REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

AUGUST, 2013

VOLUME 37, ISSUE 8

A Lowbrow Pilgrimage

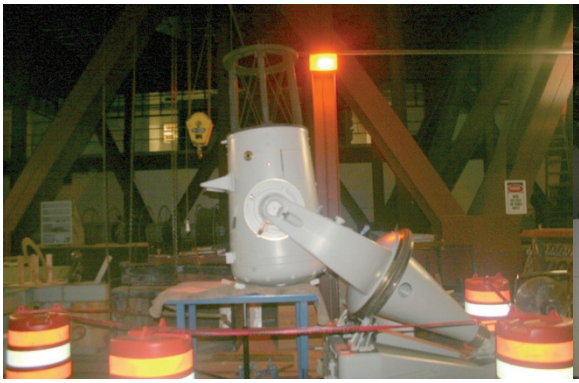
A Visit to the Palomar Observatory and the Hale 200 Inch Telescope

by Don Fohey

April, 2013--The drive from the Pacific coast to the Observatory is beautiful. You rise through valleys of avocado, and orange groves. The foothills offer vistas of the lower valleys and the final summit road switchbacks up to the top of the mountain. It was a beautiful Sunday and the road is a favorite for motorcyclists wearing full body armor. The riders treated the double yellow line as the passing lane. With engines screaming, several passed us on curves cutting back into our lane inches before our front bumper. There was one close encounter where an uphill and downhill motorcyclist both claimed the double yellow . Just five miles from the Observatory is Mother's Kitchen Restaurant which is a great place for lunch for both motorcyclist and Observatory visitors.

The Lowbrows are busy in August: See the calendar on page five!

I have seen functional observatory domes before, but I was unprepared for the beauty of the art deco design of the building. It is stunning and massive as it rises above the nearby trees. We first walked up the stairway and into the main entrance of the building to the visitor's gallery. Later we joined the tour which started behind the building through a door into the basement beneath the observing floor. This is the door through which the 200 inch mirror entered. This lower level is a workshop for the maintenance of the telescope and instruments. We had three volunteers give various parts of the hour long tour. We saw the massive steel structures that support the piers above. On the wall were huge right ascension and declination gears built as replacement parts should they ever be needed. An 18 inch Schmidt telescope was being worked on. A long stairway led us up to the observing floor.



Schmidt Telescope

Note gears on the wall

It was so much nicer to be on the observing floor; the view from the gallery had been disappointing. The pictures begin to show the massive equatorial mount, although the low light levels made photography difficult. The mask used to star test the mirror is displayed. Beyond the telescope is the large circular vacuum chamber that is used to re-aluminize the mirror every two years or so. The guides explained that the mirror is cleaned regularly by blowing carbon dioxide over the mirror to remove small particles. The telescope today is still a very important research instrument. *The observatory typically enjoys 300 observing nights yearly.* It has discovered more exo-planets than any other telescope and is the first instrument to obtain the spectrum of an exo-planet. That night the telescope was scheduled to perform a brown dwarf study. The guides also explained that researchers liked the equatorial tracking of the instrument. Most new large telescopes have computer controlled altitude-azimuth mounts which are good but not as good as the massive equatorial mount of the Hale Telescope. During tracking the right ascension drive uses only a 1/12 H.P. motor. The telescope has both a prime focus and Cassegrain focus. Seventy percent of the observation is done at the Cassegrain focus where high quality cameras and the tri-spectrometer are located. The Cassegrain focus also has the laser controlled adaptive optics.

Mirror Testing Mask

Cassegrain Focus

I want to thank Jim Forrester for the suggesting the I include the Hale Telescope visit during our spring trip to southern California. As a boy I remember reading about the great Hale 200 inch telescope. Every science textbook, which included a chapter on astronomy, had a picture of it. It was the largest telescope in the world for close to 50 years! I was inspired by it and now I have actually seen it!

