

The Dawn of Scientific Biography

Michael Segre

Gabriele D'Annunzio University of Chieti – Pescara, Italy
segre@unich.it

Abstract

This article endeavors to contribute to a better understanding of the literary contexts of early biographies of scientists written during the Scientific Revolution. To what extent are these biographies influenced by stereotypes that are an inadequate fit for modern history of science? Its claim is that there was, indeed, a literary model for biographies of scientists, and that this model had deep roots in Biblical and classical literature. While the model was similar to that used in Renaissance biographies of artists, it did not fully emerge until as late as the seventeenth century.

Keywords

scientist biographies – Scientific Revolution – Renaissance biographies – historiography of science

Introduction

The role of biography in the history of science (as in history in general) presents a delicate, vexed issue. Some regard it as devious or old-fashioned historiography, inappropriate for today's history of science; others, by contrast, say that biography plays a considerable role, particularly through functions not covered by other forms of history of science. The last decade has seen attention paid to this manifold literature, highlighting its assets.¹ The debate, in any

1 To mention a few recent works: Paola Govoni and Zeldia Alice Franceschi, eds., *Writing about Lives in Science: (Auto)Biography, Gender, and Genre* (Göttingen, 2014); Thomas Söderqvist, ed., *The History and Poetics of Scientific Biography* (London, 2017); Oren Harman, "Scientific

case, promotes the understanding of biography as an historiographical genre, permitting better insight into the past and assisting modern history of science.

Much of the debate has nevertheless concentrated on modern biographies of scientists, focusing on the life and work of scientists from the nineteenth or twentieth centuries. Let me concentrate here on earlier biographies, written during the Scientific Revolution. Of course, these early biographies differ greatly from the more modern ones. The latter have the objective of better understanding the scientists' lives and contributions to science in their intellectual and social context, while the former aim above all at accentuating the traits of the individuals they portray. The term "hagiographies" is occasionally used, although "hagiography" in its precise meaning is a literary genre that tells the stories of saints (ἅγιος, *hagios*, meaning "holy"), designed to present them as flawless so that they may become models. In modern literature the term is used to disparage uncritical or reverential biographies, yet these early biographies of scientists remain valuable sources provided they are approached with the sense of proportion appropriate to their literary contexts.

In this article, I endeavor to contribute to a better understanding of the literary contexts of the early biographies of scientists. One question in particular is posed by historians of science: what event served as a trigger for a certain individual to delve into scientific work? Early biographies of scientists often offer romanticized and legendary answers, more related to a literary style than to genuine history, and misleading as answers to the question. To what extent are these biographies influenced by stereotypes that are an inadequate fit for modern history of science? These stereotypical accounts would, of course, be the first to be doubted. Do these stereotypes fall within a more general literary model, or can one speak of *topoi* that are specific to scientists? My claim is that there was indeed a literary model for biographies of scientists; that it had deep roots in Biblical and classical literature; and that while the model was similar to that used in Renaissance biographies of artists, it did not fully emerge until as late as the seventeenth century.

1 A Possible Pattern

At the beginning of the sixteenth century, historian and physician Paolo Giovio (1483–1552) had already drawn out a distinction between a rhetorical encomium that "praises one with banners, without fear of falling in the dirt

Biography," in *Handbook of the Historiography of Biology. Historiographies of Science*, vol. 1, eds. Michael Dietrich, Mark Borrello and Oren Harman (Cham, 2018), 1–26.

of lies,” and history, which “has the light of truth” and the role of “writing of the lives of excellent men.”² While Govio’s view of history and biography is, of course, different from ours, some early biographers of scientists seem either not to have been able to distinguish between these two types of portrayal or to have followed a biographical style still much influenced by encomium or even hagiography. Two centuries later, in 1727 – shortly after Isaac Newton’s death – Bernard le Bovier (or Bouyer) de Fontenelle (1657–1757), *Secrétaire perpétuel* of the French Académie des Sciences, wrote to John Conduitt (1688–1737), husband of Newton’s niece and the scientist’s successor as Master of the Mint, requesting as much material as possible concerning Newton so that he could draw up the latter’s *éloge*.³ He writes:

I need all I can find about Newton without exception. The date and place of birth, the names of his father and mother, his education, early studies, the early signs of genius he showed, some noteworthy features of his childhood or youth, the scholars, if any, who shaped him, the readings he enjoyed most or profited from, what brought him to mathematics.

Fontenelle went on to inquire about the composition of Newton’s *Principia*, his experiments in optics, the criticism he eventually had to face, the praise he received from scholars and princes, his career and associated performance, his private life, his friendships and contacts, his character and lifestyle, his opinions concerning life, governments, and literature, his occupations at old age,

2 Paolo Govio, *Opera*, vol. 1, *Epistolarum*, ed. Giuseppe Guido Ferrero (Rome, 1956), 174.

3 Bernard le Bovier de Fontenelle, *Oeuvres complètes*, vol. 6 (Paris, 1994), 32–33. Fontenelle’s *éloge* of Newton, as well as all the early biographies of Newton quoted below, have been more recently collected in *Early Biographies of Isaac Newton*, eds. Rob Iliffe, Milo Keynes & Rebekah Higgitt, 2 vols. (London, 2006). This quotation is from <www.newtonproject.ox.ac.uk/view/texts/diplomatic/THEM00149>, accessed 29 August 2019: “J’ai besoin de tout ce que vous pouvez savoir sur M. Neuton sans exception. le iour, le lieu de sa naissance, le nom de son Pere et de sa Mere, son education, ses premieres études, les premieres marques de genie qu’il donna, quelques traits remarquables de son enfance, ou de sa ieunesse, les Sauants qui l’ont formé, les s’il y en a \eu/, les lectures qu’il aimoit le plus, ou dont il a tiré le plus de profit, ce qui le détermina au Mathematiques, comment il fit son Liure des Principes, et ses Experiences d’Optique, les censures ou oppositions qu’il aura eües a essayer, s’il y en a eu, les loüanges qu’il en a reçües de la part des Sauants, ou des Princes, la fortune et les emplois où il est parvenu, et par quels degrés, comment il s’y comportoit, quelle étoit sa forme de uie priuée, ses liaisons, ses commerces, quel étoit son caractere, ses moeurs, ses <sentiments particuliers sur la uie humaine, sur les Gouuernements &c. \son iugement sur les Auteurs celebres/ ses occupations dans sa derniere uieillesse, la maniere dont il est mort. tout cela, et tout ce que vous pourrès savoir encore de plus, et qui ne me uient pas presentement a l’esprit, me sera utile.” My translation.

and his death. Peter France remarks that “this clearly implies a standard pattern for the heroic biography of a scientist, with its obligatory mention of early signs of genius.”⁴ Though this may not be totally evident from Fontenelle’s request quoted above, biographies of scientists dating from the middle of the seventeenth century and throughout the eighteenth century – including Fontenelle’s *éloges* – indeed share a series of recurring formulations aimed at the over-appreciation of the scientist and the implication of a divine element in the scientist’s life and work. This tendency stemmed most probably from classical and, even more, from Biblical literary trends, together with hints of some clichés. The formulations were enacted mainly by highlighting and embellishing alleged qualities or events such as:

- Noteworthy occurrences around the birth and youth of the scientist;
- The precocious and high proficiency of the scientist in several fields and languages (mostly Greek and Latin), and his familiarity with many authors;
- The strange, unexpected coincidence or accident by which the future scientist finds his vocation, different from the one his father has ordained for him;
- The association of the scientist with a prominent tutor that replaces his father and legitimizes his work;
- The scientist’s transcendent knowledge of nature;
- The effect that the work of the scientist has on the community.

