Mario Biagioli. *Galileo's Instruments of Credit: Telescopes, Images, Secrecy*. Chicago: The University of Chicago Press, 2006. 302 pp. index. illus. bibl. $35. ISBN: 0–226–04561–7.

More than a decade ago, in *Galileo, Courtier*, Mario Biagioli argued that Galileo's science depended upon his masterly exploitation of the early modern

patronage system. In his recent book *Galileo's Instruments of Credit*, Biagioli revisits Galileo's rise from unknown university professor in Padua to the star of the Medici court in Florence who battled with the Roman theologians over Copernicanism. Biagioli sheds new light on this well-known episode in the history of science by borrowing metaphors from the world of economy. The construction of a *market*, the weighing of potential *credits* versus *risks*, the search for *investors*, and the creation of a *monopoly* might sound like the content of a conversation on Wall Street, but Biagioli argues that this terminology applies equally well to the making of Galileo's science.

The book traces Galileo's whereabouts between different places — from Padua to Florence and then to Rome — and between different economies. Biagioli argues that Galileo's move from Padua to Florence was also a move between two different credit systems. In Padua, Galileo operated in an artisanal economy in which he received monetary credit for the sale of goods, for example, his geometric and military compass. With the publication of *Sidereus Nuncius* (1610), Galileo entered the economy of print and discoveries. Instead of money for the sale of a useful instrument — and other types of labor-intensive related activities such as private teaching on the instrument — Galileo attempted, succesfully, to receive non-local credibility in exchange for the novelty of his telescopic discoveries. Biagioli readily admits that these two credit systems never come in their pure and abstract form. Still in Padua, Galileo stated (Biagioli notes) that the actions of Baldassare Capra, whom he accused of the piracy of his instrument and its instruction manual, "had hurt his honor, not his purse" (9). Biagioli also takes pains to show that the *Sidereus Nuncius* falls between these two different economies.

Galileo's Instruments of Credit is not a book about the material basis of Galileo's science, the instruments — the compass and the telescope — for which he received credit. It is rather about the strategies and tactics which he used to gain and maximize his credit. In his choice of these tactics Galileo was — Biagioli cites Feyerabend with approval — opportunistic. A methodology was a luxury which Galileo could not afford, Biagioli claims, because he had to respond to highly mutable working conditions. Biagioli follows Galileo through these changing circumstances in four chapters, roughly following the chronological order of Galileo's career. Chapter 1 finds Galileo in Padua in search of Medicean support for his discovery of the satellites of Jupiter. