

# Jan Swammerdam Biography

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# Biography

The son of an apothecary in Amsterdam, Netherlands, Jan Swammerdam developed an early interest in natural history, especially insects. He was stimulated by his father's collection of curiosities, which included plants, insects, animals, and fossils. Delayed in his education by poor health, Swammerdam studied medicine at the University of Leiden (then Leyden) beginning in 1661. Although he received his medical degree in 1667, Swammerdam never practiced as a physician. Instead, ignoring his father's protests, he engaged in scientific investigations, especially of insects. His father, in retaliation, deprived him of financial support. In spite of becoming sickly from malnourishment and suffering from depression, Swammerdam continued his life of research.

In 1673, he came under the influence of the Flemish mystic and religious zealot Antoinette Bowignon, who lived in exile in Schleswig-Holstein, Germany. Swammerdam turned away from science and destroyed some of his unpublished manuscripts. Nevertheless, he specified in his will just before his early death in 1680 in Amsterdam that his remaining manuscripts be published. This was finally accomplished by Hermann Boerhaave (1668-1738) in 1737, when the two-volume *Biblia naturae* (*Bible of Nature*) appeared; it is still considered one of the greatest biology books ever published.

Even as a student, Swammerdam made important discoveries and observations. His graduation thesis on respiration noted that the lungs of newly born mammals float only when breathing has begun. He demonstrated that when a muscle contracts, it does not increase in volume, which disproved current notions about muscle movement being caused by an influx of blood or spirit. In 1658, Swammerdam observed oval particles in a frog's circulating blood--he had discovered red blood corpuscles, which were later found to carry oxygen. He devised a method of exposing the valves in lymph vessels. Swammerdam also investigated and described the human reproductive system, showing that female mammals have egg-producing ova.

The bulk of Swammerdam's work was devoted to anatomical investigations of insects. He developed and classified a collection of more than 3,000 species. His *General History of Insects* (1669) and the *Biblia* provided detailed descriptions and illustrations of these insects' life cycles, conclusively demonstrating that insects do not originate by spontaneous generation and that they transform gradually to their different stages rather than suddenly and abruptly changing from one creature into another. Swammerdam's skill at microdissection also disproved the notions that insects have no internal anatomy. His studies formed the foundation of a new science--entomology.