Introduction and Acknowledgements

Every amateur astronomer, regardless of their level of expertise, will eventually find themselves observing many, if not all, of the objects covered in this book. Why would anyone want to observe the Messier Catalog? Well, simply put, they are 110 of some of the best examples of deep sky objects viewable from mid-northern latitudes. Another reason is that these objects are placed all over the northern hemisphere, allowing one to become acquainted with all of the northern constellations.

In the early 1990's I began making Messier observations with the aid of a TelRad® zero-magnification device as my primary finder scope. I found the unit to be very useful, inexpensive and accurate, however, there was a real lack of maps available to use with the TelRad®. Being the resourceful person I am, I went to work making my own with the help of some shareware and the Windows® Paint® program. These maps were crude, but accurate, and I was able to complete my hunt with them satisfactorily.

However, this is the dawn of the new millennium and astronomy-mapping programs have come a long way in their evolution. I decided it was time to make another set of maps using up-to-date resources.

The maps in this book were prepared using two different Software packages: MegaStar© and SkyMap Pro Ver. 5.0®

The information about each object on the map was derived from the Saguaro Astronomical Database, Ver. 6.

The Internet played a big part in gathering information for use in this book. Sites used are:

Students for the Exploration and Development of Space
http://www.seds.org/

Astronomical League
http://www.astroleague.org/

The Internet is also where I gathered a very useful guide to observing the Messier Objects. It is the Twelve Month Tour of the Messier Catalog by A.J. Cecce.

The spreadsheets are compiled from a program called DeepSky99©.

Disclaimer

I am grateful for the permission received to use these materials for educational purposes. Any sales of this book are for educational purposes only and any monies received go to cover the cost of printing and materials. I intend no profit to be made and will make the

materials available on-line soon for free use at:
http://www.geocities.com/CapeCanaveral/6748
As an amateur myself, I am simply trying to help others, especially beginners enjoy the hobby.

How To Use The Maps

Each Messier Object has its own map page. The top map is a 25^{0} view of the sky with a TelRad® marker in the place where one would find the object. This TelRad® marker can easily be adapted for use with any other zero-magnification finder such as the Orion EZ Finder® or the Rigel Quickfinder®.

The legend directly under the top map aids the observer in knowing the type of object marked, the magnitudes of the stars in the top map and the north, south, east and west orientation of both maps.

The top map has a limited stellar magnitude of 6.0, while the lower map has a stellar magnitude limit of 11.0.

The bottom, rounded, white-on-black map is approximately a 9^{0} field of view. This is close to the view you one might see in the less expensive 5x30 finders that come with many introductory scopes. Those with more powerful finders may still find it useful for star-hopping.

Notice that there is also a place for recording your observation of the object on the map. Doing so will not only make you eligible for the Astronomical League's Messier Observing Club Certificate, but will, over time, sharpen and hone your observing skills.

Good Luck and Clear Skies to You!
Bill O'Donnell
Omaha Astronomical Society

A Biography of Charles Messier (June 26, 1730 - April 12, 1817)

Charles Messier was born in Badonvillier, Lorraine, France (20 miles from Luneville), as the 10th of 12 children, and grew up in humble conditions. In 1741, when Charles was 11, his father died, and he had to finish his school education, and the family had even less opportunity for any betterment.

Charles got interested in astronomy when he was 14 years old, and a great 6-tailed comet appeared. This interest was further stimulated by an annular Solar eclipse which was visible from his hometown on July 25, 1748.

In 1751 he went to Paris, where he arrived in October. He was employed by the astronomer of the Navy, *Joseph Nicolas Delisle*, because of his fine hand-writing. His first job was copying a large map of China. Besides this activities, he got introduced into the observatory on Hotel de Cluny by Delisle's secretary, Libour. This man also instructed him to keep careful records of his observations. Delisle himself introduced him into elementary astronomy and convinced him of the usefulness of measuring exact positions of all observations -- without doubt one of the most important preliminaries for the success of his catalog. In 1754, he was regularly employed as a Depot Clerk of the Navy.

Some time in 1757, Charles Messier started looking for comet Halley. His first reported observation of M32, a companion of the Andromeda galaxy, took place in the same year 1757. Comet Halley was expected to return in 1758, which, at that time, was a scientific hypothesis. Delisle himself had calculated an apparent path where he expected comet Halley to appear, and Messier created a fine star chart of this path. Unfortunately, there was a mistake in Delisle's calculations, so that Messier always looked at the wrong positions. However, he observed another comet which he followed from August 15 to November 2, 1758, and discovered a comet-like patch in Taurus on August 28, 1758. Evidently it turned out that this patch was not moving, and was thus indeed not a comet, but a nebula. He measured its position on September 12, 1758, and it later became the first entry, M1, in his famous catalog -- this object later turned out to be one of the most interesting objects in the sky, the remnant of the supernova 1054, now commonly called the Crab nebula.

Comet Halley was finally discovered by the German amateur astronomer Johann Georg Palitzch in the Christmas night (December 25-26) of 1758. Messier independently found it on January 21, 1759, about 4 weeks later, when he finally doubted the correctness of Delisle's path. Delisle however did not believe in this fault, advised him to continue observing, and refused to announce his discovery. Messier as loyal employee stated: "I was a loyal servant of M. Delisle, I lived with him in his house, and I conformed with his

command." When Delisle finally announced the discovery on April 1, 1759, it was not believed by the other French astronomers (perhaps they took it as an April Fool's joke).

Perhaps this disappointment and frustration was even more stimulating to the 28-year old observer, so that he devoted his professional life to comet hunting. This devotion suffered from a further frustration (and perhaps got further emphasized) when Delisle refused to publish a further comet discovery by Messier in early 1760.

Shortly after that incident, Delisle retired, and Messier continued observing from the Hotel Cluny observatory; his appointment as Astronomer of the Navy occurred considerably later, though: Not before 1771! He recorded his second "nebula", M2 (previously discovered by Maraldi), and plotted it on a chart showing Comet Halley's path. He observed the transit of Venus in 1761, and the appearance Saturn's rings. On September 28, 1763, he discovered Comet 1763 (Messier), and the next one, Comet 1764 Messier, on January 3, 1764 (this one was as bright as 3.0 mag when discovered, according to Don Machholz). A first hope to enter the French *Academie Royale des Science* in 1763 did not come true, a considerable disappointment for Charles Messier.

With the discovery of a further "nebula", his third object (globular cluster M3) and his first original discovery, it seems that he undertook a serious scan of the skies for these objects, as they could frequently fool comet discoverers. Besides own scans, leading to 19 original Messier discoveries that year, he used the catalogs of Edmond Halley (6 objects), William Derham (who chiefly had copied Hevelius' *Prodomus Astronomiae*) which was available in a French translation by P. de Maupertius, and Lacaille's Catalog of Southern "Nebulae" of 1755, as well as lists of Maraldi, de Cheseaux, and Le Gentil. He cataloged the objects M3--M40 this year, and looked for several non-existent nebulae from the older catalogs (certainly without success, but this explains why the double star M40 entered his catalog).

At that time, Messier was in vivid correspondence with astronomers and other academicians in Britain, Germany, and Russia. His Russian correspondent, La Harpe, was exile from Swiss and member of the Academy of sciences. On La Harpe's recommendation, Messier was named to the Academy of St. Petersburg in Russia. Moreover, on December 6, 1764, Charles Messier was made a foreign member of the Royal Society in London.

Early in 1765, he found the star cluster M41. On March 8, 1766, he discovered a new comet, and co-discovered one more on April 8 of that year.

In early 1769, Messier must have decided to publish a first version of his catalog, and to enlarge the number of objects, cataloged the well known objects M42--M45 (Orion Nebula, Praesepe, and the Pleiades).

Later that year, Messier took part in a journey in order to test and regulate some new marine chronometers, constructed by J. Le Roy. Therefore, he went on the ship *L'Aurore* for a 4-month voyage in the Baltic, together with his colleague Alexander-Guy Pingre

(1711-96); Messier did the astronomical observations and Pingre the necessary calculations; during his absence, Lalande continued the observing program at Cluny.

On August 8, 1769, Messier discovered a new comet (1769 Messier, the Great Comet of that year). He sent a description and a map of this comet's discovery to the King of Prussia, who was so impressed that under his influence, Messier was made a member of the Berlin Academy of Sciences.

Finally, in 1770, he was elected into the Paris *Academie Royale des Science*. He also discovered Comet Lexell that year; this comet was however not named for its discoverer, Charles Messier, but for the calculator of its orbit, Anders Lexell, a Finnish astronomer and mathematician working at St. Petersburg Observatory.

On January 10, 1771, Messier independently co-discovered the Great Comet of that year. Three nights after the presentation of the first version of his catalog, he measured four more nebulous objects, M46--M49. For two of them, however, M47 and M48, he didn't proceed with the usual care, and did mistakes in the reduction of positional data, so that they were missed until their 20th century identification. M49 was moreover the first Virgo Cluster galaxy discovered. Later this year, on June 7, Messier discovered M62, but only measured an approximate position, so he included this "Very Fine Nebula" not before 1779. In the same year of 1771, Charles Messier was finally officially made the "Astronomer of the Navy", and granted a regular salary of 1700 francs annually (this was raised again in 1774 to 2000 francs).

"Nebula" observation was apparently reduced by Charles Messier in the years following: He only added one cluster, M50, to his list in 1772. In 1773, he discovered the second bright companion of the Andromeda "Nebula", M110, but due to unknown reason did not catalog it. He found two more objects (M51 and M52) in 1774. He discovered one more comet on October 13, 1773; this one was found when it was "just visible to the naked eye" (Glyn Jones), or at 4.5 mag (Machholz). In the year 1774, Pierre Mechain was introduced to Messier by Jerome de Lalande, the leading French astronomer at that time; it may well be (according to a conjecture of Owen Gingerich) that he had met Messier before this time.

Until 1777, Messier did not discover another nebula, nor another comet. In February that year, Messier cataloged M53 (this globular had been discovered two years earlier by Johann Elert Bode). He also contributed to the dubious hypothesis of a planet inside Mercury's orbit, when he reported several small bodies crossing the Sun's disk on June 17, 1777. He added that the objects observed might be atmospheric phenomena, but "more probably small meteorites".

In 1778 Messier found two more nebulae, the original discovery M54, and M55 which had been reported by Lacaille, and which Messier had looked for in vain in 1764.

In 1779, Messier co-discovered Comet 1779 Bode on January 19, 13 days after its original sighting by Bode on January 6. Following this comet, he observed nine objects

(M56--M63 in 1779, M64 in 1780). There was a modest discovery "outburst" when the comet passed Virgo and the Virgo cluster of Galaxies, and was observed by Messier, Johann Gottfried Koehler from Dresden, and Barnabus Oriani in Milan. Thus Koehler discovered M59 and M60 on April 11, 1779, but overlooked M58 which was discovered by Messier when he independently also found the other two on April 15. Oriani was the first to identify M61 on May 5, 1779; Messier found it the same day but took it for the comet on May 5, 6, and 11 -- he realized its nature as a nebula finally on May 11. Messier eventually got a good position for M62, which he had discovered in 1771. M63 was the first discovery of Mechain (on June 14, 1779), who had definitely started observing about that time, and like Messier focused on comet searching and observing.

Owen Gingerich reports that Messier, by chance, found M65 and M66, in March 1780; according to Kenneth Glyn Jones, these had been previously discovered by Mechain. Although a comet had passed between these galaxies in 1773, Messier had overlooked them, perhaps because the comet had outshined them. Also, Messier did not find a 3rd galaxy, NGC 3628, of visual magnitude 9.5 (but less surface brightness than the other two), which forms a conspicuous triangular group with them: This gives a hint on the modest power of his telescopes. In April 1780, he observed two further objects, and thus completed his observations for a second version of the catalog containing the objects up to M68, published 1780 in the French almanac, *Connaissance des Temps*, for 1783.

Starting in late August 1780, Messier, together with Mechain, took a vigorous effort to catalog more nebulae. By the end of the year 1780, Messier had collected the entries up to M79, and discovered a new comet (1780 I Messier, on October 27). By April 1781, the list had increased to 100 objects. Hastily, 3 more objects observed by Pierre Mechain (M101--M103) were added without personal validation, to get the catalog ready for its final publication in the *Connaissance des Temps* for 1784 (published 1781). Very shortly after publication, on May 11, 1781, Messier added M104 to his personal copy of the catalog, and probably also positions for the hitherto undetermined objects M102 and M103, as well as those nebulae mentioned at M97 (now M108 and M109). One of Mechain's discoveries of March 1781, M105, had been overlooked and missed the final catalog, and Mechain discovered a further nebulous object, now M106, in July. Mechain also discovered his first two comets in 1781, on June 28 and October 9.

Meanwhile, Friedrich Wilhelm (William) Herschel, who was at that time astronomer (observer and telescope maker) and organist at Bath, England, had discovered planet Uranus on March 13. Messier got the note in April, and immediately started observing it. He wrote to Herschel: ''It does you the more honor as nothing could be more difficult than to recognize it and I cannot conceive how you were able to return several times to this star or comet as it was necessary to observe it several days in succession to perceive that it had motion, since it had none of the usual characters of a comet." He passed his observations to the French president de Saron, who was a good mathematician, and was among the first to calculate that Uranus was a planet and not a comet, since its perihelion was too great (this result was obtained on May 8, 1781). Others, namely Boscovich, Lexell, Lalande and Mechain, obtained the same result, and confirmed that Uranus was orbiting the sun beyond Saturn's orbit.