Ann Arbor's Lone NGC Object

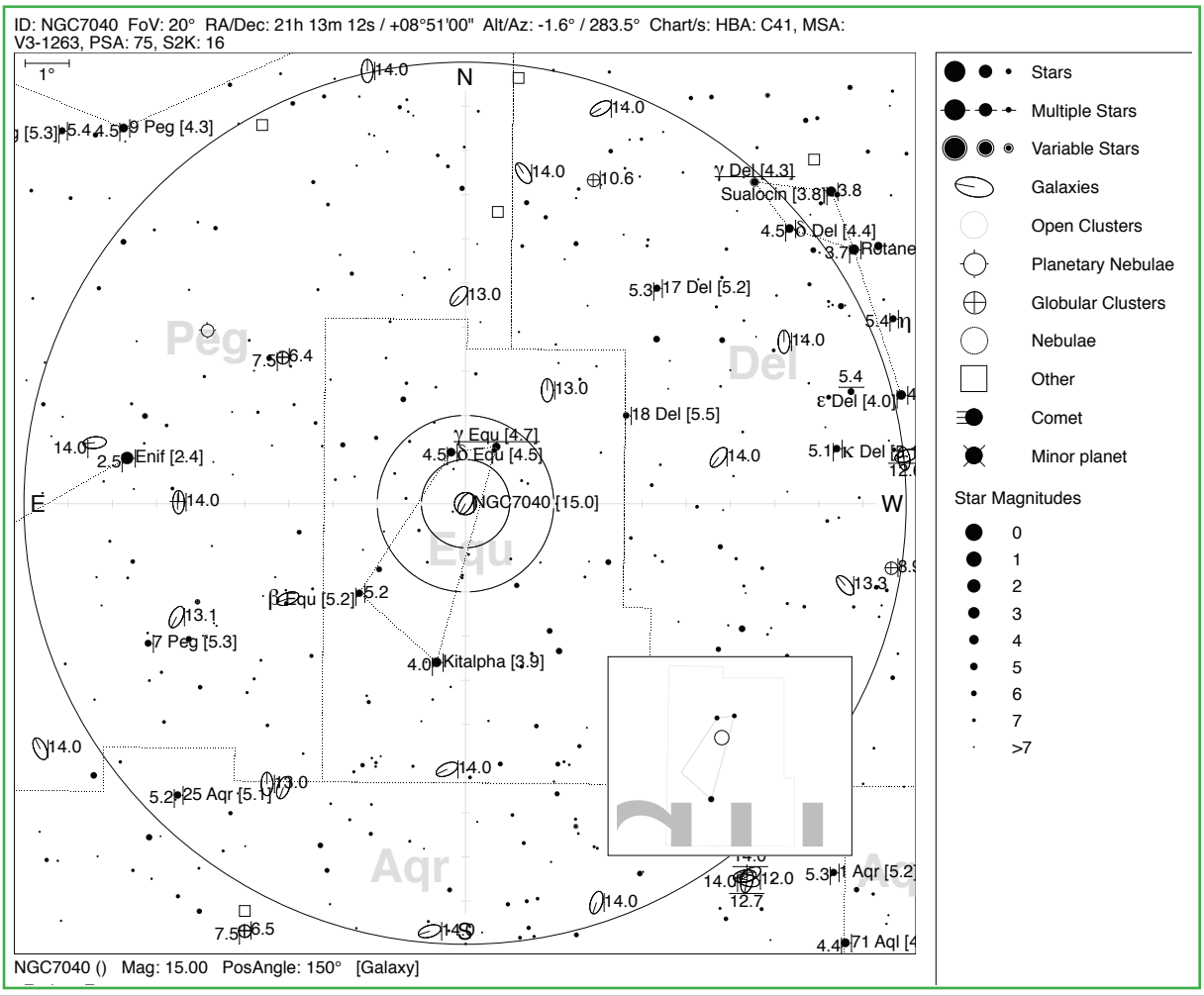
by Rudi Paul Lindner

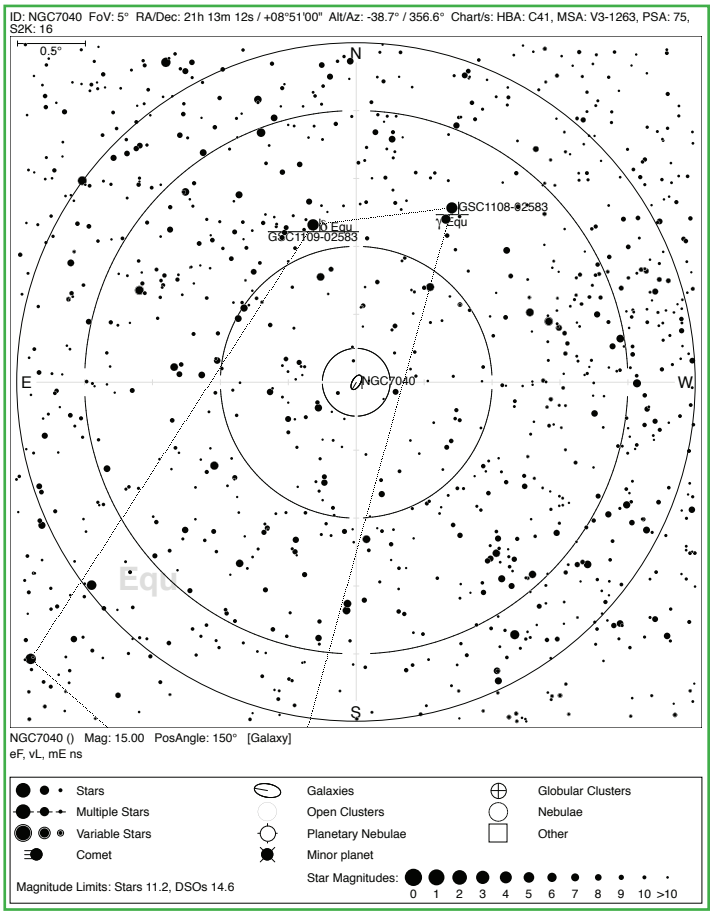
Ann Arbor is not the sort of site, with not the sort of seeing, that one expects to come across as good for nebular viewing. However, this was not always the case. After James Watson left the Detroit Observatory, Mark Harrington (UM-1871) returned from Europe, Asia, and Alaska to direct the program. He was more a meteorologist than an astronomer, but his assistants, J.M. Schaeberle and W.W. Campbell, went on to years of service at the Lick Observatory in California.

