

# Charles Messier

## 1730 to 1751: Childhood and adolescence

Charles Messier was born on the 26<sup>th</sup> of June 1730 in Badonviller, as the tenth child of the court bailiff Nicolas Messier (1682–1741) and his wife Françoise (maiden name Grandblaise, deceased 1765). His home village lies near the former German–French language border in the western part of the Vosges Mountains in Lorraine. In Messier's days, that region did not belong to the Kingdom of France, but to the independent dukedom of Salm, part of the Holy Roman Empire. The Messier family was one of the richest in the little state, with high-ranking positions and excellent connections, which would later be very helpful to the young Charles.

He grew up in a house opposite the protestant church of Badonviller, by a square which today bears his name. Six of his siblings died in their early childhood. An important role in Charles' life was played by his eldest brother Hyacinthe, who was older by 13 years. Hyacinthe started his professional career as an auctioneer and, eventually, became the highest financial officer of the dukedom. When their father died in 1741 – Charles was only 11 years old then – Hyacinthe was already able to take care of the Messier family. He gave Charles an apprenticeship in his office, mostly involving paper work. That helped develop the boy's good writing and drawing skills, and the accuracy required for finance and business. His first interest in astronomy was sparked by the large, six-tailed comet of 1744, discovered by the Swiss astronomer de Chéseaux, and the annular solar eclipse of 1748.

The year 1751 brought important changes to the life of the Messiers. The dukedom of Salm lost its independence by becoming part of Lorraine, which later fell to France by annexation. Only the former residence of the dukes of Salm, the village Senones, a few kilometers from Badonviller, retained its independence and was to become the new home of the Messier family. Now at the age of 21, it was time for Charles to seek a life of his own. With the help of a good family friend, who had contacts in important circles in Paris, an assistantship at the new Naval Observatory in Paris became available to Charles Messier. It was not re-



*Charles Messier at the age of 40, painted by Anisiaume. Messier commented that his portrait was most appropriate but made him look younger than he really was.*



*Drawing of the Hôtel de Cluny, from the beginning of the nineteenth century. The octagonal sheltered platform of the tower is Messier's observatory.*



*Today, the Hôtel de Cluny is one of the most beautiful medieval buildings of central Paris. It hosts the National Medieval Museum, but there is no commemoration of the work of Charles Messier.*

ally his interest in astronomy which got him the offer, but his good skills as an office assistant. He left Badonviller on the 23<sup>rd</sup> of September 1751.

## 1751 to 1757: Assistant of the Naval Observatory

Joseph-Nicolas Delisle (1688–1768), who taught mathematics and astronomy at the Collège Royal in Paris (later to be the Collège de France), built a private observatory on the stair-tower of the Hôtel de Cluny in 1747, opposite to the Collège Royal. Originally, the Hôtel de Cluny was the Parisian residence of the Benedictine monks from the great abbey in Burgundy. Later, it became the property of the French Navy. In 1754, the aged Delisle made a deal: he signed over the observatory to the Navy and in return, he received the custom-tailored title “Astronomer of the Navy.”

Delisle’s humble observatory stood in the shadow of the established Royal Observatory of Paris, which was well known as a leading European institution for astronomers such as Huygens, Cassini, and Maraldi. Delisle, by contrast, was not part of the French astronomy establishment. Hence, Messier entered a professional environment which allowed him to pursue his astronomical interests without any scientific obligations, but which also branded him from the outset as an outsider to professional astronomy.

The childless Delisle couple received and hosted Messier as though he were their own son, and he lived with them in their apartment in the Collège. Delisle’s assistant Libour introduced Messier to the basics of astronomy, and the young Messier’s first tasks were to make hand-drawn copies of maps and to write the observing logs.

Delisle had been in personal contact with the late, famous English scientists Newton and Halley. The latter had pointed out in his famous work of 1705 that the comet apparitions of 1456, 1531, 1607, and 1682 were due to the same physical comet, which would reappear in 1758. Delisle made an independent calculation of the comet’s orbit and derived April 1759 for the perihelion passage. Based on his master’s work, Messier drew a map of the comet’s path among the stars and had orders to watch for it from the summer of 1758 onward. That comet hunt was the first real astronomical task given to the 28-year-old, who so far had carried out only basic observations. Messier understood that this was the chance of a lifetime; he wanted to be the first to prove Halley’s milestone work.

But life took a different course. While Messier did rediscover the comet on the 21<sup>st</sup> of January 1759, he soon had to learn that a farmer in Saxony had beaten him by about a month: the previously unknown amateur astronomer Johann Georg Palitzsch (1723–1788) from Prohlis near Dresden had already spotted Halley’s Comet on the night of Christmas 1758. Messier had confined his search to Delisle’s orbital path for too long. And to his great dismay, Messier could not even get his



City map of Paris from the year 1771. The Hôtel de Cluny (1) and the Royal Observatory of Paris (2) are circled.

## Custos Messium – a constellation for the comet hunter

In 1775, the first version of the now enormously popular Messier catalog of 110 nebulae had been out for one year, with then only 45 objects. However it was his achievements as a record-breaking comet discoverer that made Charles Messier the publicly best-known astronomer of his country. In fact, Messier had discovered practically all the comets of the past 15 years. He had been a member of the elite circle of the French Academy of Sciences since 1770. But now, a very special honor was awarded to him, unprecedented in the history of astronomy.

Jérôme de Lalande (1732–1807), a famous author, professor and colleague of Messier, created a new constellation on his freshly published stellar globe: "Custos Messium" (lat.), the "Harvest Guardian." Concerning his motives, Lalande wrote: "This name will remind future astronomers of the courage and diligence of our industrious observer Messier, who since 1757 appears occupied with the sole task of patrolling the sky to discover comets." Contemporary French star charts happily included the new constellation under its French name "Messier," picturing a guardian who watched over a cornfield.

The "Harvest Guardian" had its place north of Cepheus, Cassiopeia, and Camelopardalis. Today, its space has become part of these three constellations. Messier's constellation held only one noticeable star, 40 Cas, and no remarkable deep-sky objects. As Messier related, Lalande chose that particular part of the sky, because it once hosted the comet of 1774, discovered by Montaigne. It was the only one of 14 comets that, following the death of his wife, Messier failed to discover himself. These were two big losses, which Messier could not bear – and Lalande must have been aware of that.

Lalande created two other new constellations: "Felis," the cat (between Hydra and Antlia), in memory of his favorite pet, and "Globus Aerostaticus" (between Capricornus



*The constellation Custos Messium (Harvest Guardian), pictured in Johann Elert Bode's "Vorstellung der Gestirne" (1782).*

and Piscis Austrinus) to commemorate the invention of the hot-air balloon by the brothers Montgolfier and their first air-borne voyage in 1799. All three constellations were included in J.E. Bode's Prussian star atlases – despite, certainly, some national rivalry. But in return, Lalande would include in his atlases the "Brandenburg Scepter," "Frederick's Honor," and the "Mural Quadrant," which Bode had invented. Nevertheless, all these new constellations fell out of use only 80 years later.

*Joseph Jérôme le Français de Lalande, colleague and friend of Messier. Engraving by André Pujos*



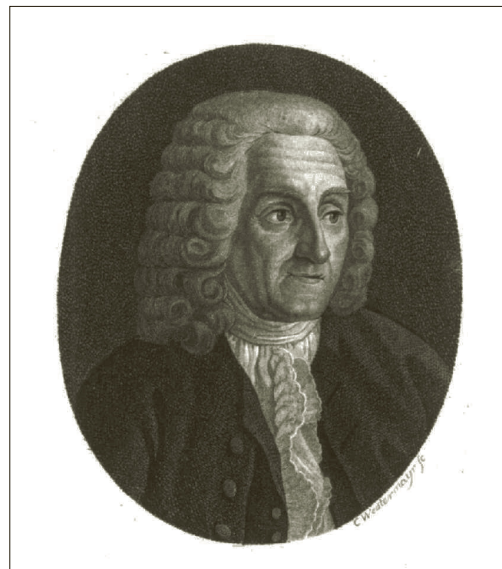
master's permission to publish his independent discovery, since Delisle did not believe that he'd made a mistake in his calculations. He thought the comet was an unrelated object. Messier bowed to the wishes of his master and host and withheld his observations for three months, until it was finally clear that Delisle was wrong. However, the long-delayed publication aroused suspicion and skepticism among the royal astronomers in Paris. His independent discovery was not acknowledged – a disappointment that Messier would not forget for a long time.

In hindsight, we know that the by-products of Messier's diligent comet hunt were much more rewarding. In August 1758, when he was observing the comet discovered by de la Nux, Messier came across an as yet unknown nebula which looked exactly like the comet. This discovery sparked the idea for his catalog, which retains Messier's name to this day. Hence, Messier made good use of that chance of a lifetime, after all – albeit in quite a different way than he, the comet enthusiast, had anticipated.

## 1759 to 1770: Comet discoveries and recognition

Comet hunting became an obsession for Charles Messier. Between 1758 and 1804, he spent more than 1100 nights on this task. He became the first real “comet hunter” in history, with a prototypical character: a most diligent observer with humble equipment but much enthusiasm, who would search for new comets with systematic endurance. He observed 44 comets altogether, more than were known to science before him. He discovered 21 comets, 6 of which are regarded today as co-discoveries. Messier was, in fact, the first observer who systematically used the telescope for comet hunting. Before him, comets were usually discovered with the naked eye. But he did not stop at the discovery of a comet. He would observe every comet as much and for as long as possible; his record was 71 nights over a period of 6 months. Furthermore, Messier measured comet positions to make orbit calculations possible. He never did that himself, though, as he was entirely devoted

*Joseph-Nicolas Delisle, teacher and benefactor of Messier. Engraving by Konrad Westermayr*



*Johann Georg Palitzsch succeeded in what Messier tried in vain: he was the first to rediscover Halley's comet on its return in 1758.*

to observation. None of his many publications would contain a single bit of math or theoretical work.

In that respect, Messier's close friendship with Jean Baptiste Gaspard Borchart de Saron (1730–1794) was most beneficial. Saron came from an established, noble family and was soon to become the royal state-attorney, and later even president of the parliament. Theoretical astronomy was one of his hobbies – a perfect match: Saron's quick calculations were essential to Messier's success, because these allowed him to find a comet again, even after a long period of bad weather.

For the discovery of the great comet of 1760, Messier was still a day late. But only a few days later, on the 26<sup>th</sup> of January 1760, he discovered the first comet named after him. In the following years, Messier nearly achieved a monopoly on comet discoveries: all eight known comets between 1763 and 1771 were discovered by him!

Messier was active in other respects, too. Between 1752 and 1770, he observed 93 lunar occultations and 400 eclipses of Jupiter's satellites, he watched 5 solar eclipses, 9 lunar eclipses, and he measured 400 stellar positions. Over the course of his lifetime, Messier followed four transits of Mercury and two of Venus, and he did a lot of planetary observing, especially of Saturn. In 1767, he made a three-month-long sea cruise to test astronomical clocks on the coasts of the Netherlands and Belgium.

Recognition by the international science community was soon to follow. In 1764, he became elected a fellow of the English and Dutch scientific academies. Such academies were of crucial importance in the eighteenth century. Only their membership made it possible to exchange correspondence with the leading scientists of the time and gave access to the accumulated knowledge of their libraries. Messier had to wait a long time for admission to the French academy of the sciences – in Paris, the skepticism aroused by his long withheld observations of Halley's comet were still not forgotten. But, at least, his salary was raised in 1765, after the retirement of Delisle from active research. Messier's breakthrough with the French astronomy establishment came with his discovery of the great comet of the year 1769. That comet was a spectacular sight, and it made its discoverer's name so popular with the general public that the king would personally receive a map drawn

## The role-model: Nicolas-Louis de Lacaille

Nicolas-Louis de Lacaille (1713–1762) was born on the 15<sup>th</sup> of May 1713 in Rumigny near Reims. As a son of noble parents, he began to study theology in Paris. He was 26 when he made his first recorded astronomical observations. Soon, he became professor at the Collège Mazarin in Paris, where in 1746 he constructed an observatory, and finally in 1741 he was admitted to the French Academy of Sciences, with the support of the Duke of Bourbon.

Lacaille was well known for his accurate observations and an over-eagerness to work – in fact, he died of overwork on March 21<sup>st</sup>, 1762. Hence, in 1751, the French academy chose him for a longer stay at the Cape of Good Hope, in order to accurately measure geographic longitudes and the positions of southern stars. Meanwhile, his scholar



*Abbé Nicolas-Louis de Lacaille, painted by Melle Le Jeuneux, 1762*

Lalande was his counterpart in Berlin for a program of simultaneous observations, which led to improved distance measurements of the planets and the Moon.

Lacaille arrived in South Africa in April 1751. At the foot of Table Mountain, which he honored with the constellation “Mensa,” he began the observations for a southern star catalog in August 1751. For that work, Lacaille used a mural quadrant, equipped with a very small telescope of only ½-inch (12.5mm) aperture and a magnification of 8x. A year later, in July 1752, this catalog contained the positions of 9776 stars.

While cataloging the heavens, Lacaille made a list of the nebulous objects he came across, which he published in 1755. It was the first of its kind, and it is appended to Messier’s third and final catalog. Thirteen new southern constellations were created by Lacaille as a by-product of his work: Antlia, Caelum, Circinus, Fornax, Horologium, Mensa, Microscopium, Norma, Octans, Pictor, Reticulum, Sculptor, and Telescopium. With these, Lacaille filled in the coarser pattern of southern constellations created 150 years earlier by Keyzer. In addition, Lacaille changed the name of the constellation Abies into Musca – not to be confused with a lost northern constellation of that name – and he suggested splitting the huge constellation Argo Navis into Carina, Vela, Pyxis, and Puppis. About 100 years later, these suggestions became widely accepted as astronomical conventions.

for him by Messier. The king nicknamed Messier “the comet nest-robber,” because for many years not a single comet “slipped out of its egg” that hadn’t already been discovered by Messier. This idea then developed into the popular nickname “the comet-ferret.”

The next year (1770), Messier discovered a comet, which was identified by the Swedish observer Lexell as a periodic comet. Two weeks after that discovery, Messier was finally admitted to the French Academy of Sciences, followed by membership of nearly all of the remaining foreign scientific associations. In addition, he received another pay rise and, in 1771, he inherited the title invented for Delisle, “Astronomer of the Navy.”

## 1770 to 1789: Changing private fortunes and observational successes

On the 26<sup>th</sup> of November 1779, Messier married the daughter of a noble professor, Marie-Madeleine Dordolot de Vermauchampt, who was three years his junior. For 15 years, they had lived under the same roof in the Collège Royal. But in the absolutistic France of that time, a marriage between a bourgeois and a noble lady would have been impossible. Only the recent great success of Charles Messier changed their fortunes. In 1771, they moved into an apartment of their own in the Hôtel de Cluny – it was then only a few steps from Charles’ bedroom to the observatory.

1771 must have been one of the best years in Messier’s life. Besides his personal good fortune, he discovered two comets and completed the first version of his catalog, then totalling 45 nebulous objects, although Messier considered the latter a mere by-product of his searches, as he just wanted to avoid confusion when he was comet-hunting.

On the 15<sup>th</sup> of March 1772, there was another reason for Messier to rejoice: his wife gave birth to a son, Antoine-Charles. But then his fortunes changed dramatically: a week later, Marie-Madeleine Messier died of puerperal fever, and the little baby followed her on the 26<sup>th</sup> of March. Messier’s reaction to this heavy double-blow to his private life is difficult to assess. The fact is, however, that he started a four-day observing campaign on comet Moutaigne – the first comet in almost 10 years which had not been discovered by him – the very night his son died.

In August 1772, Messier traveled to the dukedom of Salm, which in his own words he regarded as his “Fatherland.” He stayed some time with his eldest brother in Senones, following earlier visits in the years 1758, 1762, and 1770. Not surprisingly, Messier continued an intense observing schedule during that family visit. On his return to Paris, he was accompanied by his nephew Joseph-Hyacinthe and by his sister Barbe, who would take care of her brother until her death in 1797.

The following years were characterized by continued comet observations. In 1780, Messier published the second version of his catalog, which contained 68 nebulous objects. The first new objects were found soon after his original catalog was printed. But Messier did not keep looking systematically for new objects, he just recorded accidental findings during his comet observations. Nevertheless,

Table: 44 comets, observed by Charles Messier

Popular name	Old designation	Messier's first observation	Messier's last observation	Number of nights observed	Date of discovery	Discoverer
		Aug 14, 1758	Nov 2, 1758	31	May 26, 1758	de la Nux
P/Halley	1759I	Jan 21, 1759	May 1, 1759	47	Dec 25, 1758	Palitzsch
Great Comet	1759III	Jan 8, 1760	Jan 30, 1760	6	Jan 7, 1760	Chevalier
Messier	1759II	Jan 26, 1760	Mar 18, 1760	22	Jan 26, 1760	Messier
		May 28, 1762	Jul 5, 1762	20	May 17, 1762	Klinkenberg
Messier	1763	Sep 28, 1763	Nov 24, 1763	29	Sep 28, 1763	Messier
Messier	1764	Jan 3, 1764	Feb 11, 1764	16	Jan 3, 1764	Messier
Messier	1766I	Mar 8, 1766	Mar 15, 1766	8	Mar 8, 1766	Messier
P/Helfenzrieder	1766II	Apr 8, 1766	Apr 12, 1766	5	Apr 8, 1766	Helfenzrieder
Messier	1769	Aug 8, 1769	Dec 1, 1769	42	Aug 8, 1769	Messier
P/Lexell	1770I	Jun 14, 1770	Oct 3, 1760	47	Jun 14, 1770	Messier
Great Comet	1770II	Jan 10, 1771	Jan 20, 1771	4	Jan 10, 1771	Messier
Messier	1771	Apr 1, 1771	Jun 15, 1771	48	Apr 1, 1771	Messier
		Mar 26, 1772	Apr 3, 1772	4	Apr 8, 1772	Montaigne
Messier	1773	Oct 12, 1773	Apr 14, 1774	71	Oct 12, 1773	Messier
		Aug 18, 1774	Oct 25, 1774	41	Aug 11, 1774	Montaigne
Bode	1779	Jan 19, 1779	May 19, 1779	63	Jan 6, 1779	Bode
Messier	1780I	Oct 27, 1780	Nov 28, 1780	13	Oct 27, 1780	Messier
Méchain	1781I	Jun 30, 1781	Jul 16, 1781	14	Jun 28, 1781	Méchain
Méchain	1781II	Oct 10, 1781	Nov 5, 1781	12	Oct 9, 1781	Méchain
		Nov 27, 1783	Dec 21, 1783	13	Nov 19, 1783	Pigott
		Feb 3, 1784	May 25, 1784	13	Jan 24, 1784	Cassini
Messier	1785I	Jan 7, 1785	Jan 16, 1785	6	Jan 7, 1785	Messier
Méchain	1785II	Mar 13, 1785	Apr 16, 1785	14	Mar 11, 1785	Méchain
P/Encke	1786I	Jan 19, 1786		1	Jan 17, 1786	Méchain
		Aug 1, 1786	Oct 26, 1786	43		C. Herschel
Méchain	1787	Apr 11, 1787	May 20, 1787	6	Apr 10, 1787	Méchain
Messier	1788I	Nov 25, 1788	Dec 29, 1788	20	Nov 25, 1788	Messier
		Jan 3, 1789	Jan 6, 1789	2	Dec 21, 1788	C. Herschel
		Jan 19, 1790		1	Jan 7, 1790	C. Herschel
P/Tuttle	1790II	Jan 10, 1790	?	7	Jan 9, 1790	Méchain
		May 1, 1790	Jun 9, 1790	45	Apr 17, 1790	C. Herschel
		Dec 26, 1791	Jan 28, 1792	12	Dec 15, 1791	C. Herschel
		Feb 1, 1793	Feb 14, 1793	6	Jan 10, 1793	Gregory, Méchain
		Sep 27, 1793	Dec 8, 1793	25	Sep 24, 1793	Perny
Messier	1793I	Sep 27, 1793	Jan 7, 1794		Sep 27, 1793	Messier
		Aug 16, 1797	Aug 30, 1797	13	Aug 14, 1797	Bouvard
Messier	1798I	Apr 12, 1798	May 24, 1798	27	Apr 12, 1798	Messier
		Dec 7, 1798	Dec 12, 1798	4	Dec 6, 1798	Bouvard
Méchain	1799I	Aug 10, 1799	Oct 25, 1799	44	Aug 7, 1799	Méchain
Méchain	1799II	Dec 28, 1799	Jan 6, 1800	5	Dec 26, 1799	Méchain
Pons	1801	Jul 12, 1801	Jul 21, 1801	5	Jul 12, 1801	Pons, Messier, Méchain, Bouvard
		Aug 30, 1802	Sep 5, 1802	7	Aug 26, 1802	Pons
		Mar 11, 1804	Mar 17, 1804	6	Mar 7. 3. 1804	Pons

from: Philbert, J.P.: Charles Messier – le furet des comètes

## The competitor: Johann Elert Bode

Messier not only reinvented comet hunting, he also sparked new interest with his contemporaries in the observation of nebulae and star clusters. The German astronomer Johann Elert Bode (1747–1826), who like Messier published an annual almanac, entered into a direct competition with the French astronomer in 1777, by presenting his own catalog of nebulous objects.

Bode developed an interest in astronomy at a young age. He observed the night sky from a hatch in the roof of his parents' house in Hamburg. By chance, a math professor saw Bode's notes and encouraged him

to write a popular astronomy book. In 1768 at just 21 years old, Bode published the guidebook "Deutliche Anleitung zur Kenntnis des gestirnten Himmels" ("Concise manual to the knowledge of the starry sky"), which was received very well and reprinted several times. A later edition was used to publish the formula for the distances of the planets, which was soon known as the "Titius-Bode-Law."

Still an amateur astronomer, Bode observed the transit of Venus of 1769. But in 1772, he began to work at the royal observatory of Berlin, and a few years later, in

1779, Bode discovered his first comet. Much like Messier, that discovery gave him recognition. He eventually became the director of Berlin Observatory in 1787 and kept that office for 38 years. Bode gained some fame as the founder of the "Berliner Astronomisches Jahrbuch" ("Berlin Astronomical Almanac") and with his book "Vorstellung der Gestirne" ("Introduction to the Constellations," 1782) and the monumental celestial atlas "Uranographia" (1801). In contrast to Messier, Bode was well connected in scientific circles. The name "Uranus" for the new planet discovered by William Herschel was his suggestion. And as director of the Berlin Observatory, he had excellent contacts all over Europe. In 1774, three years after

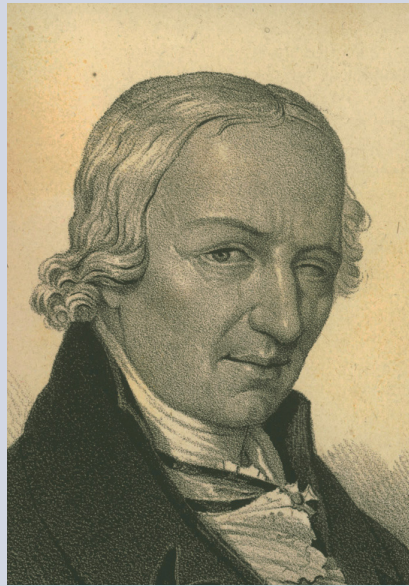
the publication of Messier's first catalog of 45 nebulae, Bode started his own search for new nebulae and star clusters. He succeeded with some genuine discoveries (M 81, M 82, M 53, M 92) and a larger number of independent findings. In 1777, he compiled his "Complete Catalog of all Observed Nebulae and Star Clusters," based on his own observations as well as on all references he could find in the literature. At its time the largest deep-sky catalog, this included 75 objects. Bode continued to observe, and he always encouraged other observers to publish their data in his almanac.

The 1779 volume contains a listing of objects found by Köhler from Dresden, and other editions reproduced the notes of Oriani and a translation of Messier's catalog.

