Disaster Studies

Throughout history disasters such as floods, famines, earthquakes, and epidemics have affected human experience in myriad ways. Disasters are given historical meaning through the impact of socioeconomic and political conditions, trauma support on a regional and national scale, and how transnational ties between global communities have ignited relief campaigns. Furthermore, for centuries, news about catastrophic events has been disseminated via media such as documentary, pamphlets, chronicles, newspapers, poems, illustrations and prints. As such, disasters have also been mediated through recurring cultural repertoires of representations.

This series seeks to address the ways in which communities in and beyond Europe have intervened in, coped with or given meaning to disasters that occurred close by or far away, in terms of both time and space. We invite submissions (both monographs and edited collections) in the fields of (political, socioeconomic and cultural) history, cultural studies, religious studies, art history, memory studies, gender studies, literary studies, and media studies.

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Dealing with Disasters from Early Modern to Modern Times

Cultural Responses to Catastrophes

Edited by
Hanneke van Asperen and
Lotte Jensen

Amsterdam University Press

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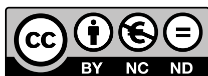

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Table of Contents

List of Illustrations 7

Introduction 15
Cultural Responses to Catastrophes from Early Modern to Modern Times
Hanneke van Asperen and Lotte Jensen

Part 1 Disaster and Emotions

1 Temporality, Emotion, and Gender in Leonardo da Vinci's Conceptualisation of Natural Violence 39
Susan Broomhall

2 Early Modern Community Formation Across Northern Europe 61
How and Why a Poet in Poland Engaged with the Delft Thunderclap of 1654
Paul Hulsenboom

3 Landscape as Wounded Body 83
Emotional Engagement in Visual Images of Floods
Hanneke van Asperen

4 Suffering Compatriots 103
Compassion, Catastrophe, and National Identification in the Netherlands in the Nineteenth Century
Fons Meijer

5 Cultural Resilience during Nineteenth-Century Cholera Outbreaks in the Netherlands 121
Lotte Jensen

Part 2 Disaster and Blame

6 Dealing in Disasters 139
Selling Apocalyptic Interpretations of Disasters in the Sixteenth-Century Low Countries
Marieke van Egeraat

7 The Ten Plagues of the New World 157
The Sensemaking of Epidemic Depopulation in Sixteenth-Century Mesoamerica
Florian Wieser

8 'Hungry Balliz Wants Weel Fillin' 177
The Visualisation of the Great Irish Famine (1845–1851) and the Lancashire Cotton Famine (1861–1865) in the Victorian Illustrated Press
Sophie van Os

9 Rinderpest in Dutch Regional Fiction 205
Community, Precariousness, and Blame
Anneloek Scholten

Part 3 Disaster and Time

10 Coping with Epidemics in Early Modern Chronicles, The Low Countries, 1500–1850 229
Theo Dekker

11 Coverage in Dutch Newspapers of Earthquakes in Italy and Beyond before Lisbon 1755 249
Joop W. Koopmans

12 The Development of Disaster Prints and Publications in Japan, 1663–1923 269
Julia Mariko Jacoby

13 Breaking the Cycles of Catastrophe 293
Disaster, Time, and Nation in Dutch Flood Commemoration Books, 1757–1800
Adriaan Duiveman

14 Disaster Memory and 'Banished Memory' 315
General Considerations and Case Studies from Europe and the United States (19th–21st Centuries)
Christian Rohr

1 Temporality, Emotion, and Gender in Leonardo da Vinci's Conceptualisation of Natural Violence

Susan Broomhall

Abstract

This chapter explores how the Italian engineer and artist Leonardo da Vinci conceptualised forms of violence in nature, to nature, or by nature. In using the term 'natural violence', this chapter aims to capture Da Vinci's broad-ranging consideration of such violence related to the natural world upon which he reflected across his work and to which he gave varied and ongoing responses over the course of his life. It argues that his perception of temporality, emotion, and gender were important aspects that helped Da Vinci make sense of natural violence. In doing so, the chapter suggests that while Da Vinci may have been radical in some aspects of thinking, in others he was representative of his era, and that investigating his conceptualisation of natural violence brings these distinctions into sharper focus.

Keywords

Leonardo da Vinci – nature – violence – gender – temporality – emotion

Throughout his life, the Italian engineer and artist Leonardo da Vinci (1452–1519) reflected upon violence in nature, to nature, or by nature, which could wreak destruction upon human and non-human species alike. These complex forms that I will consider under the term 'natural violence' were phenomena that he sought to understand, and he also worked to understand the relationships between them. In his work, Da Vinci theorised natural violence, responded to it, and aimed to guard against it. He explored natural

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violence in different forms and multiple sites – sketches, engineering designs, artworks, and writings across scattered pages of notes and notebooks. Central to his conceptualisations was an understanding of particular dimensions that underpinned natural world systems. Scholars of natural sciences in particular have tended to express these dimensions in terms of laws that Da Vinci sought to articulate through experimental investigation and upon which he drew within his engineering and artistic practices. As a consequence, other elements of his thinking – about dimensions such as time and emotion – have been less often explored in this scholarship. In this chapter, I suggest that analysis of Da Vinci's perception of temporality, emotion, and also gender is important to help to make sense of his conceptualisation of natural violence.

Early modern thinking about a world in transition has long formed the backdrop for modern scholars' consideration of the Anthropocene age. Temporality is of course central to this conceptualisation of our world, but so too is a certain historical vision of the early modern. When historian Dipesh Chakrabarty speaks of how anthropogenic explanations of climate change collapse a humanist distinction between natural and human histories, he is thinking of a mode of history widely attributed to philosopher Giambattista Vico, 'that we, humans could have proper knowledge of only civil and political institutions because we made them, while nature remains God's work and ultimately inscrutable to man'.[1] Sociologist and philosopher Bruno Latour similarly articulates a 'European prescientific vision of the Earth … as a cesspool of decay, death, and corruption from which our ancestors, their eyes fixed toward the incorruptible spheres of suns, stars, and God, had a tiny chance of escaping solely through prayer, contemplation, and knowledge', while philosopher and historian Michel Serres considers how 'nature acted as a reference point for ancient law and for modern science *because it had no subject*'.[2] As modern scholars continue to reflect on the relationship between human agency and the world around us, further study of early modern conceptualisations of this relationship is also fruitful. Da Vinci may have been radical in some aspects of his thinking, as has long been claimed, but in others he was representative of his era. Investigating

1 Research for this chapter was supported by an Australian Research Council Discovery Project (DP210100104). My thanks to the editors for their insightful feedback on an earlier draft of this chapter.
Dipesh Chakrabarty, 'The Climate of History. Four Theses', *Critical Inquiry* 35: 2 (2009), 197–222, at 201.

