PNAS COMMENTARY

Polluted realism in the art of Turner and Monet

John E. Thornes[a,1]

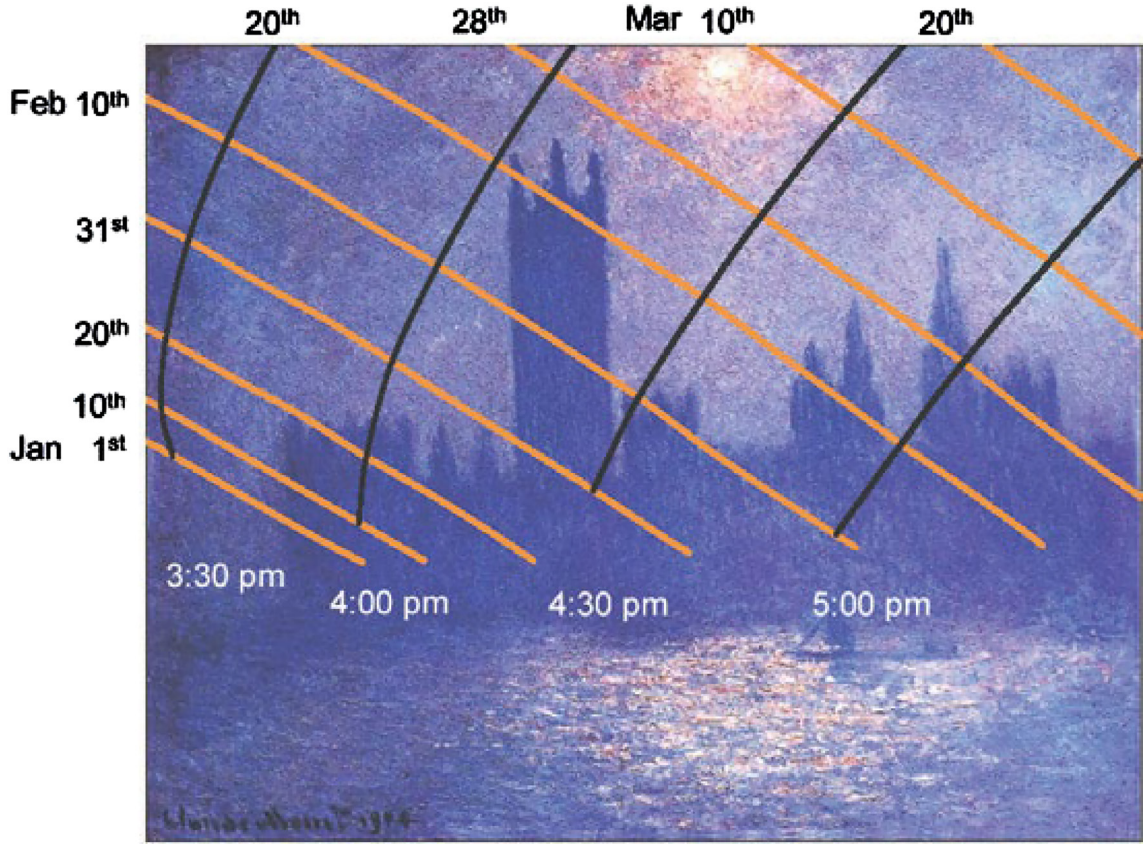

Fig. 1. Solar geometry overlaid on Monet's "London, Houses of Parliament, Effects of Sun in the Fog", giving a date and time of 7 March at 4:17 PM (1).

Thoreau, the famous American environmentalist and philosopher, wrote in 1854:

It is something to be able to paint a particular picture, or to carve a statue and so to make a few objects beautiful; but it is far more glorious to carve and paint the very atmosphere and medium through which we look … to affect the quality of the day, that is the highest of arts (2).

The Realist Manifesto in art as set out in 1861 by Gustave Courbet argued that the realists wanted to represent things as they are, almost as if the artist did not exist. This paved the way for the Impressionist movement by hastening the departure of the dominant "classical" school. Realists could therefore paint their own vision of nature, but the artists found it difficult to keep their own interpretations out of the images. This led to the rise of Naturalism in art in which artists depict the actual scene without exaggeration or imagination. With naturalism what you see is what you get. Where do Turner and Monet sit in this regard? Probably somewhere between realism and naturalism? In PNAS, Albright and Huybers (3) successfully explore the impact of trends in 19th century air pollution in London and Paris on selected landscape paintings of Turner (1789 to 1862) and Monet (1840 to 1926). The paper offers a more sophisticated quantitative "content analysis" of a selection of Turner and Monet paintings, than has been published before. Applying novel mathematical techniques, they convincingly show that both artists truly portrayed the impact of air pollution on the urban atmosphere, and like Thoreau suggests, they successfully painted "the very atmosphere and medium through which we look." In view of the fact that those images are usually completed back in the studio, some time later, rather than in front of the scene, the term polluted realism sums up their art very well.

Author affiliations: [a]School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham B15 2TT, UK

Author contributions: J.E.T. wrote the paper.

The author declares no competing interest.

See companion article, "Paintings by Turner and Monet depict trends in 19th century air pollution," 10.1073/pnas.2219118120.

[1]Email: J.E.Thornes@bham.ac.uk.

Published March 1, 2023.

Victorian London fog was probably the most famous global meteorological phenomenon of the 19th and 20th centuries and indeed became something of a tourist attraction.

Albright and Huybers successfully explore the impact of trends in 19th century air pollution in London and Paris on selected landscape paintings of Turner (1789–1862) and Monet (1840–1926).

In the Victorian winter more than a million coal fires mixed smoke and sulphur dioxide with the industrial outpourings from a myriad of chimneys, furnaces, processing plants, railway engines, steam driven barges and boats on the Thames, to produce a London Particular more than 200 feet (*60 meters*) *thick. In 1873 it was noted that during 3 days in December there were up to 700 extra deaths, 19 of them as a result of people walking into the Thames, docks or the canals and drowning* (4).

Smoke pollution not only ruined people's health through rickets, bronchitis, pneumonia, and asthma but also altered the climate, reducing sunlight and increasing the number and intensity of fog. Fog frequency, as measured by the Meteorological Office official London site in Brixton between 1871 and 1903 peaked in 1886 with 86 d, and the lowest was just 13 d in 1900 (ironically, Monet was in London for three visits between 1899 and 1901).

The concept of deconstructing proxy data from landscape art in order to reconstruct weather, climate, and climate change is not new (1, 5–10). There is much scope for further research to critically verify and add to the findings of such research.

The London fogs could occur at any time of the year but tended to peak from November to March. When Wordsworth (11) wrote his poem "Composed upon Westminster Bridge" on September 3, 1802, he seemed surprised to find a smokeless view of London.

Ships, towers, domes, theatres and temples lie
Open unto the fields, and to the sky;
All bright and glittering in the smokeless air.

Turner, in one of his lectures to students at the Royal Academy in 1811, placed great emphasis on studying our changeable British weather:

What seems one day to be governed by one cause is destroyed the next by a different atmosphere. In our variable climate where all the seasons are recognisable in one day, where all the vapoury turbulence involves the face of things, where nature seems to sport in all her dignity and dispensing incidents for the artist's study … how happily is the landscape painter situated, how roused by every change in nature in every moment (12),

Turner loved the chaotic and unpredictable ceaseless change that our weather brings to otherwise fixed unchanging landscapes. The weather brings our landscape to life, and weather combined with air pollution paints an unceasing array of infinite aerial perspectives onto our blue-sky canvas.

The impact of air pollution on aerial perspective drew Monet to London to paint the infamous London fog. Monet was fascinated by the weather and his appreciation, and visualization of the impact of atmosphere, weather, and climate in all of his works is so very similar to Turner's. Monet's London Series (1899 to 1905) provides a remarkable visual record of London's climate and air quality at that time. Monet's impressions of what he called "l'enveloppe" of light enable one to almost feel and taste the polluted climate of London.

Monet's appreciation of the London atmosphere was instigated by the Prussian invasion of Paris in 1870, which caused his brief exile, and his first encounters with London fog. Monet was resolute that he would return to England and produce a series that would rank him alongside Turner as one of the greatest landscape painters (13). He returned three times: in the autumn of 1899 and the spring of 1900 and 1901, staying at the Savoy Hotel overlooking the Thames and painting over 100 canvases of over Charing Cross Bridge, Waterloo Bridge, and from St Thomas's hospital—the Houses of Parliament. These were representations of London smoke and fog (the word smog was not used until later) that were painted on freezing balconies in the midst of the fog. Each canvas was worked on multiple times on successive days when the sun was in a similar position. The unique mixture of sunlight, atmosphere, and air pollution that enveloped London and the Thames during the 19th century was a compelling inspiration for many artists but especially Turner and Monet. Monet's London Series provides us with a fascinating representation of this transcendent London climate and atmosphere that represents a mixture of pollution and nature. The frequency and intensity of London's fogs reached a peak in the late 1880s and steadily declined afterward. Monet's London Series painted just after this peak still represents the best colored record of Victorian fogs. According to House (14), during the 1890s, Monet was preoccupied by what he called the "instantaneity" of landscapes—especially how the atmosphere (l'enveloppe) was more important to him than the physical background objects. Monet said, "For me, a landscape does not exist in its own right, since its appearance changes at every moment; but the surrounding atmosphere brings it to life, the air and the light, which vary continually … For me, it is only the surrounding atmosphere that gives subjects their true value." Later, Monet commented, "To me the motif itself is an insignificant factor; what I want to reproduce is what lies between the motif and me."