Later this year, on November 6, Messier's work was unfortunately interrupted by an awful accident, when he fell into the ice cellar about 25 feet deep. He was severely injured, and it took more than a year for him to recover; he was up not until November 9, 1782. In the meantime, in April 1782, Mechain had discovered another "nebula", which finally became the latest discovered Messier object, M107. Moreover, on September 7, 1782, Herschel began his extensive deep-sky survey, stimulated by Messier's catalog. Herschel had received on December 7, 1781, from his friend, Dr. William Watson, which had been sent to them by Alexander Aubert. He cataloged 1000 deep-sky objects until 1786, and a total of over 2500 until 1802 (however, some of them don't exist).

Three days after his recovery on November 9, 1782, Charles Messier observed a Mercury transit on November 12, 1782.

In 1783, Pierre Mechain communicated the last 3 objects discovered by him (now M105-M107) to Bernoulli, editor of the *Astronomisches Jahrbuch*, to include it (together with the Messier catalog) in the 1786 edition. In this letter, he also disclaims the discovery of M102, thereby initiating a still open controversy on the identification of this object (i.e., if it duplicates M101, or may be identified with NGC 5866).

Messier resumed his assiduous observing activities as before, again concentrating on comets. He seems to have used his personal copy of his catalog also for a number of years, but apparently did no further attempts to find new nebulous objects, and not much work to improve the catalog further. This is probably because he knew of Herschel's survey, and as he couldn't compete in instrumentation, he lost interest: Perhaps he was aware that future comet hunters could use Herschel's compilation also.

The Messier catalog was finally corrected by identifying at least 3 of the 4 missing objects, and brought into its current state by adding the late discoveries of Messier and Mechain, M104--M109, plus the uncataloged discovery M110, only in the 20th century.

Messier's comet search led to a further success on January 7, 1785, when he discovered comet 1785 I Messier-Mechain, when it was about 6.5 magnitudes bright; this one was visible for about 5 weeks. Mechain discovered another comet on March 11, 1785, and a further one on January 17, 1786; this was the first apparition of comet Encke, the comet with the shortest known orbital period of only about 3.3 years.

Messier was appointed as associate editor of the *Connaissance des Temps* in 1785, and hold this post for five years until 1790. Mechain also became associate editor one year later, in 1786. Both astronomers continued their successful comet search: Messier discovered a new one on November 26, 1788, while Mechain found a further comet on April 10, 1787, and discovered comet Tuttle when it appeared in 1790, on January 9.

Meanwhile, the French Revolution had begun with the storming of the Bastille on June 14, 1789. 4 years later, this culminated in the "Year of Terror" in France, 1793-1794. That year, the French king Louis XVI was guillotined on January 21, and Messier's friend, ex-president de Saron, on April 20, 1794, shortly after he had calculated the orbit

of Messier's comet discovered on September 27, 1793, and Messier could notify him secretly that he had found the comet on the calculated path. The terrorism ended when finally Robbespierre himself was guillotined on July 27, 1794. During that time, Messier lost his salaries and pension, and had to lean oil for his lamp from Lalande. Mechain was in Spain, employed in surveying the meridian, where he discovered another comet in January 1793, but his family lost their estate during this year. He left to Italy, and returned to Paris in 1795. He entered the *Bureau of Longitudes* and (together with Messier) the new *Academy of Sciences*.

Messier discovered another comet on April 12, 1798. That year, his wife died; according to Glyn Jones, they had always been a devoted couple, and Messier had been proud that she came from a very good family in Lorraine. They had no children. A slightly malicious legend is reported that the death of Messier's wife had prevented the discovery of another comet, and Messier was more desperate because of the lost discovery than of the death of his wife.

After her death, he lived alone for some time; later he was living with a widowed niece, a Madame Bertrand. Mechain discovered two more comets in 1799, which were also observed by Messier.

In 1801, when the first asteroid, Ceres, had just been discovered by Piazzi on January 1, Charles Messier, now at an age of 71 (shown at about this time in this image), took part in an observing project of occultation's of the mag 1 star Spica (alpha Virginis) by the Moon, on March 30 and May 24. Charles Messier did his last score in comet discovery on July 12, 1801, when he independently co-discovered Comet 1801 Pons; this brought the number of his comet discoveries to 19, 13 being original and 6 independent co-discoveries. At that time, he apparently felt the need to comment on his intention for compiling his catalog. In the *Connaissance des Temps* for 1801 he lined out:

> ``What caused me to undertake the catalog was the nebula I discovered above the southern horn of Taurus on September 12, 1758, whilst observing the comet of that year. This nebula had such a resemblance to a comet in its form and brightness that I endeavored to find others, so that astronomers would no more confuse these same nebulae with comets just beginning to appear. I observed further with suitable refractors for the discovery of comets, and this is the purpose I had in mind in compiling the catalog.
>
> After me, the celebrated Herschel published a catalog of 2000 which he has observed. This unveiling the heavens, made with instruments of great aperture, does not help in the perusal of the sky for faint comets. Thus my object is different from his, and I need only nebulae visible in a telescope of two feet [focal length]. Since the publication of my catalog, I have

> observed still others: I will publish them in the future in the order of right ascension for the purpose of making them more easy to recognize and for those searching for comets to have less uncertainty."

As it came out, Messier never carried out this plan.

Pierre Mechain lately became director of the Paris Observatory, a post he had for several years. But as he had been worrying about some latitude determinations in his longitude survey, he finally got Napoleon's permission to extend this survey to the Balearic Islands. He left Paris in 1803. After completing parts of this work, he caught yellow fever and died in Castillion de Plaza, Spain, on September 20, 1804.

In his older days, Charles Messier finally came to a certain portion of honor when Napoleon himself, in 1806, presented him the Cross of the Legion of Honor. In turn, the old man Messier ruined much of his scientific reputation by an elaborated memoir, devoting the great comet of 1769 to Napoleon, who had been born that year; thus he became probably the last serious scientist who claimed that comets announce events on earth, or as Admiral Smyth put it: 'The last comet put astrologically before the public by an orthodox astronomer'.

In the time following, Messier did less and less observing, although he didn't completely cease. His observatory grew into worse and worse state, with no funds to repair.

In 1815, Messier suffered a strike which left him partially paralyzed. After partial recovery, he attended one or two more academy meetings, but his everyday life became more and more difficult. In the night of April 11-12, 1817, Charles Messier passed away in his 87th year, in his home in Paris.

Charles Messier has been honored lately by the astronomical community by naming a Moon Crater (or even two) after him, situated on Mare Foecunditatis.

