ENGINES OF THE IMAGINATION

Renaissance culture and the rise of the machine

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14 THE RENAISSANCE MACHINE AND ITS DISCONTENTS



Figure 1.4 Zacharias Heyns, *Emblemata, Emblems Christienes, et Morales* (Rotterdam, 1625), plate 18. Glasgow University Library, Special Collections.

the grip of winter (Figure 1.5, p. 16). Once this detail in Brueghel's painting is noted, a network of ancillary meanings of the image begins to unfold, circulating around those related ideas of optimism and pessimism once more. Pessimistically, the machine is shown to be impotent in the face of the power of nature, which is able to reduce it to frost-bound stasis. But optimistically, the machine is emblematic of the social world that the frozen hunters are intent on rejoining. Something of the mythic archetypes of technological progress is at work, too, in the painting: the hunters, returning with their dogs and the single rabbit which is all they have been able to retrieve from the frozen forest, are representatives of an older, nomadic way of life. The machine, on the other hand, for all that it is held in the grip of winter, is a promise of a more secure existence. Remembering that this image is part of a cycle of paintings, the promise is that the land will, eventually, emerge from its wintry shroud, and with the spring thaw the mill's wheels will turn once more. The temporary retreat into a frozen Arcadia, which is shown to be a not entirely comfortable place, will, at last, come to an end.

Machines may be much more than extraneous details in the landscape. In Renaissance images, the machine, usually in the form of a mill of some kind, can often be glimpsed at the margin of the picture, through an opened window, or vaguely evoked in the middle or further distance. Such devices are particularly prevalent in religious painting. So, while the machine in the landscape may be understood as a sign of civility, it also reminds us of that promise of a theological restitution. It also might hint, emblematically, at the anguish suffered by Christ on the cross, imagined, as we have seen in the case of a fourteenth-century French poet, as a form of milling or grinding. In a depiction, for example, of the Rest of the Holy Family on the Flight into Egypt of c. 1525–50, attributed to the workshop of the 'master of the female half-lengths', the Virgin, St Joseph, and the infant Jesus are shown in the foreground. Behind them, in the middle distance, painted with an attentive eye to detail, can be discerned an overshot watermill and a sluice.³⁸ In the Last Supper (1531) by Pieter Coecke van Aelst (1502–56), through an opened window, behind Christ's right shoulder, we can see two windmills in the far distance. In Brueghel's Carrying of the Cross (1564), the route to Calvary is dominated by another windmill, perched precipitously on a craggy outcrop. The mill, in fact, is far easier to spot in the painting than the tiny figure of Christ struggling under the burden of his cross. Similarly, in the Madonna and Child with the Young John the Baptist (1497), the work of Fra Bartolommeo (1473-1517), the sacred figures are posed, conventionally, within an open loggia, while, behind them, the landscape unfolds to show, again, a watermill. In a picture now in the National Gallery in London known as Moses Defending the Daughters of Jethro (1609), by Carlo Saraceni (1579-1620, also known as Carlo Veneziano), an incident from the early life of Moses is depicted, in which Moses defends Jethro's daughters from a group of shepherds, intent on driving them away from a well (Exodus 2.16) (Figure 1.6, p. 17). But dominating the left-hand side of the image, the artist shows us a complex water-lifting device, quite possibly derived from the machine designs of Agostino Ramelli, whose sumptuous Le Diverse et Artificiose Machine was published in a dual French and Italian edition at Paris in 1588. In his work, Ramelli traced the divine origins of the invention of mechanisms



Figure 3.5 Agostino Ramelli, *Le diverse et artificiose machine del Capitano Agostino Ramelli*... (Paris, 1588), plate 27. Glasgow University Library, Special Collections.



Figure 3.6 Agostino Ramelli, *Le diverse et artificiose machine del Capitano Agostino Ramelli*... (Paris, 1588), plate 46, Glasgow University Library, Special Collections.