Color was central to Monet's vision of London. Monet told an interviewer in 1901: "The fog in London assumes all sorts of colors; there are black, brown, yellow, green, and purple fogs, and the interest in painting is to get the objects as seen through all these fogs." (14) It is clear therefore that Monet wanted to paint London and the Thames, through the fog, and orientated toward the sun to optimize these effects. Baker and Thornes (1) have shown, using solar geometry, that Monet very accurately depicted the position of the sun in the sky as it set over the Houses of Parliament in the London Series, enabling the date and the time of day to be calculated (Fig. 1). This confirms the veracity of his representations of London climate.

How can Turner's and Monet's preoccupations with the atmosphere help in our approach to improve our understanding of air pollution in central London at that time? We have very few measurements of air pollution in London until well into the twentieth century, and Monet's London Series is an

excellent proxy for measurements of SO2, smoke, and for visibility. It will never be possible to estimate accurately (deconstruct) the concentration of smoke and SO2 present in London's atmosphere just from the images, but it should certainly be possible to estimate a range. Thornes and Metherill (15) have shown that the mean visual range of just over 1,125 m (0.7 miles) in the 35 Monet paintings of Charing Cross Bridge corresponds very well with observations of winter visibility made in "The London Fog Inquiry" of 1901/1902 which found:

"*The contamination of the air by smoke has been very forcibly brought to my notice by the ascents of Victoria Tower and of St. Paul's. In the 10 ascents made as yet, none of which were made during fogs, and several of which were made on days of great visibility in the country, the visibility has ranged from 1/2 mile to 1 1/4 miles only. St. Paul's has not yet been seen from Westminster nor Westminster from St. Paul's, although their distance apart is but 1 1/2 miles*" (16).

Interpreting Monet's London Series to estimate air quality and visibility, together with conventional climate data, can give us a much clearer idea of the winter climate of London at that time and the extent to which it has since changed. Monet was also well aware of the potential monetary value of these images of London fog, whose transient appearances, changing colors, and mysterious formations had become an attraction to tourists. To Londoners, however, the fogs were generally ignored, an accepted part of the modern industrial era representing wealth and progress and a necessary part of the environment. Indeed, Oscar Wilde famously suggested in 1889 a very different paradigm:

At present, people see fogs, not because there are fogs, but because poets and painters have taught them the mysterious loveliness of such effects. There may have been fogs for centuries in London. But…They did not exist till Art had invented them.... Where, if not from the impressionists, do we get those wonderful brown fogs? (17).

1. J. Baker, J. E. Thornes, Solar position within Monet's Houses of Parliament. *Proc. Royal Soc. A: Math. Phys. Eng. Sci.* **462**, 3775–3788 (2006).
2. H. D. Thoreau, *Walden* (Ticknor and Fields, Boston, 1854).
3. A. L. Albright, P. Huybers, Paintings by turner and monet depict trends in 19th century air pollution. *Proc. Natl. Acad. Sci. U.S.A.* **120**, e2219118120 (2023).
4. P. Brimblecombe, *The Big Smoke. A History of Air Pollution in London Since Medieval Times* (Methuen, London and New York, 1987).
5. H. H. Lamb, Britain's changing climate. *Geogr. J.* **33**, 445–466 (1967).
6. H. Neuberger, Climate in art. *Weather* **25**, 46–56 (1970).
7. H. T. Bernstein, The mysterious disappearance of Edwardian London Fog. *London J.* **1**, 189–206 (1975).
8. S. Khan, J. E. Thornes, J. Baker, D. W. Olson, R. L. Doescher, Monet at the Savoy. *Area* **42**, 208–216 (2010).
9. C. Zerefos *et al.*, Further evidence of important environmental information content in red-to-green ratios as depicted in paintings by great masters. *Atmos. Chem. Phys.* **14**, 2987–3015 (2014).
10. D. W. Olson, *Celestial Sleuth (Springer-Praxis, New York, 2014) and Further Adventures of The Celestial Sleuth* (Springer-Praxis, New York, 2018).
11. W. Wordsworth, Composed Upon Westminster Bridge, 1st published in collected poems (1807).
12. A. Wilton, *The Life and Work of JMW Turner* (London academy Edition, London, 1979).
13. P. H. Tucker, *Monet in the 90's* (Exhibition Catalogue, Museum of Fine Arts, Boston, 1989).
14. J. House, *Visions of the Thames* (Monet's London Exhibition catalogue, Museum of Fine Arts, St Petersburg, Florida, 2005).
15. J. E. Thornes, G. Metherell, Monet's 'London Series' and the cultural climate of London at the turn of the twentieth century. *Weather, Culture, Climate* (2003), pp. 141–160.
16. MPMC, *Minutes and Proceedings of the Meteorological Council 1901–02* (Met Office Library, Exeter, 1902).
17. O. Wilde, *The Decay of Lying, (1889) in The Works of Oscar Wilde, Golden Heritage Series* (Galley Press, Leicester, 1987), pp. 909–931.