Already during his lifetime, in 1775, French astronomer colleague Jerome de Lalande had proposed to name a constellation after him, *Custos Messium*, formed of bordering stars of Cepheus, Cassiopeia and Camelopardalis. However, this constellation was very short-lived and is now long extinct.

History of the Messier Catalog

Charles Messier published his original list of 103 object entries in the *Connaissance des Temps for 1784* in 1781. Messier personally added the entry for M104 to his personal copy of the catalog from his observations, obviously intending a further revision at that time, about one month after the list was published.

Messier's friend and colleague, Pierre Mechain, also continued his search for nebulous objects, evidently with the intention to communicate his observations to Messier for

inclusion in a new revision of the Messier Catalog. When this revision did not occur, he communicated his observations of M104, M105, M106 and M107 in a letter of May 6, 1783, to Bernoulli for publication in the 1786 *Berliner Astronomisches Jahrbuch*.

These facts demonstrate that the original author and the main contributor themselves intended to extend the catalog beyond its original 103 entries; presumably this may mark the beginning of the attempts to enlarge the catalog.

Camille Flammarion more or less officially added M104 to the catalog in 1921.

David Nash has found the earliest *popular* discussion of the objects M105 to M109 is the article by Owen Gingerich in the September, 1953 *Sky and Telescope*, in which he mentions the six "Mechain objects" (M104 to M109). Gingerich cites an article by Helen Sawyer Hogg in the RASC Journal, 41, p 265, (1947) as a reference for the *Jahrbuch* report.

Considering the efforts of Messier and Mechain of 1781 to 1783 as the beginning of attempts to extend the catalog, 1921 to 1953 may be regarded as the beginning of general acceptance thereof.

Early references containing extended versions of Messier's catalog include an early list of 109 Messier objects published in "Olcott's Field Book of the Skies", 4th ed., revised by R. Newton Mayall and Margaret W. Mayall. This came out in 1954 and lists 109 Messier objects, though M104 - M109 are noted as "not in Messier's List" and added by Helen Sawyer Hogg (M104 - 107) or Owen Gingerich (M108 and M109).

Within the next 15 years the additions became pretty widely accepted; David Levy, in his "The Sky: A User's Guide", mentions only the modern 110-object catalog and claims to have observed them all between 1962 and 1967. In 1967, Patrick Moore's "Amateur Astronomy" gives the "original" to 104 but has M105-M109 listed as an addendum. Similarly Neale E. Howard's "The Telescope Handbook and Star Atlas", also published in 1967, lists the original 103 but refers to M104 through M109 in a section devoted to observing the Messiers.

By the late 1970s this convention (modern Messier list of 109 or 110) was close to universal, showing up in just about every available guide, including the Royal Astronomical Society of Canada's Observer's Handbooks and the Webb Society Deep Sky Observer's Handbook (1981 edition). Nowadays, the modern list of 110 objects is widely accepted as the standard Messier Catalog.

This page is widely based on information provided by David Nash, whose help is gratefully acknowledged.

Rules and regulations for the Astronomical League's Messier Observing Club

The Astronomical League offers special recognition in the form of a Messier Club Certificate for those that have observed most or all of the Messier objects. To qualify you must either be a Member-at-Large or be a member of an astronomical society which is affiliated with the League. To obtain an award you must observe the following rules:

Rule 1:

Observe 70 Messier objects and keep a record of your observations. Your notes must show:
a. Date of observation;
b. Time of observation;
c. Seeing conditions;
d. Aperture size of telescope;
e. Power used;
f. A short note describing your observation of the object.

Rule 2:

Have your notebook or records examined by an officer of your Society or a suitably qualified second party if you are not a member of a society and have this party forward a letter to the effect that you have made the necessary number of observations. This letter should be addressed to:

Kathy Machin
4845 N. Smalley Ave.
Kansas City, MO 64119
(816) 452-2086

Only non-society members need to actually mail their observing log to Ms. Machin. A Certificate of Membership in the Messier Club will be forwarded to your Society for presentation at a meeting. The letter should specify the address to which the Certificate should be mailed. The certificate will be suitable for framing.

Rule 3:

When you have observed the balance of the Messier Objects, have your notebook or records examined again and a letter forwarded to Ms. Machin again, indicating that you have completed the observations of the Messier Catalog. Be sure to include your present Membership Certificate. The Certificate will be endorsed for **Honorary** membership by the current President of the League. Be sure to indicate the return address.

Note:

Since the purpose of the Messier Club is to familiarize the observer with the nature and location of the objects in the sky, the use of an automated telescope, which finds the objects without effort on the part of the observer, is not acceptable. Also "Messier marathon" sessions where all the objects are found in one occasion is to be discouraged if the beginning observer depends on other experienced observers to find the object to be observed.

This book is designed to help you complete the Messier Observing program according to the rules and regulations set forth by the Astronomical League.

Twelve Month Tour of the Messier Catalog by A.J. Cecce

January Objects

This month on the tour we will be attempting several of the most difficult objects in the Catalog, a small faint planetary nebula, and a pair of face on spiral galaxies. Also featured this month is a small, but fairly bright galaxy and three open clusters. You will need binoculars and a telescope to fully enjoy the January tour.

M33

This is a very large (about the size of the full moon) face on spiral galaxy in the constellation Triangulum. The total light from M33 is about magnitude 5.3, but when spread out over its large area it yields a very low surface brightness. The best and easiest views of M33 can be found with a pair of binoculars. Look for a large, round hazy patch of light with little detail at first glance. M33 can be glimpsed with the naked eye in dark clear skies. Finding M33 in a telescope can be a challenge because of its size. Use the widest field eyepiece you have and look for a change in light level to identify the galaxy.

M103

This is a fairly small, sparse open cluster in Cassiopeia. Look for a tight group of stars in binoculars, being careful not to mistake it for several other clusters in the same area. Through a telescope the cluster is very sparse, four bright stars amidst the slight glow of much fainter companions.

M52

This rich open cluster in Cassiopeia is fairly easy to see in binoculars as a faint smudge of light. A small to mid telescope will begin to resolve this cluster. Look for a triangular patch of light with some stars clearly resolved, but most of the cluster members provide only a hint of graininess.

M76

Known as the little dumbbell, this planetary nebula in Perseus is one of the dimmest objects in the Catalog. Look for a small, faint, oblong patch of light. Not a very obvious object, if you don't see it at first try varying magnifications in an attempt to bring it out. Fortunately M76 is located near a bright star, which aids in locating the correct field to search.

M34

This is a large and bright, but sparse open cluster located in Perseus. Visible as a faint patch of light to the naked eye, it is very obvious and easy to resolve in binoculars. In fact, binoculars provide a better view of this cluster than most telescopes.