These statements are often accompanied by true or invented, often unverifiable anecdotes, amplifying the story into a myth. Of course, not all biographies carry all the elements listed above – some anecdotes may indeed be true or in some measure embellished (there is no black and white in the history of science, nor in biography). Yet, as I will try to show, there are enough repetitions to enable us to speak of a recurrent biographical pattern.

Birth and childhood are particularly relevant to Freudian psychoanalysis. In 1909 Freud’s pupil Otto Rank (1884–1939) published (in German) a “psychological exploration” concerning “the myth of the birth of the hero,” noting that all prominent civilized cultures “including Babylonians and Egyptians, Hebrews and Indians, Persians, Greeks and Romans, as well as the Germanic peoples and others, have left us literatures in which, early on, they glorify national heroes.”⁵ As examples, Rank lists a series of tales glorifying heroes

4 Peter France, “From Eulogy to Biography: The French Academic *Eloge*,” in *Mapping Lives: The Uses of Biography*, eds. Peter France and William St Clair (Oxford, 2002), 81–101, at 94.

5 Otto Rank, *Der Mythos von der Geburt des Helden. Versuch einer psychologischen Mythen-deutung* (Leipzig, 1909). The book was expanded in 1922, and this last edition was translated into English under the title *The Myth of the Birth of the Hero: A Psychological Exploration of Myth*, trans. G.C. Richter and E.J. Lieberman (Baltimore, MD, 2004), quotation from p. 1.

by stressing their extraordinary features at a young age.⁶ The dawn of heroic biography – including scientific biography – has, then, deep roots in that collective imagination common to different cultures. Such tales entered the history of art shortly before they entered the history of science: art historians Ernst Kris (1900–1957) and Otto Kurz (1908–1975) identified glorifying elements similar to the ones quoted above in Renaissance biographies of artists (Vasari's *Lives* is a paradigmatic example). Art and science biography have a lot in common, indicating that scientists and artists were considered the same type of genius.⁷ Kris, who was also a psychoanalyst, added that anecdotes in the early history of art “strive toward an approximation of real life situations and generally create the impression of being true.”⁸ Considering all this may help distinguish the reliable from the unreliable in early biographical narratives in history of science.

To be sure, even in the nineteenth century, scientists were still not acknowledged as such; the English term “scientist” is reported to have been coined by William Whewell (1794–1866) as late as 1833 at a meeting of the British Association for the Advancement of Science.⁹ What we call “science” today (still a debated concept) originated from a variety of fields, such as mathematics (in the broader meaning of those days, which included engineering), natural philosophy, medicine, and other fields, and will be used here to refer to individuals practicing in these fields.

2 Biblical and Classical Literary Roots

Central to the Renaissance was the rediscovery of lost cultures – primarily classical, but also the Hebrew culture. Both classical mythology and the Bible

6 Ibid., 1–46.

7 Ernst Kris and Otto Kurz, *Die Legende vom Künstler: Ein historischer Versuch* (Vienna, 1934); *Legend, Myth, and Magic in the Image of the Artist: A Historical Experiment*, trans. Alastair Laing (New Haven, CT, 1979). Carl Goldstein, “Rhetoric and Art History in the Italian Renaissance and Baroque,” *The Art Bulletin*, 73 (1991), 641–652, more recently outlines a series of stereotypes in Vasari and art history: see 646–647. The closeness of arts and sciences is pointed out by authors including Alistair C. Crombie, “Science and the Arts in the Renaissance: The Search for Truth and Certainty, Old and New,” *History of Science*, 18 (1980), 233–246.

8 Ernst Kris, *Psychoanalytic Explorations in Art* (London, 1953), 65.

9 *Macmillan Dictionary of the History of Science*, vol. 20, eds. William F. Bynum, E. Janet Browne and Roy Porter (London, 1988), s.v. “Scientist,” 381. Reported, without mentioning Whewell, in a book review in *Quarterly Review*, 51 (1834), 59–68, see 59. Cf. Sydney Ross, “Scientist: The Story of a Word,” *Annals of Science*, 18 (1962), 65–85.

convey the divine presence throughout (albeit of different natures). The Bible contains many reports that could have inspired later glorification, such as the birth and youth of major characters as preambles to their undertakings. Disregarding stories of annunciations in the Gospel and the Old Testament, which are irrelevant to the present study, the Bible often reports noteworthy occurrences around the birth and childhood of a central character, such as the supposed infertility of its mother (e.g., Sarah, Rebecca, Hannah and Samson's mother in the Old Testament, and Elizabeth in the New Testament) or unexpected occurrences and coincidences – at times, plain miracles – altering a set destiny. Moses' childhood is a classic example: he should have been drowned in the Nile, but the Pharaoh's daughter found the baby and adopted him (also an example of the replacement of the real parent by a more prominent figure). Indeed, in Biblical sagas the parent is made to play a minor role: Joseph as putative father is a glaring example, and Gale Christianson suggests that this is done to remove all possible moral taints from the hero's origin.¹⁰ Coincidence and anecdote often surround accounts of the ways central characters find their vocation – a central theme later in both artistic and scientific biographies. At some point in their lives, they are “called”: Samuel is called by God three times, but mistakes the voice of God for that of the priest. And Saul becomes the first king of Israel after a long and unsuccessful search for his father's lost asses brings him to Samuel who anoints him to become king. The Bible is likewise full of descriptions of magical effects wrought by some of its figures on their surroundings. The ten plagues predicted by Moses and the paramount Sinaitic covenant are amongst the more noteworthy examples. Samuel's deeds, too, repeatedly have magical effects on the Philistines, and he calls down rain and thunder to admonish the people of Israel. Later in the history of the Israelite kingdoms, the stories of the prophets Elijah and Elisha provide additional typical examples; not to mention the Gospel's rich narrative, which speaks for itself. Though the Bible reports many biographical details, it cannot of course be considered a collection of biographies as per this development in classical literature.¹¹ To be sure, classical biography – like classical literature in general – is vast and manifold, and examination of its many genres would be beyond the scope of this article.¹² It is rooted in sources including Greek mythology, initially propagated in an oral poetic tradition that eventually entered into literature

10 Gale E. Christianson, “On the Renaissance Model of Early Scientific Biography,” *International Social Science Review*, 70 (1995), 87–92, see 88.

11 Surveyed, inter alia, by Edgar Zilsel, *Die Entstehung des Geniebegriffes* (Hildesheim, 1972).

12 See Arnaldo Momigliano's classic, *The Development of Greek Biography*, expanded edition (Cambridge, MA, 1993).

and written biography. Arnaldo Momigliano (1908–1987) drew attention, inter alia, to Aristotle’s attempt to stimulate objective historical and biographical writing, albeit with the admission that, “Paradoxically, the first difficulty is in the obvious delight which Aristotle and his pupils took in anecdotes.”¹³ And a particular, later genre of biography is “aretalogy” (from Greek ἀρετή, areté, “virtue”), which is defined and presented by Moses Hadas (1900–1966) and Morton Smith (1915–1991) as “a formal account of the remarkable career of an impressive teacher that was used as a basis for moral instruction.”¹⁴ It includes collections of lives of leaders, such as *Parallel Lives* by Plutarch (ca. 46–120 AD), or *The Twelve Caesars* by Suetonius (ca. 69–after 122 AD), as well as biographies of philosophers, such as the Suetonius’ *De viris illustribus* or the *Lives and Opinions of Eminent Philosophers* by Diogenes Laertius (2nd/3rd century AD?).

