

# The Astronomer's Messier Journal An Observing Log Book

This journal belongs to: \_\_\_\_\_

It was started on \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

and ends on \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

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Cover photographs:

M42 - The Great Nebula in Orion; M45 - The Pleiades in Taurus; M13 - The Hercules Globular Cluster  
M27 - The Dumbell Nebula in Vulpecula; M31 - The Great Galaxy in Andromeda; Charles Messier

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# Introduction

*The Astronomer's Messier Journal, An Observing Log Book*, is a softcover, spiral-bound book with many attractive features.

The *Journal* consists of 55 log pages containing two of the 110 objects in the Messier Catalog on each page. The Messier objects are listed in order by catalog number. Each page is printed on heavyweight paper to minimize “see through” characteristics and contains defined fields of entry. There is generous space for the observer's notes and additional information on the object. In this edition, we have also included Seeing and Transparency tables to guide you as you make your observations. There is also a section on Astronomical Note Taking to help you make better observations.

Each listing is already filled in with the essential catalog information on each of the 110 Messier objects listed in the Astronomical League's Messier Club, and includes a reference photo of the object and a map showing the object's general position in the constellation in which it is located. This information includes NGC Number, Right Ascension and Declination, Visual Magnitude, the Type of Object, and the Constellation in which it can be found. Reference photos of the Messier objects are from the *Real Sky CD*, issued by the Astronomical Society of the Pacific in 1996. Constellation maps were generated using *SkyMap Pro* Version 5 software by Chris Marriott.

In addition to the log pages, we have provided four additional versions of the Messier list: 1) by Season, 2) by Constellation, 3) by Tirion *Sky Atlas 2000* chart number, and 4) by object type. These lists will make your observing sessions easier to plan.

A good star chart is essential for completing the Messier list, and Wil Tirion's *Sky Atlas 2000*, available from Sky Publishing Corporation, is the most commonly used by amateur astronomers. Refer to the Astronomical League's publication, **OBSERVE—The Messier Objects** for full information on the Messier Observing Club and detailed descriptions of the objects on the list.

This book will provide you with an easy way to log your Messier observations, and will make it easy for you to keep track of your progress as you work your way through the program. In the end, this book will become a valuable reference tool for you, and make it easy for you to submit your observations for certification upon completion of the program.

To receive your Messier Certificate, simply send your observations along with your name, address, phone number, and club affiliation to your club's Awards Coordinator, or to AL Messier Club Coordinator *Scott Kranz*, 106 N Darrowby Drive, Raymore, MO 64083-9181. (816) 331-5796. E-mail: [s.kranz1@comcast.net](mailto:s.kranz1@comcast.net). Upon verification of your observations, your certificate will be forwarded either to you or to your club's Awards Coordinator, whomever you choose.

If you do not belong to a member society of the Astronomical League, you may join the Astronomical League as a Member-at-Large. Contact *Astronomical League National Headquarters*, 9201 Ward Parkway, Suite 100, Kansas City, MO 64114. (816) 333-7759. E-Mail: [aloffice@earthlink.net](mailto:aloffice@earthlink.net).

The *Astronomer's Messier Journal* is a book that any amateur astronomer pursuing Messier Club Certification will benefit from. We all know the virtues of writing down what you see and keeping accurate records. The *Astronomer's Messier Journal* makes it that much easier to successfully complete the Messier Club in an organized and economical way.

Clear skies! Good Observing! Fight light pollution!

# Astronomical

When you first start to observe, the differences that make each object unique may seem to be lost in a sea of similarities: they all seem to be just so many faint smudges. However, as you observe more and more, you will find yourself noticing details that you were not able to see before. This special kind of visual acuity will steadily improve as you continue to observe and your observing skills develop.

Here is a brief outline of what you should try to notice as you observe at the telescope.

## **Date, Time, Location**

First of all, for each observation, fill in the date, time, location, and the telescope you used.

## **Seeing and Transparency**

Note the general observing conditions at your site in terms of transparency and seeing.