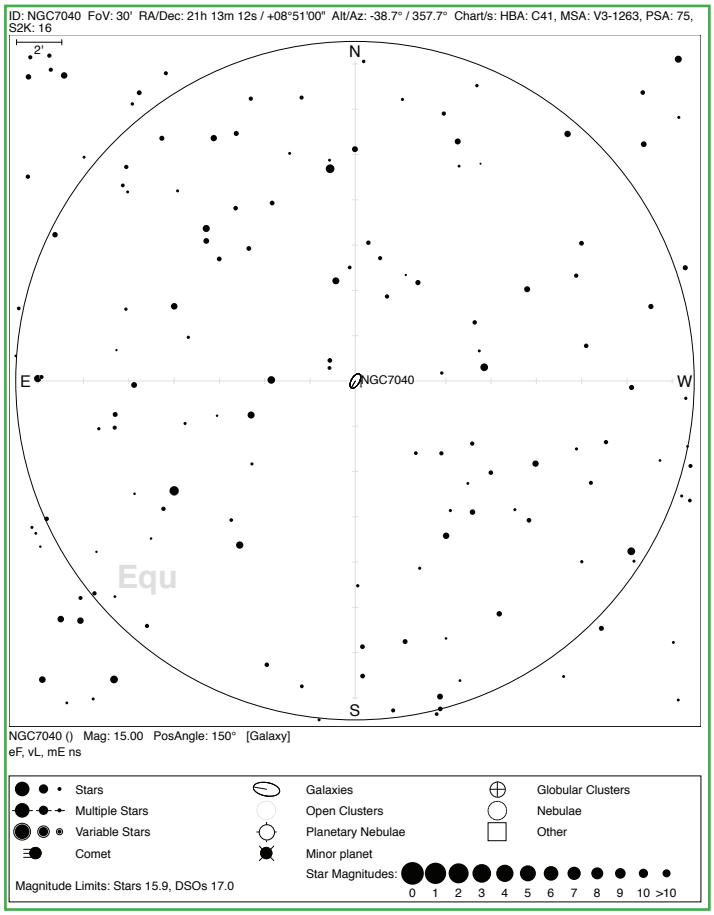
On August 18, 1882, four years after his return, Harrington accidentally discovered a nebula in the constellation Equuleus with the Fitz refractor. He noted that "It is so faint that I can only see it after resting my eyes in the dark a few moments." It is in the catalogues as NGC 7040, a fourteenth magnitude galaxy. By the way, Equuleus boasts only four NGC objects. NGC 7040 is at RA 21 13 18, Dec +08 52 00, about one minute in diameter.