Plutarch was a key reference for Renaissance and early modern biographers and, indeed, it suffices to open his *Parallel Lives* to find tales concerning the births of Theseus and Romulus that evoke divine origins. Suetonius’ style may have inspired later biographers to include gossip in their writings. Diogenes Laertius may have encouraged writers to pay attention to a scientist’s character rather than to his teachings.¹⁵ Even more closely related to the genre treated in this article are four specific examples given by Hadas and Smith in the second part of their book *Heroes and Gods: Spiritual Biographies in Antiquity*: a full translation of the *Life of Pythagoras* by Porphyry (ca. 234–305 AD), and summaries of the *Life of Moses* by Philo (ca. 20 BC–45 AD), the Gospel according to Luke (written, experts say, around 70/80 AD), and the *Life of Apollonius of Tyana* by Philostratus (ca. 170/172–247/250 AD). Taking these biographical essays in the chronological order of their protagonists’ lives, the earliest is Philo’s *Life of Moses* – a novelized version of the Biblical account. Together with Luke, it indicates how aretalogy is linked with the Biblical literary style. Porphyry’s *Life of Pythagoras*, and *On the Pythagorean Way of Life* by his pupil, Iamblichus (ca. 245–325 AD),¹⁶ include typical statements, such as those related to birth, precociousness in several fields, or their effects on their communities. Porphyry relates, for example, that “some declare Pythagoras was by procreation the child of Apollo and Pythais, and only nominally the child of Mnesarchus.”¹⁷

13 Ibid., 67–68, quotation from 68.

14 Moses Hadas and Morton Smith, *Heroes and Gods: Spiritual Biographies in Antiquity* (Freeport, NY, 1965), 3.

15 See Jørgen Mejer, “Diogenes Laertius and his Hellenistic Background,” *Hermes*, 40 (1978), 1–108, 3–4.

16 John Dillon and Jackson Hershbell (trans.), *Iamblichus: On the Pythagorean Way of Life* (Atlanta, GA, 1991), 35.

17 Hadas and Smith, *Heroes and Gods*, 108.

Iamblichus goes even further with statements such as: “Pythagoras’ soul was sent down to humans under Apollo’s leadership.”¹⁸ Finally, there is Philostratus’ impressive *Life of Apollonius*, the legendary Neopythagorean philosopher and a miracle-maker comparable to Jesus.¹⁹ Philostratus mentions the signs of transcendent wisdom that attended Apollonius’ birth:

Just as the hour of his birth was approaching, his mother was warned in a dream to walk out into the meadow and pluck the flowers [...]. Just at the moment of the birth, a thunderbolt seemed about to fall to earth and then rose up into the air and disappeared aloft; and the gods thereby indicated, I think, the great distinction to which the sage was to attain, and hinted in advance how he should transcend all things upon earth and approach the gods.²⁰

Similarly, Philostratus highlights Apollonius’ precociousness, his studies and the coincidence involved in the finding of his enterprise (including the relation between his father and his teacher). This gives way to later descriptions of his transcendent knowledge and the effects of the miracles he performed (exemplary is his witnessing in Ephesus the death of Emperor Domitian in Rome.)²¹

So much for aretalogy. One can, indeed, find traces of these illustrious biographers’ pens in later biographies of scientists. And there are many more details scattered about classical literature that may have influenced the Renaissance and early modern biography. A well-known anecdote that emerges in various forms in scientists’ biographies with the purpose of stressing their transcendent knowledge of nature is that of the famous Greek sculptor, painter, and architect, Phidias (ca. 480–430 BC), who, upon seeing a single lion’s claw, was able to calculate the size of the lion: “*ex ungue leonem*.”²²

At least some of the above features are seen to converge in the most influential collection of lives in early modern times: Giorgio Vasari’s (1511–1575) *Lives*

18 Dillon and Hershbell, *Iamblichus*, 35.

19 Philostratus, *The Life of Apollonius of Tyana*, with English trans. by F. C. Conybeare, 2 vols. (London, 1912), <<https://archive.org/details/lifeofapollonius00philuoft/page/12/mode/zup>>, accessed 1 May 2020. On Apollonius, see Maria Dzielska, *Apollonius of Tyana in Legend and History* (Rome, 1986).

20 Philostratus, *The Life of Apollonius*, 1: 13–15 (Book I, v).

21 Ibid., 1: 15–17 (Book I, vii), and 2: 389–395 (Book VIII, xxv–xxvii).

22 The story is told by the Syrian satirist and rhetorician Lucian of Samosata (ca. 125–after 180 AD) in *Hermotimus*, p. 72, <www.sacred-texts.com/cla/luc/wl2/wl205.htm>, accessed 28 August 2019.

of the Artists, published for the first time in 1550 and reissued in 1568 in an enlarged edition.²³ Vasari scholars tend to emphasize classical sources such as Cicero, Plutarch, and Diogenes Laertius more than Biblical sources.²⁴ The work, however, is occasionally a mixture of both. One example of particular attention paid to the artist's birth – as if it were the birth of the son of a god – is Vasari's detailed description of the moment of Michelangelo's (1475–1564) birth, producing its precise astrological constellation.²⁵ The peculiar coincidence by which the future artist finds his vocation, thanks to a prominent tutor that replaces his father and legitimizes his work, is exemplified by Vasari's life of Giotto (ca. 1267–1337.) According to Vasari, Giotto was initially a poor shepherd, looking after his father's sheep. By coincidence Cimabue (1240–1302) happened to pass by and saw him drawing a sheep on a rock, recognized his talent, and, having first secured his father's agreement, trained him to be a great artist.²⁶ (Incidentally, this story repeats an anecdote in *I commentarii* by Lorenzo Ghiberti (1378–1455), adding that Giotto had the ability to see more than others.²⁷)

3 Early Modern Biographies of Scientists

The pattern of heroization entered the biographies of early modern scientists gradually. Biographers may have initially been influenced by classical, perhaps even Aristotelian literature, and later also by Biblical examples. In dealing with the biographies of mathematicians written during the Scientific Revolution, one cannot overlook two impressive collection of lives written at the end of the sixteenth century: *Vite de' Matematici* by Bernardino Baldi (1553–1617), and the biographies of early modern astronomers (1654) by Pierre Gassendi (1592–1655).²⁸

23 Giorgio Vasari, *Lives of the Artists: A Selection*, trans. George Bull, 2 vols. (London, 1965, 1971).

24 For Vasari's sources, see Patricia Lee Rubin, *Giorgio Vasari: Art and History* (New Haven, CT, 1995), chap. 4, particularly 155–156, and the more recent work by Ingrid Rowland and Noah Charney, *The Collector of Lives* (New York, 2017), chap. 18.

