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Antonio Favaro and the *Edizione Nazionale* of Galileo's Works

Antonio Favaro was born in Padua on 21 May 1847 to a cultivated family of lower nobility.¹ After having accomplished his studies in mathematics at the University of Padua in 1866, he went to Turin, where he specialized as an engineer at the Scuola d'Applicazione (Polytechnical High School) in 1869. As early as 1872, he was appointed as extra-ordinary professor at the University of Padua. For fifty years he taught graphical statics there.² During different periods he also gave courses in infinitesimal calculus and projective geometry. Since 1878 Favaro, as one of the first in an Italian University, also taught history of mathematics. He died in Padua on 30 September 1922, shortly after his retirement.

Despite his academic obligations in geometry and mathematics, Favaro's major focus of interest soon became the history of science in which he published more than 500 articles and several books. Favaro had not received training as an historian. His first, amateurish steps in this field were contributions to priority disputes or historical and bibliographical notes in publications concerning technical subjects (e.g., Favaro 1869 and 1873; Quaranta 1983, 52). He was then encouraged to continue by Baldassarre Boncompagni, who was at that time an authority in the young and not yet academically established discipline of the history of science (Favaro 1878, 800).³ Favaro took Boncompagni as a model of method thus treading in the wake of an historiographical tradition more interested in the erudite compilation of bibliographies and the recuperation and interpretation of manuscripts, just as the seventeenth-century antiquarians, rather than in explaining the course of history.

¹ The references cited in this article can be found in the bibliographical section at the end of the appendix. Our account is based on Favaro G. 1922–23, Bortolotti 1923–24, and Bucciantini 1995. For Favaro's bibliography, see Favaro G. 1922–23, Gabrieli 1925, Baldo Ceolin and Olivieri 1994–95. Evaluations of Favaro's work and his place in the history of science besides the biographical notes mentioned above are Bosmans 1923, Brugnaro 1979, Galluzzi 1983, Lefons 1984, Malusa 1977, Quaranta 1983, Seneca 1995.

² Graphical statics was a newly established discipline concerning the use of graphical methods in solving problems of statics (Henneberg 1901–08, 349–51).

³ In 1868, Boncompagni (1821–1894) had started to publish the probably first worldwide journal exclusively dedicated to the history of science, the *Bullettino di bibliografia e di storia delle scienze matematiche e fisiche*. Among Boncompagni's most important achievements are the history of the medieval translations of Arabic books by Gherardo of Cremona and Platone of Tivoli and the discovery of unknown works of Leonardo Fibonacci. On Boncompagni, see Favaro 1894–95 and Cappelletti 1969; on the *Bullettino*, see Lefons 1984 and Bucciantini 1986.

Favaro soon acquired the standards of accuracy and erudition of his master, although he did not follow him in his nearly maniacal pedantry (e.g., Favaro 1875). On Boncompagni's suggestion, he started to investigate ancient Paduan mathematicians, became interested in the history of the University of Padua, and was finally captured by its major figure, Galileo Galilei. From 1880 until the end of his life, Favaro dedicated himself predominantly to the study of Galileo's life, work, and context. Besides that, he published several works on Padua University, on Niccolò Tartaglia, on Leonardo da Vinci, and occasionally on other historical as well as scientific subjects.⁴

For the scrupulous preparation of a book on Galileo, Favaro at first closely examined the extant Galilean manuscripts and documents in several archives and libraries.⁵ He could thus establish that the existing editions of Galileo's works did not satisfy scholarly criteria. Even the most recent one (Galilei 1842–56), although called the “first complete edition” was incomplete and full of errors; in plenty of cases Galileo's text had been manipulated, figures omitted or altered; the matter had been arbitrarily distributed. Furthermore, Favaro complained that the editors “did not consider at all the way followed by Galileo in order to arrive at the formulation of a certain truth.” They had disregarded Galileo's preparatory manuscripts and given only the last version of his ideas and production (Favaro 1883, 1–2; Favaro [1883] 1966, 2:318–25; Favaro 1888, 19–29; Bortolotti 1923–24, 19).

