

The View From Arunah

Arunah Hill Natural Science Center

Spring 2004

The Journal of the Arunah Hill Natural Science Center Inc.

Volume 45



The Moon over the Maine coast

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Front Cover:

Photo by Steve Curtis

Spring has been slow to arrive up here on the coast of Maine. After 4 days of snow, rain, and fog the day dawned clear and bright, the smell of salt air strong and the few remaining ice flows receding out to sea.

By early afternoon the moon rose over the balsam fir to the East and as night settled and the sky darkened Jupiter shone bright on the eastern horizon, the Moon high overhead almost due south, Saturn just a few degrees below the Moon, Mars and Venus close to the western horizon.

Spring 2004 Arunah Hill Regional Calendar:

Edited by Dan Carnevale

April-May-June

Activities at Arunah Hill and the Northeast region clubs. Stick it up on your refrigerator.

A Note from the Treasurer

I don't know if you noticed it, but there is something on the mailing label you should check out. We added the date that your membership expires. So please check it. (4/2004 means that your membership expires at the end of April 2004). If the date on your mailing label indicates that your membership has expired, this will be the last issue of "The View from Arunah" that you will receive unless we hear from you. We value you as a member but if you don't value us we can't continue to bring you the benefits of membership in the Arunah Hill Natural Science Center. So, if this applies to you, act now before you forget, and renew your membership!

Thank you, Peter Scherff,

Arunah Hill Annual Meeting, May 1st 2004

Don't forget to attend the Annual Meeting and Elections on Saturday, May 1st 2003 at Noon. This is always an important and fun meeting to attend. We hope to see you there!



DEEP SKY TREASURES

By John Davis

A short time ago, after a 5A's club meeting in Amherst, a group of us gathered at Amherst College's Wilder Observatory later in the evening for some chilly observing under clear but very cold wintry conditions. After setting up our telescopes on the frigid observatory grounds and taking in some excellent glimpses of Saturn, Jupiter and several deep sky targets, a bright orange-yellow star shining low in the east between some trees caught my attention. Seeing it, we all agreed that the appearance of Arcturus, a sure sign of spring, was a welcome sight for winter weary observers.

By this time, the semi-inverted Big Dipper had reached a point high in the northeast, its curved handle pointing down in the well-known "Arc to Arcturus". It is in the somewhat vacant looking space between the Dipper's handle, Arcturus, and the hind legs of the Bear, Ursa Major that we will glean some of our gems for this spring's observing "fling". The region is literally teeming with galaxies. This space has a name: it is occupied by the rather unspectacular constellation Canes Venatici, representing two hunting dogs depicted on old sky maps as being held on a leash by Boötes the Herdsman. The constellation was the creation of Johannes Hevelius, a 17th Century Polish astronomer who in 1687 carved it out from stars and sky that until that time had been parts of Ursa Major and Boötes. Indeed these dogs, held by the Herdsman, appear on earlier celestial charts dating back into the 16th Century. Hevelius gave them names: the southern dog, Chara, (for "Dear" or "Joy") represented by Alpha and Beta Canum, and Asterion, (for "Starry"), represented by a scattering of fainter stars north of Alpha and Beta..

It is interesting to note that the mag. 2.9 Alpha is named Cor Caroli, which means "Heart of Charles", in honor of King Charles I of England, although considerable confusion has resulted over just which King Charles this star honors. Legend has attributed its naming to Edmund Halley, who wanted to honor his benefactor, King Charles II; this upon the recommendation of the king's royal physician, Sir Charles Scarborough who noted that the star shone with unusual brilliance on May 29, 1660 when King Charles II was restored to the throne of England after years of "interregnum" by Oliver Cromwell. Actually however, it has been established from star charts of the period that the original name was "Cor Caroli Regis Martyris", obviously honoring King Charles I, who in 1649 was beheaded by the revolutionary, Oliver Cromwell and his followers. Indeed, period star charts by Francis Lamb and others show the star with a heart drawn around it.