2 Bruno Latour, 'Agency at the Time of the Anthropocene', *New Literary History* 45 (2014), 1–18, at 4, and citing Michel Serres, *The Natural Contract*, trans. Elizabeth Macarthur and William Paulson (Ann Arbor: University of Michigan Press, 1995), 86.

his conceptualisation of natural violence brings these distinctions into sharper focus.

Knowledge production about natural violence occurred in a wide range of genres in the early modern period, including fables, sketches, engineering, poetry, paintings, essays, and journal accounts. Although they produced very different forms of knowledge, collectively, they suggest that perception of such violence as disaster might only be one position, or perhaps juncture, temporal and emotional, on the interpretive spectrum of such destructive events.[3] Moreover, as Gerrit Jasper Schenk has explored, terms such as 'disaster' and 'catastrophe' held different valency in different early modern linguistic and cultural traditions.[4] Disaster as much as nature is thus a concept that finds meaning in specific cultural contexts.[5] Scholars are increasingly demonstrating how early moderns narrated events in which the natural world produced catastrophic consequences for human populations through historically specific cultural frames but did not always conceptualise such devastation as disastrous.[6] For some authors and diarists, damage that the natural world created in the lives of humans was witnessed for posterity in enumerations that appeared to operate as part of an eschatological framework pointing to end-times. For others, these could be affirmative of specific community identities and faith positions, since they could potentially demonstrate God's mercy towards those who survived to attest to the experience. Additionally, there were other early moderns who emphasised the relativity of human perceptions of disaster. Thus, the studied philosophical response of essayist Michel de Montaigne could utilise a dramatic language of feeling for devastating natural world

3 See Susan Broomhall, 'Devastated Nature. The Emotions of Natural World Catastrophe in Sixteenth-Century France', in Erin Peters and Cynthia Richards (eds), *Early Modern Trauma. Europe and the Atlantic World* (Lincoln: University of Nebraska Press, 2021), 31–53.

4 Gerrit Jasper Schenk, 'Historical Disaster Experiences. First Steps Toward a Comparative and Transcultural History of Disasters Across Asia and Europe in the Preindustrial Era', in Gerrit Jasper Schenk (ed.), *Historical Disaster Experiences, Transcultural Research – Heidelberg Studies on Asia and Europe in a Global Context* (Cham: Springer, 2017), 3–44, at 15–23.

5 On nature, see Schenk, 'Historical Disaster Experiences', 4, 13–14.

6 A phenomenon explored in detail by Jean Céard, *La nature et les prodiges* (1977; 2nd ed., Geneva: Droz, 1996) and further nuanced by Michael Kempe 'Noah's Flood. The Genesis Story and Natural Disasters in Early Modern Times', *Environment and History* 9: 2 (2003), 151–71; Philip M. Soergel, 'Portents, Disaster, and Adaption in Sixteenth-Century Germany', *The Medieval History Journal* 10: 1–2 (2007), 303–26; Elaine Fulton and Penny Roberts, 'The Wrath of God. Explanations of Crisis and Natural Disaster in Pre-Modern Europe', in Penny Roberts with Mark Levene and Rob Johnson (eds), *History at the End of the World? History, Climate Change and the Possibility of Closure* (Penrith, UK: Humanities-Ebooks, 2010), 67–79; Raingard Esser and Marijke Meijer Drees, 'Coping with Crisis. An Introduction', *Dutch Crossing* 40: 2 (2016), 93–96.

violence that he recognised as life-changing for some specific communities and not others, without providing explanation for activities that he perceived as beyond human understanding.[7]

Da Vinci's understanding of natural violence does not fit neatly within modern scholarly analysis of environmental events perceived by early moderns as disaster.[8] Schenk distinguishes between 'extreme natural events, which can take place, so to speak, in the absence of human society' from disasters that were 'always society-related'.[9] In using the term 'natural violence', I seek to capture Da Vinci's broad-ranging consideration of violence wrought in nature, to nature, and by nature upon which he reflected across his work and to which he gave varied and ongoing responses over his life. I employ this term to open up rather than foreclose the diverse avenues of his thought, in order to express the numerous relationships between violence and nature that he articulated, the different causative agents for such violence in different contexts, and the possibilities of such violence to produce creative as well as destructive consequences. Da Vinci's thought offered reflections upon natural violence and its relationship to humans and other species, considering its potential to be both generative and devastating and the human capacity to express affective and imaginative (both artistic and engineered) responses to it.[10]

Feelings about Destruction

Natural violence forms a special place in Da Vinci's works, his thoughts produced across written, visual, and material texts. He articulated, in the sense of conceptualising and interpreting, acts of violent intensity for which he saw evidence past and present in the world around him. Understanding natural violence mattered to Da Vinci. He explored it in drawings and paintings, in experiments and sketches, in designs for engineering works, and in those writings termed the literary works, which include riddles, fables, prophecies, and what may be experimental fiction. This suggests the

7 Broomhall, 'Devastated Nature', 39–40.

8 Monica Juneja and Frank Mauelshagen, 'Disasters and Pre-Industrial Societies. Historiographic Trends and Comparative Perspectives', *The Medieval History Journal* 10: 1–2 (2007), 1–31, at 13–16; Schenk, 'Historical Disaster Experiences', 3–44.

9 Schenk, 'Historical Disaster Experiences', 24.

10 Raingard Esser has explored the importance of engineering responses to early modern disaster responses in her '"Ofter gheen water op en hadde gheweest". Narratives of Resilience on the Dutch Coast in the Seventeenth Century', *Dutch Crossing* 40: 2 (2016), 97–107.

strongly interconnected nature of Da Vinci's work as part of his thinking process. The exploration of nature's destruction in these diverse genres, text types, and sites also suggests its affective power to consume and drive him. Indeed, in a first-person narration among his notes, Da Vinci, seemingly reversing the allegory known as Plato's Cave, described powerful emotions that underpinned his search to delve deeper into nature's crevices:

> Unable to resist my eager desire and wanting to see the great … of the various and strange shapes made by formative nature … I came to the entrance of a great cavern … two contrary emotions arose in me, fear and desire – fear of the threatening dark cavern, desire to see whether there were any marvellous thing within it.[11]

We might even say that Da Vinci found natural violence good to think with.

Da Vinci was intensely interested in human emotions, both the value of their experience and their expression, and he frequently utilised an explicitly affective vocabulary himself. In what was perhaps a work of experimental fiction, Da Vinci penned a letter describing a powerful weather event in the Taurus Mountains of Armenia to which the narrator appeared to be a witness. Scholars have debated whether Da Vinci could have been present at such an event, but the view of art historian Daniel Arasse is now widely shared, that it numbered among other literary writings as a site in which Da Vinci 'allowed his imagination to run loose on subjects he was passionately interested in: the creative and destructive omnipotence of nature and the infinite mutation of shapes'.[12] The text provides an insightful example of how Da Vinci's thinking about natural violence is articulated through explicit attention to responses of human feeling. He expresses natural violence as a deeply affecting experience for humans:

> during the last few days I have been in so much trouble, fear, peril, and loss, besides the miseries of the people here, that we have been envious of the dead; and certainly I do not believe that since the elements by their

11 'E tirato dalla mia bramosa voglia, vago di uedere la gran cō… delle varie e strane forme fatte dalla artifiziosa natura, … pervenni all'ēntrata d'una grā caverna … si destarono in me 2 cose, pavra e desiderio; paura · per la minacciosa oscura spilonca, desidero per vedere se là ētro fusse alcuna miracolosa cosa'. *The Literary Works of Leonardo da Vinci*, ed. and trans. Jean-Paul Richter, 2 vols (New York: Dover, 1970), vol. 2, 395, no. 1339.

12 Daniel Arasse, *Leonardo Da Vinci. The Rhythm of the World*, trans. Rosetta Translations (New York: Konecky & Konecky, 1998), 45. See also the commentary by Carlo Pedretti on *The Literary Works of Leonardo da Vinci*, 2 vols (New York: Phaidon, 1977), vol. 2, 294.

> separation reduced the vast chaos to order, they have ever combined their force and fury to do so much mischief to man.[13]

Da Vinci's descriptions of emotional responses to natural violence could also extend to expressions of feeling about the cruelty of nature and of nature's creations to each other, not least of which was the cruelty of humankind itself: 'such a cruel and horrible monster'.[14] Thus, in a brief musing within his notebooks that considered humans' violent activities to extract metals from the earth, Da Vinci laments: 'O monstrous creature! … For this the vast forests will be devastated of their trees; for this endless animals will lose their lives'.[15] 'Why did nature not ordain that one animal should not live by the death of another?' he asks in another reflection in his notes on the cruelty of nature.[16] These expressions of and about feeling deserve attention as we think about his articulations of natural violence.

Analysis of the power and meaning of emotional expression has been an important feature of recent scholarly literature exploring early modern disaster.[17] This literature has emphasised the importance of setting these affective productions, displays, or performances in different cultural forms within early modern social and rhetorical conventions that made sense to their authors and to their readers, audiences, or viewers. Culturally specific memory and emotion templates for acts and texts could strengthen or dissipate feelings

13 'ne'giorni · passati · sono stato · in tāti affanni, pavre, pericoli e danno · insieme con questi miseri paesani, che avevano d'avere invidia ai morti, e cierto · io nō credo · che, poichè gli elemēti con lor separatione · disfeciono · il grā caos, che essi riunissino · lor forza, anzi rabbia ·, a fare tanto nocimēto alli omini'. Richter, *The Literary Works*, vol. 2, 392–93, no. 1337.

14 'si crudele e spietato mōstro!' Richter, *The Literary Works*, vol. 2, 365, no. 1296.

15 'o animal mostruoso! … per costui rimarrā diserte le grā selue delle lor piāte; per costui infiniti animali perderanno la uita'. Richter, *The Literary Works*, vol. 2, 360, no. 1295.

16 'Perchè la natura non ordinò che l'uno animale nō uivesse dalla morte dell altro?' Richter, *The Literary Works*, vol. 2, 310, no. 1219. Pedretti notes that this text and no. 1162 may be two parts of a dialogue, *The Literary Works*, vol. 2, 240 and 257.

17 Susan Broomhall, 'Narrating Experiences and Emotions of Distressing Events in the French Wars of Religion', and Andreas Bähr, 'Remembering Fear. The Fear of Violence and the Violence of Fear in Seventeenth-Century War Memories', in Erika Kuijpers, Judith Pollmann, Johannes Müller, and Jasper van der Steen (eds), *Memory before Modernity. Practices of Memory in Early Modern Europe*, (Leiden: Brill, 2013), 253–67 and 269–82; Susan Broomhall, 'Disorder in the Natural World. The Perspective of a Sixteenth-Century French Convent', in Jennifer Spinks and Dagmar Eichberger (eds), *Religion, the Supernatural and Visual Culture in Early Modern Europe* (Leiden: Brill, 2015), 240–59; Jennifer Spinks and Charles Zika (eds), *Disaster, Death and the Emotions in the Shadow of the Apocalypse, 1400–1700* (London: Palgrave Macmillan, 2016); Marijke Meijer Drees, '"Providential Discourse" Reconsidered. The Case of the Delft Thunderclap (1654)', *Dutch Crossing* 40: 2 (2016), 108–21; Peters and Richards, *Early Modern Trauma*.

of traumatic events at individual and collective levels.[18] So too is temporality critical to early modern ideas and emotions about disaster. Descriptions of fear, for example, within a particular moment of devastating experience could be rhetorically resolved within the work's overarching narrative that attested to the continuation of the author, and community, in the long term. Narrating such an event then became not a story of a disaster but one of survival.

That Da Vinci articulated feelings throughout his work about such violence has not been ignored by scholars. Arasse suggests that Da Vinci's texts 'reveal certain collective anxieties and sometimes … personal fantasies and pessimism', and that his 'consciousness of these obscure, violent pulses' informed his expression of the self in his art.[19] Literary scholar Michael Jeanneret argues that it is in regard to 'natural disasters' that Da Vinci is inspired to develop some of his most personal works, in which he allowed imagination to prevail over analysis.[20] I suggest here, by contrast, that Da Vinci's analysis of emotions and the expression of emotions were fundamental alongside temporality to the way he engaged with natural violence and that these dimensions formed part of his intellectual process. This practice is somewhat obscured, however, as Da Vinci returned to this topic repeatedly throughout his life, leaving his thought to be reconstructed only imperfectly from scattered texts as they were subsequently arranged by others.[21]

