# Nature, Science, and Myth in the Landscape Art of Frederic Leighton

Naturaleza, ciencia y mito en el arte del paisaje de Frederic Leighton

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**RESUMEN**: Frederic Leighton es principalmente reconocido como el presidente de la Royal Academy en la segunda mitad del siglo XIX, exhibiendo pinturas figurativas de gran escala con un alto grado de acabado. La beca, sin embargo, ha pasado por alto sus pinturas al aire libre creadas durante sus frecuentes viajes a Italia, España, Egipto y Grecia, por nombrar algunos. Como los bocetos al óleo de Leighton comprenden más de 200 lienzos y tablas, su importancia para su obra es primordial y debe ser claramente articulada. Usando el ejemplo de *An Outcrop in the Campagna*, este artículo explora cómo los tres aspectos - naturaleza, ciencia y mito - se fusionaron en la visión del paisaje de Leighton. Se examinan la composición y la técnica de la pintura, así como la influencia del círculo de Leighton, ejemplificado por Giovanni Costa y la Escuela de Arte Etrusco. Finalmente, la física solar y la termodinámica victorianas se presentan como un contexto importante para la dimensión simbólica de los paisajes de Leighton.

PALABRAS CLAVE: Frederic Leighton, Paisaje, Plein air pintura, Ciencia, Mitografía, Siglo XIX

**ABSTRACT**: Frederic Leighton is mostly recognised as President of the Royal Academy in the latter half of the nineteenth century, exhibiting large scale figurative paintings of a high degree of finish. Scholarship has, however, overlooked his *plein air* paintings created during his frequent voyages to Italy, Spain, Egypt and Greece, to name a few. As Leighton's oil sketches comprised of over 200 canvases and boards, their significance to his *oeuvre* is paramount and needs to be clearly articulated. Using the example of *An Outcrop in the Campagna*, this article explores how the three aspects – nature, science and myth – merged in Leighton's vision of landscape. The painting's composition and technique are examined, as well as the influence of Leighton's circle, exemplified by Giovanni Costa and the Etruscan School of Art. Finally, Victorian solar physics and

thermodynamics are presented as an important context for the symbolic dimension of Leighton's landscapes.

**KEY WORDS**: Frederic Leighton, Landscape, Open-air painting, *Plein air* painting, Science, Mythography, Nineteenth century

# Introduction

The landscape oil sketches of Frederic Leighton (1830-1896) can at first glance be difficult to relate to his exhibited paintings due to the staggering discrepancy in terms of scale, subject, and technique. Still, sketching outdoors was certainly an important aspect for many painters who thus worked on their skills as well as produced useful studies which could be implemented in larger compositions already in their studios. In his exploration of painting from nature, Leighton followed the prominent tradition of British landscape art, represented by John Constable and JMW Turner, but simultaneously was alert to new tendencies – the Barbizon School. Camille Corot, whose works in the 1860s Leighton bought and displayed in his Holland Park studio house, largely inspired the latter's landscape sketching practice. Leighton's admiration for these revolutionary French artists was astonishingly 'far-sighted' on the one hand, yet on the other perfectly justified by the impact of the 'truth to nature' ideal which, initiated by the Pre-Raphaelites and propagated by John Ruskin, resonated deeply with young Leighton (Ormond, 1975, pp. 34-35). In 1852 he wrote from Rome (Barrington, 1906, vol. 1, p. 109):

"I long to find myself again face to face with Nature, to follow it, to watch it, and to copy it, closely, faithfully, ingenuously – as Ruskin suggests, 'choosing nothing, and rejecting nothing'."

In his landscapes, which he could paint freely and without imposed restrictions, Leighton certainly remained faithful to the concept of studying nature rigorously, as exemplified by his drawing of a *Lemon Tree* made on Capri and exhibited alongside the Pre-Raphaelites at the Hogarth Club in 1859 (Lang, 1886, p. 6).

# 1. Sketching in Italy

Italy was a place of particular significance to Leighton, who tried to visit it almost every year and produced numerous oil studies during each journey. In 1853 Leighton for the first time joined Giovanni Costa and George Heming Mason in a sketching expedition. Costa and Leighton developed a friendship that lasted until the latter's death, often setting out on journeys in Italy together – in fact *An Outcrop in the Campagna* [1] is most likely a product of their trip in the autumn of 1866 with William Blake Richmond (Riopelle, 1999, p. 136). More specifically, it appears that the sketch depicts the Alban Hills which is all the more likely taking into account the fact that Costa had painted there before, showing the results of those earlier trips to the newly met Richmond (Reynolds, 1992, p. 162).