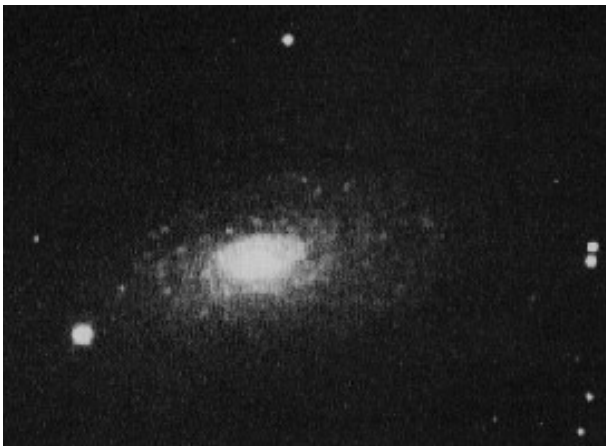
Cor Caroli also happens to be a very attractive double star with its A0 primary component and F0 secondary separated by 19.4 arc seconds. At magnitudes 2.9 and 5.6 they are easily split with any small telescope, even larger binoculars. There is a very subtle color contrast, variously recorded as seen in pale shades of blue or lilac, and yellow or fawn. Racking your scope out of focus could accentuate the hues for you. What tints can you see?

This canine constellation, along with its myriad galaxies also harbors one of the finest globular clusters in the northern sky. Discovered on May 3rd of 1764 by Charles Messier, **M-3 (NGC 5272)** is the third entry in his famous catalog. Glowing at mag. 6.3 it can be seen under pristine conditions with the naked eye (assuming good eyesight) and is located on an imaginary line drawn from Arcturus to the NW just under half way to Cor Caroli. Another way to find M-3 is by looking roughly 10° E from the N tip (Gamma Comae) of the well-known Coma Berenices open cluster to find 4th mag. Beta Comae and its neighbor, 5th mag. 41 Comae just over 1° to its W. This pair points back toward the E and by following that line nearly 7° E you should have M-3 in your finder scope. It is easily recognized as a fuzzy star forming the N base angle of a tiny isosceles triangle pointing toward Arcturus with 6.4 and 7.4 mag. stars lying respectively 28' and 54' apart from M-3 in the little triangle. Once you have spotted it you will be richly rewarded using almost any size telescope. Smaller scopes of 3½ to 4½ inches will begin to resolve the outer edges spanning 10' to 12' around a brightly glowing core. Larger scopes reveal this remarkable aggregation of over a half million stars actually covers up to 18' of sky. You will find an excellent, hard to improve upon description of what you will see in a larger telescope given in Burnham's Celestial Handbook, which we quote: "Large telescopes show an incredible swarm of countless star images, massing to a wonderful central blaze, with glittering streams of stars running out on all sides". This great cluster, which spans about 130 light years of space lies roughly 33 to 35 thousand light years distant from Earth (sources vary). It certainly rivals in splendor M-13 in Hercules, and along with M-13, and M-5 in Serpens is one of the three brightest globulars in the northern sky. Though it's classified as a middle-of-the-road Type 6 on the Shapley-Sawyer scale of globular cluster densities, I find it more tightly packed and more difficult to resolve than M-13 and M-22 in Sagittarius. A good 8" to 10" scope should resolve the halo around the small, very bright core fairly well; larger scopes will expand the resolution across the entire extent of the cluster.

M-3 is extremely rich in variable stars, approaching 200, many of which are of the RR Lyrae (short period) type. Its H-R diagram reveals that its brighter stars (above 19th magnitude) have evolved off the main sequence into the giant and sub-giant region, one of the

factors that indicates this globular, like most others is extremely old, in excess of 10-12 billion years! The keen eyed veteran observer and author, Stephen J. O'Meara in his book, "The Messier Objects" suggests an interesting project for amateur visual observers: to look for mysterious small dark spots in and near the core of M-3, first noticed by Lord Rosse at Birr Castle in Ireland in the 19th Century, and which show up in modern photographs. Are they small pockets of obscuring gas and dust within the cluster? (It's believed that's extremely unlikely in ancient globulars). Or are they merely otherwise invisible objects standing out in the foreground?

About 1/3 the distance between Cor Caroli and η (eta) UMa, Alkaid, the star at the end of the Big Dipper's handle, and slightly E of a line joining those two stars lies **M-63 (NGC-5055) "The Sunflower Galaxy"**. It is positioned conveniently just over 1° N of a little triangle shaped asterism of four stars of 5th and 6th magnitude. This rather unique spiral was discovered in 1779 by Pierre Méchain. Measuring 12.6' x 7.2' in the sky and oriented about 30° from edge-on, it shines fairly brightly at mag.8.6, with an overall surface brightness of mag.13.6. Of Hubble Class Sb, this spiral is unusual in that its bright inner core area and outer halo exhibit a marked and abrupt falling off in brightness from its inner to outer regions. Also its outer spiral arms, though present, especially in photographs appear to be disintegrating into a confusion of mottled patches arranged in arcs tracing a vague spiral pattern. Within the much brighter inner halo the spiral pattern becomes much more defined. The overall appearance, especially at higher powers resembles a flower blossom, hence the popular name: Sunflower Galaxy. M-63 is a fairly large spiral measuring 86,000 LY across at a distance of about 27 million LY from Earth. Contrast this with the 9th mag. star lying just over 4 arc min. to the west of the spiral in our own galaxy, providing a remarkable foreground perspective.



CCD image of the Sunflower Galaxy, M-63

It takes larger apertures to see some of the intricate structural detail in M-63, sometimes upwards of 20

inches. For average reflectors in the 8 to 18 inch range the veteran observer and author, Phil Harrington in his book, "The Deep Sky" says M-63 can handle higher magnifications well, and recommends powers of 150X to 200X for the best views. I would add that this suggestion would apply to a number of other bright galaxies as well, and there are quite a few of them in Canes Venatici! For example, be sure to check out M-51: "The Whirlpool", M-106, M-96, NGC 4449: "The Massachusetts Galaxy", NGC 4244, a fine edge-on, and of course, the edge-on NGC 4631, "The Whale Galaxy", all of which we have discussed in previous columns, not to mention a number of others residing in this constellation.

From M-63 we'll drop down to a spot just barely over the CVn constellation boundary in Coma Berenices to find another very nice mag.10.1 spiral galaxy, **NGC-4414**. With an "easy" surface brightness of mag. 12.8 this Hubble type Sc spiral, elongated to a flattened football shape covers about 4.0' x 2.7' of sky. You can find it first by locating again the 4th mag. star γ Comae at the N end tip of the Coma Berenices Cluster. Slide your finder 2.8° N and very slightly W from there to find a 7.8 mag. star. Just 24' ENE from this star you should spot the 10th mag. glow of the galaxy, which lies exactly 3° N of γ Comae. A magnificent Hubble photograph of this spiral showing a profusion of star clouds in its spiral arms graces the soft cover of the excellent book, "Cosmic Horizons" by Steven Sofer and Neil deGrasse Tyson, published in 2001 by the American Museum of Natural History in NYC.. Not having the HST at our disposal for our observing sessions, we can nonetheless discern some detail in this galaxy with moderate sized 8"-14" scopes, most notably, a very bright core area, which under good "seeing" will sometimes reveal a star-like nucleus. 13" and larger scopes will show a mottled appearance in the soft misty halo and outer core, with bright and dark spots showing up at higher powers of 150X or more. Several stars of 11th to 13th mag. can be seen in the field. NGC-4414 is an average size spiral about 65,000 LY across that lies about 33 million LY away.

We'll now attempt to view what is listed in the Canadian Royal Astro. Society's "Observer's Handbook" as a "challenge object". These are a pair of interacting galaxies called "**The Mice**", **NGC-4676 -A and B**. (or **Arp 242**). Their feeble 13.1 and 13.8 mag. glow reaches us from an incredible distance of over 300 million LY. Even to locate them could be a challenge. They lie (again in Coma B.) Just half a degree S of the CVn boundary at 12 h, 46.2 m - + 30° 44' or exactly 3° due W of the 5th mag. star 37 Comae which in turn lies 4° NNW from 4.3 mag. β Comae. Also, if you are viewing NGC-4631, "The Whale Galaxy" in CVn you can slide exactly 2° to the SSE to pick up "The Mice". These diminutive (2.8' x 0.6' - A and 2.1' x 1.2' -B) systems appear in long exposure photographs showing

“rat tail” streamers and distorted halos caused by violent tidal forces stretching out the long tails, all resulting from a near miss collision in their cosmic dance. They do, in fact resemble two mice in close combat in those photos, one with a straight tail, the other’s very faint tail curled around backwards. An excellent close-up NASA color photo with a description of “The Mice” can be found in Astronomy Mag.,-Kalmbach Publishing’s “Deep Space Mysteries” 2004 Calendar for the month of May. With an aperture of 10" or more you should be able to pick out the pair, and separate the two with high magnification. If you like a challenge, “The Mice” are certainly worth a try!