18 Erika Kuijpers, 'The Creation and Development of Social Memoires of Traumatic Events. The Oudewater Massacre of 1575', in Michael Linden and Krzysztof Rutkowski (eds), *Hurting Memories. Remembering as a Pathogenic Process in Individuals and Societies* (London: Elsevier, 2013), 191–201; Kuijpers, '"O, Lord, save us from shame". Narratives of Emotions in Convent Chronicles by Female Authors During the Dutch Revolt, 1566–1635', in Susan Broomhall (ed.), *Destroying Order, Structuring Disorder. Gender and Emotions in Medieval and Early Modern Europe* (Aldershot: Ashgate, 2015), 127–46; Erika Kuijpers, 'Fear, Indignation, Grief and Relief. Emotional Narratives in War Chronicles from the Netherlands (1568–1648)', and Susan Broomhall, 'Divine, Deadly or Disastrous? Diarists' Emotional Responses to Printed News in Sixteenth-Century France', in Spinks and Zika, *Disaster, Death and the Emotions*, 93–111 and 321–39; Erika Kuijpers and Judith Pollmann, 'Turning Sacrilege into Victory. Catholic Memories of Iconoclasm, 1566–1700', in Éva Guillorel, David Hopkin, and William G. Pooley (eds), *Rhythms of Revolt. European Traditions and Memories of Social Conflict in Oral Culture* (London: Routledge, 2018), 155–70. See also Allie Terry-Fritsch and Erin Felicia Labbie (eds), *Beholding Violence in Medieval and Early Modern Europe* (Aldershot: Ashgate, 2012); Judith Pollmann, 'Remembering Violence. Trauma, Atrocities and Cosmopolitan Memories', in her *Memory in Early Modern Europe, 1500–1800* (Oxford: Oxford University Press, 2017), 159–85; Domenico Cecere, Chiara De Caprio, Lorenza Gianfrancesco, and Pasquale Palmieri (eds), *Disaster Narratives in Early Modern Naples. Politics, Communication and Culture* (Rome: Viella, 2018).

19 Arasse, *Leonardo*, 232, 479–80.

20 'désastres naturels'. Michel Jeanneret, *Perpetuum mobile. Métamorphoses des corps et des oeuvres de Vinci à Montaigne* (Paris: Macula, 1997), 73.

21 See Augusto Marinoni, 'I manoscritti di Leonardo da Vinci e le loro edizioni', in A. Marazza (ed.), *Leonardo. Saggi e Ricerche* (Rome: Inst. Poligr. Stato, 1954), 229–74; Pedretti, *Literary Works*, 393–402.

Destructive Thinking

Da Vinci's thinking about natural violence appears to be animated by a conceptualisation of nature in constant flux as matter moves through different forms and is created and destroyed, and as nature interacts with time. Da Vinci is hardly alone in his deep and abiding fascination with the metamorphosis of matter; creative forces of swirling energy are seen in myriad art forms at this period.[22] For Da Vinci, such metamorphosis was commonly narrated through elemental forces, as he characterised fire in a brief passage of his notes:

> One shall be born from small beginnings which will rapidly become vast. This will respect no created thing, rather will it, by its power, transform almost every thing from its own nature into another.[23]

Nature in flux was inherently destructive even to itself, he suggested in another passage that seemed to imagine the end of life on earth, which would 'end with the element of fire … its surface will be left burnt up to cinder and this will be the end of all terrestrial nature'.[24] Destruction, in these articulations, was embedded in nature's dynamic and transformative processes of the movement of matter from one form to another.

In his thinking about matter's transformation, Da Vinci echoed ancient ideas encountered through extensive reading and vibrant interactions with his contemporaries.[25] The influence of the pre-Socratics appears strong, especially the Ionian philosophers of the sixth century, Heraclitus, Anaxagoras, and Democritus among them. Heraclitus, for example, conceptualised a process of continual flux in aphorisms such as 'Fire lives the death of earth and air lives the death of fire, water lives the death of air, earth that of water'.[26] Heraclitus' ideas were well known to the early modern community of intellectuals and artists of which Da Vinci was a

22 Jeanneret, *Perpetuum mobile*.

23 'Nascierà di piccolo principio, chi si farà cō prestezza granda; questo non stimerà alcuna creata cosa, anzi colla sua potētia quasi il tutto avrà in potentia di transformare di suo essere in vn altro'. Richter, *The Literary Works,* vol. 2, 360, no. 1295.

24 'terminare collo elemēto del fuoco; allora la sua superfice rimarrà in riarsa cienere, e questo fia il termine della terrestre natura'. Richter, *The Literary Works*, vol. 2, 310, no. 1218.

25 For his reading, see Romain Descendre, 'La biblioteca di Leonardo', in Sergio Luzzatto and Gabriele Pedullà (eds), *Atlante della letteratura italiana* (Turin: Einaudi, 2010), vol. 1, 592–95.

26 Maximus of Tyre, 41.4, cited in Diogenes Laertius, *Lives of the Philosophers*, DK 22 B76, in Patrick Lee Miller and C.D.C. Reeve (eds), *Introductory Readings in Ancient Greek and Roman Philosophy* (Indianapolis, IN: Hackett Publishing, 2015), 12.

part. The Italian painter Raffaello Sanzio da Urbino depicted the ancient philosopher with the features of fellow Italian artist Michelangelo di Lodovico Buonarroti Simoni in his fresco *The School of Athens* around 1510.[27] Da Vinci's own attachment to Heraclitan ideas is suggested by another, earlier artwork by Donato Bramante around 1486, in which the philosopher, paired with Democritus, is presented with features reminiscent of Da Vinci himself.[28] The intellectual connections between Da Vinci and Bramante, recently explored by art historian Jill Pederson, leave no doubt that the latter knew much of Da Vinci's developing thought.[29] Anaxagoras is mentioned by name in a short commentary among Da Vinci's notes, providing a similar conceptualisation of dynamic flux to that of Heraclitus:

> Anaxagoras. Every thing proceeds from every thing, and every thing becomes every thing, and every thing can be turned into every thing else, because that which exists in the elements is composed of those elements.[30]

Roman authors Ovid and Plutarch provided further influences upon Da Vinci's metamorphic vision of nature.[31] In relation to such works as well as his own experiences, Da Vinci developed a conceptualisation of the dynamic flux of all nature, in which destruction as part of transformation appeared an inherent and inevitable process.

This transformation of nature's matter was informed by temporality in Da Vinci's work. He considered time's transformative influence at the individual human scale, as one red chalk work on paper portraying old and young men together suggests.[32] His notebook reflections pondered the same question at the scale of humankind as a species. In one exploratory passage, he considered different scales of time in which humans, as part of nature, were embedded:

27 In the Apostolic Palace, Vatican City.

28 In the Pinacoteca di Brera, Milan.

29 Jill M. Pederson, *Leonardo, Bramante, and the Academia. Art and Friendship in Fifteenth-Century Milan* (Turnhout: Brepols, 2020).