25 Vasari, *Lives of the Artists*, 1: 326.

26 *Ibid.*, 1: 57–58.

27 Lorenzo Ghiberti, *I commentarii*, ed. Lorenzo Bartoli (Florence, 1998), 84. In his biographical accounts of other artists, however, Ghiberti does not follow the same pattern; see 29–33.

28 Not all of Baldi's *Lives* have been published. The lives of medieval and Renaissance mathematicians are collected in Bernardino Baldi, *Le vite de' matematici*, ed. Elio Nenci (Milan, 1998). For a list of other published lives, see *ibid.* 29–30. The manuscripts of Baldi's *Lives*

Baldi, a mathematician and man of letters from Urbino, is one of the earliest modern historians of mathematics, together with Regiomontanus (1436–1476) and Peter Ramus (1515–1572).²⁹ Between 1587 and 1595 he wrote more than 200 lives of philosophers and mathematicians who lived from antiquity to the Renaissance.³⁰ Admittedly, Baldi's biographies still include little heroization and seem primarily to have been influenced by classical biography (interestingly enough, the heroic style began to predominate from the middle of the seventeenth century onwards, with the establishment of the new science). As in some classical biography, Baldi stresses the biographical details of mathematicians; he begins by listing, and occasionally discussing, the meaning of the names, appellations, or surnames of mathematicians and emphasizes the importance of their place of birth, parentage, and, of course, teachers. He discusses the historical circumstances in which a specific mathematician lived and follows it by a detailed presentation of his work, often supported by quotations and anecdotes from classical sources. Bronisław Biliński, who discusses at length the possible precursors of Baldi's style, even considers him to be the initiator of a new, modern biographical tradition, devoid of the anecdotal worship so often found in other contemporary biographical essays.³¹ However, Baldi's biographies contain some roots of the glorifying elements that emerged only later. In his biography of Boethius (477–524), for example, Baldi emphasizes the precocious talents visible at an early age: beyond learning Latin grammar, he acquired Greek, elements of mathematics, music, and poetry and began to study philosophy – also thanks to his protector Symmachus, who noticed Boethius' talent, acted as a second father and supported him after he lost his parents.³² Baldi's teacher Federico Commandino (1509–1575) likewise learned

are kept in the Centro Internazionale di Studi Rosminiani in Stresa, on Lago Maggiore. Gassendi's biographies were included in Pierre Gassendi, *Opera Omnia*, vol. 5 (Lyon, 1658; reprinted Stuttgart-Bad Cannstatt, 1964).

- 29 Johannes Müller, known as Regiomontanus, began a series of lectures in mathematics at the University of Padua in 1463 by outlining the history of mathematics: *Oratio Iohannis de Monteregio, habita Patavij in praelectione Alfragani* (Nuremberg, 1537), reprinted in Johannes Regiomontanus, *Opera collectanea*, ed. Felix Schmeidler (Osnabrück, 1972), 41–53; see Ernst Zinner, *Regiomontanus: His Life and Work*, trans. E. Brown (Amsterdam, 1990), 69–74. Peter Ramus wrote his *Scholarium mathematicarum* (Basel, 1569) and other works to emphasize and legitimize the importance of mathematics over scholastic logic; see Robert Goulding, "Method and Mathematics: Peter Ramus's Histories of the Sciences," *Journal of the History of Ideas*, 67 (2006), 63–85.
- 30 See Paul Lawrence Rose, *The Italian Renaissance of Mathematics* (Geneva, 1975), 260–261.
- 31 Bronisław Biliński, *Prolegomena alle Vite dei matematici di Bernardino Baldi (1587–1596)* (Rome, 1977), 72–97.
- 32 Enrico Narducci, "Boetio Severino," *Bullettino di Bibliografia e di Storia delle Scienze Matematiche e Fisiche*, 19 (1886): 521–586, at 522 and 524.

the liberal arts, vocal and instrumental music, and the elements of grammar, Latin, and Greek at a young age. Later, in Urbino, his father entrusted him to the teaching of Giovan Pietro Grassi, who became cardinal and a supporter of Commandino.³³

Similar elements can be found in Gassendi's biographies. His life of Nicolaus Copernicus (1473–1543), for instance, pays particular attention to Copernicus' birth and emphasizes his early aptitudes: Gassendi describes how the young Copernicus was well versed in Greek and Latin, philosophy, and medicine, and mentions his private mathematics teacher Labert Brudzewsky.³⁴ Similarly, Gassendi's life of Tycho Brahe (1546–1601) relates that Brahe was proficient in Latin at the early age of seven and gives a lengthy account of the tuition he received.³⁵

In their work as biographers, Baldi and Gassendi may be seen as having remained under the influence of the Aristotelian "dry" historiography, where one can hardly speak of heroization. It is probably in the wake of the emergence of history of art that a more heroic style establishes itself in biographies of scientists, where it is precisely these heroic aspects, whether true or invented, that are emphasized to fit a particular literary style. Unsurprisingly perhaps, this kind of biographical treatment is first afforded to the life of the idol of the birth of modern science, Galileo Galilei (1564–1642).

4 The Heroic Epos Permeates the Biographies of Scientists

In the same year in which Gassendi's lives of astronomers were published, Vincenzo Viviani (1622–1703) and Niccolò Gherardini (1604–1678) were each writing a life of Galileo.³⁶ Both biographers had assisted him in his old age: Viviani had been Galileo's pupil and assistant, and Gherardini was the curate of the priory not far from Galileo's house.

Viviani's drafts in Florence's Biblioteca Nazionale Centrale indicate that he tried to make the date of Galileo's birth (February 15, 1564) coincide with that of Michelangelo's death (the latter, however, died three days later). A number of manuscripts I have found in volume 11 of the Galilean Collection

33 *Le vite de' matematici*, ed. Nenci, 496–497.

34 Gassendi, *Opera Omnia*, vol. 5, 499.

35 *Ibid.*, 388.

36 Both lives were included in *Le Opere di Galileo Galilei, Edizione Nazionale*, ed. Antonio Favaro, vol. 19 (Reprint, Florence, 1968), 597–646. The early biographies of Galileo were recently collected and translated by Stefano Gattei, ed., *On the Life of Galileo* (Princeton, NJ, 2019).

bear strange calculations in Viviani's handwriting, showing how the latter was checking several dating systems in the hope that somehow the dates would exactly coincide.³⁷

Viviani sets out a long description of Galileo's precociousness, beginning with a sentence that is more or less copied from Vasari's life of Giotto.³⁸ Vasari says in that work: "Mostrando in tutti gli atti ancora *fanciulleschi* una *vivacità* e prontezza del suo *ingegno*."³⁹ ("Giotto showed in all his boyish ways such unusually quick intelligence and liveliness.")⁴⁰ Viviani says of Galileo: "Cominciò ne' prim'anni della sua *fanciullezza* a dar saggio della *vivacità* del suo *ingegno*."⁴¹ ("In the early years of his childhood, he began to display the vivacity of his mind.")⁴²

As to Galileo's exceptional early childhood, Viviani relates (or invents) as follows:

In the early years of his childhood, Galileo began to display the vivacity of his mind: he spent most of his leisure time constructing various instruments and machines with his own hands, imitating and producing small scale models of man-made objects, such as mills, galleys, and all sorts of other machines of common use. [...] He committed himself to reading major Latin authors, and all by himself gained the erudition in the humanities that he later demonstrated in private gatherings [...]. At the same time, he devoted himself to the study of Greek language, which he learned quite well [...]. Galileo greatly enjoyed practicing music, fingering the keys and playing the lute. [...] He achieved such a high level of excellence on the lute that he found himself competing with the top masters of the times [...]. He very much enjoyed drawing, in which he achieved amazing results – and he was so gifted and talented in it that he later used to tell his friends that had it been possible, at this age, to choose a profession, no doubt he should have chosen painting.⁴³

37 Michael Segre, "Viviani's Life of Galileo," *Isis*, 80 (1989), 207–231. On Galileo's birth and Michelangelo's death, see *ibid.*, 222–223.

