call the smallest terrestrial planet," said Chris Russell, the Dawn Principal Investigator. "Like Earth, Mars, Venus and Mercury, Vesta has ancient basaltic lava flows on the surface and a large iron core. It has tectonic features, troughs, ridges, cliffs, hills and a giant mountain. The south polar mountain is larger than the big island of Hawaii, the largest mountain on Earth, as measured from the ocean floor. It is almost as high as the highest mountain in the solar system, the shield volcano Olympus Mons on Mars."

In mid July Dawn entered orbit around Vesta and began imaging what is possibly the oldest planetary surface in the solar system. The surface of Vesta shows the ravages of time. Many more craters are seen in the northern hemisphere than the southern because an enormous impact altered the earlier cratering record in the south. Since July the Dawn spacecraft has been moving ever closer to Vesta, moving into a polar orbit to look down on every square kilometre of the planetary surface. In mid August it entered Survey orbit at 2700 km altitude and mapped the entire sunlit surface with its framing camera and Visible and IR mapping spectrometer.

"We completed that phase at the beginning of September and since then have been moving the spacecraft to its next mapping orbit, the High Altitude Mapping Orbit at 680 km altitude, which it reached on the weekend. Over the coming month it will return complete coverage of the sunlit surface with a resolution of 60 metres," said Carol Raymond, Dawn's Deputy Principal Investigator.

"The head of the mapping spectrometer group, Angioletta Coradini, suggested that the large southern crater on Vesta be called Rheasilvia after the mother of Romulus and Remus and the mother of the Vestal virgins. The IAU has accepted this suggestion, as well as the names of thirteen Vestal virgins for craters that define quadrangles.



A montage of images of Vesta in B&W and in false colour. See more at [http://www.europlanet.eu.org/outreach/index.php?option=com\\_content&task=view&id=352&Itemid=41](http://www.europlanet.eu.org/outreach/index.php?option=com_content&task=view&id=352&Itemid=41)

The team is now measuring the craters, identifying ridges, hills and lineations to have the sunlit surface totally mapped by the end of the year," said Russell.

The Dawn framing camera, built and operated by the Max-Planck Institute for Solar System Research (MPS), in cooperation with DLR, Berlin and the Technical University of Braunschweig, provides more information than the black and white images suggest. The framing camera is equipped with seven colour filters in order to collect spectral information. This makes it possible to highlight certain spectral features in false colour maps that would not be visible to the naked eye. The surface of Vesta shows striking diversity when viewed in false colours that are ratios of light intensity at different wavelengths. These false colour variations are diagnostic of different surface materials. The spectral variations are particularly strong around craters. Where the clear filter images show bright and dark features, the colour data show these are also comprised of different materials, likely excavated by the impacts.

"One of the most prominent colour features on Vesta's surface is associated with a 40 km diameter crater near Vesta's equator. It shows a spectacular red ejecta blanket to the south. We believe that this ejecta blanket, which covers only a half-circle,

has been created by an impactor hitting the surface on an oblique trajectory," said Andreas Nathues of MPS.

"The difference in crater numbers between the two hemispheres is also striking. By counting the number of craters per unit area in different terrains, the relative ages of these different terrains can be obtained. Preliminary results of these crater age dates indicate much younger ages for areas in the south versus the north, as young as 1-2 billion years old. So far, the oldest ages, in the northern hemisphere, are younger than 4 billion years old, which is an unexpected result given that meteorites from Vesta have ages of 4 billion years. However, the crater counts will be refined with the more detailed data to be collected, and the assumptions about how the impact flux decays with time will be evaluated, so the absolute ages are preliminary.

"Vesta's surface has a surprisingly complex set of structural features, including the massive south polar mountain, steep slopes, deep troughs, and sets of curved lineations that appear in some cases to be associated with slumps, or landslides. The variation in Vesta's brightness with sun angle indicates that the surface of Vesta is very rough, causing the light to scatter. This roughness could be at the scales of surface features or at the scale of individual minerals in the rocks, or both. Vesta's roughness is larger than most asteroids in the main asteroid belt," said Raymond.