 An Outcrop in the Campagna, Frederic Leighton, c. 1866 Oil on canvas, 20.2 x 43.5 cm.
The Gere Collection, photo © The National Gallery, London

Costa was the leader of the Etruscan School of Art, officially established in the winter of 1883-84. The School's denomination came primarily from the fact that its founder "was born in the Trastevere district of Rome, which formed part of the ancient Etruria, and he was often called by his friends, Mason, Leighton, Richmond, and others, the Etruscan" (Rossetti Agresti, 1907, pp. 211- 212). The archaeological association of the term, therefore, links the painters in question with the ancient heritage of the Campagnan landscape, and perhaps played also some role in the dissemination of the solar myth among them.

The principles Costa set for the Etruscan School referred to the compositional and technical aspects, as well as to the artists' attitude towards nature. The Etruscans were most recognised for the horizontal format and "asymmetrically arranged horizon" of their paintings. To that list of characteristics Christopher Newall adds also "atmospheric tonality" and "high horizon, very often

close to the upper edge of the picture space" (Newall, 1989, p. 36). All of those descriptors are very fitting *An Outcrop in the Campagna*, and prove the degree to which Leighton was inspired by Costa's teaching.

The landscape in question depicts a panoramic view of a grassed slope with scattered rocks reflecting the sun. The hill, diagonally positioned within the frame, almost entirely fills up the canvas, leaving but a thin strip of light blue sky that is gradually opening up towards the right hand side of the composition. Leighton's palette includes soft tones of green and yellow, with a few splashes of dark green for shrubs accentuating the elevated line of horizon. While the sky is painted with a thin layer of paint – so thin that the canvas shows through – the hillside emerges with freely applied brushstrokes and varying amounts of paint, adding to the dimensionality of this natural formation. Christopher Riopelle argues that the "emphatic daub of pure white" on one of the rocks is "unexpected" (Riopelle, 1999, p. 136), yet in fact it is emblematic of many of Leighton's landscape studies as it suggests the intense sun rays being reflected by stones and white-washed walls. The way those "daubs" stand out and are not organically merged with the lower layer of paint suggests that they were perhaps added on top of the varnish, in the manner of the Old Masters when trying to mimic a spark in the eye or a glass. Interestingly, Leighton's letters of 1888 to Arthur Herbert Church, the Royal Academy's Professor of Chemistry, demonstrate both interest in and knowledge about the chemical aspects of pigments (Barrington, 1906, vol. 2, pp. 290-302), further proved by Church's dedication of his 1890 The Chemistry of Paint and Painting to Leighton himself. Another valuable source are Leighton's Royal Academy notebooks, in which he discusses the use of colours (Ormond, 1975, p. 122). In this matter, the artist relied strongly on Corot's recommendation of the French transparent yellow: Lacque de Gaude, "finding that it made a pleasant green with blue-black and white" (Hamerton, 1875, p. 32).

The palette, and composition, of Leighton's sketch indeed appear to be inspired by his French role model. Previous scholarship has omitted that *An Outcrop in the Campagna* seems to echo Corot's *A Rising Path* [2] in the scattered distribution of rocks and shrubs, as well as guiding the viewer's eye towards the top of the hill, thus lifting the line of horizon. In both cases, a thin layer of yellow was added on top of white paint and, as a result, the viewer's attention is immediately drawn – to the path in Corot's sketch, and one of the rocks in Leighton's landscape, both elements serving as tools for guiding one's eye towards the elevated horizon. Another significant commonality is that, as Philip Hamerton noted in 1875, "landscape-painters employ a transparent yellow chiefly for glazing greens" (Hamerton, 1875, p. 32). This also seems to be the case for both landscapes, and in *An Outcrop in the Campagna* it particularly adds to the effect of radiating heat, as yellow is the

dominant base. For Johann Wolfgang Goethe, yellow and blue represented the opposing qualities of "light" and "shadow," "brightness" and darkness," and "warmth" and "coldness," with green symbolising a "union" between the two (Goethe, 2000, p. 70). Being a true admirer of the poet since his youth, Leighton was undoubtedly aware of his quasi-scientific *Theory of Colours* published in London in 1840, and perhaps purposefully adopted this symbolic use of colours in his landscape sketches.



