

SYMBOLIC BUTTERFLIES AND MOTHS

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Since the dawn of Man, we have co-existed with butterflies and moths. Their effect on man has been far-reaching, inspiring us in all aspects of the arts, sciences, and humanities.

The bright clusters and nebulae of planet Earth's night sky are often named for flowers or insects. Though its wingspan covers more than three light-years, the Butterfly Nebula (NGC 6302) is one of these. This celestial object looks like a delicate butterfly. But it is far from serene.

What resembles dainty butterfly wings are actually roiling cauldrons of gas heated to more than 36,000 degrees Fahrenheit. The gas is tearing across space at more than 600,000 miles per hour—fast enough to travel from Earth to the moon in 24 minutes! A new camera aboard NASA's Hubble Space Telescope snapped this image of the planetary nebula in July 2009.

Catalogued as NGC 6302, but more popularly called the Butterfly Nebula, it lies within our Milky Way galaxy, roughly 3,800 light-years away in the constellation Scorpius. The glowing gas is the outer layers of a star, expelled about 2,200 years. The structures in the nebula are among the most complex ever observed in planetary nebulae. The spectrum of NGC 6302 shows that its central star is one of the hottest stars in the galaxy, with a surface temperature in excess of 250,000 degrees Celsius, implying that the star from which it formed must have been very large.

James Abbott McNeill Whistler (1834–1903) was an American painter and graphic artist, active during the American Gilded Age and based primarily in the United Kingdom. His famous signature for his paintings was in the shape of a stylized butterfly possessing a long stinger for a tail. Whistler invented a monogram signature—a stylized butterfly based on his initials—and always placed it deliberately as a compositional element, not just a maker's mark. A butterfly surrounded by an oval was for Whistler as a symbol of his own image, an artist of elusive beauty, professing “art for art.”

Nobel Prize winner Edward Norton Lorenz (1917–2008) was an American mathematician, meteorologist, and a pioneer of chaos theory. He introduced the strange attractor notion and coined the term, butterfly effect.



Butterfly Nebula
St. Vincent, 2013, Sc#3848a



Whistler Painting
Micronesia, 2003, Sc#564



Edward Norton Lorenz
Guinea, 2008, Mi#5886

He proposed the butterfly effect to illustrate his chaos theory, wherein the flapping of butterfly wings could result in a hurricane thousands of miles away.

The butterfly effect is the sensitive dependence on initial conditions in which a small change in one state of a complex system can result in large differences in a later state. The term is derived from the metaphorical example of the details of a tornado (exact time of formation, exact path taken) being influenced by minor perturbations such as the flapping of the wings of a distant butterfly several weeks earlier.

Lorenz discovered the effect when he observed that runs of his weather model with initial condition data that was

rounded in a seemingly inconsequential manner would fail to reproduce the results of runs with the unrounded initial condition data. A very small change in initial conditions had created a significantly different outcome.

The term refers to the idea that a butterfly's wings could create tiny changes in the atmosphere that might ultimately alter the path of a tornado or delay, accelerate, or even prevent the occurrence of a tornado in another location. The butterfly does not power, or directly create the tornado. The term is intended to imply that the flapping wing represents a small change in the initial condition of the system, which cascades to large-scale alterations of events.