# SGN Featured Constellations: Virgo (the Maiden)

## Virgo (the Maiden)

|                       |                           |
|-----------------------|---------------------------|
| α Virginis - Spica    | ε Virginis - Vindemiatrix |
| β Virginis - Zavijava | η Virginis - Zaniah       |
| γ Virginis - Porrimma | ι Virginis - Syrma        |

Virgo is both a zodiacal and equatorial constellation. Spica, its brightest star, is about 30° southwest of Arcturus in Bootes and forms the southernmost point of the Diamond of Virgo. Spica has a magnitude of 1.2 and is the 14th of the 20 brightest stars in the sky. The autumnal equinox, where the sun crosses the celestial equator on its journey south, is located close to the star η Virginis. In the rough square formed by Denebola in Leo and ε, γ and β Virginis lies the so-called "Field of the Nebula", where Herschel discovered 323 nebulae; some of these are visible in a small telescope. [aka Virgo Cluster @ 54 Mly distance. -ed]

### Double Stars Separation

|       | Mag.         | (s)  | Location | Remarks                      |
|-------|--------------|------|----------|------------------------------|
| γ     | 3.6-3.7      | 5    | 123901   | Both Yellow: beautiful pair. |
| θ     | 4.0-9.0-10.0 | 7-72 | 130705   | White-Violet-Grey.           |
| τ     | 4.0-9.0      | 80   | 135902   |                              |
| 17    | 6.2-9.0      | 20   | 122006   | Pale Green-Orange            |
| Σ1627 | 5.9-6.4      | 20   | 121504   |                              |

### Messier Objects

|       | Mag  | Location | Remarks  |
|-------|------|----------|--|
| M49   | 8.6  | 122708   | Elliptical Galaxy. Large, bright, between two bright telescopic stars. |
| M 58  | 9.2  | 123572   | Spiral Galaxy.   |
| M 59  | 9.6  | 124012   | Elliptical Galaxy.   |
| M 60  | 8.9  | 124112   | Elliptical Galaxy.   |
| M 61  | 10.1 | 121905   | Spiral Galaxy.   |
| M 84  | 9.3  | 122313   | Elliptical Galaxy. [see Virgo Cluster below]                           |
| M 86  | 9.7  | 122413   | Elliptical Galaxy. [see Virgo Cluster below]                           |
| M 87  | 9.2  | 122813   | Elliptical Galaxy.   |
| M 89  | 9.5  | 122313   | Elliptical Galaxy.   |
| M 90  | 10.0 | 123413   | Spiral Galaxy.   |
| M 104 | 8.0  | 123711   | Spiral Galaxy. [The Sombrero Galaxy]                                   |

### Other Objects of Interest

- NGC4762** - A nebula resembling a kite, grouped with three stars. A beautiful sight. Location 125012
- R Virginis** - Long period (146 days) variable, maximum magnitude 6.9. Location 123607
- S Virginis** - Long period (378 days) variable, maximum magnitude 7.0. Location 133006

## The Virgo Cluster -see pg 9 for detailed chart

The **Virgo Cluster** is a cluster of galaxies at approx.  $53.8 \pm 0.3$  Mly in the constellation Virgo. With 1300 (and possibly up to 2000) member galaxies, the cluster is the heart of the larger Virgo Supercluster, of which the Local Group is an outlying member. It is estimated that its mass is  $1.2 \times 10^{15}$  solar masses out to 8° of the cluster's center or a radius of about 7.3 Mly.

Many of the brighter galaxies, including the giant elliptical M 87, were discovered in the late 1770s and early 1780s by Charles Messier where he described them as nebulae without stars. Their true nature was not recognized until the 1920s.

The cluster subtends a maximum arc of approximately 8° centered in Virgo; many are visible with a small telescope.

The cluster is a fairly heterogeneous mixture of spirals and ellipticals. As of 2004, it is believed that the spirals of the cluster are distributed in an oblong prolate filament, approximately 4 times as long as wide, stretching along the line of sight from the Milky Way. The elliptical galaxies are more centrally concentrated than the spiral galaxies.



Markarian's Chain is a stretch of galaxies that forms part of the Virgo Cluster. It is called a chain because, when viewed from Earth, the galaxies lie along a smoothly curved line. It was named after the Armenian astrophysicist, B. E. Markarian, who discovered their common motion in the early 1960s. Member galaxies include M84 (NGC 4374) on the right, M86 (NGC 4406) to its left, NGC 4438 and NGC 4435 commonly called "the Eyes", NGC 4461, NGC 4458, NGC 4473 and NGC 4477 which is off the top of the image above. At least seven galaxies in the chain appear to move coherently, although others appear to be superposed by chance.