For our last stop we’ll return to Canes Venatici and navigate $7\frac{1}{2}^{\circ}$ NNW from Cor Caroli or $4\frac{1}{2}^{\circ}$ NNE from Chara, (β CVn) to find a magnificent red star, **Y Canum Venaticorum**. You’ll know it immediately when you spot this 5th mag. orange-red gem in your binoculars or finder! It marks one corner of an almost right triangle with Cor Caroli and Chara, with the latter marking the right angle. Y Canum is classified as among the reddest stars in the sky, and has impressed so many observers over time with its ruby sparkling radiance that as early as the mid-nineteenth century the Italian astronomer, Father Angelo Secchi, a pioneer in spectral classification, named this red gem of a star “**La Superba**”. Originally La Superba was listed as spectral type N3, which included the reddest stars known (that class also included R Leporis, “Hind’s Crimson Star”). Its deep red color is a consequence of the star’s very low surface temperature (about 2500° K) and the presence of substantial Carbon in its atmosphere, which absorbs the blue and violet radiation. Thus we have what is now called a “Carbon Star”. In the more recent spectral classification “C”, Y CVn is listed as a C5 star. It is a semi-regular variable with a 4.8 to 6.0 magnitude range, in a period averaging about 160 days. Thus, Y Canum is a super-giant star like Betelgeuse or Mira, with a tenuous and bloated atmosphere, swollen to an extent that could exceed in size the orbit of Jupiter! So, while exploring the many galaxies in this part of the sky you might take a break to enjoy this often overlooked ruby showpiece just under the Dipper’s handle!

As for seeing detail in galaxies and other deep sky treasures the best of optical equipment can’t help much without a clear and very dark transparent sky. With spring and the promise of some clear nights finally arriving, what better place is there to observe than our 2000 foot location in the western hills of Massachusetts. The dark skies of Arunah Hill await you!

The Editor's Desk

by Steve Pielock

Spring 2004

Donate to Arunah Hill today!

Welcome to the latest edition of "The View From Arunah". Soon we will be restarting some of the on-going projects at the Hill. The current projects are the construction of the Telescope Restoration Building, finishing the siding on the Pavilion and rebuilding the tracks for the Gaertner observatory building. We also have two other projects out on the horizon. These are the large telescope observatory building and the Planetarium/Visitors Center.

As you can see, we have very ambitious plans for the future! These plans will require a great deal of commitment from the New England astronomy community and naturalists. Please come up and help out with some of the physical labor and help us reach these goals. We also need grant writers. If you have any experience writing successful grants, please step forward. Arunah Hill needs your help!

Now it is time for me to sound like National Public Radio! Arunah Hill also needs other donations in the form of monetary contributions. Please remember that your donations to Arunah Hill are tax deductible! Now it is time for me to be bold! Arunah Hill is looking for large donors. Readers may be aware that Arunah Hill recently was given a major planetarium projector and dome from Deerfield Academy. We need to house it in the Visitors Center. In the coming months the Executive Board will be reviewing ideas and start planning for this building. To construct this building complex it will be a jump of several orders of magnitude from anything we have accomplished before at Arunah Hill. If there is someone out there who would like to immortalize his or her name and have it identified with the Visitors Center complex, we would be happy to oblige. Preliminary cost estimates for the Visitors Center are coming in at \$600,000. When this building comes on line, we will have the second largest planetarium in Massachusetts. We will be able to service astronomy education in not only schools in Western Mass. but also Eastern New York state, Northwest Conn. and Southern Vermont. I know these plans sound bold! But look at what we have accomplished at Arunah Hill so far! We have carved out of the woods a place where thousands have visited to enjoy their love of astronomy and nature. If there is anyone out there who can step forward to fund this project, then the sky will be the limit (no pun intended) for Arunah Hill!

In closing, please consider what Arunah Hill has done for you in the past 14 years. Then, please think about what you can do for Arunah Hill! **We need your help. Consider donating your time or money to Arunah Hill today!**

Thank you,
Steve

How to Submit Material to *The View from Arunah*

The View from Arunah welcomes material submitted by guest contributors. The strength of this publication is its writers and photographers, so we are always on the lookout for new contributors. If you have an idea that you think might make a good article, or if you are an astrophotographer who would like others to enjoy your work, then please consider contacting us. Our staff will be happy to provide any assistance that you might need to get your work published in *The View From Arunah*.

To submit articles, photographs, or drawings, please send to them to: Steve Pielock, 132 Sand Gully Rd, So. Deerfield MA 01373. Materials submitted via electronic mail should be sent to "pielock@pielock.com". Comments and criticisms are always welcome. Letters to the Editor or any of the section editors are also welcome.

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