38 *Ibid.*, 225–226. Cf. Gattei, *On the Life of Galileo*, xix.

39 Giorgio Vasari, <http://vasari.sns.it/cgi-bin/vasari/Vasari-all?code_f=print_page&work=le_vite&volume_n=2&page_n=96>, accessed 6 July 2019; my italics.

40 Vasari, *Lives of the Artists*, 2: 96.

41 Galileo, *Opere*, 19: 601.

42 Cf. Gattei, *On the Life of Galileo*, 5.

43 *Ibid.*, 4–7.

Is there anything the youthful Galileo was unable to do? Although all these claims may have been true, there is no supporting evidence to back them up.

According to Viviani, Galileo had always been possessed of a transcendent knowledge of nature: “Galileo, whom nature had elected to unveil to the world part of those secrets that had been buried in the dense darkness of human minds for so many centuries...”⁴⁴ As a student in Pisa, it sufficed for Galileo to watch a lamp swinging in the local cathedral for him to discover the principle of the isochronism of the pendulum.⁴⁵ This anecdote was cast into doubt after the art historian Iginio Benvenuto Supino discovered that the “Galilean Lamp” had not been installed in Pisa Cathedral until 1587, four years after Galileo was supposed to have watched it swing.⁴⁶ This anecdote seems, then, to be a story written in the style of that describing Phidias’ ability to calculate the size of the lion by looking at the claw. Moreover, as Viviani’s correspondence testifies, he had planned to embellish the description even further and describe Galileo’s “supernatural talent” (*talento soprannaturale*), but was dissuaded by a churchman who pointed out that under the circumstances such exaggeration would be ill-advised.⁴⁷

Galileo’s father Vincenzo wanted his son to study medicine, but Galileo was more attracted by mathematics. Viviani, for his part, describes at length Galileo’s father’s unwillingness to let his son study mathematics with Ostilio Ricci (1540–1603, a mathematician who tutored the pages of the Grand Duke), fearing that this would cause him to abandon medicine.⁴⁸ Gherardini describes how Galileo met Ricci through a curious, and unverifiable, coincidence:

Galileo went to talk with him [Ricci] a few times, and always found him teaching and explaining Euclid; and since Ricci could not listen to Galileo, Galileo listened to Ricci’s lectures. Galileo enjoyed them so much, drawing in such nourishment for his mind, that he developed a growing passion for mathematics, thereby neglecting lectures in medicine at the university. Instead, he went to the room where Master Ricci lectured on mathematics. He had no right to speak, and was even less sure that he had a right to attend the lectures, as they were meant to be for the pages only, or those who were in service at the court; so he remained in the

44 Ibid., 7.

45 Ibid., 8.

46 Iginio Benvenuto Supino, “La lampada di Galileo,” *Archivio storico dell’arte*, anno 6, 1893, fasc. 3: 215–218.

47 Luigi Tenca, “Relazione fra Vincenzio Viviani e Michel Angelo Ricci,” *Rendiconti dell’Istituto Lombardo di Scienze e Lettere*, Classe di Scienze, 87 (1954), 212–228, at 219.

48 Gattei, *On the Life of Galileo*, 10–13.

room, in a place from which he could hardly hear what was being taught. [...] Galileo persisted in attending the mathematics lectures, secretly and briefly, for nearly two months.⁴⁹

Ricci, in any case, fulfills the role of the prominent tutor who replaces, if not Galileo's father, at least overrides the latter's wishes.

Viviani furthermore reports the famous – and much-doubted – story of Galileo refuting Aristotle's law of falling bodies by experiments in letting objects fall from the Tower of Pisa. While there is no evidence that the story is true, it is a typical story of the work of a scientist producing a particular effect on his surroundings: "He showed this with repeated experiments from the top of the tower of Pisa, in the presence of the other lecturers and philosophers as well as all their students."⁵⁰

Similar elements to those found in the lives of Galileo can be found in the biography of one of Galileo's leading followers, the mathematician Bonaventura Cavalieri (1598–1647), written by the latter's pupil, Urbano D'Aviso (1618–1685).⁵¹ D'Aviso emphasizes Cavalieri's precocious talents as a child, relating how the latter excelled at school in rhetoric and writing and reading poetry. Like Viviani in the life of Galileo, he borrows from Vasari's words in the life of Giotto: "Mostrò in tal studio una *vivacità d'ingegno* grandissima" ("He showed in his study a very lively intelligence").⁵² D'Aviso uses an anecdote to illustrate the accidental way in which Cavalieri came to mathematics. After Cavalieri was ordained in his home town of Milan, he was sent to the convent of S. Girolamo in Pisa, where he felt homesick and unhappy. It so happened that Benedetto Castelli (1578–1643), Galileo's friend and follower, lived in the same convent and noted Cavalieri's sadness as well as his extraordinary talents. Castelli encouraged Cavalieri to study mathematics, partly as a means of overcoming his unhappiness. The suggestion was taken up and Cavalieri quickly became an outstanding mathematician.

Let me end this series of examples related to Italian mathematicians with the eloquent *Vita* of Vincenzo Viviani, published in 1708 by the Accademia

49 Ibid., 143.

50 Gattei, *On the Life of Galileo*, 14. Doubts on the truthfulness of the tower experiment were expressed by several authors: see Lane Cooper, *Aristotle, Galileo, and the Tower of Pisa* (Ithaca, NY, 1935) and Michael Segre, "Galileo, Viviani and the Tower of Pisa," *Studies in History and Philosophy of Science*, 20 (1989), 435–451.

51 The biography was included in Bonaventura Cavalieri, *Sfera astronomica* (Rome, 1690), xii–xxii.

52 Ibid., xii; my italics.

Arcadia, where he had been a member.⁵³ It dwells on Viviani's precociousness as a mathematician, supporting his account by anecdotes. At a certain stage of Viviani's schooling, his teacher noted his "elevatissimo *ingegno*" and recommended he should take up mathematics.⁵⁴ The same teacher, who served at the Tuscan court, later praised the sixteen-year-old Viviani's "stupendo *ingegno*."⁵⁵ The Grand Duke, then in Leghorn (Livorno), requested to see the young mathematician, and Viviani was summoned to court. During the monotonous sailing from Florence to Leghorn, Viviani managed to study up to the fourth book of Euclid. When he arrived at court and met the Grand Duke, the latter was initially skeptical and asked that Viviani be given a problem in geometry, which he quickly solved in the waiting room. This determined Viviani's future career, for the Grand Duke granted him a scholarship and introduced him to Galileo. This last anecdote dramatizes the moment in which the mathematician is initiated into his career – fitting the traditional pattern of heroization. There is, by the way, an additional unpublished biography of Viviani in the Biblioteca Nazionale Centrale in Florence (Galilean MS 155, 1–5) written by Viviani's nephew Jacopo Panzanini, which may have been used by the Arcadian author. It relates more or less the same things, but is an altogether more sober account. The Arcadia may have "stretched" facts to embellish the description and make it fit into the typical pattern of heroization. For example, Panzanini relates that as Viviani sailed to Livorno he studied only the second and a sizable part of the third book of Euclid. The Arcadia biography embellishes this by saying that Viviani read "up to the fourth" book of Euclid.