Since in the darker skies of the nineteenth century the galaxy was barely visible in a long-focus 13" refractor, I wonder whether any of the Lowbrows with large telescopes can locate it visually today. Harrington's find is the sole NGC object discovered with the Fitz.

By the way, the Fitz was not the sole "great" telescope in town. After his departure from the Lick Observatory, J.M. Schaeberle returned to Ann Arbor and set up a 13" reflector with a focal ratio of 1.5 [sic] at his Old West Side home. Here he photographed, among others, planetary nebulae, remarking that he found the Ring Nebula in Lyra to be the central portion of a two-branched spiral.







20 degree, 5 degree and 1/2 degree finder charts drawn in AstroPlanner by the editor.

Lowbrow Calendar

Saturday, August 3, 2013--***Open House at Peach Mountain***--Sunset--May be cancelled if cloudy

Friday, August 9, 2013--***Star Party at Brighton Recreation Area***--8:00 PM-12 AM May be cancelled if cloudy.

Map: https://maps.google.com/maps?ll=42.503111,-83.839588&spn=0.033031,0.084543&t=h&z=14

Saturday, August 10, 2013--*Open House at Peach Mountain*--Sunset--May be cancelled if cloudy

Friday, August 16, 2013--***Monthly Club Meeting***--7:30 PM, Rm 130 Dennison--
Dr. David Cinabro, Professor of Physics, Wayne State University: "Doomed, Insignificant and Ignorant: The State of Modern Cosmology"

Thursday, August 22, 2013--*Leslie Science Center*--Sunset--Star gazing for Center campers and their guests

Saturday,August 31, 2013--*Open House at Peach Mountain*--Sunset--May be cancelled if cloudy.

Friday, September 6, 2013--*Port Crescent State Park*--Dark Sky Preserve dedication

Map: https://www.google.com/maps/preview#!q=Port+Crescent+State+Park%2C+Port+Austin%2C+MI&data=!1m4!1m3!1d6167

Saturday,September 7, 2013--*Open House at Peach Mountain*--Sunset--May be cancelled if cloudy.

What's in a Name?

(Well Let Me Tell You)

-Part Two-

by Mark Deprest

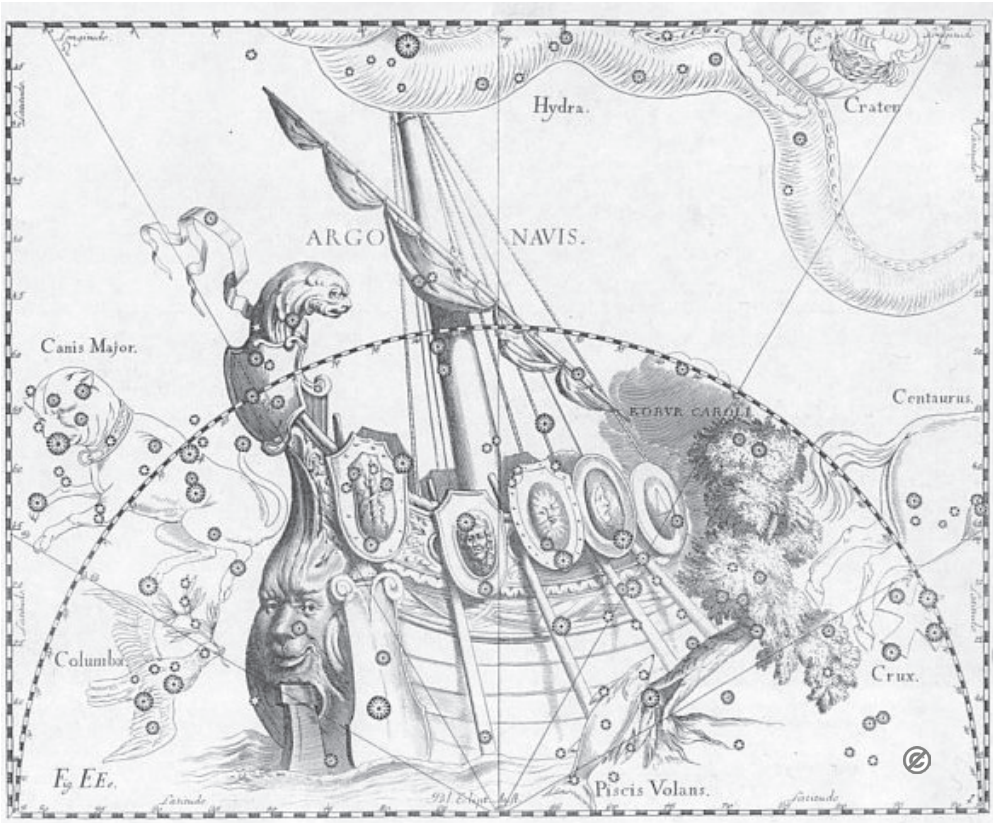
Asteroids and minor planets: In 1801, Italian astronomer *Guiseppi Piazzi* discovered the first of the minor planets subsequently to be named *Ceres*. As further minor planets were found they were named after classical or mythological figures. Soon so many were found that the traditional classical names began to run out! So other names were applied such as distinguished humans or even geographical names. Nearly 3000 minor planets have been named to date.