A good way to rate the transparency is to estimate the limiting visual magnitude of stars near the zenith, either with the naked eye or with the telescope.

To determine the seeing, estimate the actual diameter of stellar images in arc seconds, using double stars as a gauge. Look for double star pairs that are merged, or others that are resolved, but whose known separation permits an estimate of the size of the images. A list of close, equal double stars to help gauge seeing can be found in a good list of double stars. Find a favorite and then use it each time you observe.

If all of this seems too complicated, use the **Seeing and Transparency Tables** as a guide.

## **Verbal Descriptions**

When taking notes on a deep-sky object, be specific. General observations such as “great,” “beautiful,” or “dull” may be a major part of your impression at the time, but these are least useful in comparing what you see to what others see. These words should not be the major part of your written observation.

## **Relative Difficulty**

Begin by noting the relative difficulty of the object. Objects easily visible at low power may be rated “bright” or “easy,” those visible only at high-optimum powers are “difficult” or “pretty faint.”

## **Size**

At the best high power for your telescope, estimate the size, either a circular diameter, or the lengths of the longest and shortest dimensions. Do this from knowledge of the true angular field of view of the eyepiece you are using, and estimate to what portion of that field of view the object covers or extends. Doing this accurately takes practice. Be careful. It is easy to overestimate the size of objects that are small in comparison to the size of the eyepiece field.

## **Elongation**

If an object is elongated, note the approximate orientation (“elongated NE-SW”), or make an accurate measurement of the position angle (PA).

*Position Angle* is a compass angle measured from north, counterclockwise on the sky. Thus due north is PA 0 degrees; an object elongated exactly northeast to southwest will have a PA of 45

degrees; elongation southeast to northwest is PA 135 degrees. To eliminate redundancy for deep-sky objects all angles are referred to the first half of the circle: no position angles exceed 179 degrees. Positions relative to a deep-sky object and double star orientations can naturally cover the full 360 degrees. Double star position angles are always with reference to the brighter star. If you using an equatorial mount, with practice you will be able to estimate position angles to about 15 degrees of accuracy. With equatorially mounted Cassegrain telescopes, you can do even better, since the orientation of the sky in the eyepiece (if you don't use a star diagonal) is always the same relative to the telescope: marking the cardinal directions on the tailpiece of the telescope could be useful here.

## **Brightness and Density**

Note any zones of brightness in galaxies or nebulae, and the relative concentration of stars in clusters. Apply the following terms consistently to specific observable phenomena in deep-sky objects.

A “stellaring” is any faint star-like manifestation appearing on the surface of a nebulous object. In galaxies, these may be true stars of the Milky Way superposed on it, or a bright star cloud or HII region within the galaxy that appears stellar due to the modest telescopic power in use.

Use the terms “halo,” “core,” and “nucleus” to refer to more-or-less well-defined zones of brightness from the edge to the center of an object.

# Note Taking

The general terms “concentration” or “condensation” refer to any brightening in a nebula, or to the rise in apparent density of stars toward the center of a cluster. How the brightness changes with radius varies from object to object. Brightness profiles can be described as “broad,” “even,” and “sharp” concentrations. Globular clusters, more than any other group, exhibit most clearly the idealized concentration types. Note if the stars in the globular cluster can be resolved.

## Count the Stars

In star clusters, try to count the stars. Do not merely guess at the number. If there are many stars, count only half or a quarter of them and multiply accordingly. In the case of open clusters, restrict star counts to some area that seems to be the natural size of the group, and then note this size. Doing so permits a better comparison between observations made on different dates or with other instruments.

Note the location of nearby stars or other interesting aspects of the field around an object. Estimated magnitudes, directions, and distances of stars are often included, sometimes using cardinal point or PA and angular measure, sometimes only relative to the object, i.e., “a prominent red mag. 9 star at the west edge of the cluster;” or “a mag. 13.5 star just off the NE flank of the halo”.

## Filters

If you use a filter, compare the appearance of the object with and without the filter.