The biographies I have dealt with are mainly of Italian mathematicians who, at least at the beginning of the seventeenth century, still played a leading role in science. In the second half of the century the focus of scientific activity moved north of the Alps, accompanied by the same biographic style. Indeed, the style can be found all over Europe in different types of lives, from "dispassionate" dictionaries such as the *Grand diction[n]aire* of Louis Moréri (1643–1680) to entertaining bibliographical sketches like *Brief Lives* by John Aubrey (1626–1697).

53 Pierfrancesco Tocci, "Vita di Vincenzo Viviani," in *Le vite degli arcadi illustri*, part 1, ed. Giovan Mario Crescimbeni (Rome, 1708), 123–139.

54 *Ibid.*, 124, my italics.

55 *Ibid.*, my italics.

5 The Style Spreads North: France

The style of heroization gradually permeated French biographies of scientists. The first of the few examples that I wish to touch upon is Marin Mersenne (1588–1648). The first biographical study of his life was written as early as 1649, soon after his death, by his pupil, the Minim Friar Hilarion de Coste (1595–1661).⁵⁶ A specialist in writing biographies and *éloges*, Coste begins his biography by recounting that Mersenne was born on 8 September 1588:

Notable in the church as the birth of the Virgin Mary, Mother of God, and for the destruction of Jerusalem, conquered and destroyed by the Emperor Titus, son of Vespasian, as the Savior of the world had predicted forty years earlier. This day is also notable for the birth of several illustrious men of piety, of worth, and of doctrine.⁵⁷

The pompous description of the calendrical coincidence speaks for itself.

As for the biography of Blaise Pascal (1623–1662), which was written in 1663 by his sister, Françoise Gilberte Périer (1620–1687), it offers a long, and typical, description of Pascal's youth.⁵⁸ Though their father conferred a broad education on young Blaise, she writes, the boy always wanted to know more. When Blaise's talent for geometry began to emerge at the age of twelve, it met with his father's resistance: the latter wanted his son first to be proficient in languages and avoided speaking about geometry, even hiding all books on the subject. Yet Blaise continued to practice geometry, progressing as far as learning the thirty-second proposition of Euclid's first book. "*Par hasard,*" the father one day caught him delving into mathematics, unnoticed by young Pascal, and was finally convinced of his son's genius.

Apart from single biographies such as those treating the lives of Mersenne and Pascal, compilations such as Moréri's *Grand diction[n]aire historique* (first edition, 1674), contain scattered recurrent elements of the heroization

56 The title page mentions only the initials of the author: *La Vie du R.P. Marin Mersenne theologien, philosophe et mathématicien de l'Ordre des Peres Minime, par F.D.C.H. Religieux du mesme Ordre* (Paris, 1649).

57 *Ibid.*, 2–3: "... iour celebre en l'Eglise par la Natiuité de la Vierge Mere de Dieu, & pour la destruction de Hierusalem, qui fut prise & ruinée par l'Epereur Tite fils de Vespasien, comme le Sauuer du monde l'auoit predict quarante ans auparauant: Ce iour est aussi remarquable pour la naissance de plusieurs hommes illustres en pieté, en valeur, & en doctrine." My translation.

58 Blaise Pascal, *Œuvres complètes*, eds. L. Brunschvicg and P. Boutroux, vol. 1 (Paris, 1923 2nd ed.), 50–114, <https://fr.wikisource.org/wiki/Vie_de_Monsieur_Pascal/Vie#cite_note-5>, accessed 5 October 2019.

of scientists. In the 1681 edition of Moréri's *Dictionaire*, under the entry "Copernicus," one finds the hackneyed expression "*Ayant pénétré dans les secrets de la nature*" ("having penetrated the secrets of nature"), indicating the mathematician's transcendent knowledge of nature.⁵⁹ In the entry devoted to Tycho Brahe, the description of the astronomer's youth, with its emphasis on a vocation that differed from the career he was expected to follow, repeats the hackneyed pattern: Tycho was sent to Leipzig to study law and, without his teacher knowing it, began to make astronomical observations. His knowledge finally surpassed that of his teacher and all the great men of Europe were honored to pay him visits or correspond with him.⁶⁰

Moréri's work was not intended as a collection of lives as such. A more vivid contemporary example is offered by sixty-nine lives of scientists written by Fontenelle. As *Secrétaire perpétuel* of the Académie des Sciences, Fontenelle wrote its history from 1699 to 1740, and as the academicians died he wrote and published their *éloges*, including the lives of Viviani, l'Hopital, Jakob Bernoulli, Jean Dominique Cassini, Leibniz, and Newton. According to Charles B. Paul, "Fontenelle broke with a long-standing rhetorical practice of maximizing praise and minimizing concrete biographical details. Instead, he followed the minority tradition initiated by Aristotle."⁶¹ Yet Paul, including in his analysis also Fontenelle's successor, soon admits that "far more than the secretaries realized, the *éloges* they composed still displayed some major characteristics of the genre [...]. The outdoing topos was still employed, not so much in praise of the scientists as of the undertaking they were engaged in."⁶² And, as noted by Suzanne Delorme, author of the article on Fontenelle in the *Dictionary of Scientific Biography*, in the first of the *éloges* Fontenelle had not yet attained complete mastery of the genre.⁶³ All this seems to confirm France's claim (and my own) for the existence of a standard pattern for the heroic biography of a scientist even here. All the more so, Fontenelle's early *éloges* repeat certain formulations again and again; for instance, in his *éloge* of Viviani (1703) one finds the sentence "*plein de cette vigueur d'esprit que donne la première jeunesse*" ("full of that vigor of spirit given by first youth") – a phrasing reminiscent of those quoted above in descriptions of the youthful days of Giotto, Galileo, or

59 Louis Moréri, *Le grand diction[n]aire historique*, 2 vols. (Lyon, 1681), 1: 994–995. I quote this edition since it was the earliest available to me.

60 *Ibid.* 2: 1206–1207.

61 Charles B. Paul, *Science and Immortality, the Éloges of the Academy of Sciences (1699–1791)* (Berkeley, CA, 1980), 9.

62 *Ibid.*, 11.

63 *Dictionary of Scientific Biography*, ed. Charles Coulston Gillispie, vol. 5 (New York, 1972), 61.