Meteor Showers: Meteor showers are named after the constellation in which they appear to radiate from and meteorites after the region on *Earth* where they landed.

The Constellations: The oldest astronomical or astrological names are those of the signs of the *zodiac*. The *Sumerians* of the *Middle East* were thought to have given names to the constellations and later the ancient *Greeks* translated these names to a circle of animals. The *Greek* names were then translated by the *Romans* in the *Latin* forms familiar to us today. Later still, around the Middle Ages, each sign of the zodiac or its constellation name was assigned a particular symbol. It was the Greeks however that popularized constellation names to the peoples of other lands, if only through *Ptolemy's* listing of 48 of them. Apart from the 12 of the *zodiac*, he recognized 21 in the Northern Hemisphere and fifteen in the southern. All of those listed by *Ptolemy* still exist with the exception of *Argo Navis*, which has now been subdivided into four smaller constellations.

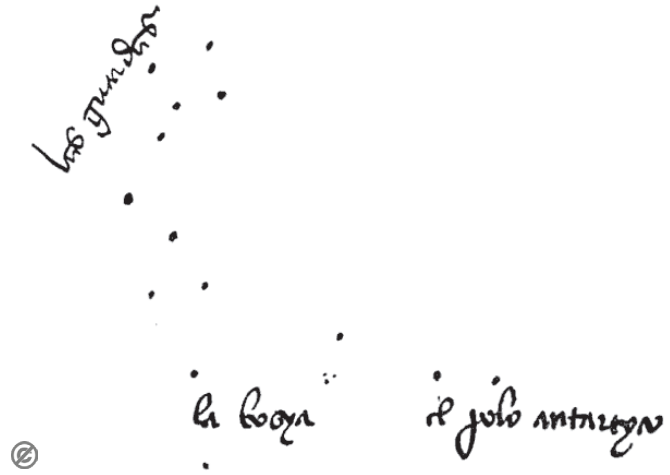
With trade and travel coming to the southern latitudes in the 16th century, came *Magellan* and many sky objects and constellations were named around this time including the *Southern Cross*, which has been known since 1520.

It was the German astronomer *Johann Bayer* who set the first trend giving exotic 'Southern seas' names to nearly a dozen constellations *Hevelius* was the next constellation namer of any magnitude and continued the 'animal naming' tradition but only in the northern hemisphere. One of the most prolific constellation namers was *Nicolas Lois de Lacaille*. He introduced his own names for southern constellations in the mid-eighteenth century and they were nearly all of scientific instruments, and in particular those used in astronomy. When it comes to the names of the constellations, astronomers will almost always use the *Latin name*, and not talk of the *Great Bear*, but say *Ursa Major*. This will even apply to the *Southern Cross*, which is *Crux Australis*.