- 53 On Kircher's *Turris Babel*, see Paula Findeln, 'Introduction: The Last Man Who Knew Everything . . . or Did He?' in Paula Findeln (ed.), *Athanasius Kircher, The Last Man Who Knew Everything* (New York and London: Routledge, 2004), p. 4.
- 54 Antony Grafton, 'Kircher's Chronology' in Findeln (ed.), Athanasius Kircher, p. 173.
- 55 For an account of the Babel story in terms of the origins of technology, see Jonathan Sawday, 'The Fortunes of Babel: Technology, History, and Genesis 11:1–9' in Kevin Killeen and Peter Forshaw (eds) *The Word and the World: Biblical Exegesis and Early Modern Science* (Basingstoke: Palgrave Macmillan, 2007), pp. 191–214.
- 56 Dante Alighieri, *The Divine Comedy 3: Paradisio* trans. John D. Sinclair (London and New York: Oxford University Press, 1971), p. 379; Augustine, *City of God*, p. 657.
- 57 Polydore Vergil, *On Discovery (De inventoribus)* ed. and trans. Brian P. Copenhaver (Cambridge, MA, and London: Harvard University Press, 2002), p. 459.
- 58 Ovid, Metamorphoses, p. 184.
- 59 Ovid, Metamorphoses, p. 185.
- 60 Ovid, Metamorphoses, p. 185.
- 61 Ovid, Metamorphoses, p. 185.
- 62 On the fate of similar overreachers in Renaissance art, see Malcolm Bull, *The Mirror of the Gods: Classical Mythology in Renaissance Art* (London: Allen Lane, 2005), p. 145.
- 63 Christopher Marlowe, *The Works* ed. C. F. Tucker Brooke (Oxford: Clarendon Press, 1941), p. 146.
- 64 On Leicester's political ambitions, see Simon Adams, 'Dudley, Robert, Earl of Leicester (1532/3–1588)', *Oxford Dictionary of National Biography* (Oxford University Press, September 2004), Internet: www.oxforddnb.com/view/article/8160. Accessed 10 August 2006.
- 65 Ovid, The xv. bookes of P. Ovidius Naso, entytuled Metamorphosis, translated oute of Latin into English meeter, by Arthur Golding Gentleman (London, 1567), sig. A3^v.
- 66 Robert Jones, The First and the Second Book of Songs and Ayres Set Out to the Lute (London, 1601), sig. B^v.
- 67 See Christopher Allen, 'Ovid and Art' in Phillip Hardie (ed.), *The Cambridge Companion to Ovid* (Cambridge: Cambridge University Press, 2002), pp. 336–67. The subject of Icarus had a wide pictorial appeal. Illustrations based on the woodcuts of Virgil Solis, which first appeared in the edition of the *Metamorphoses* (Basel, 1543) by Jakob Micyllus, were recycled throughout the sixteenth century and later, as were those by Bernard Salomon, which first appeared in the *Metamorphose figurée* (Lyons, 1557). Among the artists (in addition to those mentioned above) who turned to the theme of Icarus and Daedalus in the period, were Tomaso Manzuoli (Maso da San Friano) (1531–71), Elias Greither (*c.* 1565–1646), Carlo Saraceni (1579–1620), and Rubens (1577–1640).
- W. H. Auden, Collected Shorter Poems 1930–1944 (London: Faber and Faber, 1962), p. 19.
- 69 On Landscape with the Fall of Icarus, see Michael Levey, High Renaissance (London: Penguin Books, 1975), p. 185; E. H. Gombrich, The Story of Art (London: Companion Book Club, 1956), p. 281.
- 70 Ovid, The xv. bookes of P. Ovidius Naso, pp. 98–9.
- 71 Ovid, P. Ovidii Nasonis Metamorphosis (Antwerp, 1591), p. 195.

- 72 For a reading of the 'heroic' figure of the ploughman, see Robert Baldwin, 'Peasant Imagery and Brueghel's "Fall of Icarus"' *Konsthistorisk Tidskrift/Journal of Art History* 55 (1986), pp. 101–14.
- 73 Marsilio Ficino, *Platonic Theology (Theologia platonica de immortalitate animorum)*, 6 vols, ed. and trans. Michael J. B. Allen and James Hankins (Cambridge, MA, and London: Harvard University Press, 2001–), IV, p. 173.
- 74 Snyder, Northern Renaissance Art, p. 523. For accounts of alternative, alchemical, readings of the image, see Pamela H. Smith, The Body of the Artisan: Art and Experience in the Scientific Revolution (Chicago and London: University of Chicago Press, 2004), p. 136.

2 Philosophy, power, and politics in Renaissance technology

- 1 See Paolo Galluzzi (ed.), *The Art of Invention: Leonardo and the Renaissance Engineers* (Florence: Giunti/Instituto e Museo di Storia della Scienza, 1996), p. 84.
- 2 Irma A. Richter (ed.), *The Notebooks of Leonardo da Vinci* (Oxford: Oxford University Press, 1980), p. 18.
- 3 Richter (ed.), *Notebooks of Leonardo*, p. 23. On the mechanical basis of Leonardo's anatomical studies, see Galluzzi (ed.), *The Art of Invention*, p. 78.
- 4 See E. H. Gombrich, Martin Kemp, and Jane Roberts, *Leonardo da Vinci* (London: Yale University Press/South Bank Centre, 1989), pp. 130–6.
- 5 Richter (ed.), Notebooks of Leonardo, p. 19.
- 6 Richter (ed.), Notebooks of Leonardo, p. 26.
- 7 Kenneth Clark, 'Introduction' to Carlo Pedretti, *Leonardo da Vinci Nature Studies* from the Royal Library at Windsor Castle (Catalogue to the exhibition at the J. Paul Getty Museum, Malibu, 15 November 1980–15 February 1981, The Metropolitan Museum of Art, New York, 4 March–7 June 1981) (n.p.; Johnson Reprint Corporation, 1980), p. 11.
- 8 Kenneth Clark, *Leonardo da Vinci: An Account of His Development as an Artist* (1939, revised edition, Harmondsworth: Penguin Books, 1967), p. 148.
- 9 Michael White, *Leonardo: The First Scientist* (London: Abacus Books, 2001), pp. 25, 292.
- 10 Michel Jeanneret, *Perpetual Motion: Transforming Shapes in the Renaissance from Da Vinci to Montaigne* trans. Nidra Poller (Baltimore and London: Johns Hopkins University Press, 2001), pp. 57, 61.
- 11 Giorgio Vasari, *Lives of the Artists* (2nd edition, 1568) trans. George Bull (Harmondsworth: Penguin Books, 1965), p. 256.
- 12 Galluzzi, Art of Invention, p. 55.
- 13 Galluzzi, Art of Invention, p. 61.
- 14 Hunter Rouse and Simon Ince, *History of Hydraulics* (Iowa Institute for Hydraulic Research: State University of Iowa, 1957), p. 44. Note that Galluzzi claims that 'it is not clear' what part Leonardo played in the Arno project; see Galluzzi, *Art of Invention*, p. 70.
- 15 Martin Kemp, 'The Vortex' in Gombrich, Kemp, and Roberts, *Leonardo da Vinci*, p. 119.
- 16 Galluzzi, Art of Invention, pp. 188-91.