2. A Rising Path, Camille Corot, c. 1845
Oil on canvas, 28.6 x 17.8 cm
Private collection, reproduction in the public domain

The Alban Mountains, most likely captured in *An Outcrop in the Campagna*, had also been painted by Corot, member of the Barbizon School which promoted *plein air* oil painting already in the 1830s. Thus the Etruscans as a group of landscapists of Italian sites were themselves preceded by the French circle of Corot sketching in Rome and Campagna as early as in the 1820s (*Painting From Nature*, 1989, p. 43). As a result, the influence of Corot on Leighton was twofold, and included both direct and indirect interactions. As Leonée and Richard Ormond observed, "Leighton's early oil landscapes reflect the influence of the French artist in their quality of limpid light, enveloping atmosphere, and clear, almost classical construction. According to Leighton's friends, he frequently invoked Corot's name as an exemplar when painting out of doors" (Ormond, 1975, p. 35).

Already in the late eighteenth century, Pierre-Henri de Valenciennes and Thomas Jones pioneered in oil sketching of Italian vistas, and their influence can be seen in Leighton's use of colours, perspectives, and the choice of themes. A move away from the Neoclassical "repertory of landscape motifs and a venerable pictorial vocabulary" was beginning to take place in the nineteenth century, though artists did not entirely cease to perceive natural views through Claude's Italianate lens (Galassi, 1991, p. 224).

Although, like Corot and many others, Leighton never exchanged the studio for the field, he did realise that one should not exist without the other. The "new dialogue" meant approaching both as complementary aspects of artistic practice. However, contrary to Leighton's habit of leaving his studies in their original state, and even occasionally exhibiting them as landscapes in their own right, Costa encouraged quite a different attitude (Rossetti Agresti, 1907, p. 213):

"A picture should not be painted from nature. The study which contains the sentiment, the divine inspiration, should be done from nature. And from this study the picture should be painted at home, and, if necessary, supplementary studies be made elsewhere."

And just as the studio was never abandoned, Leighton was not free from the achievements of his predecessors – while he dared to explore and experiment outside the traditional principles of landscape art, he was particularly susceptible to Claude's iconic compositions with the sun centrally placed right above the sea horizon, which may be archetypical for the seascapes made in Asia Minor and later transferred to *Flaming June* (c. 1895, Museo de Arte de Ponce, Puerto Rico).

#### 2. Physics and Landscape Art

The focus on sunlight and its effects is indeed essential to the majority of Leighton's views and might be partially attributed to the latest trends in European landscape art epitomised by the Impressionists. As Donald R. Benson has noted, they intended "to render light itself as a substance; or the medium of that light, in and through which perception occurs; or the vibration and flow of that medium" (Benson, 1987, p. 153). This attempt to capture elusive natural phenomena on the one hand stems from the longer tradition of eighteenth-century scientific explorations accompanied by scrupulous visual records. On the other, it signals the extent to which the dissemination of contemporary physics through periodicals and popular publications affected art of the second half of the nineteenth century. Leighton's involvement with the Pre-Raphaelite Brotherhood early in his career additionally exposed him to the importance of diligently studying nature in order to "emulate scientific standards of truth" (Stafford, 1984, p. 44). Veneration of Italian Renaissance was also a salient factor in Leighton's preoccupation with painting outdoors. As he emphasised in one of his Addresses to the Academy, it was at that time that "by the side of this scientific fever the joy in rediscovered Nature manifested itself in a new delight in landscape." Observing nature with scholarly precision Leighton primarily attributed to Leonardo da Vinci, whose plant studies he described as infused with "the spirit of science" (Leighton, 1887, p. 162). Leonardo's chief

achievement, aerial perspective consisting of a blue haze over the distant planes (Hoeppe, 2007, p. 58), was often implemented by Leighton in his mountainous views and seascapes. Similarly, as Kanarakis Yannis has stressed, Walter Pater chose to devote his first book, *The Renaissance* (1873), to the period abundant in artists who "employed the sciences of mathematics, physics and anatomy in order to perfect the art of representation" (Yannis, 2010, p. 93).

