Getting to Know the Sky

Part 2

Equipment Recommendations:

Eyes, Binoculars, and Telescopes

The Human Eye – Best for Constellations

- The eye needs 30 minutes of darkness to “dark adapt”
  - White lights (phone screens, flashlights or headlights) will ruin your night vision
    - Just a second or two will ruin it for you
  - You will see more stars when dark adapted
  - Dim red colored flashlights are OK
- Travel away from city lights to find a dark site
- Have a printed sky map of the constellations handy
  - Not an app on the phone
- Lay on your back for maximum viewing angle
- Try to identify some of the constellations on your sky map
- Bring a Friend

Sky Map: Heavens-above for your time and location

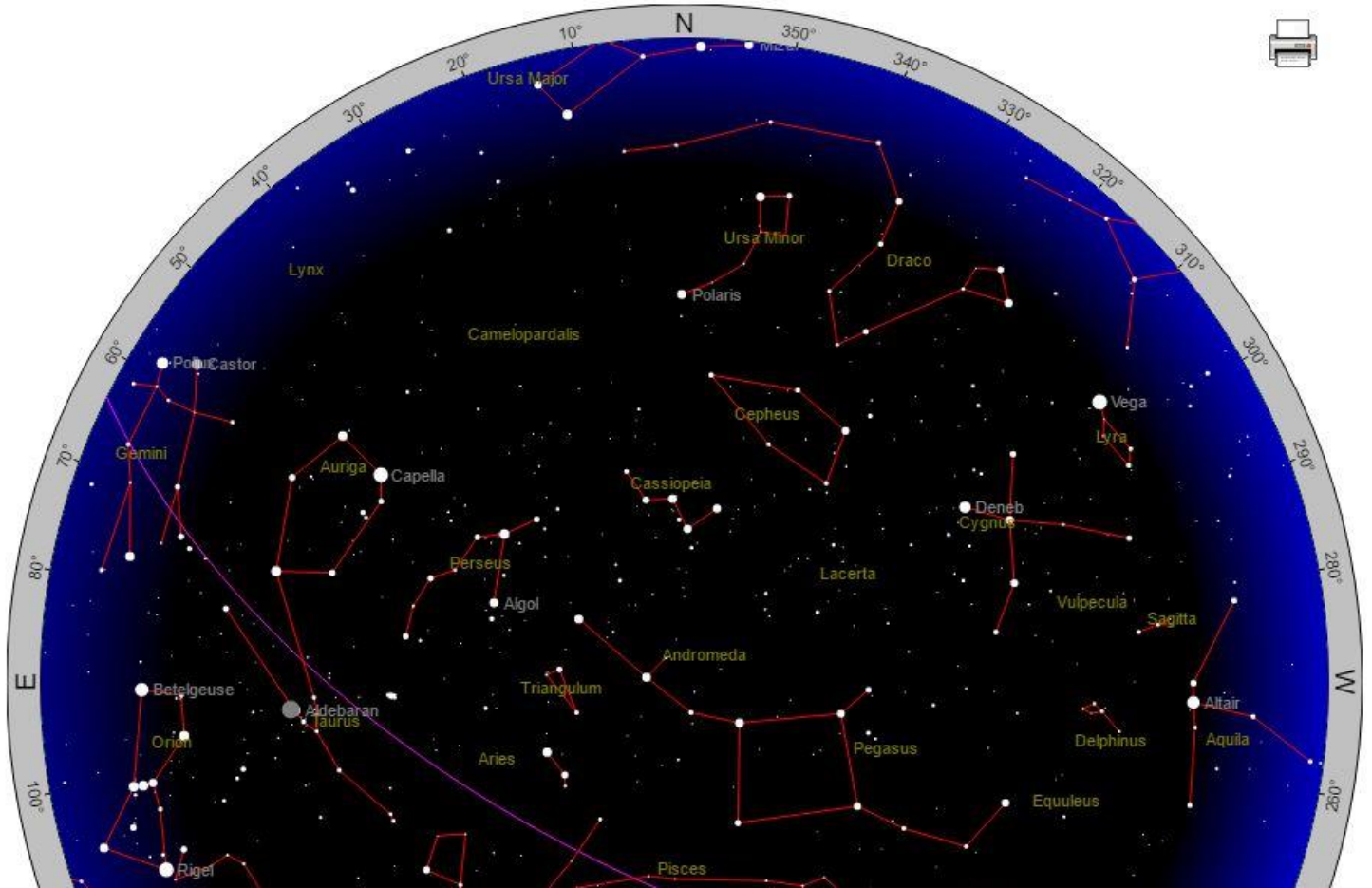
HEAVENS ABOVE

User: anonymous Login
Location: Unspecified
(35.1738°N, 111.7969°W)
Time: 23:18:58
(UTC-07:00)
Language: English

Interactive sky chart (now with PDF print option)

Home

Year 2016 Month October Day 18 - + Hour 23 - + Minute 18 - + Update Reset to now



http://www.heavens-above.com/skychart2.aspx?lat=35.1738&lng=-111.7969&loc=Unspecified&alt=2280&tz=Arizona

The Best First Purchase: Binoculars

- Standard 10x50 binoculars - $50
  - The 10 means the magnifying power, and
  - 50 is the diameter of the primary lens (mm)
- For astronomy, too much magnification is bad
  - The field of view gets too small if the magnification is too high
- A larger primary lens will allow you to see fainter objects
  - A larger primary lens diameter will cost more money and add weight
  - Example: Orion 15x70 binoculars ($90)
- Upgrades:
  - Tripod (~$50)
  - Image Stabilized Binoculars (Canon 10x30 IS - $300 used, $450 new)

Telescopes

- Main Factors to consider
  - Desirable features
    - Resolution – see more detail
    - Sensitivity – see faint objects
    - Portability – will it fit in your car? Can you lift it by yourself?
  - Undesirable features
    - Cost, Weight, Size
- Why not get the best sensitivity and resolution?
  - Unfortunately, improving the desirable Features means you get more of the undesirable features
  - It is always a tradeoff
- Two practical types to consider:
  - Newtonian Reflector – normally in a Dobson style mount
    - best performance for the money
  - Schmidt-Casegrain
    - More expensive but more compact
    - Alt-Az mount which is good for long exposure photography

Telescopes (*cont*)

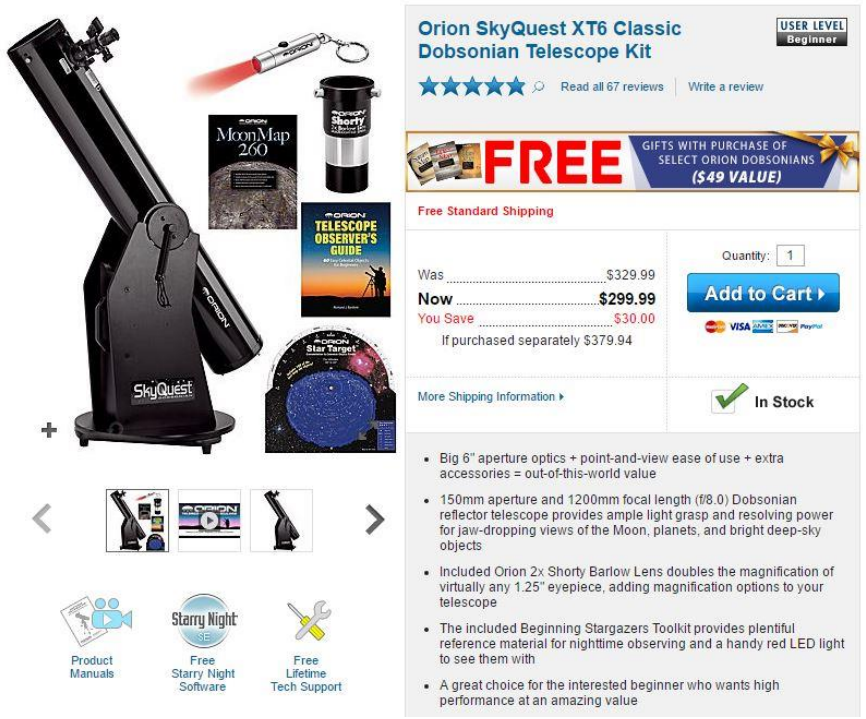
Do not get a telescope that looks like these:

They are very inexpensive, but very frustrating to use

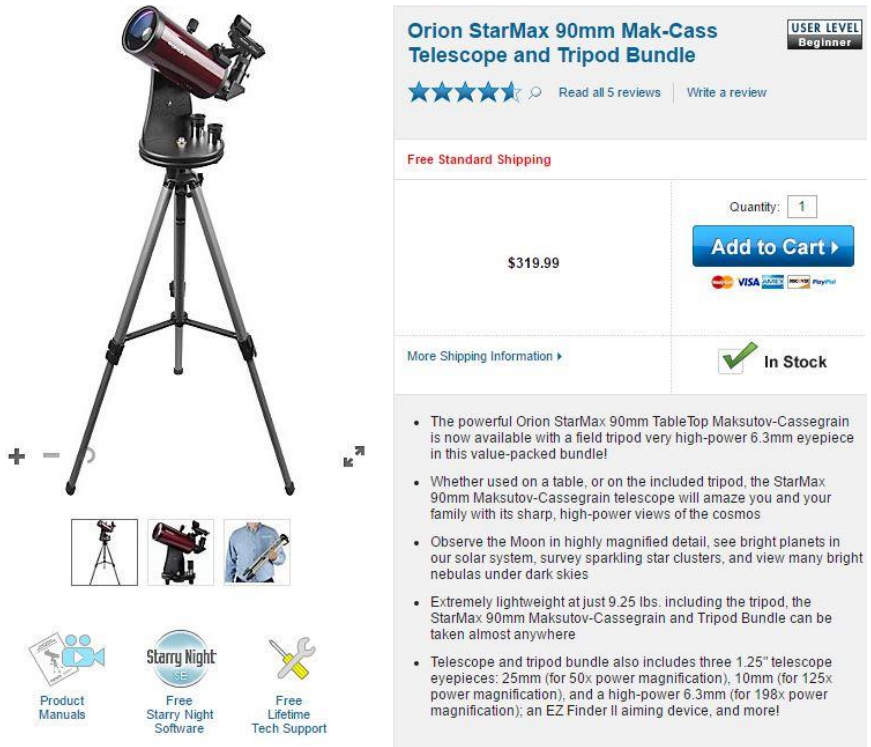
The mounts and equipment should be very solid and not wobbly

Telescopes (*cont*)

These styles are preferred



Newtonian Reflector (6” mirror)
With a Dobsonian Mount
No eyepieces included
Not motor driven



Cassegrain Style (3.5” mirror)
Alt-Az Mount
3 eyepieces included
Not motor driven

Telescopes (*cont*)

- Dobsonian Mount
  - Advantages
    - Cheaper – 6” mirror vs 3.5” mirror on the Cassegrain
    - Mount is sturdier
    - Usually simpler to aim the telescope
  - Disadvantages
    - Telescope does not track objects as the earth rotates
      - Long exposures will smear the object
    - Isn’t as compact as the Cassegrain telescopes
- Cassegrain Style and Alt-Az mounts
  - Advantages
    - If motorized and set up properly, will track earth rotation and keep object in view
      - This enables long exposure photography
    - Scope is small and can be put in a carrying case
  - Disadvantages
    - Less performance for the money (note smaller mirror size)
    - Setup generally takes longer

Telescopes (*cont*)

- Common Features
  - 1 x finder scopes are included – essential for pointing
    - 1 x means no magnification – extremely helpful when aiming
    - A red dot or a set of circles tells you where the scope is pointing
      - Makes it easy to find a bright star or two as reference points when aiming
    - 10x finder scopes make it very hard to find objects
      - Only use in addition to a 1 x finder scope
- Magnification can be changed by inserting different eyepieces
  - Low focal length eyepieces will give you a zoomed in view (5 to 9 mm)
  - High focal length eyepieces will give you a wider view (20 to 40 mm)
  - Best practice is to find the object with a high focal length eyepiece
    - Once you have the object in view, then change eyepieces to zoom in
  - Magnification = telescope focal length / eyepiece focal length