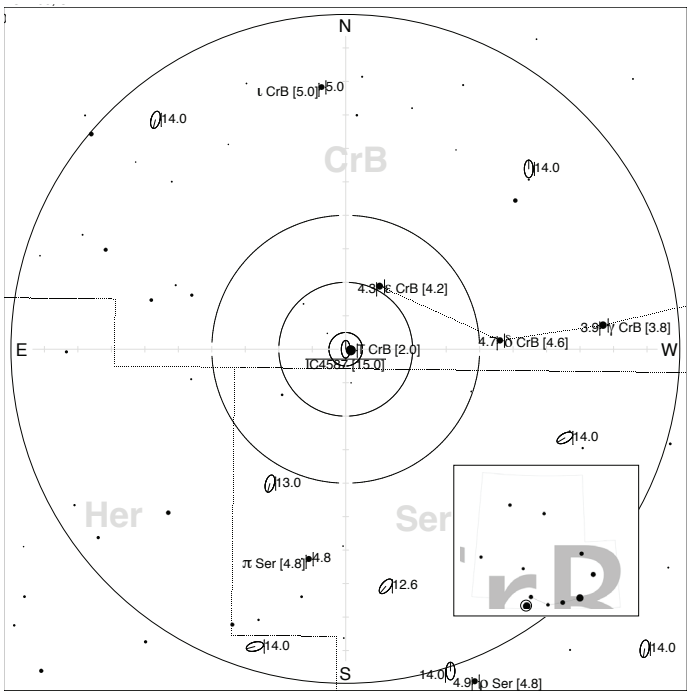
From "Uranographia", 1687, by Johannes Hevelius. Better known in his day for brewing ***Jopin Beer****. Image: Wikimedia Commons*

Just six constellations, named after mythological characters, have names that are the same in both *Latin* and *English*: *Andromeda, Cassiopeia, Cepheus, Hercules, Orion* and *Perseus*. In 1930 the International Astronomical Union finally adopted a list of 88 official constellations and the boundaries were also delineated.



The Southern Cross: *Mestre Joao Faras, Astronomer and Physician to Manual I of Portugal included this sketch in a May 1, 1500 letter to the king while on the Voyage of Discovery to Brazil with Pedro Alvares Cabral.* *Inage: Wickimedia Commons*