Ruskin and Pater, arguably the two most influential Victorian writers and art critics, both heavily engaged with current scientific thought. Donald R. Benson has noted that the metaphors Pater used "- a common air, a radiation of intellectual light and heat - may suggest a language of unconscious mutual illustration between an ether physics of radiant energies and an atmospheric art of light vibrations and diffused consciousness" (Benson, 1987, p. 144). Heat radiation, largely studied by nineteenth-century physics, is in fact a term perfectly applicable to describe An Outcrop in the *Campagna*, in which Leighton skilfully captured heat palpitating from the Mediterranean sky. He was not, however, solitary in the quest to represent such phenomena, as accounted for by the art of Leighton's close and lifelong friend George Frederick Watts. The latter's interest in the newest discoveries and theories is reflected by his virtually abstract paintings illustrating the creation of the universe and other Biblical events, which seem to echo Turner's striking compositions of the sun and its "vapour" that have been associated with the rise of solar physics and thermodynamics. According to Maria Barbara Stafford, "Turner spatially insulates his scenery through light. Exploiting the travel account's discovery of the optical power of singular effects, he apotheosizes scintillating luminosity, converting it into a major genre" (Stafford, 1984, p. 461). Similar focus was adopted by Watts, whose wife Mary recalled the artist's explanation of After the Deluge (c. 1885-91, The Watts Gallery, Compton) as illustrating "the hand of the Creator moving by light and by heat to re-create" (Bills and Bryant, 2008, p. 234). This notion is intriguingly close to what John Tyndall described about thermodynamics in his Fragments of Science of 1871: "Darkness might then be defined as ether at rest; light as ether in motion. But in reality the ether is never at rest, for in the absence of light-waves we have heat-waves always speeding through it" (Tyndall, 1871, p. 173). The dichotomy between light and darkness had been already explored by Goethe "as the primal phenomenon underlying the creation of all colour." A. S. Weber adds that "This belief in a fundamental cosmic duality (Zweiheit) expressed paradoxically as a unity demonstrates the influence of Spinoza on his thought" (19th Century Science, 2000, p. 67). The philosopher's pantheistic beliefs contribute to the argument for Leighton's spiritual reading of landscape.

The tradition of studying light's properties is long and marked by Isaac Newton's treatise of 1704, which was an early example of an attempt to reach wider, non-scientific audiences (Outram,

2006, p. 255). A date more directly connected with Leighton was around 1860 when Tyndall "began to study the effects of light and heat rays on gases and vapors" (Hoeppe, 2007, p. 159). A similar timeline characterised Leighton sunlit landscapes, with the Capri scenes of 1859 being his first known oil studies. Soon afterwards more paintings of Italian views drenched in the Mediterranean sun followed, as exemplified by *An Outcrop in the Campagna*. It is therefore crucial to establish when exactly Tyndall and the artist first met, and how their relations developed – the physicist's 1890 letter to Leighton (Leighton House Museum) suggests a very close friendship, which is further proved by the inclusion of *Fragments of Science* in Leighton's library. While the list lacks several other titles that would directly advocate the theory supporting his interest in contemporary physics, it must be emphasised that Leighton nonetheless was very much aware of new theories and discoveries, which was already highlighted by his friend and biographer Emilie Barrington (Barrington, 1906, vol. 2, p. 306):

"Though Leighton persisted in affirming that he hardly ever read, the number of letters, and answers to letters from scholars, referring to poems and general literature, which exist in the correspondence he preserved, prove that if he did not read nevertheless somehow got a knowledge of the inside of books."

Leighton, who was naturally prone to a scientific approach and methodology as his father Septimus was a successful physician, was perhaps first exposed to the science of thermodynamics during his years as a student in Germany. These resulted in Leighton's "strong connections with German intellectual life," as noted by Colin Harrison and Christopher Newall (Harrison and Newall, 2010, p. 165). In the early 1840s, Leighton pursued his education in Berlin and Frankfurt, to which he returned in 1850 – the milestone date in German physics marked by Rudolf Clausius's paper *On the Moving Force of Heat*.