An updated and enlarged list of contemporary observations of nebulae, still without knowledge of Messier's third catalog version but including the 68 objects of his second, was published by Bode in 1782 within the "Vorstellung der Gestirne."

This list not only included several new discoveries, presumably made by Bode himself, but also the objects IC 4665 (already mentioned by Al Sufi) and  $\eta$  &  $\chi$  Persei.

Despite the substantial work of Bode in this field, his name is hardly known today, in contrast to popular Messier. One good reason may be that Bode did not check the positions of objects contributed from other observers. That caused many errors in his list. His listing of 1782, for example, contains three different entries for M 8, because Bode did not realize that the different positions from Messier, Le Gentil, and Köhler all referred to the same object. Hence, despite Bode's striving for completeness, Messier's final catalog of 1781 was, at its time, second to none in terms of quality.



Johann Elert Bode

the third version of his catalog, with 103 objects, came out in 1781. This was mostly due to the wealth of input from his new colleague Pierre Méchain (1744–1804). Despite more such discoveries by Méchain after 1781, there were no further catalog versions.

The 13<sup>th</sup> of March in that same year saw the discovery of the planet Uranus by William Herschel in England. At first, Herschel took his new object for a possible comet and asked Charles Messier for his opinion. The same day he received Herschel's letter, Messier observed Uranus. Messier passed his positional measurements down to de Saron to calculate the orbit. His mathematical friend was quick to realize that Uranus was not a comet but a new planet.

After 1781, Herschel would find over 2000 new nebulous objects with his much better telescopes. However it was not only this superior competition that stopped Messier working on nebulae, but also another blow of fate: on the 6<sup>th</sup> of November 1781, Messier was on a walk with his family in the Park Monceaux. His curiosity led him to inspect the entrance to a basement, when he slipped and fell 8 m (24 feet) into a deep ice-storage cellar. Messier was seriously injured, and had broken his upper leg, upper arm, two ribs and the wrist of his hand. He lost a lot of blood from an open wound over his eye. It took him the better part of 1782 to recover from this bad accident. His leg had to be rebroken, after the bones had healed at an angle. Messier was bed-bound for a long time, and he always limped thereafter. Herschel, who paid him a personal visit in Paris 20 years later, remarked that Messier never fully recovered from that injury. It was a full year after that accident before Messier was back in his observatory, on the occasion of the transit of Mercury of the 12<sup>th</sup> of November 1782.



## 1789 to 1804: In the turmoil of the French Revolution

The French Revolution began with the storming of the Bastille in Paris on the 14<sup>th</sup> of July 1789. As for so many, the following years brought chaos and insecurity to Messier. The structures of the French Navy were dissolved and maintenance of the observatory ceased. Frequently, Messier had to borrow oil for his observing lamp from his good colleague Lalande. The latter was now director of the former Royal Observatory of Paris, and they knew each other well from the days when they both taught at the Collège Royal. In 1793, by decree of the revolutionary directorate, all academies were dissolved, with serious consequences for Messier. A further tragic event for Messier was to follow on the 20<sup>th</sup> of April 1794 when his good friend and benefactor

de Saron was guillotined under the reign of terror. Already in prison, he calculated his last comet orbit for Messier.

Fundamental changes were also imposed upon Lorraine. In 1793, the dukedom of Salm became part of revolutionized France by annexation, with significant consequences for the Messier family, which was closely involved with the local nobility. Some family members emigrated from France to Germany, following the dukes of Salm.

In 1795, a new astronomical institute was founded in Paris: the Bureau des Longitudes. Its original purpose was to outstrip the superiority of the English clocks. Messier was not among its founding members, like Méchain or Cassini, but he replaced the latter in the next year.

In 1798, still living in the Hôtel de Cluny, Messier was on his own again, after the death of his sister in the previous year. From Senones, his younger brother and his niece Josephine now came to live with him. Josephine would take care of Charles Messier until his death.

### The colleague: Pierre Méchain

Thirty of the now so-called "Messier objects" were, in fact, discovered by Pierre Méchain (1744–1804). He was a close collaborator of Messier and helped complete his final catalog in the years 1779 to 1781.

Pierre Méchain was born in Laon. He planned to become an architect, but lack of finances forced him to abandon his studies. Rumour has it that he even had to sell his telescope, which he had bought as an amateur astronomer, and that the buyer turned out to be Jérôme de Lalande, later (1794) to become the director of Paris observatory.

Lalande had been astronomy professor at the Collège Royal from 1760 to 1767, as the successor of Delisle, and from 1794 to 1807 he was also editor-in-chief of the *Connaissance des Temps*. In 1772, he managed to get Méchain a job at the treasury of the French Navy in Versailles. Two years later, Méchain obtained the official position of a "calculator." The connection with Messier's friend Lalande initiated Méchain's contribution to the Messier catalog.

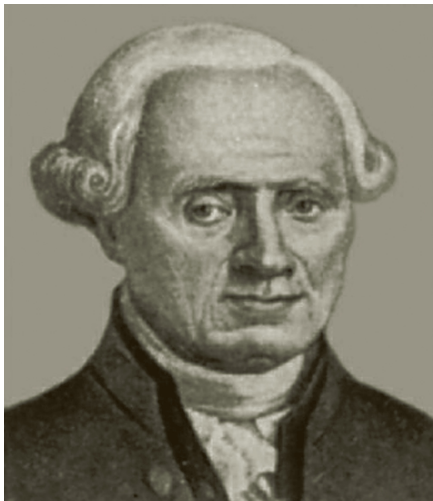
In 1781, Méchain found two new comets – eventually, his total score grew to eight discoveries. Unlike Messier, he was able to calculate his own orbits. His most famous discovery was the comet of 1786, which was proved by Encke's orbital calculations to be the second-known periodic comet (after Comet Halley).

From 1786 on, Méchain was engaged in longitude measurements. This work required clocks much more accurate than those available at the time – a big problem for offshore navigation, as well as for geodesy on land. Hence, in 1791, the French Academy of Sciences started a project to define the French prime meridian from Dunkirk in the north to Barcelona in the south. After the project finished in 1795, Méchain found an error of 3" in the calculated latitude of Barcelona (about 90 meters on the ground). We know now that this was due to a combination of instrumental inaccuracies and some deviation of the globe from a perfect sphere – but Méchain expended considerable effort trying to further increase the accuracy of the calculations. In 1798, he succeeded Lalande as director of the Observatory of Paris. In 1804, during field work in Spain to revise the measurements along the French prime meri-



*Pierre Méchain, painted by Hurlé*

dian, Méchain contracted yellow fever and died on the 20<sup>th</sup> of September 1804.



*Portrait of the comet hunter from 1801, at the age of 71, drawn by Cless from Weimar. Messier was reasonably tall for his time, measuring 1.68m (5 feet 6 inches), a little chubby, and his hair turned white around the age of 60.*

In 1801, Messier made his last comet discovery at the age of 71. Thereafter, he just lived off his past fame, which was finally recognized by the new regime. Napoleon personally bestowed him with the Cross of the Legion of Honour. This led Messier to make, in 1808, a connection between his discovery of the great comet of 1769 and the simultaneous birth of “Napoleon the Great.” This idea was so close to astrology that it did not go down well with most contemporary astronomers.

The last comet that Messier was able to observe was the great comet of 1807. Thereafter, he suffered from failing eyesight. After 1808, he could no longer read or write. In 1812, he became paralyzed on one side, and dropsy set in around 1815. Messier finally died on the 11<sup>th</sup> of April 1817 at the age of 87 years. Three days later, he was buried in the cemetery of Père Lachaise.

The speech at Messier’s grave was given by Delambre, secretary of the reconstituted Royal Academy of Sciences. He commemorated the comet hunter with the words: “He did not write a single book, nor any treatise in general or in particular, but his observations will for a long time enrich the collection of the Academy. His famous colleague Lalande has created a constellation in his honor, the only one bearing the name of an astronomer. It will keep the memory of him alive, but his name will remain with science, independent of this honouring act of friendship: in terms of the catalog of comets, in which the name Messier has been recorded as often as honestly.”



*William Herschel continued with Messier’s work. Painting by Contel, from an engraving*