M74

This galaxy in Pisces is a smaller and fainter version of M33, a face on spiral galaxy with low surface brightness. M74 is arguably the most difficult object to find in the Catalog. You will need very dark, clear skies to easily see it, anything less than perfect conditions will make M74 nearly impossible to find. Look for a very faint fuzzy star, which is the bright central condensation, surrounded by a

very faint glow. Try all of your tricks on this one; star hop to the correct field, try varying magnification, tap the scope to detect the galaxy through its motion. If all of the above fail, try again another night or seek darker skies.

M77

This is a small faint galaxy in Cetus. It is possible to see it in binoculars, but very difficult, look for a faint fuzzy star. Through a telescope look for a fuzzy, oval shaped patch of light, bright in the center, fading towards the edges.

February Messier Objects

This month highlights 10 messier objects, most are within reach of binoculars, and over half can be seen with the naked eye.

M1

The Crab nebula is a supernova remnant in Taurus. It is a hazy patch in small telescopes, large scopes can resolve some detail. It is difficult but possible to see in binoculars.

M45

The Pleiades are a large open cluster in Taurus. Easy to resolve six stars naked eye. Binoculars provide the best view. Large telescopes can show some nebulosity.

M35, M37, M36, M38

A series of open clusters in the winter Milky Way. M35 is in Gemini, the others are in Auriga. All can be seen naked eye as faint fuzzy stars, binoculars reveal fuzzy patches, low power telescopes can resolve these rich clusters.

M42, M43

M42 is the great Orion Nebula. It can be seen as small fuzzy patch naked eye. Binoculars show some detail, and the view is superb in most any scope. M43 is a small region of nebulosity next to M42, and probably requires the use of a telescope to view. Use low to moderate powers for the best view of this pair.

M78

A small emission nebula in Orion, a tough binocular object. Best viewed in a telescope at moderate powers.

M79

One of the smallest and dimmest globular clusters in the catalog. A tough binocular object in Lepus, best viewed in a telescope at moderate powers.

March Messier Objects

This month we will look for 10 objects, 8 open clusters in the southern milky way and a pair of galaxies, all are within reach of binoculars. The open clusters are easy binocular targets and most are visible with the naked eye. M81 and M82 are difficult binocular targets that offer a stunning telescopic view.

M41

This cluster in Canis Major is visible as a hazy patch to the naked eye just below Sirius. M41 is resolvable in binoculars and appears fairly loose in telescopes at low power.

M93

This is a small fuzzy patch of light in Puppis, partially resolvable in binoculars. The hardest part of finding this cluster in binoculars is picking it out of a fairly rich region of the milky way. Use low power to examine this cluster and the surrounding richness in a telescope. Medium power provides a nice view of the cluster itself.

M47

A bright cluster in Puppis, easily visible as a hazy patch to the naked eye. Binoculars will show a large hazy patch with many stars resolvable. Telescopes show a fairly loose cluster with stars of wide variety of magnitudes.

M46

This cluster is right next to M47 and is also visible to the naked eye. In binoculars M46 appears as a large hazy patch with no stars resolvable, giving a nice contrast to M47. In telescopes at low powers this cluster evenly fills the eyepiece. While you are here go to medium or high power and look for the planetary nebula NGC2438. It will appear as a faint uneven ring, with a blue/green color.

M50

An open cluster in Monoceros, this is a small hazy patch in binoculars, partially resolvable. Like M93, the richness of the surrounding field is the only difficulty in finding this object. This is a fairly tight cluster at low power in a telescope.

M48

Moving on to Hydra, we find another naked eye cluster. M48 is a large fuzzy patch in binoculars, partially resolvable. Use low to medium power in your telescope for a spectacular view.

M67

In the southeast portion of Cancer is another open cluster, barely visible as a fuzzy patch to the naked eye. Binoculars show M67 as a large hazy patch of light, similar to M46. Use low power to resolve this large, rich cluster in a telescope.

M44

Known as the Praesepe or Beehive Cluster, this open cluster is easily visible to the naked eye as a large, fuzzy patch bigger than the moon. Binoculars or rich field telescopes provide the best view of M44.

M81, M82

These pair of galaxies in Ursa Major are very possible to see in binoculars, they look like a pair of fuzzy stars. Both galaxies will fit into the same low power telescope field. M81 will appear as a large oval gray patch of light. M82 is a pencil like streak of light next to and perpendicular to the long axis of M81.

April Messier Objects

Springtime is galaxy time. As the winter Milky Way sets into the west we begin to get overhead, clear views outside of our own galaxy. During April we will begin in earnest our search for elusive galaxies. We will be searching for very distant objects, thus in general they will be small and faint.

There are several things to keep in mind to be successful at hunting distant galaxies. The darker the sky the better. Search out dark sky sites, or wait until the desired target is at maximum altitude or passes through relatively darker portions of moderately light polluted skies. Search with low power, once a possible fuzzy is found switch to higher powers for confirmation and to look for more detail.

Nearly all of the objects this month are possible in binoculars, though most need dark skies, averted vision, and a trained eye to see. We will be hunting eight galaxies and two objects from our galaxy, a double star and a planetary nebula.

M40

This is a pair of faint stars located in Ursa Major. They are a tough find in binoculars, and you will be challenged to split them with binoculars. In telescopes, they appear to be an identical pair of stars and easy to split even at low power.

M108

This galaxy will appear as a thin streak of light in telescopes, there is a definite brightening towards the middle. M108 is a very tough object for the largest binoculars.

M97

This planetary nebula in Ursa Major, also called the Owl nebula, appears as a fairly large, round, hazy patch of light in a telescope. It is in the same field of view as M108 at low to medium powers. Use averted vision to see the faint glow of the Owl nebula through binoculars.

M109

This spiral galaxy in Ursa Major appears as a small, oval patch of light. It can be found in the same field of view as Gamma UMa at low to medium power in a telescope. Use large binoculars under good conditions for a chance of seeing this one.

M106

This galaxy in Canes Venatici appears as an oval patch of light, larger than M109, with a fairly bright core. A tough, but possible binocular target.

M95

This galaxy in Leo appears as a faint round patch of light with a bright nucleus. Large binoculars and good conditions a must.

M96

Look for M96 in the same low power telescope field as M95. Another round patch of light, slightly larger and brighter than M95, it too has a stellar core. Binocular advice for M96 is the same as M95.

M105

This is a small elliptical galaxy in Leo, and can be found in the same low power field as M96. It look like a small fuzzy star. M105 has a close companion galaxy, NGC 3384, which is only slightly smaller and fainter than M105. To prevent confusion, M105 is the closer of the pair to M96. Not possible in binoculars, except maybe with averted "imagination".