30 'Anasagora; ogni cose viē da ogni cosa, – ed ogni cosa si fa ogni cosa, e ogni cosa torna in ogni cosa; perchè ciò ch'è nelle elemēti è fatto da essi elemēti'. Richter, *The Literary Works*, vol. 2, 445, no. 1473.

31 André Chastel, 'Léonard et la culture', in his *Fables, formes, figures*, 2 vols (Paris: Flammarion, 1978), vol. 2, 251–63.

32 See *Heads of an Old Man and a Young Man*, c. 1495, red chalk on paper, 208 x 150 mm, Galleria degli Uffizi, Florence, Gabinetto Disegni e Stampe, 423 E r.

> O time, swift robber of all created things, how many kings, how many nations hast thou undone, and how many changes of states and of various events have happened since the wondrous forms of this fish perished here in this cavernous and winding recess. Now destroyed by time thou liest patiently in this confined space with bones stripped and bare; serving as a support and prop for the superimposed mountain.[33]

In another, his musings on the end of life on earth, Da Vinci suggested that human destruction was simply one small part of what will succumb to the inevitable flux, a process that was conceptualised and narrated as both past and future.[34]

> The watery element was left enclosed between the raised banks of the rivers, and the sea was seen between the uplifted earth and the surrounding air which has to envelope and enclose the complicated machine of the earth, and whose mass, standing between the water and the element of fire, remained much restricted and deprived of its indispensable moisture; the rivers will be deprived of their waters, the fruitful earth will put forth no more her light verdure; the fields will no more be decked with waving corn; all the animals, finding no fresh grass for pasture, will die and food will then be lacking to the lions and wolves and other beasts of prey, and to men who after many efforts will be compelled to abandon their life, and the human race will die out.[35]

33 ‘O tēpo, velocie predatore delle create cose, quāti rè, quāti popoli ài tu disfatti, e quāte mutazioni di stati e vari casi sono seguite dopo che la maravigliosa forma di questo pescie qui morì per le caverne e ritorte interiora; ora disfatto dal tēpo patiēte giacci ī questo chiuso loco; colle spolpate e ignivde ossa ài fatto armadura e sostegnio al sopra posto mote’. Richter, *The Literary Works*, vol. 2, 310, no. 1217.

34 Paolo Galluzzi, ‘Leonardo da Vinci’s Concept of “Nature”. “More Cruel Stepmother than Mother”’, in Marco Beretta, Karl Grandin, and Svante Lindqvist (eds), *Aurora Torealis. Studies in the History of Science and Ideas in Honor of Tore Frängsmyr* (Sagamore Beach: Science History Publications, 2008), 13–29, at 15–16. Leonardo’s use of shifting tense structures is also noted by Jeanneret, *Perpetuum mobile*, 78.

35 ‘Rimase lo elemēto dell’acqua rīchiuso īfra li crescivti argini de’ fiumi, e si vede ’l mare jfra la crescivta terra e la circunatricie aria, avēdo a fasciare e circonscrivere la moltificata machina della terra, e la sua grossezza, che staua fra l’acqua e lo elemēto del fuoco, rimāga molto ristretta e private dalla bisogniosa acqua, la fertile terra nō māderà piv leggieri frōde, nō fieno piv i cāpi adornití dale ricascāti piāte; tutti li animali nō trovādo da pasciere le fresche erbe, morranno, e māccherà il cibo ai rapaci lioni e lupi e altri animali che vivono di ratto, e agli omini dopo molti ripari cōverrà abādonare la loro vita, e mācherà la gienerazione vmana’. Richter, *The Literary Works*, vol. 2, 310, no. 1218.

Figure 1.1 Leonardo da Vinci, *A Deluge*, c. 1517–18, black chalk, pen and ink, wash, 16.2 × 20.3 cm (sheet of paper). Royal Collection Trust, RCIN 912326. © His Majesty King Charles III 2023

Existential destruction of humankind by nature was part of a large process of transformative flux that in Da Vinci's texts appeared inevitable.

A number of Da Vinci's drawings depicted what seem to be such cycles of transformation innate in nature. Ten such drawings are similarly sized and mostly in black chalk, suggesting their possible relationship as a kind of thought experiment and visual theorisation (Fig. 1.1).[36] Such images were not observations of nature, although they may have been informed by observation: they were natural philosophical *and* artistic articulations.[37]

36 On the Windsor Deluge drawings, Arasse, *Leonardo*, 112; Martin Kemp, *Leonardo* (Oxford: Oxford University Press, 2004), 158–64; Martin Kemp, *Leonardo da Vinci. The Marvellous Works of Nature and Man* (1981; revised ed., Oxford: Oxford University Press, 2007), 311–20.

37 Ernst Gombrich, 'The Form of Movement in Water and Air', in C.D. O'Malley (ed.), *Leonardo's Legacy* (Berkeley: University of California Press, 1969), 171–204; Martin Kemp, 'Leonardo and the Idea of Naturalism. Leonardo's Hypernaturalism', in Andrea Bayer (ed.), *Painters of Reality. The Legacy of Leonardo and Caravaggio in Lombardy* (New York: Metropolitan Museum of Art, 2004), 65–73; Enzo O. Macagno, 'Leonardo's Methodology in his Fluid Mechanical Investigations', in Ching Jen Chen (ed.), *Turbulence Measuring and Flow Modelling* (New York: Hemisphere, 1987), 833–94.

These depictions of natural violence communicated repeated swirls and spirals that churned all in their wake. The overwhelming, existential nature of the disaster is barely contained within the frame of paper on which Da Vinci sought to articulate it. There was nothing beyond, nothing that remained outside the path of such violence.

Nature as Mistress and Mother and Masculine Generation

If nature's cycle of destructive and generative transformation was aided by time in Da Vinci's work, so too was his conceptualisation shaped by the gender ideologies of his era. Gender mattered to the complicated pedagogical and power relationship between nature, normatively female in Da Vinci's works, and the artist, normatively male. When he reflected upon the art of painting in his notes, Da Vinci conceived of painting in a filial relationship with nature, its mother: 'for painting is born of nature – or, to speak more correctly, we will say it is the grandchild of nature; for all visible things are produced by nature'.[38] Elsewhere, engaging with a long-standing debate within ancient and contemporary artistic discourse about imitation, emulation, and invention, Da Vinci argued, in his writings on the history of artistic achievements, that only by direct engagement with nature, 'the mistress of all masters', could painting as an artform be renewed and developed.[39]

Nature's creations could even be surpassed, Da Vinci suggested, for painting

> is of such excellence that it keeps alive the harmony of those proportionate parts which nature, for all her powers, cannot manage to preserve. How many paintings have preserved the image of a divine beauty, which in its natural manifestation has been rapidly overtaken by time or death. Thus the work of the painter is nobler than that of nature, its mistress.[40]

38 'perchè la pittura · è partorita da · essa natura·; ma per dire piv corretto dirremo nipote di natura·, perchè tutte le cose evidēti sono state partorite dalla natura'. Richter, *The Literary Works*, vol. 1, 326, no. 652.