Apart from those early exposures, Leighton was likely acquainted with the scientific articles frequently circulated in press, particularly in such periodicals as the *Cornhill Magazine*, *Blackwood's*, or *Macmillan's Magazine*. *Fragments of Science* too belonged to the publications designed to disseminate awareness of the current state of physical sciences. As Bernard Lightman has observed, "professional scientists such as Thomas Henry Huxley and John Tyndall account for only a small portion of the works of Victorian populizers of science" (Lightman, 1997, p. 187). The boom in especially British and German publications promulgating, and translating, otherwise hermetic knowledge took place across the nineteenth century, but intensified in the latter half. This inevitably entailed certain distortions as the published information, very powerful in its implications,

8

needed to be somehow processed by lay audiences. Gillian Beer has explained that (Beer, 1989, p. 169):

"To most intelligent Victorian readers physics could become intelligible only in a popular conceptual form. Moreover, the absence of a formal scientific education meant that scientific ideas tended to be received by non-scientific Victorians in the mode of dreads and dreams as well as intellectual conundrums. The result is that ideas of 'force' and 'energy', arguments concerning the age of the earth and the cooling of the sun, passed rapidly into an uncontrolled and mythologized form."

Indeed, the intensity of captured heat in *An Outcrop in the Campagna* is perhaps an early reaction to the social unrest caused by William Thomson's article *On the Age of the Sun's Heat*, published in 1862. The concept of the gradual cooling of the central star soon became to be interpreted as prophetic of the "death" of the sun, and ultimately – of the universe.

# 3. Pantheism and Sun Worship

The nineteenth-century apocalyptic vision of the Earth's future was first introduced by Hermann von Helmholtz in 1854, in *Observations on the Sun's Store of Force*. The heated debate which took place in a number of subsequent publications, including the one by Thomson, found its way to Victorian literature and art. With the association of the sunset with a prelude to the final "death" of the sun came poetic metaphors, some of which had already been exploited by the previous generation of writers. It is in fact a quotation from Byron's *Sardanapalus* (1834) that opens Ruskin's *The Storm- Cloud of the Nineteenth Century* (1884), describing the Chaldean priest's prayer to the setting sun and asking: "Yet what is Death, so it be but glorious? 'Tis a sunset" (Ruskin, 1884, p. 10). In artistic terms, this notion was for instance represented by William Holman Hunt's landscapes, one of which Ruskin himself bought (Staley and Newall, 2004, p. 128). Also worth noting is the fact that Ruskin's pantheistic *Queen of the Air* (1869) figured as part of Leighton's library alongside *Fragments of Science* and included a statement that "the sun itself is an influence, to us also, of spiritual good - and becomes thus in reality, not in imagination, to us also, a spiritual power" (Ruskin, 1869, p. 11).

As Arnika Schmidt has observed, it was precisely Victorian development of the natural sciences that led to the pantheistic tendencies in literature and art in England as it challenged the traditional, Christian paradigm (Schmidt, 2016, p. 114). Pantheistic reading of landscape, embodied by Leighton's two versions of *Clytie* (1892 and 1896), was preached vigorously by his Italian friend. Costa and the Etruscans created paintings "full of 'rejoicing sunshine' as well as visual

contemplations on life, death, ever-changing nature and transcendence" (Schmidt, 2016, pp. 115-116). As a product of one of the sketching expeditions with Costa, *An Outcrop in the Campagna* undoubtedly reflects his multi-faceted influence on Leighton. The latter himself clearly articulated his justification for the landscapes he painted, arguing that "sunlight can never be accessory - its glory is paramount where it appears everything except water us tributar to its song of splendour" (Ormond, 1975, p. 95).

# Conclusion

Scholarship lacks a thorough examination of Frederic Leighton as a landscape painter – the staggering number of over 200 oil studies he created proves the importance of this activity to his *oeuvre* and reflects his numerous and diverse voyages during which he painted from nature. The artist's early interest in the Barbizon School, particularly in Camille Corot, introduced him to the latest trends in European landscape art, which he incorporated in his own artistic practice.

An Outcrop in the Campagna represents the particular significance of Italian landscape to Leighton as well as the influence which Giovanni Costa, leader of the Etruscan School of Art, exerted on the young English artist. In his landscape painting, Leighton frequently adopted an asymmetrically arranged line of horizon, panoramic format, and emphasis on the effects of the sun.

Victorian solar physics – implying the imminent "death of the sun" – and thermodynamics – focusing on heat radiation as a form of energy – were popularised by books and articles available to general public. They were circulated in the form of mythologised interpretations and found their way into Victorian landscape art. Leighton and his close friend George Frederick Watts were chief examples of the artistic awareness of the current state of science. By accentuating the vibrant intensity of the Mediterranean sun, Leighton managed to convey its dual symbolism as a source of both life and death.