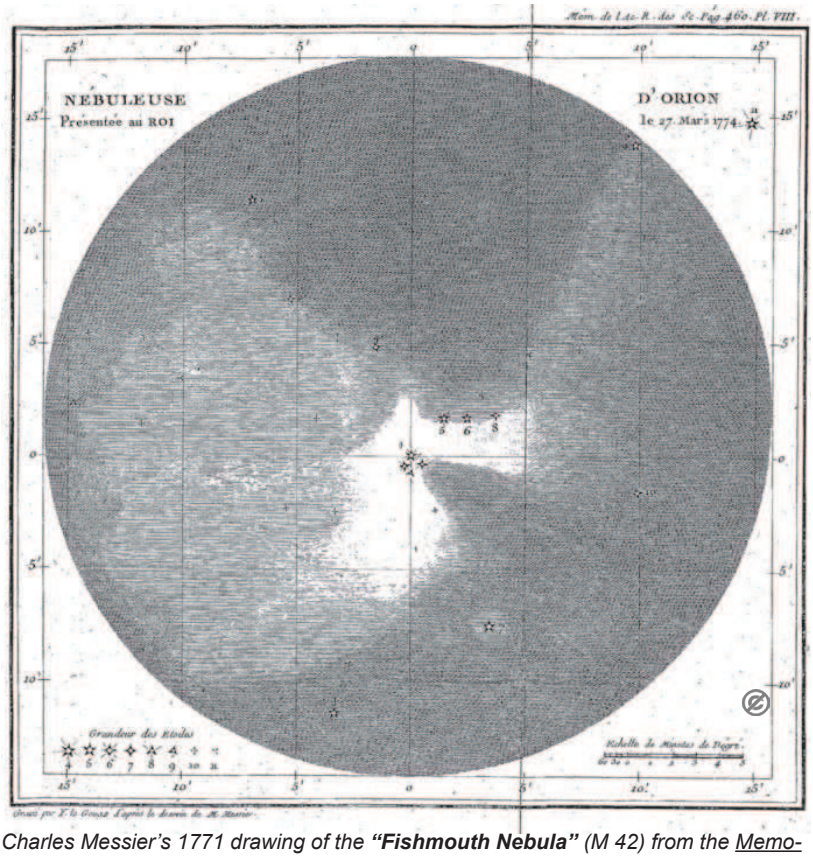
The Stars: The peoples of the *Middle East*, in the earliest days, also named individual stars, and many of these are still popularly known today in their *Arabic* form. Some of the stars have *Greek* or *Latin* names. A good example here is the star *Proxima Centauri*, which is a mixture of *Latin* and *Greek*, meaning 'nearest one of *Centaurus*'. *Greek* names often relate to characters and incidents in classical mythology. Some stars such as *Beta Centauri* have several original names *Hadar* or *Agena*, making a total of three different names. It can be seen that astronomical names can be complex affairs, involving at least three ancient languages (*Arabic, Greek* and *Latin*)! It should not be assumed that the *Arabic* star names were the originals as the *Arabians* themselves translated many names that had arisen in the Middle East before them. Today astronomers use the ancient names of stars infrequently, preferring instead the binomial designation consisting of *Greek* letter plus the Latin name of the appropriate constellation in the genitive, such as *Alpha Centauri* rather than *Rigil Kentaurus*. It is also a general principal that the brightest star is the one named *alpha*, the second brightest *beta* and so on. But there are several prominent exceptions to this rule. For instance, in *Orion* and *Gemini*, it is the Beta star that is the brightest, and as a result of the subdivision of the ancient large constellation of *Argo Navis* into smaller constellations, neither *Vela* nor *Puppis* have *alpha* or *beta* stars at all. Moreover, a few constellations have gaps in the run of *Greek* letters, notably *Carina*, which has no *gamma* or *delta*, and also omits other letters. Some stars have different designations, with for example a *Roman* letter, not a *Greek* one. Such stars will not normally have an ancient name, but may have a *modern* English name, which is really more a descriptive nickname. An example is the *Blaze Star*, in the constellation of *Corona Borealis*. Its official designation is *T Coronae Borealis*. Such letters often apply to variable stars, and originated when the German astronomer *Friedrich Argelander* assigned the *Roman* letters R to Z to conspicuous and unnamed variable stars in each constellation. After Z he then adopted the double form RR through to ZZ. After this one must start again with AA and so on ending with QZ. This allows for 334 variables in each constellation, and if there are any more than that, one simply has the letter V (for variable) and counts from 334, thus having V.335 and so forth. Not all variables are designated this way. This system of *Roman* letters should not be confused with another usage of *Roman* letters for classifying stars according to their heat. The Roman letter system to develop this naming aspect was the one introduced in 1890 by the American astronomer *Edward C. Pickering*, director of the *Harvard College Observatory*, hence the system's original name (Harvard System). The current version of this heat classification system requires a mnemonic to memorize the sequence. The one normally used by astronomers is: *Wow! Oh Be A Fine Girl/Guy Kiss Me Right Now, Sweetie/Smack*. This produces the sequence WOBAFGKMRNS. Stars in the W category (rarest) have surface temperatures up to 80,000°C whilst S stars are around 2,600°C. The system is now known as the *Yerkes System*. Apart from these names and designations, some stars have popular or folk names such as the *Dog Star* and the *Pole Star*. Other names may be commemorative such as *Barnard's Star*. The spelling of stellar names and the rendering of their foreign language names, especially in *Arabic*, can be a tricky matter and there may be notable variations between various source books. It is recommended to use the most consistent version of any particular name. Another way to identify stars is by numbers. In each constellation the stars are numbered in order of *right ascension*. These stars are usually referred to as *Flamsteed numbers*.



IC4587 () Mag: 15.00 PosAngle: 0° [Galaxy]
eF, eS, T CBr sp

5 degree finder chart for the ***Blaze Star*** ***Drawn in AstroPlanner***

The Galaxies: Galactic nomenclature starts with our home galaxy the *Milky Way*, which is an English translation of the *Latin 'Via Lactea'* which is in turn a translation of the *Greek 'Kyklos Galaktikos'* meaning milky circle based on the *Greek* word for milk *'gala'*. Other terms that apply to galaxies usually refer to the constellation through which the galaxy is seen, the galaxy type, and to the peculiar characteristic of individual galaxies such as *'The Whirlpool Galaxy'*. Most galaxies are covered by the New General Catalogue or by the Messier list. Some galaxies such as Malin1 are commemorative.