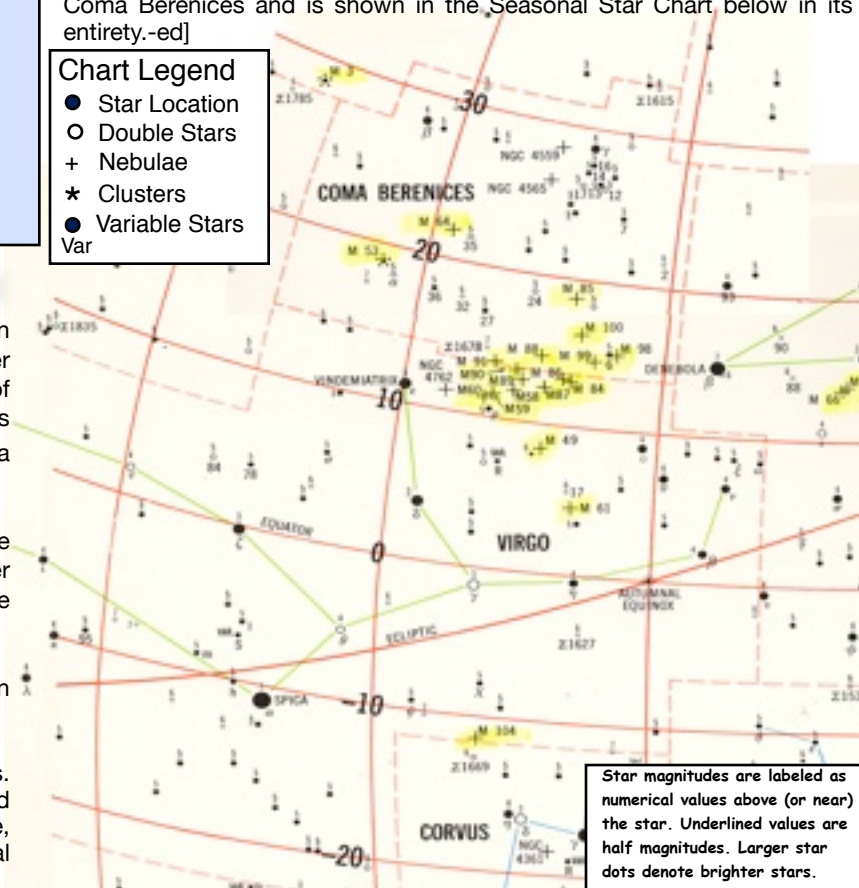
Image above by John Moore, Farnham Astronomical Society (UK)  
<http://www.farnham-as.co.uk>

The cluster is an aggregate of at least three separate subclumps centered on the galaxies M87, M86, and M49. Of the three subclumps, the one centered on M87 is the dominant one, with a mass of approximately  $10^{14}$  solar masses, which is approximately an order of magnitude larger than the other two subclumps.

[Article from Wikipedia. The Virgo cluster actually crosses the border into Coma Berenices and is shown in the Seasonal Star Chart below in its entirety. -ed]

