

ABBREVIATIONS USED:

A = component A of a double or multiple star
adj = adjacent
B = component B of a double or multiple star
B = (with number) Barnard's catalogue of dark nebula
C = component C of a multiple star
CC = concentration class for globular clusters, from I to XII
Cl = cluster(s)
cn* = central star of planetary nebula
Dbl = double star
dl = dark lane in galaxy or emission nebula
DN = dark nebula

EN = emission nebula
G = galaxy (with type)
GC = globular cluster
IC = Index catalogue
-in = inch (as in "8-in," meaning a telescope of 8-inch aperture)
inv = involved
LMC = Large Magellanic Cloud
M = Messier catalogue
m, mag = visual magnitude
Mlt = multiple star
[name] = the originator of a descriptive name
NE = visible with the naked eye
Neb = nebula
NGC = New General Catalogue

OC = open cluster
OIII = An Oxygen III nebular filter ([O III]) is recommended
p = photographic magnitude
PN = planetary nebula
Ri = rich in stars
RN = reflection nebula
SMC = Small Magellanic Cloud
SNR = Supernova remnant
st = star(s)
UHC = A filter passing both [O III] and Hydrogen Beta is recommended
Var = Variable Star
? = the author questions the *NGC 2000.0* visual magnitude ●

Retired weatherman Alan Whitman is now a full-time amateur astronomer. His other interests include windsurfing on the Okanagan Valley's lakes, hiking and skiing on its mountains, and travel. He invites observing reports for use in this column from experienced amateurs who have largely completed their Messier list.

The History of Astronomy

Unsung Heroes

by Barbara Silverman, Montreal Centre

In the shadows of the past lurk many unsung heroes. No longer physically with us, they exist only as a paragraph or two in a dusty encyclopaedia, or as a passing reference in the biography of one more famous. Their contributions may have been small or indirect, but they have contributed to the growth of astronomy and deserve to have the dust blown from their stories so that their achievements can be more widely known.

The name of Charles Messier is well known to most amateur astronomers. His dedication and perseverance resulted in his famous list of celestial splendours. Messier had one other very important quality: he unhesitatingly gave credit to his colleagues, in particular Bouchart de Saron and Pierre François André Méchain.

Saron was born on January 16th, 1730. He studied at the Collège de Louis-le-

Grand, becoming a lawyer and natural scientist. In 1748 he became legal counselor to the Parliament of Paris, and from there his political career advanced quickly. He became Master of Requests in 1750, Advocate General in 1753, and Judicial President in 1755. He was an accomplished mathematician, and computed cometary orbits for his friend Messier, who tabulated his sightings then turned his data over to Saron to do the orbital calculations. Saron also computed the orbit of the planet Uranus, thus becoming one of the first to realize that Uranus was a planet.

As a patron of the sciences, Saron amassed one of the world's best collections of reflecting telescopes and other astronomical instruments. His collection was known for both its quality and quantity. In 1779 the Academy of Sciences admitted Saron as an honorary member. During

1784 he financially aided the publication of the Marquis de Laplace's *Theory of the Movement and Elliptic Figure of the Planets*.

A few months prior to the French Revolution in 1789, Saron became the President of the Parliament of Paris. After the revolution, when that body was dissolved, his vehement protests led to his eventual demise. In September 1793, Saron received data from Messier on a new comet, for what would be the last time. He completed the orbit calculations in prison, only days before the Reign of Terror claimed his life on the guillotine.

Pierre Méchain was more fortunate. Born on August 16th, 1744, in Laon, France, he was the son of a master ceiling plasterer. Forced by family difficulties to terminate his architectural studies, he was re-evaluating his future when he came to the attention of Lalande, the noted French

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astronomer. Lalande was impressed with the young Méchain's potential, especially his mathematical abilities. In 1772 Lalande obtained for Méchain the position of astronomer-hydrographer at the Dépôt de la Marine in Versailles. Unfortunately, political instability had an adverse effect on the situation, and Méchain had to leave. When the Dépôt was reorganized eighteen months later, Méchain returned. Shortly thereafter, the Dépôt was moved to Paris, bringing Méchain and Messier together.

In 1791 the French National Assembly decided to introduce a uniform system of measurement, known today as the metric system. In 1792, from prison, King Louis XVI instructed Méchain and engineer Jean Delambre to complete the calculations required to establish the length of the metre. It had already been decided that a metre would be one ten-millionth of the distance between the North Pole and the Equator measured along the meridian passing through Paris. Méchain and Delambre's assignment was to measure the meridian from Barcelona to Dunkirk. The work took many years to complete, but happily for Méchain it took him away from the strife and worst excesses of the French Revolution. Upon completion of the survey, the standard metre was established. The metric system became fact in June 1799.

Pierre Méchain's work received notable recognition from the French Academy of Sciences. He was awarded a prize in 1782 for his essay on the comets of 1552 and 1661. Previously both comets were believed to be the same, but Méchain proved them to be two separate entities. Méchain's lifetime comet count is ten, and he calculated the orbits of all comets he discovered, as well as those of others.

Méchain's telescope was used to find

more than just comets. Much of the Messier list is based on the observations of Méchain himself, who is credited with the discovery of at least 32 fixed nebulae. He worked closely with Messier, who verified Méchain's sightings and included the information in his famous catalogue. In the original listing, Méchain's name appears beside M71, M72, M74–M82, M85, and M94–M96.

There were six objects sighted by Méchain that Messier did not have time to verify. Although the discoveries were not published by Messier, they are included in his private notebooks with the notation that they had been discovered by Méchain. Méchain was also the first person to discover the abundant nebulae in the Coma-Virgo region. After he turned the information over to Messier on March 18th, 1781, Messier had one of his best observing nights, discovering nine nebulae.

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It was Méchain who discovered that M101 and M102 are actually the same object. His letter announcing the correction was published several times between 1786 and 1917, but always in publications that did not have a wide circulation. It was not until 1947, when Helen Sawyer Hogg published his letter in the *Journal*, that the error was brought to the attention of modern-day astronomers.

After the Revolution, Méchain's fortunes improved. A few years before

his death he became director of the Paris Observatory, and joined Messier as a member of the New Academy of Sciences and Bureau of Longitudes. He died September 20, 1805, in Castellon de la Plana, Spain, but not before leaving his mark on the world of astronomy.

Next we come to Dollond and the controversy over the achromat lens. John Dollond, the son of Huguenot refugees, was born June 10th, 1706, in London, England. Originally he joined the family trade of silk weaving, but Dollond's proficiency in optics and astronomy led him to become a maker of optical and astronomical instruments. In 1752 he joined his son Peter in the optical business, and in 1754 introduced the heliometer, a telescope designed to measure the Sun's diameter as well as the angles between celestial objects.

In 1747 Newton had stated that chromatic aberration in lenses was not correctable. Between 1754 and 1758, Dollond devised an achromatic lens consisting of flint and crown glasses, thus disproving Newton's statement and at the same time earning the Copley Medal of the Royal Society for 1758. At that point the Royal Society learned about Chester

M. Hall. Back in 1720 that gentleman had experimented and designed achromatic lenses. For reasons known only to himself, Hall did not publicize his invention. The Royal Society, after careful investigation, reversed their decision on the Copley Medal, and recognized Hall as the true inventor of the achromatic lens. Dollond died November 30th, 1761 in London. Though not credited with the original invention of the achromat, he certainly made a lasting contribution by reinventing it and bringing the lens design to the