Favaro came to the obvious conclusion that a new edition of Galileo's works was needed.⁶ It should include, of course, all of Galileo's writings, also the unpublished and fragmentary ones, Galileo's own marginal notes to other books, and the letters Galileo sent as well as those sent to him. In addition to this, the new edition should include texts of Galileo's disciples commenting on his works, the works of other people to whom Galileo replied or on which he made comments, excerpts from letters between third persons relating to Galileo, and finally archival documents relating to him and his family. Favaro wanted to present not only the “truly complete” works of Galileo, but also his scientific as well as historical context.

With regard to the general partition between scientific texts, literary texts, correspondence, and documents, Favaro opted for a strict chronological order as “being the more suitable in order to faithfully render the natural generation of the ideas” (Favaro 1888, 34). As to the editorial method, all the texts would be collated

⁴ Major works are Favaro 1877, [1883] 1966, 1886a, 1887a, 1891, 1911–12, 1922a, 1922b. In recent years, some of the journal articles on Galileo and his context have been collected in volumes: Favaro 1968, 1983, 1992a, 1992b.

⁵ Articles on Galilean documents are, e.g., Favaro 1880 and 1882. Of paramount importance is the Galilean Collection put together by the former Grand Dukes of Tuscany and preserved at the Biblioteca Nazionale Centrale in Florence. Favaro dealt repeatedly with this Collection (Favaro 1879–80, 1883, 1885, 1886b).

⁶ The new edition project is presented in Favaro [1883] 1966, 2:311–31, and in Favaro 1888. For the editorial criteria, see Favaro 1888, 30–42; Favaro 1898–99.

with the published or unpublished sources and should be “reproduced like they have flown out of their author’s pen” (Favaro [1883] 1966, 2:328), the language would not be modernized, figures would be exactly reproduced. Favaro shared the rule of strict adherence to the sources with Isidoro Del Lungo, the highly esteemed Italian philologist that he had enlisted as co-editor responsible for textual criticism.⁷ Their benchmark was — as Del Lungo wrote — the “testificazione alla tedesca,” the establishment of texts following the rules of the German philological school (Seneca 1995, 398).

Having won the financial support of the Italian Government, Favaro started to publish the new edition, the so-called “Edizione Nazionale” of Galileo’s works in 1890. The twenty volumes came out in almost regular yearly succession (Galilei 1890–1909). Thanks to Favaro’s editorial policy, this edition satisfied scholarly needs for almost a century.⁸ Comparable undertakings at the turn of the century were the editions of Descartes (Descartes 1897–1913) and of Huygens (Huygens 1889–1950), indicating the existence of widespread interest in the seventeenth-century scientific revolution. The high level of editorial standards common to all these productions was, furthermore, the sign of a shared awareness of the importance of the sources for their historical reconstruction.

In preparing the Galileo edition and concurrently to it, Favaro concentrated his studies on the historical context, especially on the people whom Galileo came across, scientists as well as relatives, friends as well as foes. The results of this research, for which he systematically explored public and private archives, went into the footnotes to the main opus or into a long series of articles and erudite notes. Favaro was also allowed access to the Vatican Archives and could publish the documents of the trial against Galileo (Favaro 1907b).

Favaro did not cease working on Galileo after the accomplishment of the edition in 1909, his aim being a collection of materials as complete as possible in order to write the long-projected scientific biography. In fact, this major work was never written. Only a short popularization was published (Favaro 1910). The aspiration to completeness probably hid Favaro’s hesitation to leave secure documentary basis in order to tackle problems of interpretation of Galileo’s scientific development and of the changes he brought about in the natural sciences (Galluzzi 1983, VI). Favaro’s major preoccupation was to faithfully present the documents without giving any interpretation. Almost all his papers dealt mainly with persons or institutions, not with topics of natural sciences, and were usually accompanied by rich documentary appendices.

⁷ On Isidoro Del Lungo (1841–1906), see Strappini 1990. On the collaboration between Favaro and Del Lungo, see Seneca 1967 and 1995.

⁸ Only in the last decades has scholarly attention focused on scattered fragments and notes that Favaro was not able to connect with bigger texts and were therefore left unpublished (e.g., Drake 1979). The arrangement given by Favaro to a group of fragments concerning the theory of motion has been criticized by Wisan: “Favaro’s treatment of the manuscript seems almost calculated to discourage further investigation of the fragments, and this may be connected with some strong objections Favaro had to Caverni’s published interpretation of the manuscript” (Wisan 1974, 126).

