(Messier's Original Catalog)

Catalog of Nebulae and Star Clusters.

Observed at Paris by M. Messier.
At the Observatory of the Marine.
Hotel de Cluny. Rue de Mathurins.

1. 5h 20m 02s (80d 00' 33") +21d 45' 17"

(September 12, 1758) `Nebula above the southern horn of Taurus, it doesn't contain any star; it is a whitish light, elongated in the shape of a flame of a candle, discovered while observing the comet of 1758. See the chart of that comet, *Mem. Acad.* of the year 1759, page 188; observed by Dr. Bevis in about 1731. It is reported on the English *Celestial Atlas*.'

[A note in Messier's handwriting added in the margin of his copy of the *Connoissance des Temps* for 1783 reads:] `This nebula reported on the great English atlas: Seen by Dr Bevis about 1731. according to his letter written to me on 10th June 1771.'

2. 21h 21m 08s (320d 17' 00") -1d 47' 00"

(September 11, 1760) `Nebula without star in the head of Aquarius, its center is brilliant, & the light surrounding it is round; it resembles the beautiful nebula which is situated between the head & the bow of Sagittarius [M22], it is seen very well with a telescope of 2 feet [FL], placed below the parallel [same Dec] of Alpha of Aquarius. M. Messier has reported this nebula on the chart of the track of the comet observed in 1759. *Mem. Acad.* of the year 1760, page 464. M. Maraldi has seen this nebula in 1746 while observing the comet which appeared that year. (Diam. 4')'

[Handwritten note in Messier's personal copy:] `No. 53 of the Berlin tables'

3. 13h 31m 25s (202d 51' 19") +29d 32' 57"

(May 3, 1764) `Nebula discovered between Bootes & one of the Hunting Dogs of Hevelius [Canes Venatici], it doesn't contain any star, its center is brilliant, & its light is gradually fading away, it is round; in a beautiful [dark] sky, one can see it in a telescope of 1-foot [FL]: It is reported on the chart of the comet observed in 1779. *Memoirs of the Academy* of the same year. Reviewed on March 29, 1781, always very beautiful. (Diam. 3')'

[Handwritten remark in Messier's copy:] `Reviewed on January 9, 1790.'

4. 16h 09m 08s (242d 16' 56") -25d 55' 40"

(May 8, 1764) `Cluster of very small [faint] stars; with an inferior telescope, it appears more like a nebula; this cluster is situated near *Antares* & on its parallel. Observed by M. de la Caille, & reported in his catalog. Reviewed January 30 & March 22, 1781. (Diam 2.5')'

5. 15h 06m 36s (226d 39' 04") +2d 57' 16"
(May 23, 1764) `Beautiful Nebula discovered between the Balance [Libra] & the Serpent [Serpens], near the star in the Serpent, of 6th magnitude, which is the 5th according to the Catalog of Flamsteed [5 Ser]: it doesn't contain any star; it is round, & one sees it very well, in a fine [clear dark] sky, with an ordinary refractor of 1-foot [FL]. M. Messier has reported it in the chart of the comet of 1763. *Mem. Acad* for the year 1774, page 40. Reviewed on Sep. 5, 1780, January 30 & March 22, 1781. (Diam. 3')'

6. 17h 24m 42s (261d 10' 39") -32d 10' 34"
(May 23, 1764) `Cluster of small stars between the bow of Sagittarius & the tail of Scorpius. At simple view [to the naked eye], this cluster seems to form a nebula without stars; but even with the smallest instrument one employs for investigating one sees a cluster of small [faint] stars. (Diam. 15')'

[Handwritten remark:] Lacaille has it.

7. 17h 38m 02s (264d 30' 24") -34d 40' 34"
(May 23, 1764) `Star cluster more considerable than the preceding [M6]; this cluster appears to the naked eye like a nebulosity; it is little distant from the preceding, placed between the bow of Sagittarius & the tail of Scorpius. (Diam. 30')'

[Handwritten remark:] Lacaille has it.

8. 17h 49m 58s (267d 29' 30") -24d 21' 10"
(May 23, 1764) `A cluster which appears in the shape of a nebula when observed with an ordinary telescope of 3 feet [FL]; but with an excellent instrument one perceives nothing but a large quantity of small [faint] stars; near this cluster is a fairly bright star, surrounded by a very faint glow: this is the ninth star of Sagittarius, of seventh magnitude, according to Flamsteed [9 Sgr]: this cluster appears in elongated shape, which extends from North-East to South-West, between the arc of Sagittarius & the foot of Ophiuchus. (Diam. 30')'

[Handwritten remark:] Lacaille has it.

9. 17h 05m 22s (256d 20' 36") -18d 13' 26"
(May 28, 1764) `Nebula, without star, in the right leg of *Ophiuchus*; it is round & its light is faint. Reviewed on March 22, 1781. (Diam. 3')'

10. 16h 44m 48s (251d 12' 06") -3d 42' 18"
(May 29, 1764) `Nebula, without stars, in the belt of *Ophiuchus*, near the 30th star of that constellation, of sixth magnitude, according to Flamsteed [30 Oph]. This nebula is beautiful & round; one can only see it with difficulty in an ordinary telescope of 3-feet [FL]. M. Messier has reported on the 2nd chart of the track of the Comet of 1769. *Mem. Acad.* for the year 1775, *plate IX*. Reviewed on March 6, 1781.' (Diam. 4')

[manuscript note in Messier's personal copy, 1780 catalog:] `Reviewed in the morning of March 6, 1781. "Always very fine."'
[note in the 1781 catalog:] `Reviewed in the morning of March 10, 1790. Night-glass of Rebour.'

11. 18h 30m 23s (279d 35' 43") -6d 31' 01"
(May 30, 1764) `Cluster of a great number of small [faint] stars, near the star K of *Antinous* [Sct], which one can see only in a good instrument; with an ordinary telescope of 3 feet [FL] it resembles a Comet: This cluster is mingled with a faint glow; in this cluster there is a star of 8th magnitude. M. Kirch observed it in 1681. *Philosophical Transactions No. 347, p. 390*. It is reported on the English *Great Atlas*.' (diam. 4')

12. 16h 34m 53s (248d 43' 10") -2d 30' 28"
(May 30, 1764) `Nebula discovered in the Serpent, between the arm and the left side of *Ophiuchus*: this nebula doesn't contain any star, it is round & its light faint; near this nebula there is a star of 9th magnitude. M. Messier has reported it on the second Chart of the Comet observed in 1769. *Mem. Acad. 1775, pl. IX*. Reviewed March 6, 1781. (diam. 3')'

[Handwritten remark in Messier's copy:] On March 10, 1790 reviewed.

13. 16h 33m 15s (248d 18' 48") +36d 54' 44"
(June 1, 1764) `Nebula without star, discovered in the belt of Hercules; it is round & brilliant, the center [is] more brilliant than the edges, one perceives it with a telescope of one foot [FL]; it is near two stars, the one & the other of 8th magnitude, the one above and the other below it: the nebula ['s position] was determined by comparing it with Epsilon Herculis. M. Messier has reported it on the Chart of the Comet of 1779, which was included in the volume of the Academy of that year. Seen by Halley in 1714. Reviewed Jan. 5 & 30, 1781. It is reported in the English *Celestial Atlas*.' (diam. 6')

14. 17h 25m 14s (261d 18' 29") -3d 05' 45"
(June 1, 1764) `Nebula without star, discovered in the garb which dresses the right arm of *Ophiuchus*, & situated on the parallel of Zeta of Serpens: this nebula is not large, its light is faint, one can see it nevertheless with an ordinary telescope of three feet and a half [FL]; it is round, near it is a small [faint] star of the nineth magnitude; its position has been determined by comparing it with *Gamma* of *Ophiuchus*, & M. Messier has reported its position on the Chart of the Comet of 1769. *Memoirs de l'Academy, year 1775, plate IX*. Reviewed on March 22, 1781.' (diam. 7')

15. 21h 18m 41s (319d 40' 19") +10d 40' 03"
(June 3, 1764) `Nebula without a star, between the head of Pegasus and that of Equuleus; it is round, in the center it is brilliant, its position was determined by comparison with Delta Equulei. M. Maraldi, in the Memoirs of the Academy of 1746, reports of this nebula: "I have found, he says, between the stars Epsilon Pegasi and Beta Equulei, a fairly bright nebulous star, which is composed of

many stars; its right ascension is 319d 27' 6", and its northern declination is 11d 2' 22".' (diam. 3')

16. 18h 05m 00s (271d 15' 03") -13d 51' 44"
(June 3, 1764) `A cluster of small stars, enmeshed in a faint glow, near the tail of Serpens, at little distance to the parallel of Zeta of this constellation; with an inferior telescope this cluster appears like a nebula.' (diam. 8')

17. 18h 07m 03s (271d 45' 48") -16d 14' 44"
(June 3, 1764) `A train of light without stars, of 5 or 6 minutes in extent, in the shape of a spindle, & a little like that in Andromeda's belt [M31] but of a very faint light; there are two telescopic stars nearby & placed parallel to the equator. In a good sky one observes this nebula very well in an ordinary telescope of 3.5-foot [FL]. Reviewed on March 22, 1781.' (diam. 5')

18. 18h 06m 16s (271d 34' 03") -17d 13' 14"
(June 3, 1764) `A cluster of small stars, a little below above nebula, No. 17, surrounded by slight nebulosity, this cluster is less obvious than the preceding, No. 16: with an ordinary telescope of 3.5-foot [FL], this cluster appears like a nebula; but with a good telescope one sees nothing but stars.' (diam. 5')

19. 16h 48m 07s (252d 01' 45") -25d 54' 46"
(June 5, 1764) `Nebula without stars, on the parallel of *Antares* between Scorpius and the right foot of *Ophiuchus*: this nebula is round; one can see it very well with an ordinary telescope of 3.5-foot [FL]; the nearest neighboring known star to this nebula is 28 *Ophiuchi*, which is of mag. 6, according to Flamsteed.' (diam. 3')

20. 17h 48m 16s (267d 04' 05") -22d 59' 10"
(June 5, 1764) `Cluster of stars, a little above the Ecliptic, between the bow of Sagittarius & the right foot of *Ophiuchus*. Reviewed on March 22, 1781.' [see also description of M21]

21. 17h 50m 07s (267d 31' 35") -22d 31' 25"
(June 5, 1764) `Star cluster, near the preceding [M20]: The nearest neighboring known star to these two clusters is 11 Sagittarii, 7 mag, according to Flamsteed. The stars of both these clusters are of 8-9 magnitude, enveloped in nebulosity.'

22. 18h 21m 55s (275d 28' 39") -24d 06' 11"
(June 5, 1764) `Nebula, below the ecliptic, between the head and the bow of Sagittarius, near a star of 7th magnitude, 25 Sagittarii, according to Flamsteed, this nebula is round, it doesn't contain any star, & one can see it very well in an ordinary telescope of 3.5-foot [FL]; the star Lambda Sagittarii served for determination [of its position]. Abraham Ihle, a German, discovered it in 1665, while observing Saturn. M. Le Gentil observed it in 1747, & he made an engraving of it. *Memoirs* of the Academy, year 1759, page 470. Reviewed March 22, 1781; it is reported in the English *Atlas*.' (diam. 6')

23. 17h 42m 51s (265d 42' 50") -18d 45' 55"
(June 20, 1764) `A star cluster, between the end of the bow of Sagittarius & the right foot of *Ophiuchus*, very near to 65 *Ophiuchi*, according to Flamsteed. The stars of this cluster are very close to one another. Its position was determined from Mu Sagittarii.' (diam. 15')

24. 18h 01m 44s (270d 26' 00") -18d 26' 00"

(June 20, 1764) `Cluster on the parallel of the preceding [M23] & near the end of the bow of Sagittarius, in the Milky Way: a large nebulosity in which there are many stars of different magnitudes: the light which is spread throughout this cluster is divided into several parts; it is the center of this cluster which has been determined [position].' (diam. 1d 30')

25. 18h 17m 40s (274d 25' 00") -19d 05' 00"
(June 20, 1764) `A cluster of small stars in the neighborhood of the two previous clusters [M23 and M24], between the head & the end of the bow of Sagittarius: the nearest known star to this cluster is 21 Sagittarii, 6th magnitude, according to Flamsteed. The stars of this cluster are seen with difficulty with an ordinary telescope of 3.5-foot [FL]; no nebulosity can be seen. Its position has been determined from Mu Sagittarii.' (diam. 10')

26. 18h 32m 22s (278d 05' 25") -9d 38' 14"
(June 20, 1764) `A cluster near Eta and Omicron in Antinous [now Alpha and Delta Scuti], between which there is another one of more brightness: with a telescope of 3.5-foot [FL] one cannot distinguish them, one needs to employ a good instrument. This cluster contains no nebulosity.' (diam. 2')

27. 19h 49m 27s (297d 21' 41") +22d 04' 00"
(July 12, 1764) `Nebula without star, discovered in Vulpecula, between the two forepaws, & very near the star 14 of that constellation, of 5th magnitude according to Flamsteed; one can see it well with an ordinary telescope of 3.5-foot [FL]; it appears of oval shape, & it contains no star. M. Messier has reported its position on the chart of the Comet of 1779, which was engraved for the volume of the Academy of the same year. Reviewed on January 31, 1781.' (diam. 4')

28. 18h 09m 58s (272d 29' 30") -24d 57' 11"
(July 27, 1764) `Nebula discovered in the upper part of the bow of Sagittarius at about one degree from the star Lambda & little distant from the beautiful nebula which is between the head and the bow [M22]. It contains no star; it is round, it can only be seen difficultly with an ordinary telescope of 3.5-foot [FL]. Its position has been determined from Lambda Sagittarii. Reviewed March 20, 1781.' (diam. 2')

29. 20h 15m 38s (303d 54' 29") +37d 11' 57"
(July 29, 1764) `A cluster of 7 or 8 very small stars, which are below Gamma Cygni, which one sees with an ordinary telescope of 3.5-foot [FL] in the form of a nebula. Its position determined from Gamma Cygni. Reported on chart of the Comet of 1779.'

30. 21h 27m 05s (321d 46' 18") -24d 19' 04"
(August 3, 1764) `Nebula discovered below the tail of Capricorn, very near to the star 41 of that constellation, of 6th magnitude, according to Flamsteed. One sees it with difficulty with an ordinary telescope of 3.5-foot [FL]. It is round & contains no star; its position determined from Zeta Capricorni, M. Messier reported it on chart of the Comet of 1759. *Mem. Acad.* 1760, pl. II.' (diam. 2')

31. 0h 29m 46s (7d 26' 32") +39d 09' 32"
(August 3, 1764) `The beautiful nebula of the belt of Andromeda, shaped like a spindle; M. Messier has investigated it with different instruments, & he didn't recognise a star: it resembles two cones or pyramides of light, opposed at their

bases, the axes of which are in direction NW-SE; the two points of light or the apices are about 40 arc minutes apart; the common base of the pyramids is about 15'. This nebula was discovered by Simon *Marius*, & consequently observed by different astronomers. M. le Gentil has given a drawing in the Memoirs of the Academy for 1759, page 453. It is reported on the English *Atlas*.' (diam. 40')

(*Flammarion* reports that Messier added a note in his personal copy of the catalog by hand: `I have employed different instruments, especially an excellent Gregorian telescope of 30 feet FL, the large mirror 6 inches in diameter, magnification 104x. The center of this nebula appears fairly clear in this instrument without any stars appearing. The light gradually diminishes until it becomes extinguished. The former measurements were made with a Newtonian telescope of 4.5 feet FL, provided with a silk thread micrometer. Diameter 40'. August 3, 1764.')

32. 0h 29m 50s (7d 27' 32") +38d 45' 34"
(August 3, 1764) `Small nebula without stars, below & at some minutes [separation] from that of the belt of Andromeda [M31]; this small nebula is round, its light fainter than that of the belt. M. le Gentil has discovered it on October 29, 1749. M. Messier saw it, for the first time, in 1757, & he has not found any change.' (diam. 2')

33. 1h 40m 37s (20d 09' 17") +29d 32' 25"
(August 25, 1764) `Nebula discovered between the head of the Northern Fish [of Pisces] & the great Triangle, a bit distant from a star of 6th magnitude: The nebula is of a whitish light of almost even density [of brightness], however a little brighter along two-third of its diameter, & contains no star. One sees it with difficulty with an ordinary telescope of 1-foot [FL]. Its position was determined from Alpha Trianguli. Reviewed on September 27, 1780.' (diam. 15')

34. 2h 27m 27s (36d 51' 37") +41d 39' 32"
(August 25, 1764) `Cluster of small stars, between the head of Medusa (Algol) & the left foot of Andromeda, a little below the parallel of Gamma [Andromedae]: with an ordinary telescope of 3 foot [FL] one can distinguish the stars. Its position has been determined from Beta [Persei], the head of Medusa.' (diam. 15')

35. 5h 54m 41s (88d 40' 09") +24d 33' 30"
(August 30, 1764) `Cluster of very small stars, near the left foot of Castor, at a little distance from the stars Mu & Eta of that constellation [Gemini]. M. Messier has reported its position on the chart of the comet of 1770, *Mem. Acad. 1771, pl. VII*. Reported in the English *Atlas*.' (diam. 20')

36. 5h 20m 47s (80d 11' 42") +34d 08' 06"
(September 2, 1764) `Cluster of stars in Auriga, near the star Phi: with an ordinary telescope of 3.5 foot [FL] one has pain to distinguish the stars, the cluster contains no nebulosity. Its position determined from Phi [Aurigae].' (diam. 9')

37. 5h 37m 01s (84d 15' 12") +32d 11' 51"
(September 2, 1764) `Cluster of small stars, little remote from the preceding [M36], above the parallel of chi Aurigae; the stars are smaller, more close together and enclosing some nebulosity; with an ordinary telescope of 3.5 feet

[FL], one has pain to see the stars: this cluster is reported on the Chart of the second Comet of 1771, *Mem. Acad. 1777*.' (diam. 9')

[Handwritten remark in Messier's copy:] Reviewed on the 6th of March, 1781.

38. 5h 12m 41s (78d 10' 12") +36d 11' 51"
(September 25, 1764) `Cluster of small stars in Auriga, near the star Sigma, little distant from the two preceding clusters [M36 and M37]; this one is of square shape & contains no nebulosity, if one takes care to examine it with a good telescope. Its extension is about 15' of arc.' (diam. 15')

39. 21h 23m 49s (320d 57' 10") +47d 25' 00"
(October 24, 1764) `Cluster of stars near the tail of the Swan; one can see them with an ordinary telescope of 3.5 feet [FL].' (diam. 1d 00')

40. 12h 11m 02s (182d 45' 30") +59d 23' 50"
(October 24, 1764) [1771] `The same night of October 24 to 25, I searched for the nebula above the tail of the Great Bear, which is indicated in the book *Figure of the Stars*, second edition: its should have, in 1660, the right ascension 183d 32' 41", & the northern declination 60d 20' 33". I have found, by means of this position, two stars very near to each other & of equal brightness, about the 9th magnitude, placed at the beginning of the tail of Ursa Major: one has difficulty to distinguish them with an ordinary [nonachromatic] refractor of 6 feet [FL]. Here are their position: right ascension, 182 deg 45' 30", & 59 deg 23' 50" northern declination. There is reason to presume that Hevelius mistook these two stars for a nebula.'

[1780 and 1781] `Two stars very close together & very small, placed at the root of the tail of the Great Bear: One has difficulty to distinguish them with an ordinary telescope of 6 feet [FL]. While searching for the nebula above the back of Ursa Major, reported in the book Figures des Astres, and which is supposed to be for 1660 at 183d 32' 41" right ascension, & 60d 20' 33" northern declination, which Messier couldn't see, he has observed these two stars.'

[actually, it seems that Hevelius has observed another nearby binary, 74 Ursae Majoris, of mag 5]

41. 6h 35m 53s (98d 58' 12") -20d 33' 00"
(January 16, 1765) `Cluster of stars below *Sirius*, near Rho Canis Majoris; this cluster appears nebulous in an ordinary telescope of one foot [FL]; it is nothing more than a cluster of small stars.'

42. 5h 23m 59s (80d 59' 40") -5d 34' 06"
(March 4, 1769) `Position of the beautiful nebula in the sword of Orion, around the star Theta which ii contains [together] with three other smaller stars which one cannot see but with good instruments. Messier has entered into the great details in this great nebula; he has created a drawing, made with the greatest care, which one can see in the *Memoirs of the Academy for 1771, plate VIII*. It was Huygens

who discovered it in 1656: it has been observed since by many astronomers. Reported in the English *Atlas*.'

43. 5h 24m 12s (81d 03' 00") -5d 26' 37"
(March 4, 1769) `Position of the little star surrounded by nebulosity & which is below the nebula of the sword of Orion. M. Messier has included it in the drawing of the Great [Nebula].'

44. 8h 27m 22s (126d 50' 30") +20d 31' 38"
(March 4, 1769) `Cluster of stars known by the name of the nebula in Cancer. The position given is that of the star C.'

45. 3h 33m 48s (53d 27' 04") +23d 22' 41"
(March 4, 1769) `A cluster of stars, known by the name of the *Pleiades*. The position reported is that of the star *Alcyone*.'

46. 7h 31m 11s (112d 47' 43") -14d 19' 07"
(February 19, 1771) `A cluster of very small stars, between the head of the Great Dog and the two hind feet of the Unicorn, [its position] determined by comparing this cluster with the star 2 Navis, of 6th-magnitude, according to Flamsteed; one cannot see these stars but with a good refractor; the cluster contains a bit of nebulosity.'

47. 7h 44m 16s (116d 03' 58") -14d 50' 08"
(February 19, 1771) `Cluster of stars, little distant from the preceding; the stars are greater [brighter]; the middle of the cluster was compared with the same star, 2 Navis. The cluster contains no nebulosity.'

(At the position recorded by Messier, which also found its way into *John Herschel*'s GC as GC 1594 and, consequently, into *Dreyer*'s NGC as NGC 2478, no cluster is found, so that this object was missed, until *T.F. Morris*, in 1959, identified it correctly as Herschel's cluster H VIII.38 (NGC 2422), and realised that Messier had done a simple sign error in RA difference when reducing the positional data.)

48. 8h 02m 24s (120d 36' 00") -1d 16' 42"
(February 19, 1771) `Cluster of very small [faint] stars, without nebulosity; this cluster is at a short distance from the three stars that form the beginning of the Unicorn's tail.'

(As for M47, Messier did a reduction error, this time giving a position exactly 5 degrees north of the object, so that M48 was missing until *Oswald Thomas* identified it correctly but perhaps by chance in 1934, and *T.F. Morris* identified it in 1959, with Herschel's H VI.22, NGC 2548.)

49. 12h 17m 48s (184d 26' 58") +9d 16' 09"
(February 19, 1771) `Nebula discovered near the star Rho Virginis. One cannot see it without difficulty with an ordinary telescope of 3.5-feet [FL]. The Comet of 1779 was compared by M. Messier with this nebula on April 22 and 23: The comet and the nebula had the same light. M. Messier has reported this nebula on

the chart of the route of the comet, which appeared in the volume of the Academy of the same year 1779. Reviewed on April 10, 1781.'

50. 6h 51m 50s (102d 57' 28") -7d 57' 42"
(April 5, 1772) `Cluster of small stars, more or less brilliant, above the right loins of the Unicorn, above the star Theta of the ear of Canis Major, & near a star of 7th magnitude. It was while observing the Comet of 1772 that M. Messier observed this cluster. He has reported it on the chart of that comet, on which its trace has been drawn. *Mem. Acad. 1772*.'

51. 13h 20m 23s (200d 05' 48") +48d 24' 24"
(January 11, 1774) `Very faint nebula, without stars, near the eye of the Northern Greyhound [hunting dog], below the star Eta of 2nd magnitude of the tail of Ursa Major: M. Messier discovered this nebula on October 13, 1773, while he was watching the comet visible at that time. One cannot see this nebula without difficulties with an ordinary telescope of 3.5 foot [FL]: Near it is a star of 8th magnitude. M. Messier reported its position on the Chart of the Comet observed in 1773 & 1774. *Memoirs of the Academy 1774, plate III*. It is double, each has a bright center, which are separated 4'35". The two "atmospheres" touch each other, the one is even fainter than the other. Reobserved several times.'

[Handwritten note in Messier's personal copy of the 1780 version of the catalog:] M. Méchain has seen that nebula on March 21, 1781 .. [included is a sketch of the two "nebulae" and a star]

52. 23h 14m 38s (348d 39' 27") +60d 22' 12"
(September 7, 1774) `Cluster of very small [faint] stars, mingled with nebulosity, which can be seen only with an achromatic telescope. It was when he observed the Comet which appeared in this year that M. Messier saw this cluster, which was close to the comet on the 7th of September 1774; it is below the star *d* Cassiopeiae: that star was used to determine [the position of] both the cluster of stars & the comet.'

53. 13h 02m 02s (195d 30' 26") +19d 22' 44"
(February 26, 1777) `Nebula without stars discovered below & near Coma Berenices, a little distant from the star 42 in that constellation, according to Flamsteed. This nebula is round and conspicuous. The Comet of 1779 was compared directly with this nebula, & M. Messier has reported it on the chart of that comet, which will be included in the volume of the Academy for 1779. Reviewed on April 13, 1781: It resembles the nebula which is below Lepus (M79).'

54. 18h 40m 52s (280d 12' 55") -30d 44' 01"
(July 24, 1778) `Very faint nebula, discovered in Sagittarius; its center is brilliant & it contains no star, seen with an achromatic telescope of 3.5 feet [FL]. Its position has been determined from Zeta Sagittarii, of 3rd magnitude.'

55. 19h 26m 02s (291d 30' 25") -31d 26' 27"
(July 24, 1778) `A nebula which is a whitish spot, of about 6' extension, its light is even and does not appear to contain any star. Its position has been determined from zeta Sagittarii, with the use of an intermediate star of 7th magnitude. This

nebula has been discovered by M. l'Abbe de LaCaille, see *Mem. Acad. 1755, p. 194* [Glyn Jones has erroneously 1775]. M. Messier has looked for it in vain on July 29, 1764, as reported in his memoir.'

56. 19h 08m 00s (287d 00' 01") +29d 48' 14"
(January 23, 1779) `Nebula without stars, having little light; M. Messier discovered it on the same day as he found the comet of 1779, January 19. On the 23rd, he determined its position by comparing it with the star 2 Cygni, according to Flamsteed: it is near the Milky Way; and close to it is a star of 10th magnitude. M. Messier reported it on the chart of the comet of 1779.'

57. 18h 45m 21s (281d 20' 08") +32d 46' 03"
(January 31, 1779) `A cluster of light between Gamma & Beta Lyrae, discovered when looking for the Comet of 1779, which has passed it very close: it seems that this patch of light, which is round, must be composed of very small stars: with the best telescopes it is impossible to distinguish them; there stays only a suspicion that they are there. M. Messier reported this patch of light on the Chart of the Comet of 1779. M. Darquier, at Toulouse, discovered it when observing the same comet, and he reports: "Nebula between gamma and beta Lyrae; it is very dull, but perfectly outlined; it is as large as Jupiter & resembles a planet which is fading".'

[was it this description which gave rise to the term, "Planetary Nebula" ?]

58. 12h 26m 30s (186d 37' 23") +13d 02' 42"
(April 15, 1779) `Very faint nebula discovered in Virgo, almost on the same parallel as epsilon [Virginis], 3rd mag. The slightest light for illuminating the micrometer wires makes it disappear. M. Messier reported it on the chart of the Comet of 1779, which is located inthe volume of the Academy for the same year.'

59. 12h 30m 47s (187d 41' 38") +12d 52' 36"
(April 15, 1779) `Nebula in Virgo & in the neighborhood of the preceding [M58], on the parallel of epsilon [Virginis], which has served for its [position] determination: it is of the same light as the above, equally faint. M. Messier reported it on the Chart of the Comet of 1779.'

60. 12h 32m 28s (188d 06' 53") +12d 46' 02"
(April 15, 1779) `Nebula in Virgo, a little more distinct than the two preceding [M58 and M59], on the same parallel as epsilon [Virginis], which has served for its [position] determination. M. Messier reported it on the Chart of the Comet of 1779. He discovered these three nebulae while observing this Comet which passed very close to them. The latter passed so near on April 13 & 14 that the one & the other were both in the same field [of view] of the refractor, and he could not see it; it was not until the 15th, while looking for the Comet, that he perceived the nebula. These three nebulae don't appear to contain any star.'

61. 12h 10m 44s (182d 41' 05") +5d 42' 05"
(May 11, 1779) `Nebula, very faint & difficult to perceive. M. Messier mistook this nebula for the Comet of 1779, on the 5th, 6th & 11th of May; on the 11th he recognized that this was not the Comet, but a nebula which was located on its path & in the same point [place] of the sky.'

62. 16h 47m 14s (251d 48' 24") -29d 45' 30"
(June 4, 1779) `Very beautiful nebula, discovered in Scorpio, it resembles a little Comet, the center is brilliant & surrounded by a faint glow. Its position [was] determined, by comparing it with the star Tau of Scorpius. M. Messier had already seen this nebula on June 7, 1771, without having determined the position where it is close to. Reviewed on on March 22, 1781.'

63. 13h 04m 22s (196d 05' 30") +43d 12' 37"
(June 14, 1779) `Nebula discovered by M. Méchain in Canes Venatici. M. Messier searched for it; it is faint, it has nearly the same light as the nebula reported under *no. 59* [M59]: it contains no star, & the slightest illumination of the micrometer wires makes it disappear: it is close to a star of 8th magnitude, which precedes the nebula on the hour wire. M. Messier has reported its position on the Chart of the track of the Comet of 1779.'

64. 12h 45m 51s (191d 27' 38") +22d 52' 31"
(March 1, 1780) `Nebula discovered in Coma Berenices, which is about half as apparent as that which is below the hair [M53]. M. Messier has reported its position on the Chart of the Comet of 1779. Reviewed on March 17, 1781.'

65. 11h 07m 24s (166d 50' 54") +14d 16' 08"
(March 1, 1780) `Nebula discovered in Leo: It is very faint and contains no star.'

66. 11h 08m 47s (167d 11' 39") +14d 12' 21"
(March 1, 1780) `Nebula discovered in Leo; its light is very faint & it is very close to the preceding [M65]: They both appear in the same field [of view] in the refractor. The comet of 1773 & 1774 has passed between these two nebulae on November 1 to 2, 1773. M. Messier didn't see them at that time, no doubt, because of the light of the comet.'

67. 8h 36m 28s (129d 06' 57") +12d 36' 38"
(April 6, 1780) `Cluster of small stars with nebulosity, below the southern claw of Cancer. The position determined from the star Alpha [Cancri].'

68. 12h 27m 38s (186d 54' 33") -25d 30' 20"
(April 9, 1780) `Nebula without stars below Corvus & Hydra; it is very faint, very difficult to see with the refractors; near it is star of sixth magnitude.'

69. 18h 16m 47s (274d 11' 46") -32d 31' 45"
(August 31, 1780) `Nebula without star, in Sagittarius, below his left arm & near the arc; near it is a star of 9th magnitude; its light is very faint, one can only see it under good weather, & the least light employed to illuminate the micrometer wires makes it disappear: its position has been determined from Epsilon Sagittarii: this nebula has been observed by M. de La Caille, & reported in his Catalog; it resembles the nucleus of a small Comet.' (diam 2')

[in appendix of the *Connoissance des Temps* for 1783, p. 408] `On August 31, 1780, M. Messier has once again discovered two nebulae placed below the left arm & near the arc of Sagittarius, both on the same parallel; here are their positions,
274d 11' 46" in right ascension & 32d 31' 45" in southern declination [M69]
277. 13. 16. ..... 32. 31. 7. [M70]

70. 18h 28m 53s (277d 13' 16") -32d 31' 07"
(August 31, 1780) `Nebula without star, near the preceding [M69], & on the same parallel: near it is a star of the nineth magnitude & four small telescopic stars, almost on the same straight line, very close to one another, & [they] are situated above the nebula, as seen in a reversing telescope; the [position of the] nebula was determined from the same star Epsilon Sagittarii.' (diam 2')

[in appendix of the *Connoissance des Temps* for 1783, p. 408] `On August 31, 1780, M. Messier has once again discovered two nebulae placed below the left arm & near the arc of Sagittarius, both on the same parallel; here are their positions,
274d 11' 46" in right ascension & 32d 31' 45" in southern declination [M69]
277. 13. 16. ..... 32. 31. 7. [M70]

