

Topic Page: [Nebulae](#)

Definition: **nebula (plural nebulae)** from *The Penguin Dictionary of Science*

A cloud of gas in the interstellar medium. There are two main types of **diffuse nebula: emission nebulae**, which are self-luminous, and **reflection nebulae**, which shine by reflected light from nearby stars. Emission and reflection nebulae are together classed as **bright nebulae**; **dark nebulae** (such as the Coalsack) are not illuminated and are visible as darker areas against background stars. Other types include **planetary nebulae**, which are shells of gas shed by old stars.



Image from:

[supernova remnant
in a supernova
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Summary Article: **nebula**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Cloud of gas and dust in space. Nebulae are the birthplaces of stars, but some nebulae are produced by gas thrown off from dying stars (see planetary nebula; supernova). Nebulae are classified according to whether they emit, reflect, or absorb light.

An **emission nebula**, such as the Orion nebula, glows brightly because its gas is energized by stars that have formed within it. In a **reflection nebula**, starlight reflects off grains of dust in the nebula, such as surround the stars of the Pleiades cluster. A **dark nebula** is a dense cloud, composed of molecular hydrogen, which partially or completely absorbs light behind it. Examples include the Coalsack nebula in Crux and the Horsehead nebula in Orion.

Early in the 18th century astronomers adopted the word nebula, derived from the Latin for 'foggy' or 'misty', to describe any noncometary celestial object that appeared hazy in the telescopes then in use. The first list of them was drawn up by Charles Messier in 1784 and numbered 103 prominent objects in the northern sky. Messier 1 or M1, for example, is the remains of the 1054 supernova known as the Crab nebula; M13 is the globular cluster in Hercules; M31 is the spiral galaxy in Andromeda; M42 is the large gaseous nebula in Orion; M44 is the open star cluster Praesepe in Cancer; and M57 is a planetary nebula in Lyra known as the Ring nebula.

The Herschels discovered large numbers of objects similar to those in Messier's list and continued the practice of cataloguing them together, even though their more powerful telescopes were able to pick out the star clusters from the true nebulae. Their descriptions were collected in a catalogue, which was updated and revised by Dreyer as *A New General Catalogue of Nebulae and Clusters of Stars* (1888). Usually known as the NGC, this, together with two supplements published in 1895 and 1908, remained the standard list for nearly 70 years. As telescopes improved, many of the objects previously considered nebulous were seen to be collections of separate stars, and the belief began to grow that all such objects would in time be resolved in this way.

This belief was shattered in 1864 when Huggins observed that NGC 6543, the bright planetary nebula in Draco, did not have a continuous spectrum like that of a star, but one consisting of bright lines characteristic of a glowing vapour at very low density. The Orion nebula was found to have a similar spectrum. It was realized that the gaseous nebulae with this kind of spectrum were of two main types:

the planetary nebulae (small, compact, with clear-cut edges) and the diffuse nebulae (very much more extensive, cloudlike in their structure, with no clearly defined boundaries). Some of the lines in the nebular spectrum were clearly due to hydrogen, but the origin of the strongest ones could not at first be established. They were therefore attributed to a hypothetical element called **nebulium** just as strong lines in the solar spectrum had been attributed to helium before it was identified on Earth. It was not until 1927 that Bowen recognized the nebulium lines as being due to so-called forbidden transitions in the spectra of various common ions, the strongest lines being due to doubly ionized oxygen.

The use of the term 'nebula' to describe the different types of object contained in Messier's list and the NGC is a cause of confusion. Modern practice reserves the use of the word to clouds of gas and dust in interstellar matter, and refers to extragalactic systems as galaxies.

images

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