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Commentary on Raphael's *The Transfiguration*

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Historical sources about Raphael's death provide different hypotheses about its cause. Continuous fever is the only symptom described. Raphael's lucidity in managing his last affairs exclude syphilis, made widespread by the French army. The same applies to malaria, which was endemic in Rome. Not even the reference to bloodletting helps us,[1] as it was a longstanding therapy to reduce fever. The most prudent hypothesis is an infectious disease.

Later historical sources hypothesize the sudden death of the young genius resulted from poisoning. The hypothesis, which can help to better contextualize Raphael's death, probably originated in a satire, composed in Rome around 1712, telling of a spectacular exhumation of Raphael's extraordinarily well-preserved remains. The integrity of the corpse suggests the presence of arsenic as a preservative, a substance that was used until the nineteenth century by famous embalmers.[2] Arsenic poisoning by a rival was also proposed, however no available historical source authorizes such a supposition. Another avenue of exposure may have been Raphael's work, since artists certainly came into contact with toxic substances. Raphael's network of relationships and his propensity for color experimentation suggest his awareness of the "chemical" properties of substances. Furthermore, Vasari says Raphael made the colors for his paints himself, drawing as much on craftsmanship skills as on reading the ancient texts.[1]

Vitruvius' *De architectura* contains recipes from which Raphael obtained his Egyptian blue[3] by mixing sand, nitro flower, copper, and water. Depending on the metals used to make paint colors, mixing the ingredients can produce impurities of arsenic, tin, and lead. The arsenic sublimated together with sulfur creates orpiment, a golden yellow substance abandoned for its toxicity only in the nineteenth century. Lead is also present in Raphael's works prior to the Roman period, all of which were characterized by a soft yellow background mixed with white lead and tin-lead yellow.[4,5,6]

Close to the time of his death, Raphael worked on *The Transfiguration*. Vasari recounts that he had resorted to using carbon black from printers to give strength to the shadows.[1] Probably he prepared the carbon black on his own, in the process exposing himself to the high temperatures necessary for its preparation and to the high percentage of carbon (88% to 99%) and soot generated by the harmful combustion processes. The hypothesis of exposure to toxicants is supported by an authoritative but hitherto little-considered source, *De Morbis Artificum Diatriba*, the first treatise on occupational medicine, published in 1700 by Bernadino Ramazzini.[7]

Ramazzini directly associates Raphael's death with exposure to the "materia de' colori."[7] The colors from metals are more stable than those derived from vegetable and other plant sources, and therefore they were used much more often during this era. As a result, the diseases of painters were once the same as those of metal workers. As Ramazzini notes, it was also customary for some artists to clean their brushes with their fingers or worse with their mouth, contaminating the brain in one case and the ventricle and intestines in another. In addition, examining the diseases of printers, Ramazzini records the very high frequency of cases of "continuous fevers, chest ills, inflammation of the lungs and other chest morbs,"[7] due to the combination of work activities carried out in very warm places and going outdoors in cold climates. These are exactly the conditions in which Raphael worked.

Raphael's experimental path to creating paints surely passed through toxic substances, and if these toxins did not directly cause his death, they may still have debilitated his health, as they did the health of many painters, metal workers, and printers of the time.[7] The hematotoxic, hepatotoxic, and neurotoxic effects of the substances may have become chronic, exposing the artist to the complications of a more common illness. In this sense, a paleopathological and molecular examination of the skeletal remains of Raphael could reveal the still-elusive circumstances of his death.

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