Charles Messier's 1771 drawing of the ***"Fishmouth Nebula"*** *(M 42) from the Memories de l'Academie Royal.* *Image: Wickimedia Commons*

Nebulae and clusters: Names of star groups or clusters, ranging from the *Milky Way* downwards, can be either *English* or *Latin*-based, in the latter case taking their name from the constellation with which they are associated, such as the Orion Nebula. Astronomers often use the English names given to various nebulae, galaxies and other *asterisms* (as star groups are sometimes called). So the *Beehive Cluster, Eskimo Nebula* and the *Fish Mouth Nebula* are just as acceptable as the most intricate star designation. However nebulae are also designated in two other ways, in one or other of two catalogues. The *Andromeda Nebula* (galaxy) is also known as M31 or NGC 224. The first of these means that it was assigned the serial number 31 in the catalogue compiled in the eighteenth century by *Charles Messier*, and his designations are still in use for those nebulae that can be seen with small telescopes. The second has letters standing for *New General Catalogue*. This was a more professional compilation of nebulae drawn up in 1888 by the Danish born astronomer *John Dreyer* and has been revised twice but is still very much in use, and in the *Southern Hemisphere* is essential, because *Messier* did not include any nebula south of declination –35°. *Messier's* original catalogue ended at 103, but there are a few higher numbers added by later astronomers. NGC figures are found well into four figures.

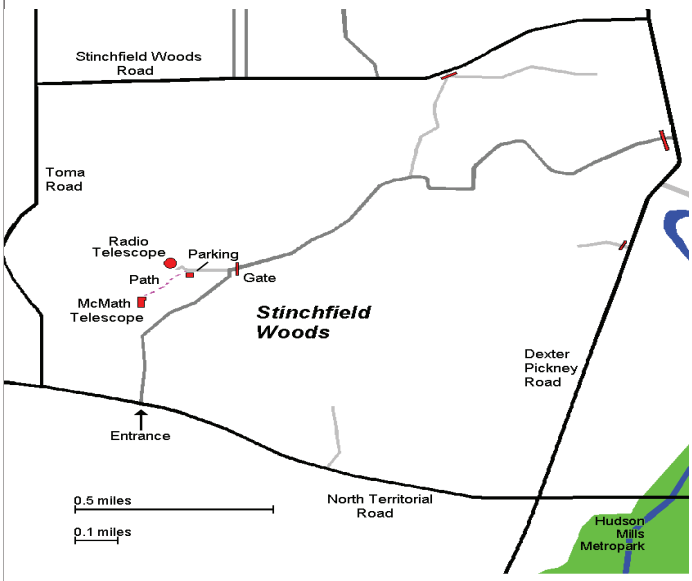
Well, that should make it as clear as mud! Yes, I left one group of objects out, "Comets". That will be in part 3 of this series. For now let's just think about those who have come before to provide us with such bizarre system of astronomical nomenclature.

Galileo's drawing of the Beehive, M44 or Praesepe from Sidereus Nuncius, 1610

Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory will follow the meeting.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope as well as the University's McMath 24" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, $12 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional $12 annual fee to cover printing and postage. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers

P.O. 131446

Ann Arbor, MI 48113

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - $32.95 / year $62.95/2 years

Astronomy - $34.00 / year or $60.00 for 2 years

For more information contact the club Treasurer at:

lowbrowdoug@gmail.com

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.

Call or Email the Newsletter Editor: **Jim Forrester (734) 663-1638 or** jim_forrester@hotmail.com to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

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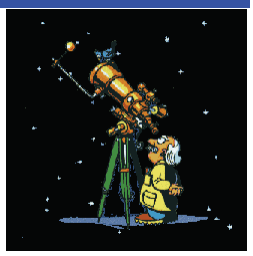
Reflections & Refractions



Website
www.umich.edu/~lowbrows/

Your editor, born in the last millenium with a young astronomer born in this one at the Leslie Science Center, June, 2012. These are terrific events and we have another scheduled for Thursday, August 22. *Photo: Mike Radwick*

A FINAL NOTE: THE ARTICLE BANK IS EMPTY. NO ARTICLES, NO PHOTOS, NO SKETCHES–NOTHING. GET BUSY OR THE SEPTEMBER ISSUE WILL BE VERY THIN.–JIM FORRESTER, EDITOR

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