### Chart Legend

- Star Location
- Double Stars
- + Nebulae
- ★ Clusters
- Variable Stars
- Var



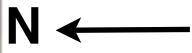
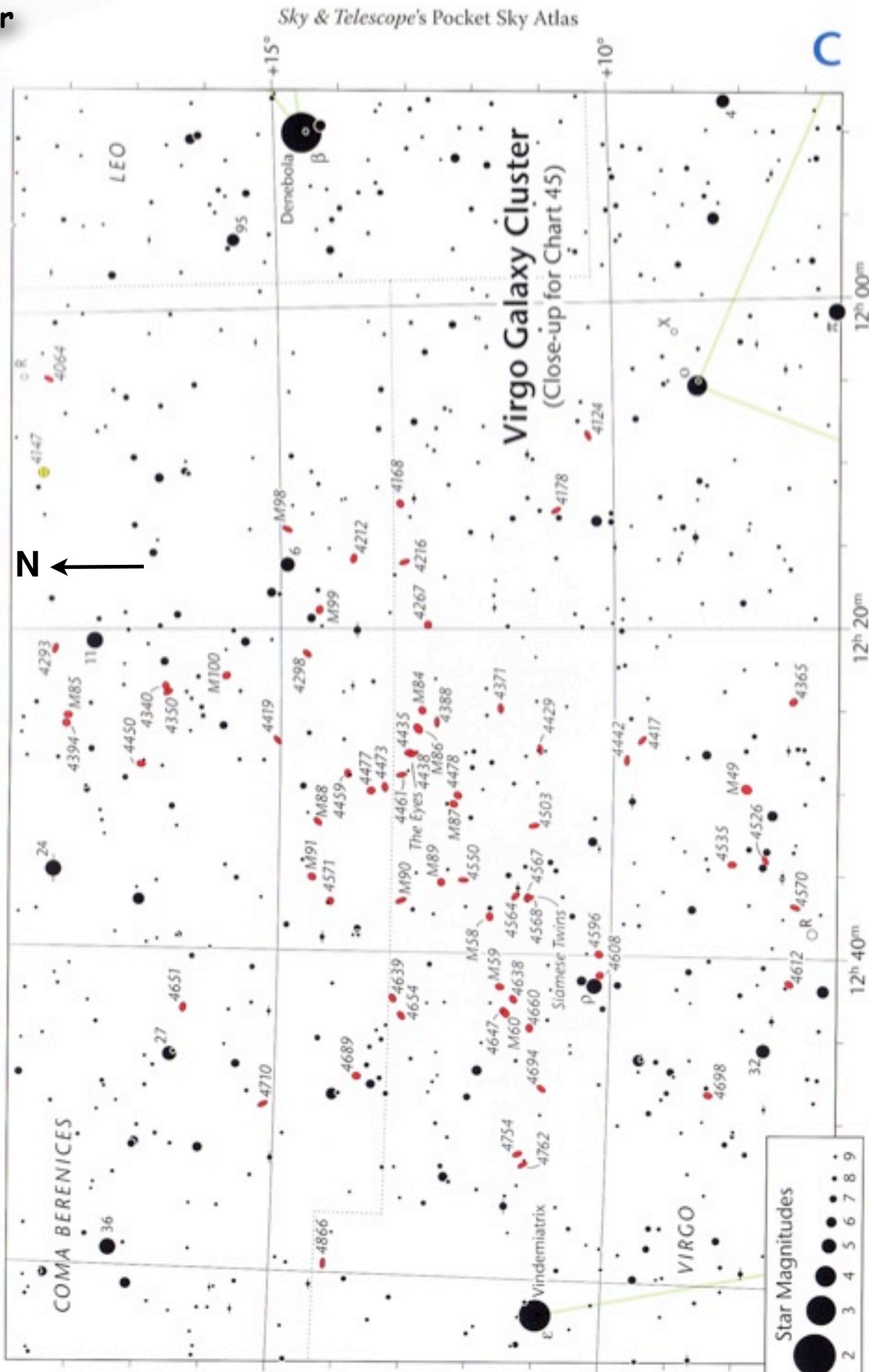
Star magnitudes are labeled as numerical values above (or near) the star. Underlined values are half magnitudes. Larger star dots denote brighter stars.

# The Virgo Cluster

The **Virgo Cluster** chart here is a copy of the detailed map provided in the appendix of the Pocket Sky, -an enlargement of the Virgo/Coma Berenices region of chart 45 in that atlas. Markarian's Chain runs from M84 to NGC 4477 in the centre of the cluster and includes the two galaxies labelled "The Eyes".

The Virgo Cluster contains upwards to 2000 galaxies and in the brightest 160, (see Atlas of the Universe, [www.atlasoftheuniverse.com](http://www.atlasoftheuniverse.com)) there are only 19 ellipticals. The view through the telescope, however, shows a preponderance of "ellipticals" and only a few spiral types. The answer is that there are also a large number of S0 galaxies (the rounded spirals with no obvious arms) which masquerade as ellipticals in telescopic views. In the top 160 galaxies, 40 are S0 and many more are Sa spirals with tightly wound spiral arms which look a lot like ellipticals as well. The table in the blue box on pg 9 is also misleading, listing 7 elliptical galaxies and only 4 spirals. In the Coma Berenices region of the map on pg 9, the same Seasonal Star Chart (not provided here) indicates that all 6 of the Messier galaxies are spirals. This is a more correct representation (accidental no doubt), of the proportion of galaxies represented in the overall cluster.