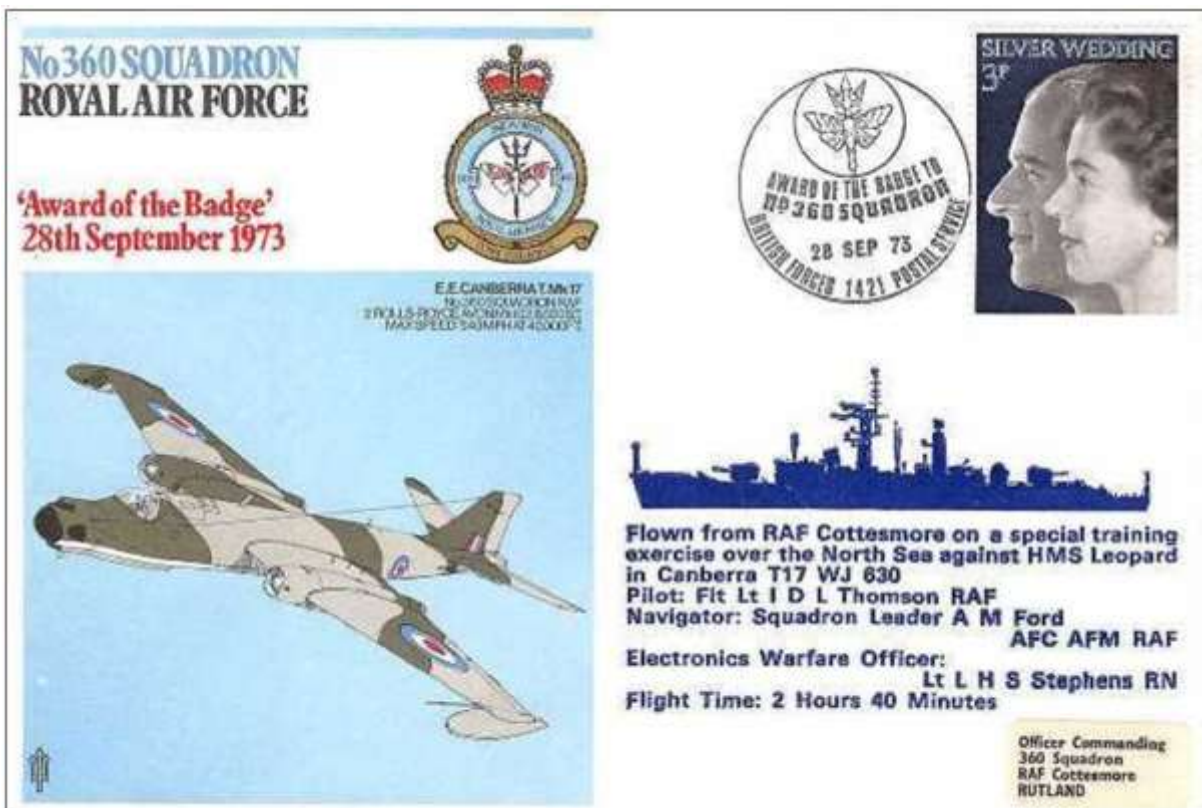
Had the butterfly not flapped its wings, the trajectory of the system might have been vastly different—but it is also equally possible that the set of conditions without the butterfly flapping its wings could lead to a tornado. The butterfly effect presents an obvious challenge to prediction, since initial conditions for a system such as the weather can never be known to complete accuracy. This problem motivated the development of ensemble forecasting, in which a number of forecasts are made from perturbed initial conditions.

Melese laodamia is a moth of the family Erebidæ. It is found in Mexico, Panama, Colombia, Venezuela, and Trinidad. This species has a pair of sound-producing tymbals, where each organ is a swollen, air-filled structure formed externally from the lower part of the thorax with 15–20 grooves on its outer face. The moth can compress these using its basalar muscles and the grooves act as an array of “microtymbals,” each producing a brief pulse of sound. The result is a pattern of ultrasonic vibrations generated between 30 and 90 kHz with a pulse repetition frequency of 1200 per second. The ultrasound was thought to jam the sonar of insectivorous bats.

This moth was used in the insignia of the Royal Air Force (RAF) 360 Squadron, whose task was to develop equipment and tactics to jam enemy radars during the Cold War period. This joint Royal Navy/Royal Air Force squadron provided electronic countermeasures training for users of air defense radar systems.



Hurricane Hattie Relief
Br. Honduras, 1962, Sc#165



Melese laodamia on RAF 360 Squadron Badge Insignia Cachet and Special Cancel
Great Britain, 28 September 1973

Butterflies are often used to accompany the yin-yang symbol, representing perfect balance and harmony among Man and his universe. The yin yang symbol is all about finding unity amidst duality. It's a perfect sign for balance, harmony and moderation.

In Chinese philosophy, the concept of yin yang is used to describe how polar opposites, or seemingly contrary forces are interconnected and interdependent in the natural world, and how they give rise to each other in turn. Opposites thus only exist in relation to each other.

The concept lies at the origins of many branches of classical Chinese science and philosophy, as well as being a primary guideline of traditional Chinese medicine. The symbol is also a central principle of different forms of Chinese martial arts and exercise.

Many natural dualities (e.g., dark and light, female and male, low and high, cold and hot, water and fire, air and earth) are thought of as manifestations of yin and yang respectively. The national flag of South Korea has an image of the yin-yang symbol, which represents balance in the universe. A stamp from South Korea shows a moth with a marking in its wing that closely resembles the symbol on the flag.

In China, the butterfly is a symbol of long life because the second character in the word butterfly in Chinese has exactly the same pronunciation as the character (die) which means "70 or 80 years of age." The butterfly also signifies joy and warmth.

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Alternative Medicine
Sri Lanka, 2000, Sc#1323



Metopta rectifasciata
South Korea, 1954, Sc#202A