71. 19h 43m 57s (295d 59' 06") +18d 13' 00"
Méchain: (296d 00' 04") +18d 14' 21"
(October 4, 1780) `Nebula discovered by M. Méchain on June 28, 1780, between the stars Gamma and Delta Sagittae. On October 4 following, M. Messier looked for it: its light is very faint & it contains no star; the least light makes it disappear. It is situated about 4 degrees below [south of] that which M. Messier discovered in Vulpecula. See No. 27. He reported it on the Chart of the Comet of 1779.' (diam 3.5')

72. 20h 41m 23s (310d 20' 49") -13d 20' 51"
Méchain: (310d 21' 10") -13d 21' 24"
(October 4, 1780) `Nebula seen by M. Méchain in the night of August 29-30, 1780, above the neck of Capricorn. M. Messier looked for it on the 4th and 5th October following: the light is as faint as for the preceding [M71]; near it is a small telescopic star: the position was determined from the star Nu Aquarii, of fifth magnitude.' (diam 2')

73. 20h 46m 52s (311d 43' 04") -13d 28' 40"
(October 4 & 5, 1780) `Cluster of three or four small stars, which resembles a nebula at first sight, containing a little nebulosity: this cluster is situated on the same parallel as the preceding nebula [M72]: its position was determined from the same star Nu Aquarii.'

(in Messier's handwritten notes on the discovery of the objects, he does not mention Nu Aquarii, and his description on how he measured M72 implies that this "Same Star" may actually be 6th-mag HD 198431 just west of M72.)

74. 1h 24m 57s (21d 14' 09") +14d 39' 35"
Méchain: (21d 17' 00") +14d 36' 00"
(October 18, 1780) `Nebula without stars, near the star Eta Piscium, seen by M. Méchain at the end of September 1780, & he reports: "This nebula doesn't contain any stars; it is fairly large, very obscure, and extremely difficult to observe; one can recognize it with more certainty in fine, frosty conditions". M. Messier looked

for it & found it, as M. Méchain describes it: it has been compared directly with the star Eta Piscium.'

75. 19h 53m 10s (298d 17' 24") -22d 32' 23"
Méchain: (298d 17' 30") -22d 32' 00"
(October 18, 1780) `Nebula without star, between Sagittarius & the head of Capricorn; seen by M. Méchain on August 27 & 28, 1780. M. Messier looked for it on the following October 5, & on October 18, compared it [i.e., its position] with the star 4 Capricorni, of sixth magnitude, according to Flamsteed: it seemed to M. Messier to be composed of nothing but very small [faint] stars, containing nebulosity: M. Méchain reported it as a nebula without stars. M. Messier saw it on October 5; but the Moon being above the horizon, & it was not until the 18th of the same month that he was able to judge about its form & determine its position.'

76. 1h 28m 43s (22d 10' 47") +50d 28' 48"
Méchain: (22d 10' 26") +50d 28' 12"
(October 21, 1780) `Nebula at the right foot of Andromeda, seen by M. Méchain on September 5, 1780, & he reports: "This nebula contains no star; it is small and faint". On the following October 21, M. Messier looked for it with his achromatic telescope, & it seemed to him that it was composed of nothing but small stars, containing nebulosity, & that the least light employed to illuminate the micrometer wires causes it disappear: its position was determined from the star Phi Andromedae, of fourth magnitude.' (diam. 2')

77. 2h 31m 30s (37d 52' 33") -0d 57' 43"
Méchain: (37d 52' 58") -0d 57' 44"
(December 17, 1780) `Cluster of small stars, which contains some nebulosity, in Cetus & on the parallel of the star Delta, reported of the third magnitude, & which M. Messier estimated to be hardly of the fifth. M. Méchain saw this cluster on October 29, 1780 in the form of a nebula.'

78. 5h 35m 34s (83d 53' 35") -0d 01' 23"
Méchain: (83d 53' 02") -0d 00' 31"
(December 17, 1780) `Cluster of stars, with much nebulosity in Orion & on the same parallel as the star Delta in the belt, which has served to determine its position; the cluster follows [is east of] the star on the hour wire at 3d 41', & the cluster is above [north of] the star by 27'7". M. Méchain had seen this cluster at the beginning of 1780, & reported: "On the left side of Orion [Glyn Jones has, erroneously, the right]; 2 to 3 minutes in diameter, one can see two fairly bright nuclei, surrounded by nebulosity".' (diam. 3')

79. 5h 15m 16s (78d 49' 02") -24d 42' 57"
Méchain: (78d 47' 10") -24d 44' 46"
(December 17, 1780) `Nebula without star, situated below Lepus, & on the same parallel as a star of sixth magnitude: seen by M. Méchain on October 26, 1780. M. Messier looked for it on the following December 17: this nebula is beautiful; the center brilliant, the nebulosity a little diffuse; its position was determined from the star Epsilon Leporis, of fourth magnitude.'

80. 16h 04m 00s (240d 59' 48") -22d 25' 13"
Méchain: (241d 00' 26") -22d 27' 58"
(January 4, 1781) `Nebula without star, in Scorpius, between the stars *g*. [now

Rho Ophiuchi] and Delta, compared to *g* to determine its position: this nebula is round, the center brilliant, & it resembles the nucleus of a small Comet, surrounded with nebulosity. M. Méchain saw it on January 27, 1781.' (diam. 2')

81. 9h 37m 51s (144d 27' 44") +70d 07' 24"
Méchain: (144d 27' 00") +70d 04' 00"
(February 9, 1781) `A nebula near the ear of the great Bear [Ursa Major], on the parallel of the star *d*, of fourth or fifth magnitude: its position was determined from that star. This nebula is a little oval, the center clear, & one can see it well in an ordinary telescope of 3.5 feet [FL]. It was discovered by M. Bode at Berlin on December 31, 1774, & by M. Méchain, in the month August 1779.'

82. 9h 37m 57s (144d 29' 22") +70d 44' 27"
Méchain: (144d 28' 13") +70d 43' 05"
(February 9, 1781) `Nebula without star, near the preceding [M81]; both are appearing in the same field of the telescope, this one is less distinct than the preceding; its light faint & [it is] elongated: at its extremity is a telescopic star. Seen at Berlin, by M. Bode, on December 31, 1774, & by M. Méchain in the month August 1779.'

83. 13h 24m 33s (201d 08' 13") -28d 42' 27"
(February 17, 1781) `Nebula without star, near the head of Centaurus: it appears as a faint & even glow, but it is difficult to see in the telescope, as the least light to illuminate the micrometer wires makes it disappear. One is only able with the greatest concentration to see it at all: it forms a triangle with two stars estimated of sixth & seventh magnitude: [its position was] determined from the stars *i*, *k* and *h* in the head of Centaurus: M. de la Caille has already determined this nebula. See the end of this Catalog.'

84. 12h 14m 01s (183d 30' 21") +14d 07' 01"
(March 18, 1781) `Nebula without star, in Virgo; the center it is a bit brilliant, surrounded with a slight nebulosity: its brightness & its appearance resemble that of those in this Catalog, *No.s 59 & 60*.'