M65

A small, but relatively bright galaxy in Leo. It is an elongated oval patch of light with a bright stellar core. A tough, but possible binocular target.

M66

A close companion galaxy to M65, it can be seen in the same low to medium power field as M65. M66 is another oval patch of light, brighter and slightly wider than M65. Another possible binocular target. While you are here be sure to look for the a thin streak of light which is the galaxy NGC 3628. It can be found north of M66 in the same low power telescope field as both M65 and M66.

May Messier Objects

This month we continue our tour of our nearby neighbors outside the Milky May galaxy. Our observing will take in 10 more galaxies. Be ready to look for very faint and small objects. Most are possible to see in binoculars, but you will need a telescope and dark skies to really enjoy the sights. This is the final warm up to prepare us for next month's challenge, navigating the Virgo Cluster of galaxies. When you are done with these objects and give yourself a treat, skip ahead to the summer globular clusters of M3 or M13. While they are not an official part of this month's tour they should never be missed whenever they are available. Besides these bright and spectacular objects are a treat to tired eyes after a night of galaxy hunting. Be careful, these are so bright after the other objects that you might want to wear shades.

M51

The famous Whirlpool galaxy in Canes Venatici is a bright face on spiral with a smaller elliptical companion, NGC 5195. Look for a pair of fuzzy patches of light. The slightly larger and brighter one is M51. Make sure to spend some time here; as there is almost always some spiral structure to be seen, on good nights the detail possible is unbelievable. This is a difficult but very possible object in binoculars appearing as a hazy patch of light.

M63

Another spiral galaxy in Canes Venetici smaller and fainter than M51, but seen more edge on so the galaxy appears as an elongated patch of light with a bright star at one end. Further inspection will show a faint halo around this patch. A difficult object in binoculars.

M94

Just past M63 is another galaxy in Canes Venetici. Look for a bright fuzzy star to find the core of M94, surrounded by a faint haze. A tough binocular object.

M101

I consider this face on spiral galaxy in Ursa Major one of the most difficult Messier objects to find in a telescope. This is a large faint patch of light almost as big as the full moon. There are no real condensations so use low power and look for a brighter part of the sky, more of a change in contrast than an object at first glance, which is the galaxy. Dark skies really help in the search of this one and are a to find M101 in binoculars.

M102

Not an official Messier object in most references, we will look for the galaxy NGC 5866 which is a somewhat standard insertion. Look for a small, faint patch light that looks like a short fuzzy line.

M64

In a telescope this galaxy in Coma Berenices is a fairly bright, slightly oval shaped patch of light. Look for the dark lane which gives this galaxy the common name Black Eye. The galaxy appears as a faint fuzzy patch in binoculars.

M85

This elliptical galaxy lies in Coma Berenices just north of the Virgo Cluster of galaxies. This appears as a bright, but small, patch of light with a bright stellar core.

M49

This is an elliptical galaxy in Virgo just south of the main cluster of galaxies. M49 is round patch of light with bright center gradually fading to a round halo. M49 looks like a faint fuzzy star in binoculars.

M61

This is a face on spiral galaxy just south of M49 in Virgo, but much fainter. Look for a faint, round fuzzy patch of light.

M104

This is the well known Sombrero galaxy in Virgo. It is bright edge on spiral galaxy which looks like a bright, elongated streak. It is very possible to see in binoculars.

June Messier Objects

This month we attack the heart of the Virgo cluster of galaxies. We will be hunting 13 galaxies all within less than 100 square degrees of sky. The brightest of these galaxies, M87, is only 8.6 in total magnitude so this will be a telescope only month. Plan on searching for small faint fuzzies, dark skies are a must.

Successfully navigating the Virgo cluster is the biggest challenge in the Messier Catalogue, and is affectionately known as "Heartbreak Ridge" to marathoners. What makes the Virgo cluster such a challenge is the closeness of the Messier objects to each other, and the large number of other galaxies in this region. It is easy to become lost among the galaxies, and not be able to tell which one you are looking at. Here are several tips that can be of use as you navigate your way through the cluster.

- Get a good chart of the region that shows not only the M objects, but also the brighter NGC galaxies. You should also have pictures of the objects in the region to help in confirmation of a sighting.
- Use low power while searching. When you find an object you can switch to higher powers to see more detail.
- Avoid large aperture scopes. Small telescopes 6"-8" in size make finding the M-objects easier. Large scopes will show many of the other faint galaxies and may help you become disoriented. Same is true for sky darkness. Minimal light pollution will also help to "filter out" the dimmer galaxies from the brighter Messier objects. In my moderately light polluted back yard with an 8" scope I can find the Messier objects easily, but can barely see the other galaxies. Of course to really enjoy and get the most out of any galaxy you want the largest scope and darkest skies you can find.
- Plot your paths through the cluster, including a "home base". Your home base should be an easily recognizable M-object or field in the cluster. This will be the starting point for any excursions you plan, and a place to return to should you become lost. I use M84, M86 as my home base. I can find this pair of galaxies easily by pointing my accurately aligned telrad on the midpoint of a straight line from Denebola (beta Leonis) to Vindemiatrix (epsilon virginis). This matched pair of small fuzzy balls will both be within a low power field of view every time I do this. I've heard of other people using M87 as their home reference because of it's brightness.

  The paths I like to use are

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M84,M86 -> M87 -> M89,M90 -> M91 -> M88
    |----> M87 -> M89 -> M58 -> M59,M60
    |----> M99 -> M98 -> M100
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- As you move from an identified object in search of a new object keep track of how far you have traveled. At low power the most you should have to move between objects is 3 or 4 fields of view. If you go much farther than that go back to your last object or all the way back to home.
- Have patience and keep trying. Getting to know this area of sky is very rewarding. Under dark skies and with a large scope I can easily get seven galaxies into the same field of view. An amazing sight to behold.
- Remember, you are looking for light that left its source about 70 million years ago. Most of these objects at low power are not much more than dim, fuzzy, out of focus looking stars. Allow your eyes to become fully dark adapted and take your time looking at each field. When done with this challenge be sure to swing over to M3 or M13 to let your photon starved retinas feast on a real meal.

M84, M86

A pair of small fuzzy balls with bright, almost stellar cores. Both easily fit into the same low power field of view. M86 is slightly brighter and more oval than round M84.

M87

Another round fuzzy ball with a bright core. Slightly brighter than both M84 and M86.

M89, M90

Both of these galaxies fit into the same low power field of view. M89 is another round fuzzy ball similar to M84, while M90 appears as an oval patch of light larger than M89. M90 has a bright central region.

M91

A faint, slightly irregular oval hazy patch of light.

M88

A small oval shaped fuzzy patch with a bright stellar core. Similar in size and shape to M90. Can fit into the same field of view as M91.

M58

A slightly oval shaped fuzzy patch of light with a bright central region.

M59, M60

M59 and M60 can both easily fit into the same field of view. M59 is a small, hazy oval patch, not all that easy to see. M60 is another fuzzy oval patch of light, larger and brighter than M59.

M99

A bright round fuzzy patch of light.

M98

This galaxy appears as a bright pencil like streak of light.

M100

A round hazy glow of light, bright in the center but gradually fading towards the edge.

July Messier Objects

This will be a light month as we wait for the summer Milky way to rise into better view later this summer. Our quarry will consist of six globular clusters and one very bright galaxy. All of these objects are possible with binoculars, most are down right easy even with small binoculars.

M3

This globular cluster in Canes Venetici is one of the brightest objects in the sky. In binoculars this object is definitely not star like, but more of a bright, small snowball easy to see. Small telescopes will begin to resolve M3 into individual stars. The hardest part of this object is locating it in a portion of sky that contains few bright landmarks.

M53

Another globular cluster in Canes Venatici. While not quite as big or bright as M3 it is still an obvious binocular object. Resolvable in small telescopes, it as easy object to find sharing the same low power telescope field as fifth magnitude Alpha Coma Berenices.

M5

A big, bright globular cluster located in Serpens Caput. M5 is as nice as M3 but lies near a fifth magnitude naked eye star (5 Serpentis) making it an easy object to find.

M68

An eighth magnitude globular cluster in Hydra, M68 is a difficult binocular object for Northern observers. It appears as a faint fuzz spot in binoculars, you may need to use averted vision or large binoculars to find this one. Appearing as a round fuzzy patch in a 8" telescope, you will need a much larger aperture to really resolve it.

M83

A face on spiral in Hydra. M83 is fairly easy in binoculars as a faint, fuzzy patch of light. In a telescope look for a large patch of light with a bright center.

M4

A big bright globular in Scorpius, easily located near Antares. This is an easy binocular object appearing as a round snowball. Partially resolvable in a telescope, the trade mark of this globular is a line of bright stars crossing the center.

M80

This is the smallest and faintest globular cluster this month. Located in Scopius, M80 is a very tough binocular object appearing as a faint star with slight fuzziness around the edges. This is confirmed with a telescope, M80 has a bright central condensation in the middle of faint fuzz. It is one of the Messier objects that even through a medium telescope still looks like a comet.

August Messier Objects

This is the month that we begin to sneak into the summer Milky Way and the heart of our galaxy as we find 12 more object. Some are visible to the naked eye, all are possible in binoculars. There are six globular clusters, four open clusters, and two diffuse nebula. Many of these objects also appear to be in pairs, either in visual appearance or location.

M10, M12

This pair of globular clusters in the middle of Ophiuchus is easily swept up in binoculars looking like small blue snow balls. Through an 8" telescope M12 is well resolved while M10 is slightly more fuzzy looking. Both become very bright towards the center.

M107

A small, fairly faint globular cluster in Ophiuchus, it is a tough binocular object, appearing as a very small faint patch of light possibly requiring averted vision. In

a telescope, M107 is a larger and brighter fuzzy patch of light than what can be seen in binoculars.

M9

Another small, relatively faint globular cluster in Ophiuchus. M9 is very similar to M107, only slightly brighter. Another tough, but possible binocular object.

M19, M62

Another pair of globular clusters in Ophiuchus separated by about four degrees. Fairly easy to find in binoculars, they are smaller than M10 and M12 thus not quite as obvious. These clusters are not resolvable through small scopes, and appear as round fuzzy patches brightening towards the center. M19 is slightly brighter than M62.

M6, M7

This is a pair of large, bright open clusters in Scorpius visible to the naked eye. Binoculars provide the best view of these clusters. Both are completely resolvable in 10x50 binoculars and can be fit into the same field of view. M7 is the larger and brighter of the pair.

M8

This is a bright emission nebula in Sagittarius, easily visible to the naked eye. The common name of M8 is the Lagoon nebula. In binoculars M8 is an oval cloud of light larger than the full moon with several bright stars embedded within it. A telescope makes this nebula larger and brighter but does not really improve the view.

M20

Another diffuse nebula in Sagittarius only 1.4 degrees northwest of M8 and is called the Trifid nebula. This is easily seen in binoculars looking like a cloud of smoke around some bright stars. A view through a telescope appears much the same, although try to pick out the three dust lanes that gives M20 its name. This is a somewhat difficult object to see right away, at first glance it looks like the optics are in need of cleaning and are causing the light from the bright stars to "smear".

M21

This is a small, but bright open cluster in Sagittarius right next to M20. Binoculars show a very small bright patch partially resolvable. Small telescopes easily resolve all of the clusters members. M8, M20, and M21 are all within the same binocular field and lie in a very rich region of the Milky Way. This view is one of the finest to be found.

M23

The last object of the month is a large open cluster in Sagittarius. through binoculars M23 is a large, hazy patch of light almost the size of the full moon. A telescope at low powers easily resolves this cluster among a rich background of other stars.

September Objects

We continue our tour this month with eight more globular clusters, all are possible in binoculars, and two of these are the finest globulars, which can be seen from northern locations.

Sagittarius is the home of many globular clusters, which surround the center of the Milky Way Galaxy. Seven of the these globulars appear in the Messier catalog, we will be visiting five of them this month. When you complete the search for these objects be sure to spend some time scanning this region with binoculars or a telescope and see what other sights you can discover. I guarantee you will not be disappointed.

M13

The great globular cluster in Hercules is bright enough to be seen with naked eye. Binoculars easily show this cluster as a bright fuzzy ball. M13 is partially resolvable in small aperture telescopes and becomes a fantastic swarm of tightly packed individual stars through large scopes.

M92

Another globular cluster in Hercules, M92 is easy to find in binoculars appearing slightly dimmer and smaller than M13. As with M13 it is partially resolvable in small scopes and is a fine sight in large instruments.

M14

A small, bright globular cluster in Ophiuchus. It is a difficult binocular object, look for a small fuzzy patch of light. Through a telescope M14 is an even patch of light, the stars not resolvable except through large scopes.

M22

This is the other great globular in our tour this month. Located just above the teapot asterism in Sagittarius, M22 can be seen with no optical aid. M22 is easy to find in binoculars, and easy to resolve in telescopes, with about the same impressiveness as M13.

M28

Located near M22 in Sagittarius, this is a small bright globular. A tough binocular object, look for a small fuzzy patch. Easily seen in a telescope, but requires large apertures to resolve individual stars.

M69, M70, M54

All of these are small bright globular clusters laying along the bottom of the teapot in Sagittarius. Very similar in appearance to M28, these are all tough binocular objects requiring dark skies and possibly averted vision to see. M54 is slightly brighter and appears more star like through binoculars than the other globulars. These are all easily seen in telescopes, though not easily resolvable.

