

The "Ferret of Comets"

The Life of Charles Messier



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Good afternoon. Today we are going to take a short retrospective look back at the life of French astronomer Charles Messier, one of the best known astronomers and comet hunters from the 'Age of Enlightenment', which marked the birth of modern science. We'll also cover his greatest contribution – his list of deep-sky objects, to avoid while comet hunting, his '*Catalog of Nebulae and Star Clusters*'.

Outline

- Early Years:
- Equipment:
- Observations:
- Personal Life
- Legacy and Conclusion:

Early Years:

Charles Joseph Messier was born on June 26th, 1730 in the small village of Badonviller, located in the Lorraine region of France. Charles was the tenth child born, (out of twelve children) to his father Nicolas and mother Françoise Messier. At the time, the region where they lived was a semi-independent small state called the Principality of Salm. Nicolas was a court usher for the state princes, which allowed his family to live a decent well-off lifestyle in a large home. Still, six of Charles' siblings died while he was young, and at the age of 11, in 1741, his father Nicolas died. Charles also had a close brush when as a child he fell out of an upper story window and broke his leg. Due to the family's financial constraints, Charles had to leave school, and one of his older brothers finished his education and training in administrative work.

While a teenager, Charles' developed an interest in astronomy by the appearance of the six-tailed Comet of 1744, and a few years later in 1748 by an annular solar eclipse that was visible from his hometown. From this spark, Charles began observing the stars and learning the phenomena in the night sky.



In 1751, Charles, now age 21, left home to look for work in Paris. With help from a family friend of his late father, Charles was able to get an interview with Joseph Delisle, the official astronomer of the French Navy. Delisle found Charles fine hand-writing and drawing skills particularly useful and hired him as an assistant, at the Royal Navy observatory located on top of the Hôtel de Cluny in Paris, where he lived. Messier was given a room in the same hotel apartment wing with Delisle and his wife.

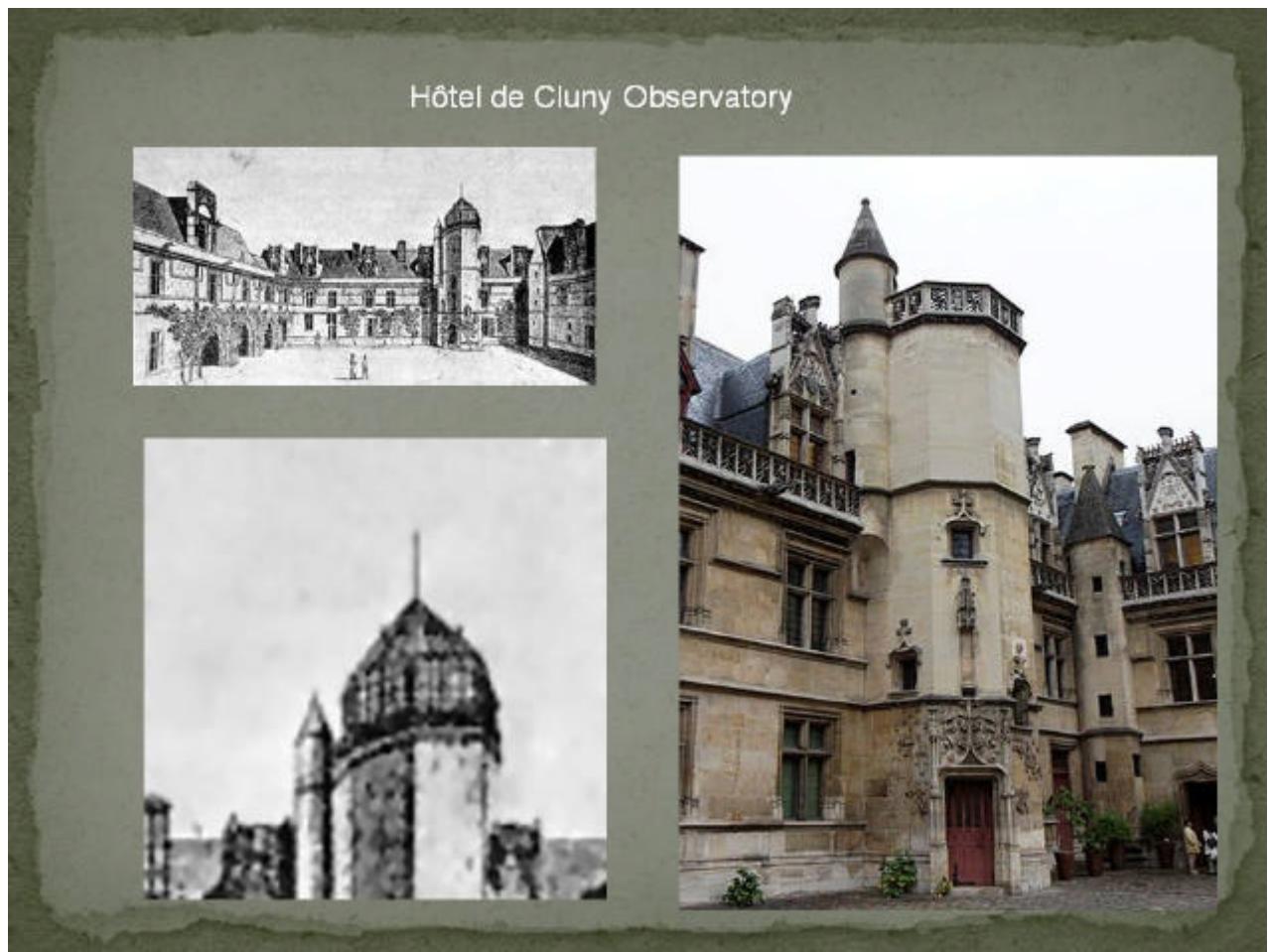
Messier's job was to keep careful records of Delisle's observations and copy maps and charts for use at the observatory. He was also to learn how the observatory functioned and instructed in using its various telescope instruments. Delisle took it upon himself to teach Charles elementary astronomy and precise record keeping and measuring exact positions of all observations. Messier excelled at the work he was given, finding it very suitable to his skills. By 1754, Charles was promoted to a clerk of the Depot of the Navy, making a tidy income and becoming involved in projects to create a new city map of Paris and a new large-scale map of France.



Equipment:

Observatory -

The Hôtel de Cluny was originally a medieval town house built in 1334 for the abbots of Cluny when they would visit Paris, and was constructed over the remnants of a third century Roman bath in one of the oldest districts of Paris. The townhouse and rebuilt during 1485–1510 for extended use of the local bishop, visitors from the Vatican, and the occasional royal. In the 18th century, the building was rented to the Royal Navy and the tower of the *Hôtel de Cluny* was used as an observatory by a number of French astronomers. On the Roof of the tower was built a pyramidal structure with large side windows that could be opened. Inside was kept the portable observatory telescopes that could be positioned to point out of whichever window the observer preferred. After Messier's time, the observatory went unused, fell into disrepair, and was eventually removed from the tower. In 1843, the *Hôtel de Cluny* was made into a public museum, displaying historical objects from France's middle-age gothic past.



Telescopes -

Below is a list of telescopes that Charles Messier used at the Hôtel de Cluny observatory.

For the majority of his observing work, Messier used a small 100mm (4 inch) refractor.

The concept of interchangeable telescope eyepieces was not yet common in Messier's time; most of his telescopes have a fixed eyepiece lens and magnification. While some of Messier's reflecting telescopes had large apertures for the time, up to 8 inches, as they were made of speculum metal, which was the standard of the day, their light gathering ability was only about 70% when newly polished and generally the mirrors would tarnish quickly from the moist night air.

Today's modern small refractor or reflector will easily outperform the best of Messier's telescopes.

Charles Messier's Telescopes:

- Ordinary refractor of 25 foot FL, Mag. 138x
- Achromatic refractor, 10.5 foot FL, Mag. 120x
- Achromatic refractor, 3.25 foot FL (Dollond), Mag. 120x
- Ordinary refractor of 23 foot FL, Mag. 102x
- Ordinary refractor of 30 foot FL, Mag. 117x
- Campani refractor, Mag. 64x
- Gregorian reflector ('Short') 6 feet FL, Mag. 110x
- Gregorian reflector 30 feet FL, 6 inch aperture, Mag. 104x
- Newtonian reflector 4.5 foot FL, Mag. 60x
- Refractor 1 foot FL, 3-inch aperture, Mag. 44x



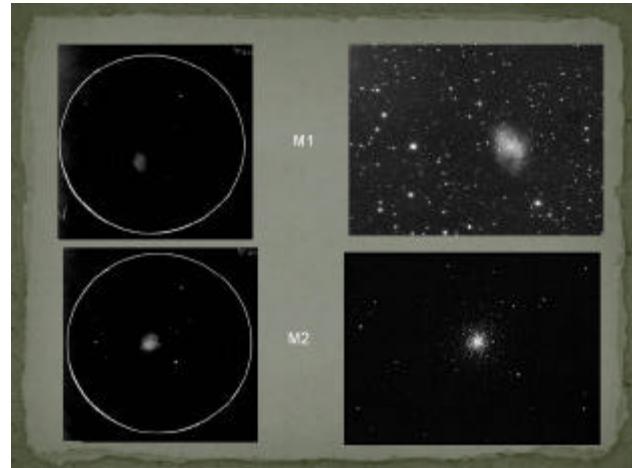
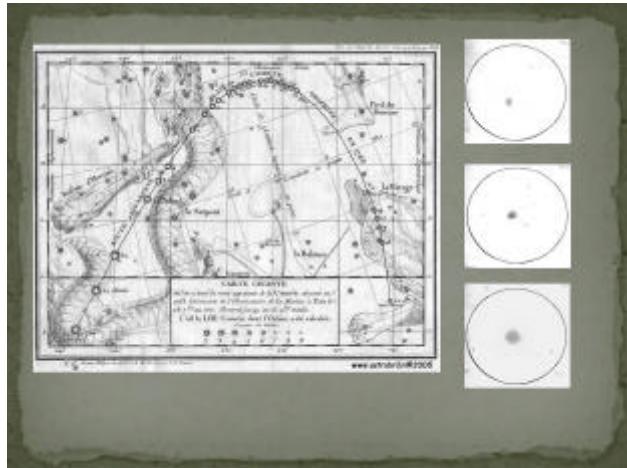
Observations:

Charles Messier's first personal documented astronomical observation was that of the transit of the planet Mercury visible from Paris in May of 1753. Delisle was impressed by Messier's skill at making and recording the transit observation, along with Messier's knowledge of the observatory and it's equipment that Delisle decided to assign Messier in 1757 the task of searching early for the first predicted return of Halley's comet. Delisle drew up calculated star charts with the most probable positions of the predicted comets return for Messier to use in his nightly sweeps. Delisle instructed Messier to use the observatory's 4.5 foot Newtonian reflector, specifically follow the charts, keep meticulous observation records, and not to waste time making any other observations. During this period, Messier recovered his first returning comet in August 1758 and followed it thru early November. Finally on the night of January 21st, 1759, Messier swept up the faint glow of a comet. It was Halley's at last, appearing 52 days before reaching perihelion!



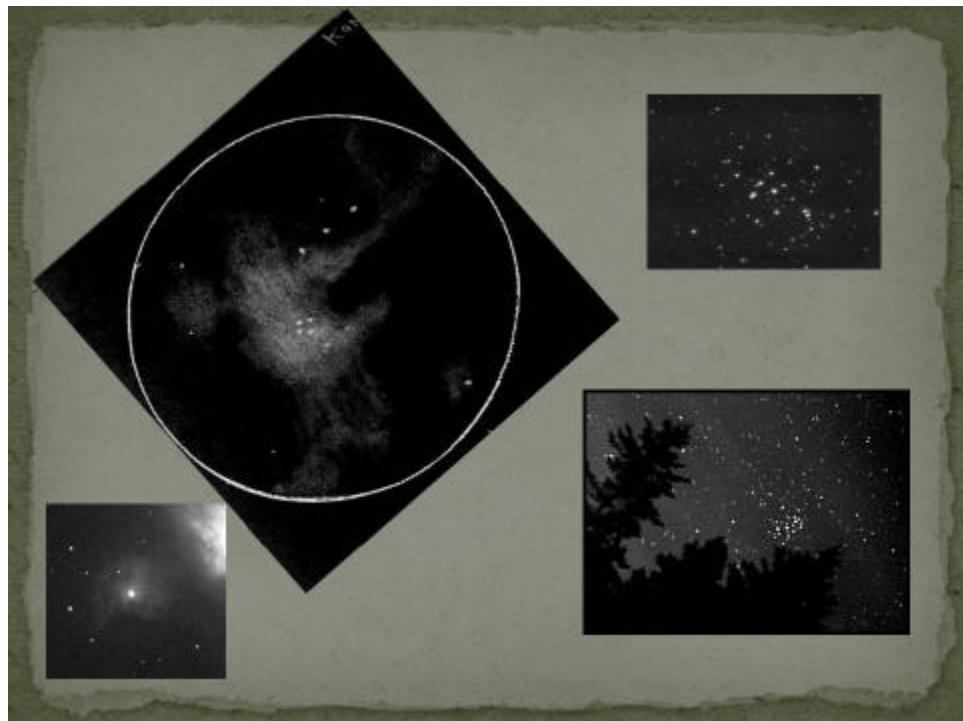
Then amazingly for some reason, Delisle decided to hold off on announcing Messier's historic recovery of the comet, and instead instructed Messier to tell no one, but to keep observing the comet until it was lost in the Sun's glare. This delay in the discovery announcement was to become the greatest disappointment in Messier's life, haunting him till the very end of his life. While waiting for the comet to rise above the Sun and become visible once again, news came that a German amateur astronomer from Dresden had actually been the first to see Halley's Comet back on December 25th of 1758. The news from Dresden had been delayed by several months and only now getting out, setting the astronomical world buzzing with the comet recovery. Messier was devastated by his lost of recognition, and it was not until early April that senior astronomer Delisle finally allowed Messier to publish his earlier observation. The lateness in releasing Messier's recovery led to skeptical criticism by other astronomers in why the observations were kept quiet, which caused more grief for Messier. In the end, Messier decided it was best to stay silent and loyal to his mentor and let it all go. This ended up working in Messier favor, as within a year of the 1761 transit of Venus, (which Messier made a successful observation of), Delisle retired and Messier was placed in charge of the observatory at Hôtel de Cluny where he could now dedicate himself to what Charles thought was his life's purpose, hunting for comets!