It is fair to say that there is a considerable gap between Favaro's ideas on science and its history and his actual historic works. Favaro shared with the scientists of his time the positivistic belief in a steady growth of knowledge (Quaranta 1983, 53, 55). For him science, in the sense of a set of discoveries, was a "transient result" of human activity. In direct polemic with conceptions considering these results as if they were a coherent revelation descending who knows where from, Favaro, in a methodological article, pointed out the way covered in order to get to the present stand. The journey had not been easy and straight-forward, but rather laborious and wandering. The discoveries have been accumulated through the efforts of generations of scientists, genius as well as obscure scholars, all of them worthy of being studied (Favaro 1878; see also Favaro 1874, 456–58; Favaro 1887b; Favaro 1887c, 345). Furthermore, Favaro was aware that intellectual discoveries are not extemporaneous; in certain periods they rather lie everywhere like "germs" that come to light at the same time.⁹ Consequently, Favaro stated the need to study the intellectual context in order to detect even minor exchanges and influences (Favaro 1885, 1–2).

In fact, though, Favaro addressed his attention almost exclusively to the biographies of the figures of Galileo's world but wrote little on their scientific contributions. He did not deal with questions concerning the development of a science. As a colleague wrote in the obituary "It seems that Favaro wants to write the *history of mathematicians* in order to collect material for the *history of mathematics*," on which he wrote only rarely. Paradoxically, he omitted dealing with the very object of the history of mathematics, i.e., the mathematics itself, even in publications concerning the works of mathematicians (Bortolotti 1923–24, 12–14). Instead, he limited himself to very short, resumptive notes on their books without trying to understand the intrinsic reason for their achievements (eg., Favaro [1883] 1966, 1:78–105; Favaro 1886a, 73–75).

Similarly, Favaro stated the importance of studying the academic disputes for the history of universities (Favaro 1919, 459) but his own works in this field dealt almost completely with institutional and personal aspects, giving little attention to the ideas. Favaro's work was a determinative factor for the establishment of the interpretation of Galileo as the inventor of the experimental method, but Favaro himself did not take part in any interpretative debate (Malusa 1977, 560; Galluzzi 1983, VI). Besides presenting what he considered the "pure facts," Favaro engaged only in priority disputes in order to clear Galileo from accusations of intellectual dishonesty and to emphasize his originality (Favaro 1907a, 1913–14, 1918, 1919–20a, 1919–20b). His only other interpretative contribution was to depict the anti-Galilean catholic reaction as a curb for scientific progress. Of course, he pursued these targets with sobriety and without polemical excess, relying only on the documentary evidence (e.g., Favaro 1916; Bosmans 1923, 174).

⁹ The metaphor comparing scientific discoveries with germs that are in the air is expressed in a long quotation from the German historian Alfred Clebsch, with whom Favaro explicitly agrees (Favaro 1874, 457; see also *ibid.*, 565; Lefons 1984, 87).

Favaro has been considered a positivistic historian (Malusa 1977, 552, 555, 560; Galluzzi 1983, VI; Lefons 1984, 89), and indeed he himself declared his agreement with the “positivism indisputably dominating the modern studies.” However, he understood positivism in the narrow sense of strict reliance to the sources, highest scrupulosity and exactitude (Favaro 1882, 581). Consequently, Favaro performed the “first part of the positivist programme” in historiography as identified by Collingwood (Collingwood [1946] 1993, 126-27), namely “ascertaining the facts,” but he was not interested in the second part, namely “framing laws.” Indeed, Favaro delivered an enormous amount of ascertained facts but renounced one of the major tasks of any historian, i.e. trying to give an explanation of why the facts happened as they did. As Micheli remarks, Favaro’s approach was essentially an erudite one, as opposite to Caverni, who tried to interpret Galileo’s work “in intrinsic terms and in the light of an organic, comprehensive evaluation of science of the Renaissance and the sixteenth century” (Micheli 1980, 611–12).

Nevertheless, Favaro’s detailed research on secondary, even anecdotal circumstances of Galileo’s life was not carried through only for the sake of accumulating historical facts without connection, as one would understand eruditeness, but with the aim of rendering a broader picture, the scientist’s context. Only on the basis of the facts collected by Favaro was it possible to acquire a comprehensive view of science in sixteenth-century Italy. Only thanks to Favaro’s reconstruction of Galileo’s net of personal, political, and scientific relations does it become possible to understand the scientific world in which he operated.

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