39 'natura, maestra dei maestri'. Richter, *The Literary Works*, vol. 1, 332, no. 660. On these debates, see George W. Pigman III, 'Versions of Imitation in the Renaissance', *Renaissance Quarterly* 33: 1 (1980), 1–32; Andrea Bolland, 'Art and Humanism in Early Renaissance Padua. Cennini, Vergerio and Petrarch on Imitation', *Renaissance Quarterly* 49: 3 (1996), 469–87; and beyond Italy, see Anton W.A. Boschloo (ed.), *Aemulatio. Imitation, Emulation and Invention in Netherlandish Art from 1500 to 1800. Essays in Honor of Eric Jan Sluijter* (Zwolle: Waanders, 2011).

40 Leonardo da Vinci, *Treatise on Painting* (*Codex Urbinas Latinus 1270*), trans. A. Philip McMahon, (Princeton, NJ: Princeton University Press, 1956), no. 30, cited in Galluzzi, 'Leonardo

Here time assisted the male painter's copy to assert supremacy over female nature's original and imperfect creation.[41] Nature's maternity could be rivalled by the male artist's act of generation. Moreover, the artist created not only through the production of a painted simulacrum. If the painter did more than draw 'merely by practice and by eye, without any reason … like a mirror', he could participate in the creation of 'true knowledge'.[42] Nature, simultaneously mistress and mother, Da Vinci suggested, could and should be controlled, subordinated by a certain kind of skilled individual who could disclose her inner workings at a time of his choosing.

Nature's Desire

Da Vinci feminised the cycle of destructive violence in the natural world. Nature was of course commonly presented as female, both in the ancient sources and among his contemporaries. Da Vinci may thus have been following a standard view. Historian of science Marco Beretta proposes that his terminology suggests a conceptualisation of natural processes in the model of Epicureanism that was advanced by the Roman poet and philosopher Lucretius. Da Vinci's vision of progressive decay of fertile nature to a state of barrenness within a single earth-scaled transformative cycle echoed the path of Lucretius's industrious Venus Daedala and Genetrix to her inevitable desolate end over the course of his *De Rerum Natura* ('On the Nature of Things').[43] Da Vinci's characterisation of nature as female was not unexpected within his cultural worldview, just as within that of Lucretius, but we should not take it for granted. Firstly, Da Vinci may have been among the most radical of the era's thinkers about movement and metamorphosis, as Jeanneret suggests, but gender ideology appears one area in which his ability to think outside contemporary socio-cultural systems was more limited.[44] Secondly and importantly, the consequences of this particular characterisation shape Da Vinci's thinking about natural violence.

Da Vinci's nature as both mistress and mother would display particular feeling characteristics consistent with contemporary gender ideologies, which were fundamental to his consideration of natural violence. The

da Vinci's Concept of "Nature"', 25.

41 A claim by no means unique to Leonardo, see Jeanneret, *Perpetuum mobile*.

42 'Il pittore che ritrae per practica e givditio d'ochio, sanza ragione è come lo spechio', 'veramēte questa è sciētia', Richter, *The Literary Works*, vol. 1, 18, no. 20, and 326, no. 652.

43 Marco Beretta, 'Leonardo and Lucretius', *Rinascimento* 49 (2009), 341–72, at 363–64.

44 Jeanneret, *Perpetuum mobile*, 59.

affective dimensions of nature's maternity appeared to confound, perhaps even confront, Da Vinci. In a brief reflection in his notes about the cruelty of humans towards asses, he expounded: 'O Nature! Wherefore art thou so partial; being to some of thy children a tender and benign mother, and to others a most cruel and pitiless stepmother?'[45] Da Vinci's depiction of nature's forms of motherhood has attracted scholarly attention because of the strong feeling with which he expresses his perception of nature's ambivalence towards its creations and the violence rendered unto them. In another notebook, a single sentence jotting observed: 'nature appears with many animals to have been rather a cruel stepmother than a mother, and with others not a stepmother, but a most tender mother'.[46] Da Vinci's repeated connection between particular affective dispositions of different forms of female parenting emphasised normative expectations of maternal affections and, furthermore, the assumption that these were forged by direct blood relations that distinguished them from the care of a stepmother. It may be tempting to draw reference to Da Vinci's own experiences in such relationships, for he was not the child of any of his father's three wives. Da Vinci likely intended that humans held no privileged position in relation to nature, as historian of science Paolo Galluzzi argues.[47] Yet Da Vinci's framing of this idea is distinctly emotive. A rich literature has examined how early moderns voiced strong expectations of women as mothers, especially where a breach in performing culturally normative affective displays or acts of care led to the abandonment or death of a child and could incur severe punishment for the women concerned.[48] Da Vinci's powerful emotive exclamations and questions about nature's actions for her creations are deeply embedded in cultural expectations about maternal care.

45 'O natura, perchè ti sei fatto partiale, facciēdoti ai tua figli d'alcuna pietosa e benignia madre, ad'altri crudelissima e spietata matrignia?' Richter, *The Literary Works*, vol. 2, 354, no. 1293.

46 'La natura pare qui in molti o di molti animale stata più presto crudele matrignia che madre, e d'alcuni nō matrignia ma pietosa madre'. Richter, *The Literary Works*, vol. 2, 131, no. 846.

47 Galluzzi, 'Leonardo da Vinci's Concept of "Nature"', 14.

48 For recent examples of this literature, focused particularly on emotional dimensions, see Susan Broomhall, 'Understanding Household Limitation Strategies among the Sixteenth-Century Urban Poor in France', *French History* 20: 2 (2006), 121–37; Garthine Walker, 'Child-Killing and Emotion in Early Modern England and Wales', in Katie Barclay, Kimberley Reynolds, and Ciara Rawnsley (eds), *Death, Emotion and Childhood in Premodern Europe* (Basingstoke: Palgrave Macmillan, 2017), 151–72; Sally Holloway, 'Materializing Maternal Emotions. Birth, Celebration and Renunciation in England, c. 1688–1830', in Stephanie Downes, Sally Holloway, and Sarah Randles (eds), *Feeling Things. Objects and Emotions through History* (Oxford: Oxford University Press, 2018), 154–71.