Before long, in late 1763, and January 1764, Charles discovered his first two comets using the observatory's telescopes. He followed that up in 1766 by discovering a naked-eye comet that had been missed by all. But, it was during his dark-of-the-Moon comet hunting that Messier began noticing a recurring problem, false comets! During his night sweeps, Charles kept finding faint dim objects that somewhat resembled comets. He would take the time to record their positions and watch for movement over several hours, sometimes for even most of an entire evening, only to finally realize he was wasting his time. The objects weren't comets, but some faint nebula or unresolved cluster of stars.



Messier resolved in May of 1764 to keep a list of the objects as he found them so that during future comet sweeps, he could easily disregard these objects as not being the comets that he was interested in. Charles decided to start making his list by re-surveying the already 16 known nebulae from antiquity or more recently discovered by other observers over the last 100 years. Before the year was out, Messier had put together an observed list of 40 objects, 18 of which were newly discovered by him. The first object in his list was the little nebula in Taurus that he had stumbled upon back in 1758 while searching for Halley's Comet. We know this object today as the supernova remnant M1, the 'Crab Nebula'. The second object, M2, was a partly resolvable ball of stars in the constellation of Aquarius that we now know is a globular star cluster orbiting our home galaxy. Within a few short months of Messier thinking he had finished his list of false comets to avoid, he stumbled on a new one, a faint cluster of stars in Canis Major, just below the bright star Sirius. Messier knew then that his search wasn't done, but other projects came up, forcing him to set aside this secondary list for the next year. One of these was a non-astronomical project involving the sea trials of a new marine chronometer used in determining longitude. Messier spent a number of months at sea, making the necessary astronomical observations needed for doing the calibrations on testing the clocks.

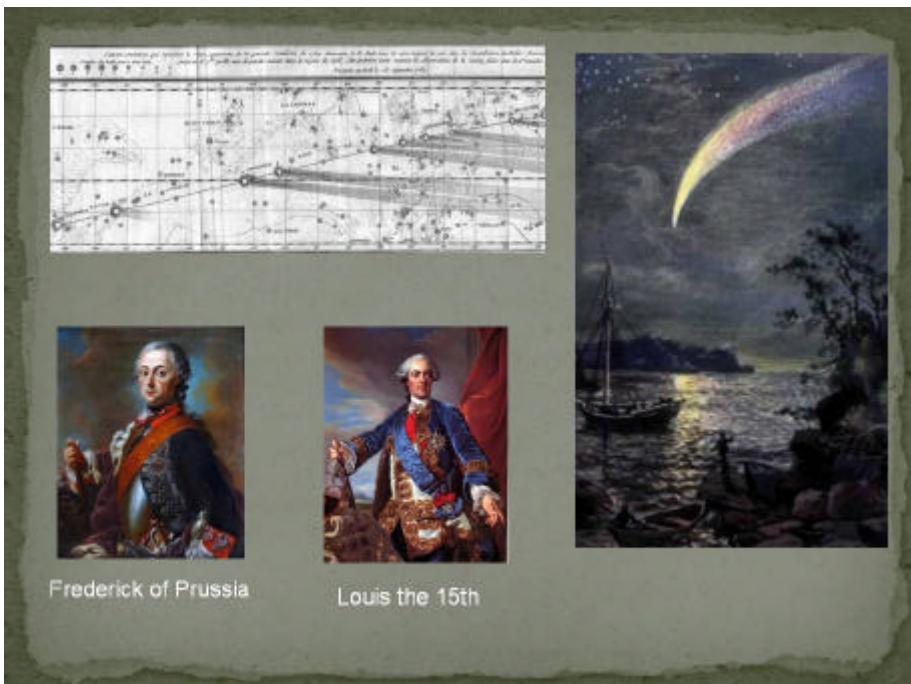
Once he finished that in early 1769, Messier returned to his comet hunting sweeps and decided to write-up his list of 41 ‘non-comet’ objects, along with a description of what each one looked like and their celestial positions in the sky. But he decided to add a few more items to the list, including the already well known objects of the Pleiades and Praesepe star clusters and the Orion Nebula to round the list off at 45 objects.



But before he could publish the list, in August 1769, Charles discovered a new comet that became one of the Great Comets of the 18th century, developing a dazzling coma and a tail over 90 degrees long!.

This comet even brought royal recognition from the King of Prussia, Frederick the Great, by a written letter thanking Messier for his discovery, and for sending the king a map and description of the comet. Charles followed this up a year later in June 1770 with another extraordinary bright comet discovery that brought worldwide recognition.

It was at this point that the King of France, Louis 15th, gave Messier the name “Ferret of Comets”.



With these two great comet discoveries, Charles Messier was elected to the French Academy of Sciences. Shortly afterwards, in 1771, Charles was made the official Astronomer of the Navy, following in the footsteps of his old mentor, Joseph Delisle. And, in 1771 Messier was able to publish the first edition of his '*Catalog of Nebulae and Star Clusters*' in the official journal of the French Academy. Charles Messier was now finally a world renowned astronomer!



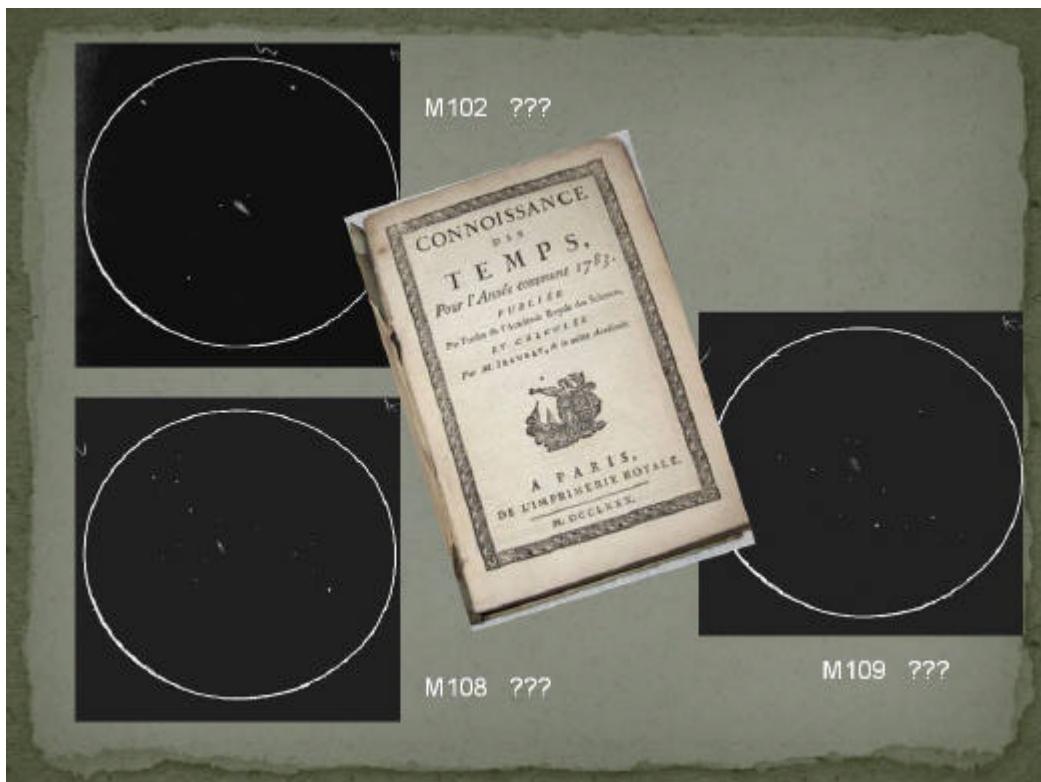
But soon after publishing his catalog, Messier found four more objects to add to the list. He soon added a fifth in 1772, two more in 1774, and after a dry spell another in 1777. Unfortunately for whatever reason, Charles didn't make his usual precision in recording some of the observations of these new objects, particularly M47 and 48, which led many future observers to miss-identify the objects. Messier continued to find additional new objects such that in early 1780, he published a new revised list of 68 objects in the French publication '*Connaissance des Temps*'. He then went on with help from fellow French astronomer and comet hunter Pierre Mechain to find another 32 faint 'nebula' by April 1781, bringing his list up to a new total of 100 'false-comet' objects. Pierre Mechain, 1744 – 1804, was gifted in physics and mathematics, and his abilities in astronomy was noticed by Joseph Lalande who had hired Pierre as a proof-reader. Lalande helped Mechain secure a post as assistant hydrographer with the Naval Depot of Maps and Charts. Through this job, he met Charles Messier and the pair became good friends, and worked together over the years as fellow astronomers. Right before Charles new list of 100 objects was to be published, Mechain sent another three objects which Messier threw in. Unfortunately, Mechain in his haste to get the new objects in time to Messier ended up duplicating the second entry, leading once again to confusing future observers.



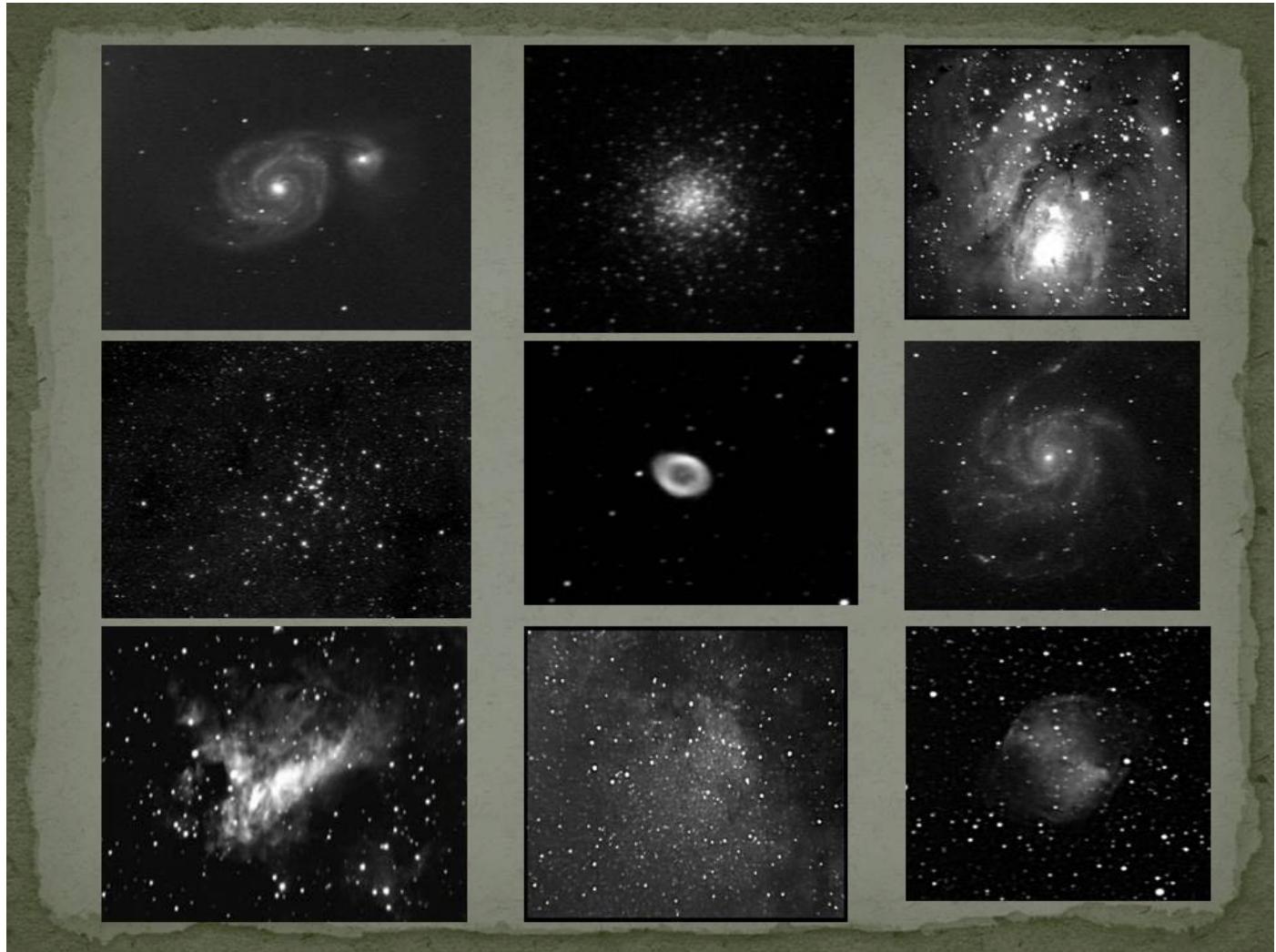
Charles Messier went on to discover seven more comets in 1771, 1773, 1780, 1785, 1788, 1793, and 1798. Messier eventually became the discoverer or co-discoverer of 21 comets and made observations of a total of 41 individual comets, including both new discoveries and previously returning comets. Of the 45 comets discovered between 1758 and 1801, Messier accounted for almost half. During this time, Messier had planned on revising his 103 objects catalog with additional searches. From an article in the *Connaissance des Temps* for 1801, Messier outlined plans to publish another updated version of his catalog, and that he had observed "still other" nebulous objects. But with various distractions such as the injuries from his accident, the French Revolution, and William Herschel's deep sky searches with far superior equipment than what Messier would have, Charles never did move forward with his revisions and publishing a new list.



Over the centuries, as missing documents and manuscripts from both Messier and Mechain have been found by astronomers and historians, the case was made to expand the list to 110 objects to include those that Messier was thought to have planned on including in his final revision. Today, most sources now include those last 7 – 8 objects, though there is still some doubt as to the actual identity of several, including M102, M108 & M109.



Out of the modern Messier catalog, Messier himself had independently found 65 of the 110 objects. His friend and associate Pierre Mechain contributed 25 original discoveries. The remaining other 20 objects came from prior earlier sources and observers. Of the 110 objects, today we know that 40 are galaxies, 29 globular clusters, 27 open star clusters, 6 diffuse nebulae, 4 planetary nebulae, 1 supernova remnant, and 3 ‘misc’ objects of the star cloud M24, double star M40, and the asterism of 4 stars M73.



Personal Life:

Charles Messier married Marie-Françoise de Vermauchampt on November 26th 1770, after courting her over a fifteen year period. In the fall of 1771, the couple moved from the old Delisle apartment wing to better roomier section within the Hôtel de Cluny. There on March 15, 1772, Marie gave birth to a son, who they named Antoine-Charles. But the delivery didn't go well for either the mother or child, and Marie never recovered and passed-away on March 23rd, followed soon after by their son on March 26th.

According to popular legend, Messier's deep display of grief over his wife and son's death was as much from his missing the discovery of a new comet while attending to her on her death bed as to her actual passing away!

It's been determined that this was a false story, as the actual comet in question was discovered a week before the delivery by another observer. In any event, Messier must have been devastated by the deaths of Marie and Antoine, as he went home to Badonviller in Lorraine for three months afterwards.

In November of 1782, while Charles and some friends were visiting a park owned by the royal family, he was seriously injured in an accident. Strolling along one of the many garden paths by himself, Charles noticed a small door off to one side that he thought went to another section of the park. Upon stepping into the dark interior, he fell 25 feet into what was an old ice cellar and had to be rescued by rope and ladder. Messier received a severe bloody head wound and multiple broken bones, including several ribs, one of his wrist and arms, and his right thigh which didn't heal cleanly and had to be re-broken by his doctor. That left him with a permanent limp that became disabling in his old age.



Messier was laid-up for a very long time, and it was almost a year before he could return to work at the observatory. A number of years later, one of Charles sister's, Anne, came to Paris to live with Charles for awhile, but she passed away in 1798. Thereafter, was looked after by one of his nieces.

During Charles Messier's lifetime, he gained many honors: In 1764, he was elected a fellow of the Royal Society of London. In 1769, he was elected a foreign member of both the Royal Swedish Academy of Sciences, and the Berlin Academy of Sciences. And in 1770, he was elected to the French Academy of Sciences, his most cherished membership. In 1785, he became an editor of the French science publication 'Connaissance des Temps' and served for a five year term. Messier lived thru the bloody French Revolution where the guillotine claimed a number of his friends and colleagues and went on to receive the 'Legion of Honour' Cross from Napoleon in 1806 for his lifetime astronomical work. Soon after this, Messier went into semi-retirement, but occasionally still used the old observatory at the Hôtel de Cluny, which had fallen into disrepair with no one to really look after it. In 1815, Messier had a stroke that partly paralyzed him. Finally in the spring of 1817, at the age of 87, Charles came down with a virus and after a few days in bed, died on April 12.