There are 19 Messier objects in the cluster: 11 galaxies, in Virgo and 7 galaxies and one globular cluster, M53 on the Coma side. M64 in Coma is the Black Eye Galaxy and M104 on the border of Corvus is the Sombrero Galaxy, -both are worth a look. Another favourite is NGC 4565 in Coma near the star  $\gamma$ -Com. This is a beautiful edge-on spiral with a prominent dust lane. The chart at right does not show the location of any of these interesting objects. Check your other atlases for these.



- May 1 Mars 8° N of Moon
- May 4 Spica 1.5° N of Moon  
Saturn 6° N of Moon
- May 5 ε -Aquarid Meteors (moon full (-:-))
- May 5 Full Moon (Planting Moon) rises at 8:25 pm DST (largest of 2012)
- May 12 Last Quarter Moon rises at 2:18 am DST
- May 15 Venus stationary  
Pallas 0.8° N of Moon
- May 19 Juno at opposition (mag. 10)
- May 20 New Moon rises at 5:30 am DST  
Annular Solar Eclipse (vis here from 8:20 pm to sunset 8:48 pm)
- May 22 Venus 5° N of Moon
- May 28 First Quarter Moon rises at 1:04 pm DST
- May 29 Mars 7° N of Moon

## BAS Events

Note Change of Venue May 20

- Apr 28 Astronomy Day observing ES Fox Observatory @dark
- May 2 BAS Meets at Grey Roots, multi-purpose room 7:00 pm  
Speaker from KW Telescopes
- May 11 Night Sky Tour Grey Roots parking lot at dusk
- May 20 Annular Sol Ecl Southampton High St Beach 8:20-8:45 pm, followed by BAS Viewing ES Fox Obs after sunset
- May 27 Huron Fr Birders Star Tour ES Fox Obs 8:15 pm
- Jun 5 Transit of Venus ES Fox Obs(BBQ?) 6:08 pm to sunset (9:02 pm); BAS Meeting ES Fox Obs 7:00 pm

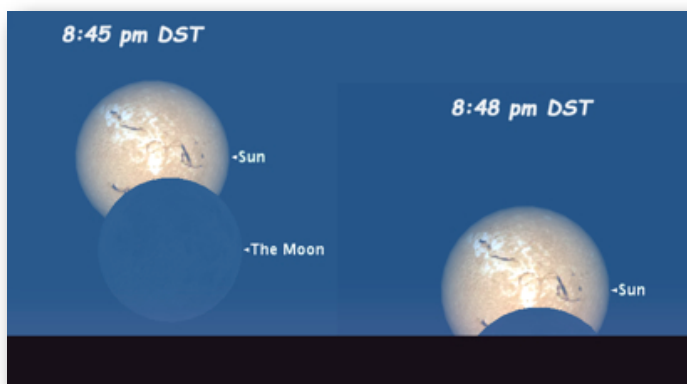
## Special Events

### Venus near Elnath, Annular Eclipse

Venus has been rising in the western sky all spring and finally stops its upward motion May 15 when near one of the "horns of Taurus", Elnath, or γ-Tau. In the evening sky on May 6, Venus is only 50 minutes of arc away. By May 15, Venus stops its apparent eastward motion and starts to head back toward the sun. Now while moving westward, it will appear to move much quicker across the sky and the trip to the horizon will be shorter. By mid-June it will be lost in the glare of the sun. But don't despair! Before you see Venus as a Morning Star again, you will see it pass across the sun in the last transit in our lifetimes!

### May 20 Solar Eclipse

The sun undergoes an annular (ring) eclipse this month visible at its best from the S. Pacific. A short partial eclipse can be seen from most parts of Canada as the sun is setting in the west. Locally, if you have a flat western horizon, you will see about 28 minutes of partially-eclipsed sun as it sinks towards the horizon. First contact is at



8:20 pm DST when the sun is about 4.5 degrees above the horizon. The sun sets for communities along the Lake Huron shore at about 8:48 pm DST so viewing from a flat western horizon is recommended. None of this eclipse will be safe to view without solar eclipse glasses. Contact Joan S. if you need a pair for the event. Sky News magazine is also supplying a pair for free with the May/June issue.