October Objects

As summer turns to fall we complete our tour of the wonders in Sagittarius. Sixteen Messier objects are found within the constellation of Sagittarius, we will seek the six that remain to be seen on our tour. We will also search for three others just north of Sagittarius in the Milky Way.

Our October tour includes two nebulae and the clusters that power them, four open clusters, a star cloud, and lastly two globular clusters. All of these objects are possible in binoculars, most are easy in even small binoculars. Several of these are also possible naked eye objects.

M24

This "object" is actually a section of the Milky Way in Sagittarius. It is easily seen with the naked eye as a fuzzy, oval patch about four times the size of the full moon. The best views are through binoculars or rich field telescopes.

M25

Just east of M24 in Sagittarius we find this open cluster. Visible to the naked eye, M25 lies in the same binocular field as M24. In binoculars it appears as a partially resolved star cluster buried in faint nebulosity. A view through a telescope shows the nebulosity is in fact many faint stars that are not resolved in small instruments.

M18

This is a small open cluster just north of M24 in Sagittarius. In binoculars M18 is easy to see as a small fuzzy patch of light in the same field of view as M24. Telescopes reveal this cluster for what it is, a small, sparse collection of fairly bright stars.

M17

Just north of M18 and in the same binocular field as M24 and M18 lies the Omega nebula. Possible to see with the naked eye and easy with binoculars, this nebula appears as a small faint patch of fuzz. A telescope will show the unique V shape nebulosity that gives the cluster its name. The shape reminds me of a swan with two bright stars that power the cluster embedded in the head and neck of the swan.

M16

Continuing north of M17 we find another nebula in Serpens. To the naked eye and binoculars, this small patch of haze is very similar in appearance to M17, which is in the same binocular field of view. Through a telescope the M16 looks like a sparse open cluster of stars surrounded by faint wisps of smoke.

M26

Continuing to head north through the Milky Way we find this open cluster in the constellation Scutum. This is a difficult object to find in binoculars, but possible as a faint patch of fuzz. Telescopes partially resolve this cluster and show several stars buried in a faint glow from the unresolved stars.

M11

Just north of M26 in Scutum lies the Wild Duck Cluster. Possible to see with the naked eye, binoculars show a small faint patch surrounding a bright star. Telescopes resolve many of the stars in this very rich cluster.

M55

Dipping back into Sagittarius we find two more globular clusters waiting for us. The first is one of the brightest and largest globulars in the catalogue. Possible to see naked eye, it is an easy binocular object appearing as a bright fuzzy ball of light. Telescopes show a round patch of light bright in the center and fading toward the edges. Large apertures are needed to resolve this globular.

M75

The last object of the month, and the last object to be visited in Sagittarius. In binoculars, M75 is not too hard to see, look for a small fuzzy star. A telescope will show a small fuzz ball with a bright center.

November Objects

This month we will search for seven more objects from the Messier Catalog. These include four globular clusters, the largest and the smallest planetary nebulas in the catalog, and a small oddity. Two of the objects are fairly easy in binoculars, while four others will require dark skies, patience, and keen eyes to find.

M57

This smallest planetary nebula in the Messier Catalog is the famous Ring nebula in the constellation Lyra. Low power telescope views show a very small blue/green disk, not much bigger than a star. Medium to high power will magnify the size of the nebula while leaving the surrounding stars the same size, confirming you have found it. Can be seen in binoculars as a faint star like point of light.

M56

Also in the constellation of Lyra we find our first globular cluster of the night. In a telescope look for a small round ball of light, slightly brighter in the center. This is a difficult binocular object appearing as a small fuzzy patch.

M27

Also known as the Dumbbell nebula, the largest planetary nebula in the Messier Catalog, M27 lies in the constellation Vulpecula. Fairly easy to see in binoculars as a small hazy patch. In small to medium scopes it appears as a rectangular patch of light. In large scopes it may even appear round in shape with a bright rectangular, or dumbbell shaped core.

M71

Lying in Sagitta, this globular cluster appears as a faint oval hazy patch of light in a telescope. This is a very difficult but possible binocular object, requiring dark skies and trained eyes.

M30

This globular cluster in Capricornus is tough but very possible to see in binoculars as a faint fuzzy star. Telescopes show a small fuzzy ball of light, bright in the center fading to the edges.

M72

This is a small faint globular cluster in Aquarius. Look for a faint oval patch of light, gradually brighter towards the middle. A very difficult binocular object.

M73

This asterism is located near M72 in Aquarius. In a low power telescope view it looks like a very small fuzzy patch of light at first glance. When stared at it

reveals itself as a small collection of stars. Medium to high power shows the view best described by Messier "cluster of three or four stars...containing very little nebulosity".

December Objects

This will be a fairly easy month on the tour. We will view two small, but bright globular clusters, two open star clusters, and the grandest galaxy in the sky along with it's two companions. All of these objects are possible to find in binoculars, most are fairly easy.

M2

This is a small, bright globular cluster in Aquarius. To find it in binoculars look for a fuzzy star in a star poor field. A low power telescope field will show a round fuzzy patch, brighter in the center and fading to the edge, in a field with no other bright objects.

M15

This globular cluster in Pegasus is very similar to M2 in size and brightness, except it is surrounded by several bright stars. Fairly easy to find in binoculars but the best view is through a telescope at medium to high power.

M29

This galactic cluster is a small, sparse group of stars in Cygnus. It appears as a small fuzzy patch amongst a rich star field in binoculars. A telescope will easily resolve the members of this cluster. The shape of the cluster reminds me of the Pleiades as viewed through binoculars.

M39

Dark skies will allow this large, bright cluster in Cygnus to be seen with the naked eye as a hazy patch of light. Binoculars easily resolve this cluster into it's bright and widely scattered members, and provide a better view than can be seen with most telescopes.

M31

This is the famous Andromeda Galaxy, our closest galactic neighbor, and the largest, brightest galaxy to be seen in the northern sky. The ability to see M31 with the naked eye provides a good test of the darkness of your skies. M31 is so large that binoculars provide the best view, allowing the entire galaxy to be seen in one field of view. Look for an elongated patch of light, with a bright, round central core.

M32

This is an elliptical companion galaxy to M31. Through a telescope look for a slightly oval ball of fuzz in the same low power field as the core of M31. M32 is very possible to find in binoculars as a star like point of light.

M110

Another elliptical companion galaxy to M31, lying on the opposite side of the core as M32. Through a telescope look for a large, oval patch of light. Although M110 is as bright as M32 it is much larger and thus has a lower surface brightness making it a difficult object in light polluted skies. M110 is a very difficult

binocular object requiring dark transparent skies, and trained eyes to have a chance at finding it.