85. 12h 14m 21s (183d 35' 21") +19d 24' 26"
Méchain: (183d 35' 45") +19d 23' 00"
(March 18, 1781) `Nebula without star, above & near to the ear of the Virgin [Virgo], between the two stars in Coma Berenices, *No.s 11 & 14* of the Catalog of Flamsteed: this nebula is very faint. M. Méchain had determined its position on March 4, 1781.'

86. 12h 15m 05s (183d 46' 21") +14d 09' 52"
(March 18, 1781) `Nebula without star, in Virgo, on the parallel & very near to the nebula above, *No. 84*: their appearances are the same, & both appear together in the same field of the telescope.'

87. 12h 19m 48s (184d 57' 06") +13d 38' 01"
(March 18, 1781) `Nebula without star, in Virgo, below & very near a star of eighth magnitude, the star having the same Right Ascension as the nebula, & its Declination was 13d 42' 21" north. This nebula appears at the same luminosity as the two nebulae *Nos. 84 and 86*.'

88. 12h 21m 03s (185d 15' 49") +15d 37' 51"

(March 18, 1781) `Nebula without star, in Virgo, between two small stars & one star of the sixth magnitude, which appear at the same time as the nebula in the field of the telescope. Its luminosity is one of the faintest, & [it] resembles the one reported in Virgo, *No. 58*.'

89. 12h 24m 38s (186d 09' 36") +13d 46' 49"
(March 18, 1781) `Nebula without star, in Virgo, a little of distance from & on the same parallel as the nebula reported above, *No. 87*. Its light was extremely faint & pale, & and it is not without difficulty that one can distinguish it.'

90. 12h 25m 48s (186d 27' 00") +14d 22' 50"
(March 18, 1781) `Nebula without star, in Virgo: its light is as faint as the preceding, *No. 89*.'

91. 12h 26m 28s (186d 37m 00s) +14d 57' 06"
(March 18, 1781) `Nebula without star, in Virgo, above the preceding *No. 90*: its light is still fainter than that of the above.'

(At the position Messier has given, no object is present which he could have seen, thus M91 was missing until 1969, when *William C. Williams* discovered that Messier had probably measured its position from M89, while he thought he used M58, and plotted it wrong.)

(Following the entry for M91 in the *Connoissance des Temps* for 1784, Messier added the note below:)
`*Note.* The constellation of Virgo, & especially the northern Wing is one of the constellations which encloses the most Nebulae: this Catalog contains thirteen which have been determined: viz. *Nos. 49, 58, 59, 60, 61, 84, 85, 86, 87, 88, 89, 90, & 91*. All these nebulae appear to be without stars: one can see them only in a very good sky, & near their meridian passage. Most of these nebulae have been pointed to me by M. Méchain.'

(This notion is apparently the first impact of the Virgo cluster of galaxies into the scientific literature, i.e. the discovery of that galaxy cluster).

92. 17h 10m 32s (257d 38' 03") +43d 21' 59"
(March 18, 1781) `Nebula, fine, distinct, & very bright, between the knee & the left leg of Hercules, it can be seen very well in a telescope of one foot [FL]. It contains no star; the center is clear & brilliant, surrounded by nebulosity & [it] resembles the nucleus of a large Comet: its brightness, its size, approach much that of the nebula which is in the girdle of Hercules. See *No. 13* of this Catalog: its position has been determined, by direct comparison with the star Sigma Herculis, fourth magnitude: the nebula & the star are on the same parallel.' (diam. 5')

93. 7h 35m 14s (113d 48' 35") -23d 19' 45"
(March 20, 1781) `Cluster of small stars, without nebulosity, between the Greater Dog [Canis Major] and the prow of the ship [Puppis of Argo Navis].' (diam 8')

94. 12h 40m 43s (190d 10' 46") +42d 18' 43"

Méchain: (190d 09' 38") +42d 18' 50"
(March 24, 1781) `Nebula without star, above the Heart of Charles [alpha Canum Venaticorum], on the parallel of the star *no. 8*, of sixth magnitude of the Hunting Dogs [Canes Venatici], according to Flamsteed: In the center it is brilliant & the nebulosity [is] a bit diffuse. It resembles the nebula which is below Lepus, *No. 79*; but this on is more beautiful & brighter: M. Méchain has discovered this one on March 22, 1781.' (diam. 2.5')

95. 10h 32m 12s (158d 03' 05") +12d 50' 21"
Méchain: (158d 06' 23") +12d 49' 50"
(March 24, 1781) `Nebula without star, in the Lion [Leo], above star *l* (53 Leonis): its light is very faint.'

96. 10h 35m 05s (158d 46' 20") +12d 58' 09"
Méchain: (158d 48' 00") +12d 57' 33"
(March 24, 1781) `Nebula without star, in the Lion [Leo], near the preceding [No. 95]: this one is less distinct, both are on the same parallel of *Regulus*: they resemble the two nebulae in the Virgin [Virgo], *Nos. 84 and 86*. M. Méchain saw them both on March 20, 1781.'

97. 11h 01m 15s (161d 18' 40") +56d 13' 30"
(actually, an erroneous "A" for "Australis", thus "Southern dec" appears in the printed version of the Catalog in the *Connoissance des Temps*, while not in Messier's preliminary, handwritten notes)

(March 24, 1781) `Nebula in the great Bear [Ursa Major], near Beta: It is difficulat to see, reports M. Méchain, especially when one illuminates the micrometer wires: its light is faint, without a star. M. Méchain saw it the first time on Feb 16, 1781, & the position is that given by him. Near this nebula he has seen another one, [the position of] which has not yet been determined [M108], and also a third which is near Gamma of the Great Bear [M109 near Gamma Ursae Majoris].' (diam. 2')

(The two nebulae mentioned here have been entitled M108 and M109 by Owen Gingerich in 1953, see the additional Messier objects.)

98. 12h 03m 23s (180d 50' 49") +16d 08' 15"
(April 13, 1781) `Nebula without star, of an extremely faint light, above the northern wing of the Virgin [Virgo], on the parallel & close to the star *no. 6*, fifth magnitude, of the hair of Berenice [Coma Berenices], according to Flamsteed. M. Méchain saw it on Mar 15, 1781.'

99. 12h 07m 41s (181d 55' 19") +15d 37' 12"
(April 13, 1781) `Nebula without star, of a very rare [pale, faint] light, nevertheless a little clearer than the preceding [M98], situated on the northern wing of the Virgin [Virgo], & near the same star, *no. 6*, of the hair of Berenice [Comae Berenices]. The nebula is between two stars of seventh & of eighth magnitude. M. Méchain saw it on March 15, 1781.'

100. 12h 11m 57s (182d 59m 19s) +16d 59' 21"

(April 13, 1781) `Nebula without star, of the same light as the preceding [M99], situated in the ear of Virgo. Seen by M. Méchain on March 15, 1781. These three nebulae, *nos. 98, 99 & 100*, are very difficult to recognize, because of the faintness of their light: one can observe them only in good weather, & near their passage of the Meridian.'

101. 13h 43m 28s (208d 52' 42") +55d 24' 25"

(March 27, 1781) `Nebula without star, very obscure & pretty large, of 6 or 7 minutes [of arc] in diameter, between the left hand of Bootes & the tail of the great Bear [Ursa Major]. It is difficult to distinguish when one lits the [graticule] wires.' (diam. 7')

102.

(*Méchain*) `Nebula between the stars Omicron of Bootes & Iota of the Dragon [Draco]: it is very faint; near it is a star of the sixth magnitude.'

(Handwritten position added by Messier in his personal copy: 14h 40m, +56.)

(The discoverer, *Pierre Méchain*, disclaimed the discovery of this object in his letter to Bernoulli, written May 6, 1783, and declared it was an erroneous reobservation of M101. However, his description matches well with an existing object, NGC 5866, as does Messier's position measurement, if one takes an error of exactly 5 degrees in right ascension into account. This issue was ever since, and is still, subject to controversial discussion. Anyway, M102 was missed for more than a century.)

103.

(*Méchain*) `Cluster of stars between Epsilon & Delta of the leg of Cassiopeia.'

(Handwritten position added by Messier in his personal copy: 1h 20m, +61.)

104. 12h 28m 39s (187d 9' 42") -10d 24' 49"

(*Messier*'s handwritten note in his copy of the *Connoissance des Temps* for 1784) (May 11, 1781). `Very faint nebula, seen by M. Méchain on May 11, 1781.'
[A position follows which agrees with Herschel's H I.43, according to Camille Flammarion, see below]

(*Méchain* in his letter to Bernoulli, May 6, 1783) `On May 11, 1781, I discovered a nebula above the Raven [Corvus] which did not appear to me to contain any single star. It is of a faint light and difficult to find if the micrometer wires are illuminated. I have compared it [its position] on this day and the following with Spica in the Virgin and from this derived its right ascension 187d 9' 42" and its southern declination 10d 24' 49" [the same position as in Messier's handwritten note]. It does not appear in the *Connoissance des Temps*.'

(*Flammarion:* `It has the position of the nebula H I.43 found by Wm. Herschel, and is No. 4594 of the NGC of Dreyer. We can add it to Messier's catalog and

give it the number 104. The result is that Messier's catalog from now on is reckoned as numbering 104 instead of 103.')

105.

Méchain: 10h 36m 15s (159d 3' 45") +13d 43' 58"
(*Méchain* in his letter to Bernoulli, May 6, 1783) `Mr. *Messier* mentions there on page 264 and 265 two nebulous stars, which I have discovered in the Lion [Leo; M95 and M96]. I find nothing to correct for the given positions which I have determined by comparison of their situation with respect to Regulus. There is, however, a third one, somewhat more northerly, which is even more vivid [brighter] than the two preceding ones [M95 and M96]. I discovered this one on March 24, 1781, 4 or 5 days after I had found the other two. On April 10, I compared its situation with Gamma Leonis from which followed its right ascension 159d 3' 45" and its northern declination of 13d 43' 58".'

106.

Méchain: 12h 6.7m (181d 40') +49d
(*Méchain* in his letter to Bernoulli, May 6, 1783) `In July 1781 I found another nebula close to the Great Bear [Ursa Major] near the star No. 3 of the Hunting Dogs [Canes Venatici] and 1 deg more south, I estimate its right ascension 181d 40' and its northern declination about 49d. I will be going to determine the more acurate position of this one shortly.'

107.

(*Méchain* in his letter to Bernoulli, May 6, 1783) `In April 1782 I discovered a small nebula in the left flank of Ophiuchus between the stars Zeta and Phi, the position of which I have not yet observed any closer.'

108.

(from the description of M97) `Nebula near [M97 and Beta UMa], [position] yet to be determined.'

(Messier added a position by hand which was identified by Owen Gingerich in 1953 as that of H V.46 = NGC 3556, which is now called M108)

(manuscript:) Nebula near the preceding .. it is even fainter: it is 48 or 49' further north and 30 min .. following in RA: Found by M. Méchain 2 or 3 days after the preceding [February 18 or 19, 1781]

(*Méchain* in his letter to Bernoulli, May 6, 1783) `Page 265 No. 97 [M97]. A nebula near Beta in the Great Bear. Mr. Messier mentions, when indicating its position, two others, which I also have discovered and of which one is close to this one *[this is M108]*, the other is situated close to Gamma in the Great Bear [M109], but I could not yet determine their positions.'

109.

(from the description of M97) `A Nebula which is near Gamma UMa.'

(Messier added a position by hand which was identified by Owen Gingerich in 1953 as that of H IV.61 = NGC 3992, which is now called M109)

(manuscript:) Nebula near Gamma UMa, same right ascension a bit near this star and 1 deg .. more south. Discovered by M. Méchain on March 12, 1781.

(*Méchain* in his letter to Bernoulli, May 6, 1783) `Page 265 No. 97 [M97]. A nebula near Beta in the Great Bear. Mr. Messier mentions, when indicating its position, two others, which I also have discovered and of which one is close to this one [M108], the other is situated close to Gamma in the Great Bear *[this is M109]*, but I could not yet determine their positions.'

110.

(*Messier* in *Observations Astronomiques, 1770-1774*; Connaissance des Tems for 1801, Paris 1798, p. 461. Also published in *Mélanges de l'Astronomie*, Vol. 2, Paris 1798)
On August 10, [1773,] I examined, under a very good sky, the beautiful nebula of the girdle of Andromeda [M31], with my achromatic refractor, which I had made to magnify 68 times, for creating a drawing like the one of that in Orion [M42] (Mém. de l'acad. 1771, *pag. 460*). I saw that [nebula] which C. [Citizen] Legentil discovered on October 29, 1749 [M32]. I also saw a new, fainter one, placed north of the great [nebula], which was distant from it about 35' in right ascension and 24' in declination. It appeared to me amazing that this faint nebula has escaped [the discovery by] the astronomers and myself, since the discovery of the great [nebula] by Simon Marius in 1612, because when observing the great [nebula], the small is located in the same field [of view] of the telescope. I will give a drawing of that remarkable nebula in the girdle of Andromeda, with the two small which accompany it.

(On a drawing of M31 and companions published 1807) `Messier 1773. *Petite Nébuleuse, plus faible*.' (Small nebula, very faint.)

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