Visit Your Local Astronomy Club before Buying

- Most cities have local Astronomy Clubs that host star parties once a month
- Attend a meeting to chat about pros and cons
  - Amatuers usually love to talk about their choice of telescope
- Find out where they meet for their star party
  - Attend a star party and try out the different types of scopes
    - Everyone loves to share views of objects in their telescopes
    - Ask them how much the scope cost
    - Ask what they like and dislike about their scope
- After seeing the different types of telescopes, you will be more confident that you will be happy with your purchase

Clear Skies and Happy Viewing

Supplemental Material

Northern Visible Constellations

Red = hard to spot

Bold = part of Zodiac

Bold = part of Zodiac but faint

Blue = ex-Zodiac member

Northern Constellations

No.	Latin Name	English Name	Abb.	Can Identify
1	Andromeda		And	
2	**Aquarius**	Water Carrier	Aqr	
3	Aquila	Eagle	Aql	
4	**Aries**	Ram	Ari	
5	Auriga	Charioteer	Aur	
6	Bootes	Herdsman	Boo	
7	Camelopardalis	Giraffe	Cam	
8	**Cancer**	Crab	Cnc	
9	Canes Venatici	Hunting Dogs	CVn	
10	Canis Major	Big Dog	Cma	
11	Canis Minor	Little Dog	Cmi	
12	**Capricornus**	Goat	Cap	
13	Cassiopeia		Cas	
14	Cepheus		Cep	
15	Cetus	Whale	Cet	
16	Coma Berenices	Berenice's Hair	Com	
17	Corona Borealis	Northern Crown	CrB	
18	Corvus	Crow	Crv	
19	Crater	Cup	Crt	
20	Cygnus	Swan	Cyg	
21	Delphinus	Dolphin	Del	
22	Draco	Dragon	Dra	
23	Equuleus	Little Horse	Equ	
24	Eridanus		Eri	
25	**Gemini**	Twins	Gem	
26	Hercules		Her	

No.	Latin Name	English Name	Abb.	Can Identify
27	Hydra		Hya	
28	Lacerta	Lizzard	Lac	
29	**Leo**	Lion	Leo	
30	Leo Minor	Little Lion	Lmi	
31	Lepus	Hare	Lep	
32	**Libra**	Scales	Lip	
33	Lynx		Lyn	
34	Lyra	Lyre	Lyr	
35	Monoceros	Unicorn	Mon	
36	***Ophiuchus***	Serpent Holder	Oph	
37	Orion		Ori	
38	Pegasus		Peg	
39	Perseus		Per	
40	**Pisces**	Fishes	Psc	
41	Sagitta	Arrow	Sge	
42	**Sagittarius**	Archer	Sgr	
43	**Scorpius**	Scorpion	Sco	
44	Scutum	Shield	Sct	
45	Serpens	Serpent's Head	Ser	
46	Sextans	Sextant	Sex	
47	**Taurus**	Bull	Tau	
48	Triangulum	Triangle	Tri	
49	Ursa Major	Great Bear	Uma	
50	Ursa Minor	Little Bear	Umi	
51	**Virgo**	Virgin	Vir	
52	Vulpecula	Little Fox	Vul	

Mid-latitude Constellations

Low Constellations as viewed from the North

No.	Latin Name	English Name	Abb.	Can Identify
1	Antlia	Pump	Ant	
2	Caelum	Chisel	Cae	
3	Centaurus	Centaur	Cen	
4	Columba	Dove	Col	
5	Corona Australis	Southern Crown	CrA	
6	Fornax	Furnace	For	
7	Grus	Crane	Gru	
8	Horologium	Clock	Hor	
9	Lupus	Wolf	Lup	

No.	Latin Name	English Name	Abb.	Can Identify
10	Microscopium	Microscope	Mic	
11	Norma	Square	Nor	
12	Phoenix		Phe	
13	Piscis Austrinus	Southern Fish	PsA	
14	Puppis	Ship's Stern	Pup	
15	Pyxis	Ship's Compass	Pyx	
16	Sculptor		Scl	
17	Telescopium	Telescope	Tel	
18	Vela	Ship's Sail	Vel	

Southern Constellations

Southern Constellations

No.	Latin Name	English Name	Abb.	Can Identify
1	Apus	Bird of Paradise	Aps	
2	Ara	Altar	Ara	
3	Carina	Ship's Keel	Car	
4	Chamaeleon	Chameleon	Cha	
5	Circinus	Dividers	Cir	
6	Crux	Southern Cross	Cru	
7	Dorado	Swordfish	Dor	
8	Hydrus		Hyi	
9	Indus	Indian	Ind	