Contemporary gender ideologies that assumed women's inherent desire for maternity and constructed how that maternity should be *affected* were thus reflected in Da Vinci's works via the emotions with which he accredited his mistress/mother nature. Da Vinci's ideas about human women and their reproductive organs are suggestively complex in their simplicity. As cultural historian Sander Gilman observes, his depiction of a woman and man in coitus figures her as 'but womb and breasts'.[49] Just as women were widely perceived to be driven to procreate by the urges of the wandering animal inside them, a widespread early modern (mis) understanding of Greek philosopher Plato's description of the uterus, so too did nature desire generation.[50] However, like a woman, nature's generative potential would eventually be exhausted, as time ensured that her fertility was inevitably followed by sterility. Nature's time-limited capacity for creative production, subsequent natural world change, and, ultimately, destruction were within and indeed central to natural world processes. The feeling force that drove feminised nature was, in Da Vinci's mind, hugely powerful. As a sustained speculative commentary among his notes records, against time's inevitability to destroy, nature's urge to create was, for Da Vinci, ferocious:

> taking pleasure in creating and making constantly new lives and forms, because she knows that her terrestrial materials become thereby augmented, is more ready and more swift in her creating, than time in his destruction.[51]

Nature's desire for continual diversity of forms involved all kinds of her production, even where one of her creations endangered others among them.

> Nay, this not satisfying her desire, to the same end she frequently sends forth certain poisonous and pestilential vapours upon the vast increase

49 Sander L. Gilman, 'Leonardo Sees Him-Self. Reading Leonardo's First Representation of Human Sexuality', *Social Research* 54: 1 (1987), 149–71, at 160. Gilman also produced an intriguing account of Leonardo's depictions of the uterus outside the body as the sign of the bestial, at 169.
50 Ian MacLean, *The Renaissance Notion of Woman. A Study in the Fortunes of Scholasticism and Medical Science in European Intellectual Life* (Cambridge: Cambridge University Press, 1980); Mark J. Adair, 'Plato's View of the "Wandering Uterus"', *The Classical Journal* 91: 2 (1995–96), 153–63.
51 'pigliãdo piacere del creare e fare cõtinue vite e forme, perchè cognioscie che sono accrescimẽto della sua terrestre materia, è volonterosa e piv presta col suo creare che 'l tẽpo col cõsumare'. Richter, *The Literary Works*, vol. 2, 310–11, no. 1219.

> and congregation of animals; and most of all upon men, who increase vastly because other animals do not feed upon them.[52]

Thus, nature's desire to generate delivered its own forms of violence. And 'so she has ordained that many animals shall be food for others', the speculation continued, as ever-new forms of life upon the earth were forced into confrontation and contest with each other.[53]

Da Vinci referred here to nature as 'inconstant'.[54] However, what he articulated was the predictable outcome of a state of desiring generation, perceived to be specific to women, that was inherently irrational. This would produce in nature, as in women, affects and their consequences that would appear unpredictable at a local scale. Nature's intense emotions, her desire for maternity that pushed her even to neglect the creations she produced, might be irrational, but these feelings were logical and consistent with the expectations of her feminine characterisation. It was thus not only time that brought about nature's violence to herself and her creations as her generative capacity waned, but the consequences of her generative desire that would destroy them too: 'This earth therefore seeks to lose its life, desiring only continual reproduction'.[55]

For Da Vinci, emotion, interpreted through contemporary gender templates that produced specific affects in women, informed his understanding of nature's processes and particularly its violence. Feminised irrational emotion, as Da Vinci constructed it, provided a logical key to nature's acts of both generation and destruction within a cycle of transformation. Nature's powerful maternal desires were as critical to understanding natural world systems as was time, which contributed to pushing the generative desire of nature and, ultimately, encouraged nature to destroy even herself.

Nature's Affective Legacy: Feeling as Logos

Da Vinci appeared to identify both humans and other species as having capacity for emotions; after all, they were all nature's children. One set of

52 'e nō soddisfaciēdo questo a simile desiderio, e' spesso māda fuora cierti avelenati e pestilēti vapori sopra la grā moltiplicazioni e cōgregazioni d'animali, e massime sopra gli omini, chef anno grade accrescimēto, perchè altri animali nō si cibano di loro'. Richter, *The Literary Works,* vol. 2, 311.

53 'e pero à ordinato che molti animali sieno cibo l'uno dell'altro'. Ibid.

54 'vaga'. Richter, *The Literary Works*, vol. 2, 310, no. 1219.

55 'adūque questa terra cierca di mācare di sua vita, desiderādo la continva moltiplicazione'. Richter, *The Literary Works*, vol. 2, 311, no. 1219.

Figure 1.2 Leonardo da Vinci, *A Rearing Horse, and Heads of Horses, a Lion, and a Man* (recto), c. 1503–4, pen and ink, wash, a little red chalk, 19.6 cm × 30.8 cm (sheet of paper). Royal Collection Trust, RCIN 912380. © His Majesty King Charles III 2023

drawings on a sheet of paper placed expressions of intense emotion displayed on the bodies and heads of horses, a lion, and a man, side by side, seemingly in comparative analysis.[56] For Da Vinci, humans were not above nature but a deeply integrated part of it. He sometimes foregrounded the capacities of humans above other of nature's creations to shape the world around them; indeed his own engineering designs functioned to enhance human experience of the natural world. Yet his was a highly ambivalent position.[57] In one long set of prophetic reflections in his notes, the topic to which he gave most attention was the cruelty of humankind. Here, he opined that, despite hopes and aspirations to be more than earthly, humans were pulled back to the earth: 'from their immoderate pride they will desire to rise towards heaven, but the too great weight of their limbs will keep them down'.[58]

Moreover, Da Vinci suggested that humans fully participated in natural world processes with the affective inheritance that they had been given from nature. Humans were not only subject to nature's desires and processes, but they reproduced them in their turn. Da Vinci depicted humans driven

56 Jeanneret, *Perpetuum mobile*, 63.

57 Galluzzi, 'Leonardo da Vinci's Concept of "Nature"', 15.

58 'e per la loro smisurata superbia questi si vorranno leuare inverso il cielo, ma la superchia gravezza delle lor membra gli porrà in basso'. Richter, *The Literary Works*, vol. 2, 365, no. 1296.

to acts of violence, sharing nature's inherent desire for both creation and destruction. The same prophetic musing on the cruelty of humankind in his notes thus continued:

> there will be no end to their malignity; by their strong limbs we shall see a great portion of the trees of the vast forests laid low throughout the universe … Nothing will remain on earth, or under the earth or in the waters which will not be persecuted, disturbed, and spoiled.[59]

Plants and animals consumed by humans became matter once more transformed, 'their bodies will become the sepulture and means of transit of all they have killed'.[60] Da Vinci suggested that the forces driving humans' violent tendencies were expressed as strong feeling processes, for 'the satisfaction of their desires will be to deal death and grief and labour and wars and fury to every living thing'.[61] Human destruction also involved humans as well; humankind was driven to self-destruction. They were, Da Vinci opined, no more than animals 'who will always be fighting against each other with the greatest loss and frequent deaths on each side'.[62] Emotion, for Da Vinci, was then not simply the recorded witness to destruction, to human existence and the transformation of nature. In a musing among his notes concerned with morality and the meaning to life, Da Vinci considered how emotions were integral to violence itself, because it was in human nature to desire it.