Cavalieri.⁶⁴ These recurrences became more and more frequent as Fontenelle became more practiced in the art of obituary. In later biographies he constantly remarked, inter alia, on how a mathematician found his vocation by pure coincidence or how extraordinary talent at a young age drove another to his true vocation. So we learn that the Marquis Guillaume-François de l'Hopital (1661–1704) was initially not intentioned to become a mathematician, but when he came across geometry he immediately discovered his great natural talent and began studying it passionately.⁶⁵ At the age of fifteen, he happened to find himself in the company of some mathematicians discussing a problem posed by Pascal related to the cycloid (“*roulette*”); l'Hopital took only a day to solve the problem. According to Fontenelle, Jakob Bernoulli (1654–1705) received the usual classical education consisting of Latin, Greek, and scholastic philosophy, but no geometry. “*Par hasard*,” he noticed some geometrical figures and was attracted by them. As soon as he got hold of some mathematics books he began to study alone, furtively, with no other teacher but his talent, against the will of his father. By the age of eighteen, thanks only to his natural gift for calculation, he was already able to solve a difficult mathematical problem related to the calendar.⁶⁶

Fontenelle's *éloge* of Jean Dominique Cassini (1625–1712) describes in detail the coincidence which led the latter to astronomy. According to Fontenelle, Cassini was visiting his friend Lercaro, later Doge of the Republic of Genoa; on this occasion a churchman lent him (Cassini) some books on judiciary astrology for fun. The books awakened Cassini's natural affinity for the stars; Fontenelle emphasizes that his attraction to “ridiculous” astrology was short-lived, but was enough to arouse Cassini's interest in the “solid charm” of astronomy. Cassini devoted himself to astronomy, made rapid progress, and at the age of only twenty-five was appointed to the chair of astronomy in Bologna.⁶⁷

In sketching the life of Leibniz, to give another example, Fontenelle presents the latter as a prodigy whose genius went beyond normal human talents and who could be compared to a titan such as Hercules. Following the pattern of heroization, he describes Leibniz's precociousness by relating his talents as a poet and says that he once composed a poem of three hundred verses in Latin without a single error.⁶⁸

64 Fontenelle, *Oeuvres*, 6: 82.

65 *Ibid.*, 95–96.

66 *Ibid.*, 109.

67 *Ibid.*, 265–266.

68 *Ibid.*, 378.

Fontenelle's *éloge* of Newton, to be sure, is not particularly "heroic," and this may have well been a result of his reservations concerning Newton's science, since Fontenelle was a partisan of Cartesianism and criticized Newtonian action at a distance.⁶⁹ If this is so, his *éloge* furnishes an exception that confirms the rule; criticism is here expressed by reducing the dose of heroization. In any case Fontenelle's *éloges*, like Moréri's *Dictionnaire*, show the extent to which the pattern of heroization was widespread in France. The same pattern spread to other countries and influenced various types of prose.

6 English Biography of Scientists

Francis Bacon (1561–1626), the first modern philosopher to formulate a thorough method of natural investigation, greatly influenced both British and continental science, and deserved an appropriate biography. William Rawley (ca. 1588–1667), the seventeenth-century editor of Bacon's works (1657) under the title *Resuscitatio*, included a biography of Bacon in which the latter's precocious and high proficiency was presented with an anecdote that is very similar to Viviani's Arcadian biography.⁷⁰

*His first, and childish, years, were not without some Mark of Eminency; At which Time, he was endued, with that Pregnancy, and Towardness, of Wit; As they were Presages, of that Deep, and Universall, Apprehension, which was manifest in him, afterward; And caused him, to be taken notice of, by several Persons, of Worth, and Place; And, especially, by the Queen; who, (as I have been informed,) delighted much, then, to confer with him; And to prove him with Questions; unto whom, he delivered Himself, with that Gravity, and Maturity, above his years; That her Majesty, would often term Him, The young Lord Keeper.*⁷¹

69 See Paul, *Science and Immortality*, 29–35; France, "From Eulogy to Biography," 94–95; Simon Schaffer, "Fontenelle's Newton and the uses of genius," *L'Esprit Créateur* 55 (2015): 4861, DOI: 10.1353/esp.2015.0031. Fontenelle's *éloge* of Newton: <www.newtonproject.ox.ac.uk/view/texts/normalized/OTHE00036>, accessed 29 August 2019.

70 William Rawley, *Resuscitatio, or, Bringing into Publick Light Severall Pieces of the Works, Civil, Historical, Philosophical, & Theological, Hitherto Sleeping; Of the Right Honourable Francis Bacon ... Together with his Lordship's Life* (London, 1657).

71 *Ibid.*; the first part of the book is without page numbers. Spelling and italics as in the original text.

To increase the literary impact, in the 1661 edition of the *Resuscitatio*, the following sentence was added: “*Being asked, by the Queen; how old he was? He answered with much discretion, being then but a boy; That he was two years younger than Her Majesties happy Reigne; with which Answer the Queen was much taken.*” Remaining in the English sphere, let us now turn to Newton’s biography as authored by William Stukeley (1687–1765), an antiquarian, physician, and clergyman, who – like Viviani and Gherardini in Galileo’s case – had befriended the subject of the biography he was writing, having met Newton at the Royal Society. Stukeley later moved to Grantham, where Newton had spent his youth, in order to collect reminiscences of the genius’ early life, and his 1752 biography is an interesting example of heroization.⁷² Stukeley, too, refers to Plutarch as the prototype of biography: “Biography is a thing which I have no claim to, and has only been well executed by the masterly pen of Plutarch.”⁷³ Stukeley describes Newton’s birth as a cosmic event: “He was born on Christmas Day 1642. Some have observed, this time was particularly fruitful of great genius’s.”⁷⁴ As Christianson notes:

Like the Biblical Joseph, Isaac the father plays but a minor role in the story, thus removing all moral taint from the hero’s origin. The widowed Hannah Newton is without blemish, as pure in spirit as the Madonna herself: “She was,” in Stukeley’s words, “a woman of so extraordinary an understanding and virtue that those who think that a soul like Sir Isaac Newton’s could be formed by any thing less than the immediate operation of a divine Creator might be apt to ascribe to her many of those extraordinary qualities with which he was endowed.”⁷⁵

The long description of Newton’s childhood, full of hyperbole, is equally typical of the pattern suggested in this article, with many anecdotes indicating Newton’s precocious talent. Stukeley relates how all those that knew Newton in Grantham

recount many instances of the pregnancy of his genius, whilst a boy, his strange inventions and extraordinary inclination and skill for mechanical

72 William Stukeley, *Memoirs of Sir Isaac Newton’s Life*, ed. A. Hastings White (London, 1936), <www.newtonproject.ox.ac.uk/view/texts/normalized/OTHE00001>, accessed 13 August 2019.

73 *Ibid.*, 2.

74 *Ibid.*, 19. This sentence does not appear in the online version.