No.	Latin Name	English Name	Abb.	Can Identify
10	Mensa	Table Mountain	Men	
11	Musca	Fly	Mus	
12	Octans	Octant	Oct	
13	Pavo	Peacock	Pav	
14	Pictor	Easel	Pic	
15	Reticulum	Net	Ret	
16	Triangulum Australe	Southern Triangle	TrA	
17	Tucana	Toucan	Tuc	
18	Volans	Flying Fish	Vol	

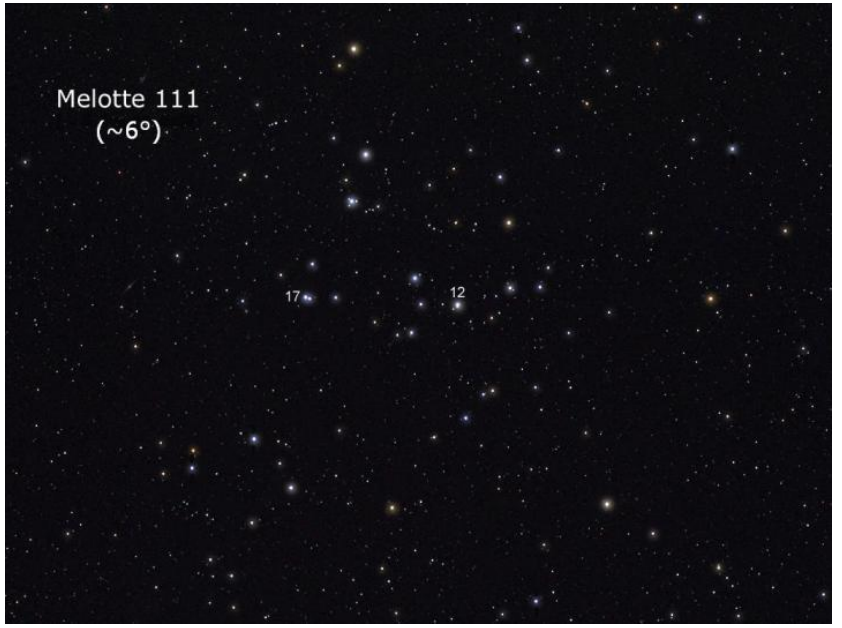
Best with Binoculars

Large Open Clusters	(Name)	Mag	Size (arcmin)
M45	Pleiades	1.2	110
Melotte 111	Coma Bernieces Cluster	1.8	275
M7	Ptolemy Cluster	3.3	80
M44	Beehive	3.1	95
ngc869, ngc884	Double Cluster	5.3	25 x 105