## Sketches

Sketches are a helpful

supplement to verbal notes, though making them can be very time consuming. Sketches are most effective with interesting, detailed objects and when indicating nearby stars or features difficult to describe verbally. Sketches can also serve to show the relationships among several objects in the same field, and provide a means of later identifying unknown objects.

Secure a copy of *The Astronomer's Journal, An Observing Log and Sketch Book* from AstroMax if you wish to sketch the Messier objects.

## Observing Programs

Observing programs offer a structured and fun way to pursue your study of the night sky. At first, you will find yourself learning the constellations and what time of year they are visible in order to locate your targets. As you progress, you will come to enjoy a deeper understanding of the universe and the world we live in.

The American Association of Amateur Astronomers, through its affiliation with the Astronomical League, provides a wide range of observing programs for amateur astronomers, from beginners all the way to advanced observers.

The Astronomical League offers certification for its binocular, planetary and lunar programs. The most famous of these is the Messier program, a tradition of observing the galaxies, clusters and nebulae on the list compiled by French astronomer Charles Messier in 1781. Visit the AAAA web site for more information.

## Astronomical Seeing

1. **Severely disturbed skies:** Even low power\* views are uselessly shaky. Go read a good book.
2. **Poor seeing:** Low power images are pretty steady, but medium powers are not.
3. **Good seeing:** You can use about half the useful magnification of your scope. High powers\* produce fidgety planets.
4. **Excellent seeing:** Medium-powers are crisp and stable. High-powers are good, but a little soft.
5. **Superb seeing:** Extremely Steady. Any power eyepiece produces a good crisp image.

\* The PRACTICAL LOWEST power magnification for any telescope is approximately 7 times for each inch of aperture. Example: 28X for a 4-inch (100mm) diameter telescope

\* The PRACTICAL HIGHEST power magnification for any telescope is approximately 50 times for each inch of aperture. Example: 200X for a 4-inch (100mm) diameter telescope.

## Transparency Scale

0. **Do Not Observe**—Completely cloudy or precipitating.
1. **Very Poor**—Mostly cloudy.
2. **Poor**—Partly cloudy or heavy haze. 1 or 2 Little Dipper stars visible.
3. **Somewhat Clear**—Cirrus or moderate haze. 3 or 4 Little Dipper stars visible.
4. **Partly Clear**—Slight haze. 4 or 5 Little Dipper stars visible.
5. **Clear**—No clouds. Milky Way visible with averted vision. 6 Little Dipper stars visible.
6. **Very Clear**—Milky Way and M31 visible. 7 Little Dipper stars visible.
7. **Extremely Clear**—M33 and/or M81 are visible.

## The Greek Alphabet

Alpha	α
Beta	β
Gamma	γ
Delta	δ
Epsilon	ε
Zeta	ζ
Eta	η
Theta	θ
Iota	ι
Kappa	κ
Lambda	λ
Mu	μ
Nu	ν
Xi	ξ
Omicron	ο
Pi	π
Rho	ρ
Sigma	σ
Tau	τ
Upsilon	υ
Phi	φ
Chi	χ
Psi	ψ
Omega	ω

# The Messier Catalog

In 1781, French astronomer Charles Messier listed 110 of the most beautiful objects available to amateur observers and their telescopes. Messier was a comet hunter, and his purpose was to provide a list of previously discovered objects that were not comets. Instead, the Messier Catalog marked the start of a new era of deep-sky astronomy, and the tradition of observing the galaxies, clusters, and nebulae on Messier's list is still alive today.

The objects that appear in the Messier Catalog can easily be found with the optical equipment available to today's amateur astronomer. Although binoculars or a small telescope cannot show all the detail that appears in the famous observatory photographs, nevertheless, study of the Messier objects with such instruments can be a rewarding and fascinating way to learn about the sky and the beautiful objects it contains.

Beginning astronomers will find that using binoculars is the smartest, easiest and most cost effective way to begin their exploration of the night sky. Experts recommend binoculars as an amateur astronomer's first optical instrument. And experienced amateur astronomers will find that they can enjoy the new perspective that binocular observing provides. A good pair of binoculars is an essential part of any amateur's observing tools and an ideal way to prepare yourself for that first telescope. Any of the observations you make with binoculars can be counted toward Messier Club certification—one of the most efficient ways to find an object with a telescope is to first locate its position in the sky with binoculars.

## Observing is the Heart of Amateur Astronomy

Observing programs offer a structured and fun way to start your study of the night sky. For many years, the Messier Club sponsored by the Astronomical League has been the premier observing project for amateur astronomers. The 110 objects in the Messier Catalog introduced astronomers in the Northern Hemisphere to the most important, beautiful and interesting deep-sky objects available to observers with a telescope. Upon completion of the Messier list, an observer will have learned the sky, become familiar with their equipment and how to use it, and become successful at making and recording observations.

As you begin your search, you will find yourself learning the constellations and what time of the year they are visible in order to locate your targets. As you progress, you will come to enjoy a deeper understanding of the universe and the world we live in. And when you are done, it's fun to be presented with an official certificate and a beautiful lapel pin for your effort.

This project is aimed at visual observers using either telescopes or binoculars. Most of the objects are big and bright, but some are not. Use averted vision to view these dimmer objects. Another trick that is useful when viewing dim objects is to rock the eyepiece field back and forth - the slight movement will make otherwise dim objects "pop out".

Computer controlled telescopes are quite common today, but, in order to qualify for certification from the Astronomical League, all objects in the Messier Club must be found without computer aid. Star hopping is still the best method to complete any observing club. While the task may seem to be made more difficult, in the end, you will find that the work is more challenging and thus more satisfying. One of the reasons for undertaking a project like this is to increase observing skills and learn the sky. Computer controlled telescopes will not take you to this goal.

For those of you who complete the work necessary to earn certification in the Messier Club, you can be assured that you will know the sky and the instrument you are using, and you will also know your own observing skills. And you will have demonstrated the curiosity and knowledge that are so important to successfully study the vast and beautiful universe we live in.

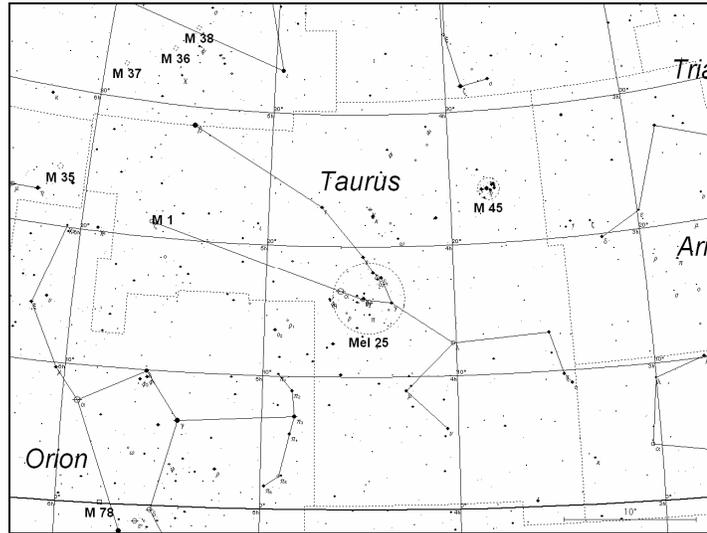
So go ahead, get a star chart and a comfortable lawn chair, take your telescope or binoculars out under a beautiful night sky, and get to work on the most famous and rewarding of all the observing programs sponsored by the Astronomical League: The Messier Club.

# M1



## Super Nova Remnant in Taurus / *Crab Nebula*

Catalog Number:	<b>NGC 1952</b>
Right Ascension (R.A.)	<b>5:34.5</b>
Declination (Dec.)	<b>+22:01</b>
Magnitude:	<b>8.0</b>
Size:	<b>6'x4'</b>



Date: \_\_\_\_\_

Time: \_\_\_\_\_

Location: \_\_\_\_\_

Seeing (1-5): \_\_\_\_\_

Transparency (1-7): \_\_\_\_\_

Telescope: \_\_\_\_\_

Eyepiece(s): \_\_\_\_\_

Filter(s): \_\_\_\_\_

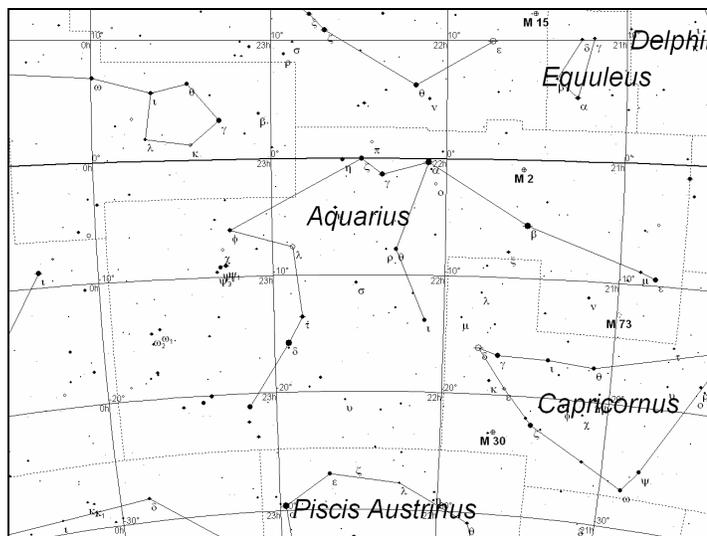
Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# M2



## Globular Cluster in Aquarius

Catalog Number:	<b>NGC 7089</b>
Right Ascension (R.A.)	<b>21:33.5</b>
Declination (Dec.)	<b>-00:49</b>
Magnitude:	<b>6.3</b>
Size:	<b>16'</b>



Date: \_\_\_\_\_

Time: \_\_\_\_\_

Location: \_\_\_\_\_

Seeing (1-5): \_\_\_\_\_

Transparency (1-7): \_\_\_\_\_

Telescope: \_\_\_\_\_

Eyepiece(s): \_\_\_\_\_

Filter(s): \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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## Messier by Season