# **Bibliography**

- BARRINGTON, Emilie (1906). *The Life, Letters and Work of Frederic Leighton*, 2 vols. London: George Allen.
- BEER, Gilian (1989), "The Death of the Sun': Victorian Solar Physics and Solar Myth", in BULLEN,J. B. (ed.). *The Sun is God: Painting, Literature and Mythology in the Nineteenth Century*. Oxford: Oxford University Press, pp. 159-180.

- BENSON, Donald R. (1987), "Catching Light": Physics and Art in Walter Pater's Cultural Context', in LEVINE, George (ed.). *One Culture*. Madison: University of Wisconsin Press, pp. 143-163.
- BILLS, Mark and BRYANT, Barbara (2008). *G. F. Watts: Victorian Visionary*. New Haven and London: Yale University Press.
- GALASSI, Peter (1991). Corot in Italy. New Haven and London: Yale University Press.
- GOETHE, Johann Wolfgang (2000), "Goethe's Theory of Colours", in WEBER, A. S. (ed.). 19th Century Science: An Anthology. Ontario: Broadview Press.
- HARRISON, Colin and NEWALL, Christopher (2010). *The Pre-Raphaelites and Italy*. Oxford: Ashmolean Museum.
- HAMERTON, Philip Gilbert (1875), "Technical Notes on Lord Leighton", Portfolio, pp. 31-32.
- HOEPPE, Götz (2007). *Why the Sky is Blue: Discovering the Color of Life*. Princeton: Princeton University Press.
- LANG, Mrs Andrew (1886). Sir Frederick Leighton, BART. London: Art Journal Office.
- LEIGHTON, Frederic (1887), "Art in Modern Italy; Tuscany. The Renaissance" in LEIGHTON, Frederic. *Addresses Delivered to the Students of the Royal Academy* (1897). London: Kegan Paul, Trench, Trübner and Co., pp. 135-172.
- LIGHTMAN, Bernard (1997), " 'The Voices of Nature': Popularizing Victorian Science", in LIGHTMAN, Bernard (ed.), *Victorian Science in Context*. Chicago: Chicago University Press, pp. 187-211.
- NEWALL, Christopher (1989). *The Etruscans: Painters of the Italian Landscape 1850-1900*. Stokeon-Trent: Stoke on Trent City Museum and Art Gallery.
- ORMOND, Leonée and Richard (1975). Lord Leighton. New Haven and London: Yale University Press.
- OUTRAM, Dorinda (2006). Panorama of the Enlightenment. Los Angeles: Getty Publications.
- PAINTING FROM NATURE: The Tradition of Open-Air Oil Sketching from the 17th to 19th Centuries (1981). London: Arts Council of Great Britain.
- REYNOLDS, Simon (1992), "William Blake Richmond in Italy", *Apollo*, vol. 136, no. 367, pp. 161-165.

- RIOPELLE, Christopher (1999), "52. An Outcrop in the Campagna, perhaps 1866", in RIOPELLE, Christopher and BRAY, Xavier. *A Brush with Nature: The Gere Collection of Landscape Oil Sketches*. London, National Gallery Publications.
- ROSSETTI AGRESTI, Olivia (1907). *Giovanni Costa: His Life, Work, and Times*. London: Gay and Bird, 1907.
- RUSKIN, John (1869). *The Queen of the Air: Being A Study of the Greek Myths of Cloud and Storm*. London: Smith, Elder and Co.
- RUSKIN, John (1884). *The Storm-Cloud of the Nineteenth Century. Two Lectures Delivered at the London Institution*. Kent: George Allen.
- SCHMIDT, Arnika (2016). *Nino Costa (1826-1903): Transnational Exchange in European Landscape Painting*. Milan: Silvana Editoriale.
- STAFFORD, Barbara Maria (1984). Voyage into Substance: Art, Science, Nature, and the Illustrated Travel Account, 1760-1840. Cambridge, Massachusettes and London: MIT Prress.
- STALEY, Allen and NEWALL, Christopher (2004). *Pre-Raphaelite Vision: Truth to Nature*. London: Tate Publishing.
- TYNDALL, John (1871). Fragmets of Science for Unscientific People: A Series of Detached Essays, Lectures, and Reviews. New York: D. Appleton and Company.
- WEBER, A. S. (2010) (ed.). 19th Century Science: An Anthology. Ontario: Broadview Press.
- YANNIS, Kanarakis (2010), "The Aesthete as a Scientist: Walter Pater and Nineteenth-Century Science", *Victorian Network*, vol. 2, no. 1, pp. 88-105.