M45

M44

Melotte 111



M7

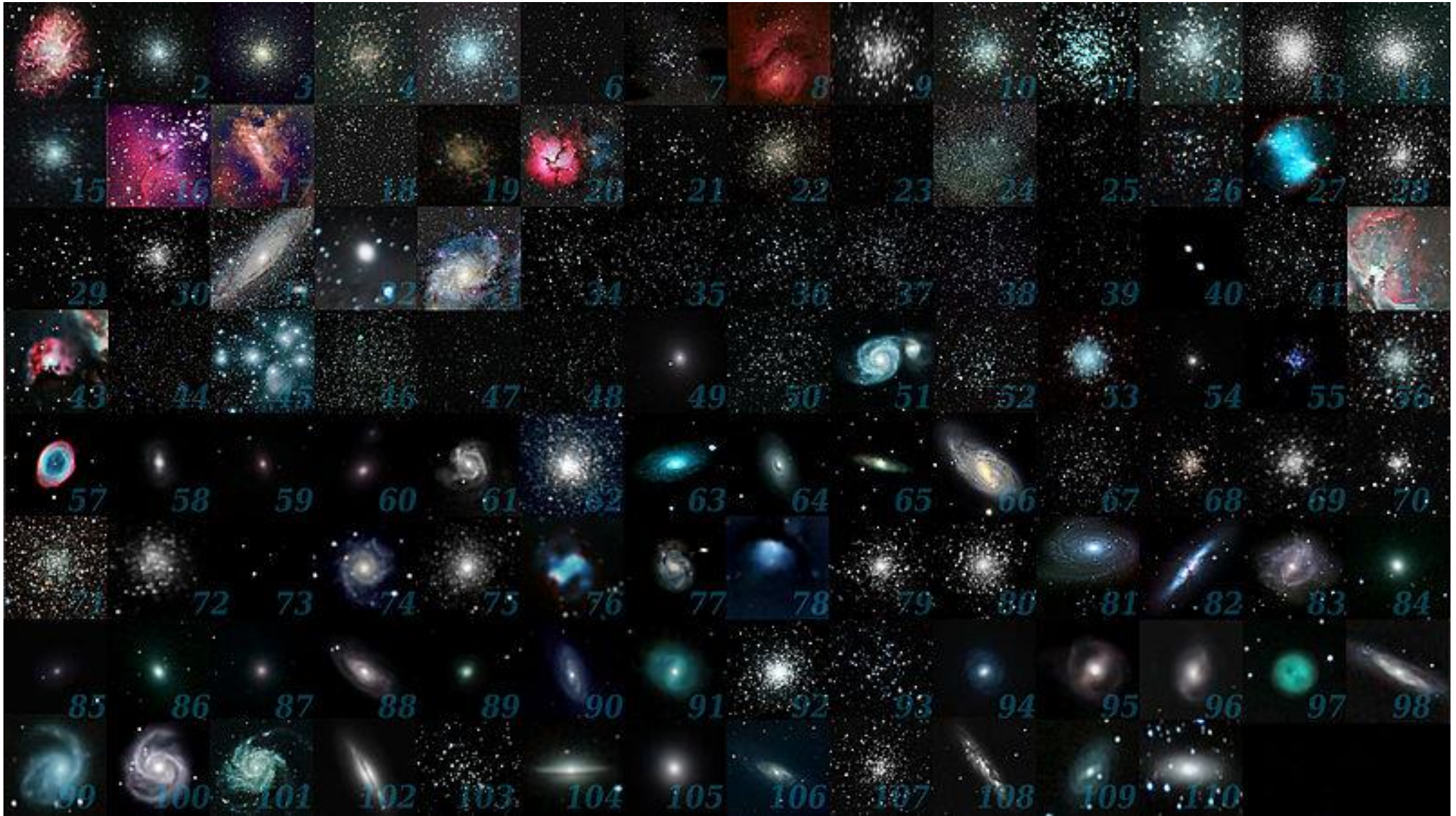
Double Cluster

Charles Messier – Comet Hunter (1730-1817)

The Messier catalogue comprises nearly all the most spectacular examples of the five types of deep sky object – diffuse nebulae, planetary nebulae, open clusters, globular clusters, and galaxies – visible from European latitudes.

- He focused on Comets
- Made a list of blurry objects that were not comets
- Didn’t want to be distracted by these other things that didn’t move
- His 10 cm telescope wasn’t good enough to see detail in these pesky blurs

110 Messier Objects



Most Objects are Spectacular

- M31 – The Andromeda Galaxy
- M57 – Planetary nebula called the Ring Nebula
- M42 – The Orion Nebula
- M1 – Crab Nebula from the 1044 Super Nova

Small telescopes required for these objects

M31 – Andromeda Galaxy
with its two satellite galaxies: M32 and M110

M57 – The Ring Nebula
a Planetary Nebula

M42 – The Orion Nebula
Near the middle star of Orion’s Sword

M1 – The Crab Nebula
Supernova of 1054

A Few are not quite so Spectacular

Less Inspiring Messier Objects	(Name)	Mag	Size
M40	two stars	N/A	
M73	4 stars	N/A	
M29	It's in a busy area of the sky	6.6	6
M39	in the Milkyway	4.6	31
M26	6 main stars	8	14

M40

M73

M29

M39

M26

But Most of Them Are Quite Amazing

M51 – The Whirlpool Galaxy Consuming Another Galaxy

But Most of Them Are Quite Amazing

M13 – Globular Cluster in Hercules

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Messier Objects – reference page

- https://en.wikipedia.org/wiki/Charles_Messier
- https://en.wikipedia.org/wiki/Messier_object