Legacy and Conclusion:

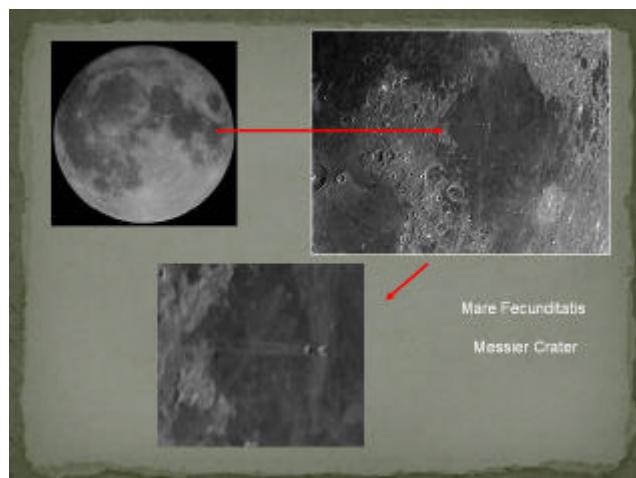
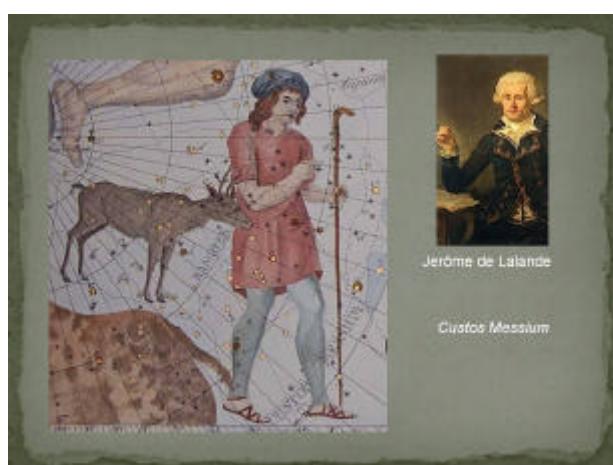
Over the course of his lifetime Charles Messier discovered 21 new comets, including the Great Comets of 1769 & 1770. Charles is also credited with the first recovery observations of many previously found comets, including being one of the first to recover Halley's Comet in 1759.

Like most astronomers, in addition to his many comet observations, Charles Messier also observed the planets Saturn, Jupiter, and Mars when they were at favorable oppositions, along with the Moon and its craters. While during the daytime, he successfully observed transits across the Sun of both Mercury in 1753 & 1782 and Venus in 1761, and tracked and recorded over 100 solar sunspot observations, and even kept records of the daily meteorological weather!

Charles Messier was also involved in 1781 with the follow-up confirmation observations of William Herschel's newly discovered object, putting his then considerable comet hunting expertise into validating that it was not some new form of comet, but instead a planet – Uranus! This led to a friendly long-term relationship between the two great observers, with Herschel actually traveling to Paris to visit Messier.



In 1775, French astronomer Jérôme de Lalande created a new constellation named after Charles Messier. He called it '*Custos Messium*'. This constellation was located on the borders of Cepheus, Cassiopeia and Camelopardalis. It did not receive wide-spread support from the astronomical world, and was eventually dropped from usage. But Charles Messier's lifetime achievements were honored by the international astronomical community by naming a pair of Moon crater's after him, located in Mare Fecunditatis. Also asteroid 7359, discovered on January 16, 1996, has been named "Messier" in his honor.



But none of this is what Charles Messier is known for today.

Instead, it is his list of fixed diffuse objects to avoid while comet hunting, his '*Catalog of Nebulae and Star Clusters*', that today's modern amateur astronomers seeks out as bright showcase galaxies, nebula, and star clusters of the night sky. His 100+ deep sky objects listed in hundreds of books, observing guides, magazines, and star atlases over the centuries and beloved by today's amateurs is his legacy!

That is what Charles Messier, the "Ferret of Comets", is renowned for in the 21st



References

Wikipedia: *various entries*

SEDS (Students for the Exploration and Development of Space): [SEDS Messier Database](http://messier.seds.org)
"Messier's Nebulae and Star Clusters", By Kenneth Glyn Jones:

