

Hidden Butterfly and Its Complete Metamorphosis in the “Portrait of a Lady” by Leonardo Da Vinci

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Abstract

One of Leonardo da Vinci’s areas of interest was the microcosm of insects. His sketches show that he studied in detail and observed their structure and peculiarities. The object of the research is the painting “Portrait of a Lady”. Upon closer examination of the painting, we discovered one detail that having the shape of a butterfly wing. Through the program Paint X, we moved the details to the amulet and we got an image of butterfly. Subsequent analysis of the painting showed that Leonardo described in this work a complete life cycle of butterfly consisting of four stages: the egg, the feeding stage, the transition stage, and the reproductive stage. Our research shows that Leonardo described the butterfly and its stages metamorphosis in “Portrait of a Lady”. Art and scientific knowledge are harmoniously combined in this work.

Keywords

Portrait of a Lady, Leonardo Da Vinci, Butterfly, Metamorphosis

1. Introduction

Leonardo da Vinci’s (15 April 1452-2 May 1519) was an Italian artist who lived in the time of the Renaissance. He is famous for his paintings, but he was also a mathematician, engineer, anatomist, sculptor, architect, musician, and writer. His goal was to see the world through reality with his own eyes and not through a religious and historical perspective. One of his areas of interest was the microcosm of insects. His sketches show that he studied in detail and observed their structure and peculiarities. Leonardo used the acquired knowledge in engineering and painting. The knowledge and conclusions gained from his observations

and researches are still successfully used by mankind today. Examples include Leonardo's aerodynamic laws (Richardson, 2019), as well as anatomical (Sterpetti, 2016) and geographical studies (Tyler, 2017). His anatomical researches include studies of the structures of humans as well as animals, birds, and insects (Lombardero & Del Mar Yllera, 2019; Kritsky & Daniel, 2010).

2. Materials and Methods

The object of the research is the painting "Portrait of a Lady" (La belle Ferroniere). This work was created in 1490-1496 by Leonardo da Vinci (Figure 1(A)). The woman depicted in the painting was later identified as Lucrezia Crivelli. To this day, however, there are differences of opinion. According to some researchers, the painting depicts Beatrice d' Este, wife of Ludovico Sforza (Syson & Larry, 2011). This view casts doubt on the first version, according to which the portrait depicts Lucrezia Crivelli, a mistress of Ludovico (Isbouts, 2017).

Upon closer examination of the painting, we discovered one detail that Leonardo has delineated with a faint contour having the shape of a butterfly wing (Figure 2(A)). Through the program Paint X, we moved the details to the amulet.

We used this method of moving details to interpret Leonardo da Vinci's other four paintings as well (Keshelava, 2020a, 2020b, 2020c, 2020d).

3. Results and Interpretation of the Obtained Image

By moving the details we got an image of butterfly (Figure 1(B)). The image we received shows the butterfly's head, eye, antennae, body and wing (Figure 2(B)-d).



Figure 1. (A) "Portrait of a Lady" (La belle Ferroniere) created in 1490-1496 by Leonardo da Vinci; (B) An image of a butterfly obtained by moving a detail.

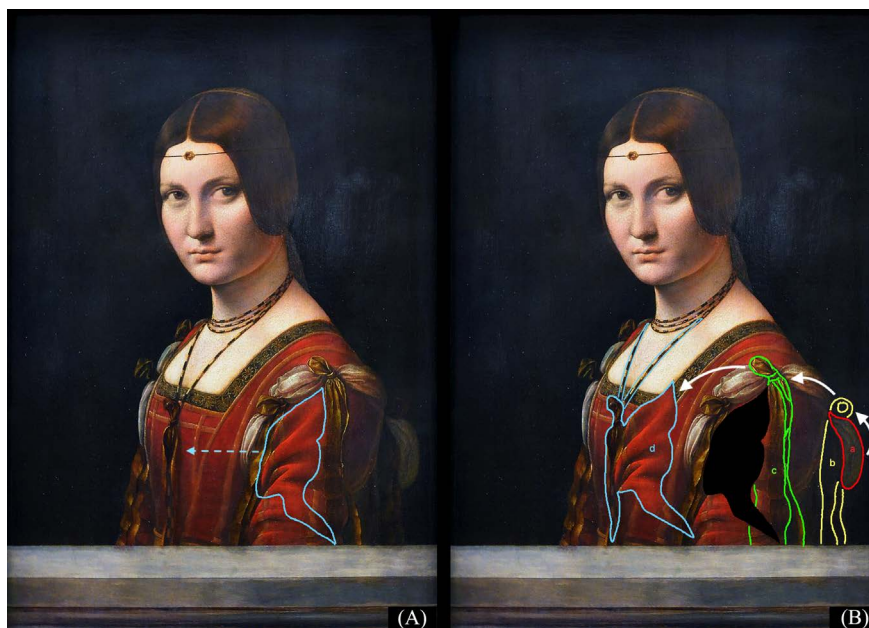


Figure 2. (A) Blu outlined detail that Leonardo has delineated with a faint contour having the shape of a butterfly wing; the blue arrow indicates the direction of movement of the detail; (B) a-the egg; b-the feeding stage (caterpillar); c-the transition stage (pupa); d-the reproductive stage (adult); white arrows indicate the sequence of stages of metamorphosis.

Subsequent analysis of the obtained image showed that Leonardo described in this work a complete life cycle of butterfly consisting of four stages: Stage of egg (**Figure 2(B)-a**), the feeding stage (caterpillar) (**Figure 2(B)-b**), the transition stage (pupa) (**Figure 2(B)-c**), and the reproductive stage (adult) (**Figure 2(B)-d**). The sequence of metamorphosis stages is preserved in the painting.

The egg is depicted with a whitish elliptical figure, above which is larva's head and eye, and below is her elongated body. The pupa is golden and resembles the body of a butterfly. There is an emptiness inside it and it gives the impression that the butterfly has left its storeroom. The image of an adult butterfly in the painting we found exactly replicates the structure of a real butterfly.

4. Discussion

Leonardo da Vinci tried to explain the events scientifically and not religiously. The knowledge and conclusions gained from his observations and researches are still successfully used by mankind today. He tried to study nature and its regularities. Vasari wrote: "*Leonardo's cast of mind was so heretical that he did not adhere to any religion, thinking perhaps that it was better to be a philosopher than a Christian*" (Vasari, 1568).

Leonardo's insects fall into three categories. First are the true studies and observations, and are rare but carefully drawn (**Figure 3(A)** and **Figure 3(B)**). The second and largest category includes insects that Leonardo drew for the analysis of flight. The third category includes the pictograms, which are humorous (Kritsky & Daniel, 2010).

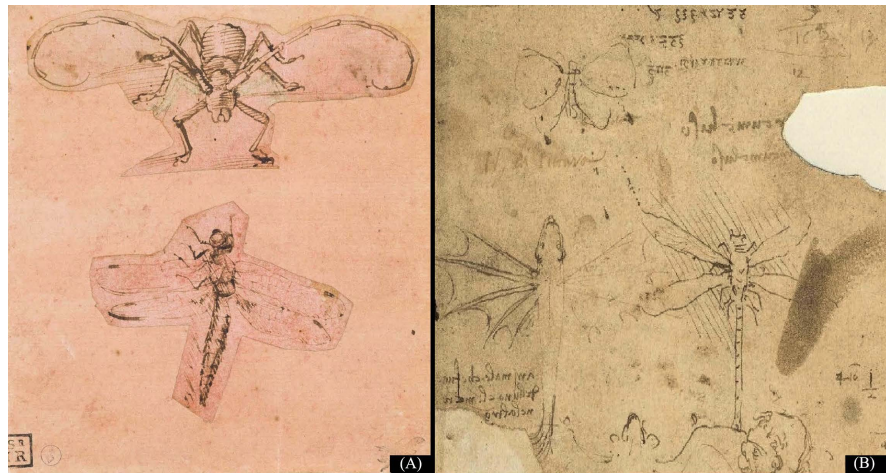


Figure 3. (A) Drawing by Leonardo da Vinci (the long horned beetle and dragonfly study); (B) Drawing by Leonardo da Vinci (dragonfly and butterfly from manuscript B, 100 v).

It is known that Leonardo was interested in birds and the phenomenon of flight. Between 1505-1506 he wrote a Codex concerning birds and their flight. This paper is known as the Codex on the Flight of Birds. Leonardo tried to determine how much human flight would be possible. He was the first to describe in detail the dynamic of bird flight. His detailed graphics of the dynamic soaring of birds remain the best available today (Richardson, 2019). The same can be said for insects. His sketches show that he studied in detail and observed their structure and peculiarities. It would be logical to assume that Leonardo would have known about the butterfly metamorphosis.

Today it is known that the insects have two types of metamorphosis. Grasshoppers, crickets, dragonflies, and cockroaches have incomplete metamorphosis. Butterflies, moths, beetles and bees have complete metamorphosis. There are four stages in life cycle of butterfly: egg, larva, pupa, and adult (Kalman, 2002). As mentioned above, the painting describes the butterfly and its stages accurately and sequentially.

Why did Leonardo secretly depict a butterfly in a “Portrait of a Lady”? We think we should look for the answer to this question in the symbolism of the butterfly. It is known that the butterfly is a symbol of great change. There is another interpretation as well. The butterfly represents a lightness of being, helping remove the tension (Catlett, 2103). Perhaps for Leonardo, the person depicted in the painting was associated with the above characteristic, since she was a mistress of Ludovico Sforza. But this only a guess and it is impossible to prove it.

As for the displacement of details in the painting, we think in some of Leonardo’s works, the content changes as the detail moves (Keshelava, 2020a, 2020b, 2020c, 2020d). He sometimes hides things in his art work.

5. Conclusion

Our research shows that Leonardo described the butterfly and its stages meta-

morphosis in “Portrait of a Lady”. Art and scientific knowledge are harmoniously combined in this work.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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