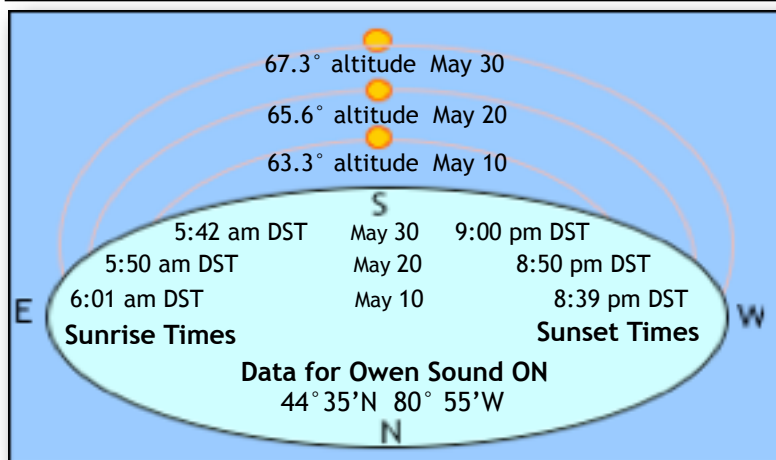
## Planets



**SATURN is back!**  
Opposition May 15

**MERCURY**, is poorly placed in May for northern observers. Better viewing will occur in June in the evening sky. **VENUS**, (-4.4), is less than a degree from Elnath (β-Tau) on May 6 (see Special Events), stops its motion on May 15 and reverses from then on. It is still well-placed for viewing. A thin crescent Moon (1.8 days old) is nearby on May 22. **MARS** fades to mag 0.3 by May 31 and the disc shrinks to only 8.5" across at month end. It moves quickly eastwards away from Regulus (15° E by May 31). **JUPITER**, is lost in the glare near the sun and not visible this month. **SATURN**, (mag 0.4), is visible all night long and a prime target for viewing. Rings close slightly to 12.8° this month. **URANUS**, (5.9) rises by 3 am by month-end preceded by an hour by **NEPTUNE**, (7.9). Both are in dark sky for two hours or so before sunrise. Ceres is now too close to the sun but two other asteroids, Pallas (9.4) and Juno (9.8) are visible. **PLUTO** (mag. 14) rises in the east by 11:00 pm and may be found with accurate charts and large telescopes.

The diagram below gives the sunrise/sunset times and the sun's altitude on three dates this month. The calendar below the sun chart shows the moon phases for the month. Times of moonrise for NM, FQ, FM and LQ are in the Sky Calendar listing at left.



By permission of The University of Texas McDonald Observatory

### May 2012

| Sun   | Mon   | Tue | Wed | Thu | Fri | Sat   |
|-------|-------|-----|-----|-----|-----|-------|
|       |       | 1   | 2   | 3   | 4   | 5 FM  |
| 6     | 7     | 8   | 9   | 10  | 11  | 12 LQ |
| 13    | 14    | 15  | 16  | 17  | 18  | 19    |
| 20 NM | 21    | 22  | 23  | 24  | 25  | 26    |
| 27    | 28 FQ | 29  | 30  | 31  |     |       |

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**For Sale: HUTECH part # 3101 Single Arm Compact Fork Mount Head,**

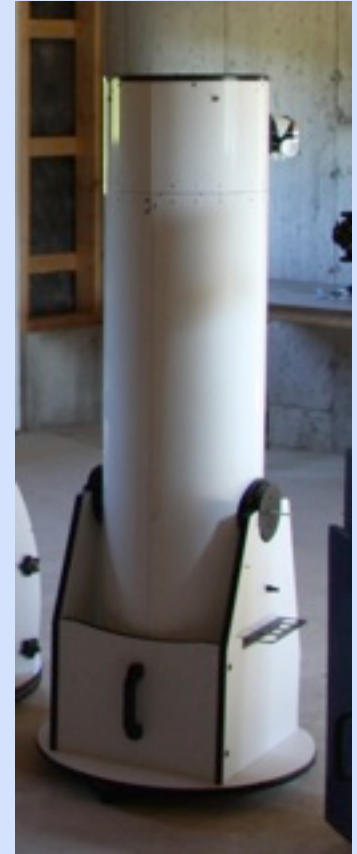
Can be used in Alt-Az as well as Equatorial mode with lightweight Scope (I have used it with PRONTO on Manfrotto 128RC Photo-tripod). Has Slo-Mo knobs (flexible shafts can be added to it - not included) 1/4 - 20 thread on base, Size: 3" x 3" x 6". [Review/pictures can be found here: [http://www.cloudynights.com/item.php?item\\_id=798](http://www.cloudynights.com/item.php?item_id=798)]

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Saturday June 9, 2012

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