> Now you see that the hope and the desire of returning home and to one's former state is like the moth to the light, and that the man who with constant longing awaits with joy each new spring time, each new summer, each new month and new year – deeming that the things he longs for are ever too late in coming – does not perceive that he is longing for his own destruction.[63]

59 'questi non avrā termine nelle lor malignità; per le fiere mēbra di questi uerranno a terra grā parte deli alberi delle gran selue dell'universo … nulla cosa resterà sopra la terra e l'acqua che nō sia perseguitata ·, remossa o guasta'. Ibid.

60 ''l corpo di questi si farà sepultura e transito di tutti i già da lor morti corpi animati'. Ibid.

61 'il nutrimēto de' loro desideri sarà, di dar morte e affanno e fatiche e guerre e furie a qualūche cosa animata'. Ibid.

62 'I quali senpre conbatterranno infra loro e con danni grandissimi e spesso morte di ciascuna delle parti'. Ibid.

63 'Or vedi la sperāza e'l desiderio del ripatriarsi e ritornare nel primo caso fa a similitudine della farfalle al lume, e l'uomo che cō cōtinvi desideria sēpre cō festa aspetta la nvova primavera, sempre la nvova state, sempre e nvovi mesi, e nvovi anni, parēdogli che le desiderate cose, venēdo, sieno trope tarde, E' non s'avede che desidera la sua disfazione'. Richter, *The Literary Works,* vol. 2, 291, no. 1162.

Nature had bestowed her propensity for both feeling and violence upon humankind.

Da Vinci saw how humans perceived violence in and of nature through intense emotional frameworks. Whether or not he ever witnessed the Armenian event narrated in the draft letter composition, he attested to it as an emotional experience: 'those few who remain unhurt are in such dejection and such terror that they hardly have courage to speak to each other, as if they were stunned'.[64] This was beyond words, perception through feeling. Just as he asserted painting could operate to discover natural world processes, feeling became for Da Vinci an alternative mode of knowledge in relation to natural violence. Emotions held power in Da Vinci's work because they helped him make sense of the status of humankind. Nature could silence not only human tools of language but also human records of expression, as he reflected in a passage concerned with forms of authority for geographical knowledge:

> Since things are much more ancient than letters, it is no marvel if, in our day, no records exist of these seas having covered so many countries; and if, moreover, some records had existed, war and conflagrations, the deluge of waters, the changes of languages and of laws have consumed every thing ancient.[65]

Time would erase even the expression of these emotions. But *the experience of feeling* here and now reminded humans, at least Da Vinci, that they too were part of a larger inevitable process. As he wrote in a musing about life,

> this desire is the very quintessence, the spirit of the elements, which finding itself imprisoned with the soul is ever longing to return from the human body to its giver. And you must know that this same longing is that quintessence, inseparable from nature, and that man is the image of the world.[66]

64 'E que' pochi, che siamo restati, siamo rimasti · cō tanto sbigottimēto e tata pavra che appena come balordi abbiamo ardire di parlare · l'uno coll'altro'. Richter, *The Literary Works*, vol. 2, 393, no. 1337.

65 'Perchè molto sō piv antiche le cose che le lettere, non è maraviglia, se alli nostri giorni non apparisce scrittura delli predetti mari essere occupatori di tanti paesi; e se pure alcuna scrittura apparia, le guerre, l'incēdi, li diluvi dell'acque le mutationi delle lingue e delle leggi ànno cōsumato ogni antichità'. Richter, *The Literary Works*, vol. 2, 207, no. 984.

66 'E uo'che sapi che questo medesimo desiderio è quella quītessēza, cōpagnia della natura, e l'uomo è modello dello mōdo'. Richter, *The Literary Works*, vol. 2, 291, no. 1162.

Understanding that humans' nature was to desire violence held its own significance, as it became a new emotional, experiential knowledge. The reflection above is matter of fact, consequential and knowledge-forming: 'now you see' flows to 'and you must know'. Da Vinci presents his thought as ultimately a path towards existential enlightenment, from discovery to acceptance of humanity's inclusion within nature and her emotional cycle that would involve inevitable annihilation.

Conclusions

Leonardo da Vinci articulated natural violence – that is, violence to, within, and by nature, in creative and striking terms, which themselves formed a rich and complex set of relations and which implied diverse consequences and responses for human and non-human species alike. Natural violence was not systematically conceptualised as disaster, even when it could elicit intense and negative emotional responses. It was importantly shaped by temporal and affective dimensions. More conventionally but no less consequentially, natural violence was for Da Vinci further informed by assumptions arising from contemporary gender ideologies. Human relationships to nature were affectively complicated by 'her' identity as both a mistress and mother. Yet the experience of intense emotions was also a reminder of humankind's inheritance from nature, a legacy that subjected humans to natural world systems both as they spurred humans to produce violence upon nature's creations and to accept future existential destruction in turn. Da Vinci's conceptualisation of natural violence across timescales that were both human and geological invites comparison with Chakrabarty's call that 'the Anthropocene requires us to think on the two vastly different scales of time that Earth history and world history respectively involve', scales of time 'tinged with different kinds of affect'.[67] As we consider our agency to arrest the course of climate change, emotions have thus returned to our discussions. Or, as the title of scientist James Lovelock's influential work *The Revenge of Gaia. Earth's Climate Crisis and the Fate of Humanity* suggests, perhaps the emotions of a feminised nature have always been entrenched in our conceptualisations.[68] What we embed, what we allow, and how we respond as a result of seeing nature and human relations in gendered and emotional terms deserve closer attention not only as a matter of historical interest but as one of urgency in our own historical moment.

67 Dipesh Chakrabarty, 'Anthropocene Time', *History and Theory* 57: 1 (2018), 5–32, at 6, 13.
68 (New York: Basic Books, 2006).

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