75 Christianson, “On the Renaissance Model of Early Scientific Biography,” 88. Newton’s father’s first name was also Isaac.

works. That insted of playing among other boys, when from school, he always busyed himself in making knicknacks of divers sorts and models of wood.⁷⁶

Stukeley repeatedly emphasizes Newton's practical talents: he recounts that Newton had all sorts of tools, "which he would use with much dexterity, as if he had been brought up to the trade."⁷⁷ Newton had a transcendent knowledge of nature: he "penetrated beyond the superficial view of the thing."⁷⁸ While the story of Newton's apple, also related by Stukeley as well as by Conduitt and other sources, may contain more truth than the story of Galileo's pendulum, it is another example of *ex ungue leonem*.⁷⁹ And Patricia Fara reminds us that the apple could recall the forbidden fruit of knowledge in the Garden of Eden: again a Biblical reference.⁸⁰ Stukeley further relates that (much like Galileo) Sir Isaac "was not only expert at his mechanical tools, but equally so with his pen; for he busyed himself very much with drawing, which he took his own inclination and improv'd by his observation of nature."⁸¹ He goes on:

When he was order'd into the field to tend on a flock of sheep, he was sitting under a tree, with a book in his hand; or busying himself with a knife, cutting models and inventions in wood. At other times he would get to a spring head or running stream, which this charming country abounds with. There he made little wheels, such as they use in water-mills.⁸²

True, embellished, or plainly invented, all of these elements fit well in the pattern of glorification. Alas, Newton's father died before he was born. In the absence of a "disappointed father," zealous Stukeley casts his mother in this role: "His mother, as well as the servants, were some-what offended by this bookishness of his."⁸³ He then replaces her with a legitimizing father figure: "But his old master, Mr. Stokes, who now became rector of Costerworth, saw thro', judg'd better, and admir'd his uncommon genius; he never ceas'd

76 Stukeley, *Memoirs of Sir Isaac Newton's Life*, 38.

77 Ibid.

78 Ibid., 39.

79 Ibid., 20. On the plausibility of the story of Newton's apple, see Richard Westfall, *Never at Rest: A Biography of Isaac Newton* (Cambridge, 1980), 154.

80 Patricia Fara, "Catch a Falling Apple: Isaac Newton and Myths of Genius," *Endeavour*, 23 (1999), 167–170, see 167.

81 Stukeley, *Memoirs of Sir Isaac Newton's Life*, 43–44.

82 Ibid., 48.

83 Ibid., 50.

remonstrating to his mother what a loss it was to the world, as well as a vain attempt, to bury so extraordinary a talent in rustic business.”⁸⁴ Finally, a description of the particular effect that the genius had on the community: Newton as president of the Royal Society. “There we view him in his proper dignity [...]. There he sat at rest, in the intellectual center, as the great solar orb shining with its own light, and diffusing his beamy influence thro’ the whole system of arts and science.”⁸⁵

These are only a few examples out of the many scattered through Stukeley’s essay testifying that he was writing according to a specific pattern of heroization. So too was John Aubrey in his amusing *Brief Lives*, also written during the second half of the seventeenth century, though not published until the nineteenth century.⁸⁶

Aubrey’s *Brief Lives* contain picturesque anecdotes, stories, memoirs, or gossip about well-known individuals, and Allan Pritchard remarks that in the field of biography, Aubrey breaks decisively with the past.⁸⁷ This is not quite the case: even these unique biographical sketches contain many of the past elements of heroization. A considerable part of Aubrey’s sketch of the life of Newton’s teacher, Isaac Barrow (1630–1677), for example, is dedicated to his precociousness as a child and to how he came to his profession.⁸⁸ Barrow, coming from a family of merchants, was not predestined to become a mathematician. Following the typical biographical pattern, Aubrey emphasizes the father’s involvement (and skepticism) in the choice of Barrow’s career by providing an anecdote: in Cambridge, Barrow’s father “asked what profession he would be of, a merchant or....” Barrow, of course, begged to be allowed to continue studying at the University. The father agreed, and Barrow’s tutor, foreseeing Barrow’s great future, even offered to waive the tuition fees.

In the description of Edmund Halley’s (1656–1742) childhood, Aubrey relates that as a child, Halley was so precocious and so skilled in making celestial globes that a famous globe-maker said of him, “if a star were misplaced in the Globe, he would presently find it.”⁸⁹ He studied geometry as a young boy and could make a sundial at the age of sixteen. When he went to Queen’s College, Oxford, not a whit older, he was already well versed in Latin, Greek, and Hebrew. Three years later he solved the problem in astronomy which today bears his name. In

84 Ibid., 50–51.

85 Ibid., 63.

86 I used *Aubrey’s Brief Lives*, ed. Oliver Lawson Dick (London, 1987).

87 Allan Pritchard, *English Biography in the Seventeenth Century: A Critical Survey* (Toronto, 2009), 172.

88 *Aubrey’s Brief Lives*, 125–128.

89 Ibid., 205.

a similar vein is Aubrey's presentation of Robert Hooke (1635–1703).⁹⁰ Young Hooke, according to Aubrey, succeeded in painting a picture without any previous training as a painter; made “A Diall on a round trencher; never having had any instruction. His father was not Mathematicall at all”; he learned to play the organ in twenty lessons; and, matching Viviani and Stukeley, “in one week's time made himself master of the VI books of Euclid.”

Conclusion

I hope the evidence presented is sufficient to confirm that early biographies of scientists followed a specific pattern originating in antiquity, in a compromise between the need to describe truth and to follow a particular literary style. Of course, not all the quoted biographies agree with one another. Some show signs of providentialism, others do not; some are heroic, others not; some seem to be close to historical events, others are clearly embellished; some try to have a moral implication (inviting the reader to admire and emulate the scientist's enterprise), while others do not seem to have that moralizing tone. This calls for further probing with respect to the context in which the early biographers of scientists were writing: why, and for whom, were they writing? What biographical or literary tradition inspired each biographer – whether mythological, Biblical, or classical – and taking the classical context as bright, complex, and heterogeneous (writing in the wake of Aristotle, for instance, would have been different than taking Plutarch as paradigm)? What was their ideal hero? To what extent were the authors innovators as biographers of scientists?

The very fact that the elements within the pattern suggested by this article keep appearing, at times repeating specific formulations, in biographies that are so different to one another (and there are many more examples) indicates that there must indeed have been a standard frame of reference, implicit or explicit. Above all, the parallels with Renaissance biographies of artists indicate that, in those days, artists and scientists were considered as belonging to the same type of genius. Indeed, many of the roots of modern science originated in the milieus of Renaissance artisans, artists, and engineers.⁹¹ The biographical style used for describing scientists emerged as late as the middle of the seventeenth century, when scientists started to be socially

90 Ibid., 242–245.

91 There is a vast literature discussing the role of artisans, engineers, and artists in the establishment of modern science; see Pamela O. Long, *Artisan/Practitioners and the Rise of the New Sciences, 1400–1600* (Corvallis, OR, 2011).

recognized as a group with a certain prominence, just as artists had been a century earlier. Nineteenth-century biographers often relied uncritically on previous accounts.⁹² Only in the twentieth century, as the historiography of science developed, did such legendary accounts start to disappear – although not totally, and not from the popular histories of science: as Alexandre Koyré (1892–1964) mused, “Every historian, and especially every biographer, is something of a hagiographer.”⁹³ Are we then confronted with more than just a literary style, namely with a basic human need to create exemplary heroes as guides to be worshiped?

Acknowledgements

I am indebted to Christoph Lüthy for his useful criticisms, and to Alison Moffat for editing the article.

92 As illustrated by Peppino Ortoleva, “Vite geniali: sulle biografie aneddotiche degli inventori,” *Intersezioni*, 15 (1995), 41–61; Richard Yeo, “Genius, Method, and Morality: Images of Newton in Britain, 1760–1860,” *Science in Context*, 2 (1988), 257–284.

93 Alexandre Koyré, *Galileo Studies* (Hassocks, 1978), 65.