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X	Group	M	NGC	Con	R.A.	Dec.	Mag	Type	Remarks
<b>I. The Winter Group</b>									
—	I	M1	1952	Tau	5:34.5	+22:01	8.0	Super Nova Remnant	Crab Nebula
—	I	M31	224	And	0:42.7	+41:16	3.4	Spiral Galaxy	Andromeda Galaxy
—	I	M32	221	And	0:42.7	+40:52	8.2	Dwarf Elliptical Galaxy	satellite to M31
—	I	M33	598	Tri	1:33.9	+30:39	5.7	Spiral Galaxy	
—	I	M34	1039	Per	2:42.0	+42:47	5.2	Open Cluster	
—	I	M35	2168	Gem	6:08.9	+24:20	5.1	Open Cluster	with NGC 2158
—	I	M36	1960	Aur	5:36.1	+34:08	6.0	Open Cluster	
—	I	M37	2099	Aur	5:52.4	+32:33	5.6	Open Cluster	
—	I	M38	1922	Aur	5:28.7	+35:50	6.4	Open Cluster	
—	I	M41	2287	CMa	6:47.0	-20:44	4.5	Open Cluster	
—	I	M42	1976	Ori	5:35.4	-05:27	3.7	Open Cluster and Emission Nebula	Orion Nebula
—	I	M43	1982	Ori	5:35.6	-05:16	6.8	Emission Nebula	"tail" of M42
—	I	M45	-	Tau	3:47.0	+24:07	1.5	Open Cluster	Pleiades
—	I	M46	2437	Pup	7:41.8	-14:49	6.1	Open Cluster	
—	I	M47	2422	Pup	7:36.6	-14:30	5.7	Open Cluster	
—	I	M50	2323	Mon	7:03.2	-08:20	5.9	Open Cluster	
—	I	M52	7654	Cas	23:24.2	+61:35	6.9	Open Cluster	Bubble Nebula
—	I	M76	650	Per	1:42.4	+51:34	10.1	Planetary Nebula	Little Dumbell
—	I	M78	2068	Ori	5:46.7	+00:03	8.0	Diffuse Nebula	
—	I	M79	1904	Lep	5:24.5	-24:33	7.7	Globular Cluster	
—	I	M93	2447	Pup	7:44.6	-23:52	6.2	Open Cluster	
—	I	M103	581	Cas	1:33.2	+60:42	7.4	Open Cluster	
—	I	M110	205	And	0:40.4	+41:41	8.0	Elliptical Galaxy	satellite to M31
<b>II. The Early Spring Group</b>									
—	II	M3	5272	CVn	13:42.2	+28:23	5.9	Globular Cluster	
—	II	M40	Win4	UMa	12:22.4	+58:05	9.0/9	Double Star	
—	II	M44	2632	Cnc	8:40.1	+19:59	3.1	Open Cluster	Beehive Cluster
—	II	M48	2548	Hya	8:13.8	-05:48	5.8	Open Cluster	
—	II	M51	5194	CVn	13:29.9	+47:12	8.4	Spiral Galaxy	Whirlpool Galaxy
—	II	M63	5055	CVn	13:15.8	+42:02	8.6	Spiral Galaxy	Sunflower Galaxy
—	II	M65	3623	Leo	11:18.9	+13:05	8.8	Spiral Galaxy	
—	II	M66	3627	Leo	11:20.2	+12:59	9.0	Spiral Galaxy	
—	II	M67	2682	Cnc	8:50.4	+11:49	6.0	Open Cluster	
—	II	M81	3031	UMa	9:55.6	+69:04	6.9	Spiral Galaxy	
—	II	M82	3034	UMa	9:55.8	+69:41	8.4	Irregular Galaxy	
—	II	M94	4736	CVn	12:50.9	+41:07	8.2	Spiral Galaxy	
—	II	M95	3351	Leo	10:44.0	+11:42	9.7	Barred Spiral Galaxy	
—	II	M96	3368	Leo	10:46.8	+11:49	9.2	Spiral Galaxy	
—	II	M97	3587	UMa	11:14.8	+55:01	9.9	Planetary Nebula	Owl Nebula
—	II	M101	5457	UMa	14:03.2	+54:21	7.9	Spiral Galaxy	
—	II	M105	3379	Leo	10:47.8	+12:35	9.3	Elliptical Galaxy	
—	II	M106	4258	CVn	12:19.0	+47:18	8.3	Spiral Galaxy	
—	II	M108	3556	UMa	11:11.5	+55:40	10.0	Spiral Galaxy	
—	II	M109	3992	Uma	11:57.6	+53:23	9.8	Barred Spiral Galaxy	
<b>III. The Late Spring Group</b>									
—	III	M49	4472	Vir	12:29.8	+08:00	8.4	Elliptical Galaxy	
—	III	M53	5024	Com	13:12.9	+18:10	7.7	Globular Cluster	
—	III	M58	4579	Vir	12:37.7	+11:49	9.6	Barred Spiral Galaxy	
—	III	M59	4621	Vir	12:42.0	+11:39	9.6	Elliptical Galaxy	
—	III	M60	4649	Vir	12:43.7	+11:33	8.8	Elliptical Galaxy	
—	III	M61	4303	Vir	12:21.9	+04:28	9.6	Spiral Galaxy	
—	III	M64	4826	Com	12:56.7	+21:41	8.5	Spiral Galaxy	Black Eye Galaxy
—	III	M68	4590	Hya	12:39.5	-26:45	7.6	Globular Cluster	
—	III	M84	4374	Vir	12:25.1	+12:53	9.1	Elliptical Galaxy	
—	III	M85	4382	Com	12:25.4	+18:11	9.1	Lenticular Galaxy	
—	III	M86	4406	Vir	12:26.2	+12:57	8.9	Elliptical Galaxy	
—	III	M87	4486	Vir	12:30.8	+12:24	8.6	Elliptical Galaxy	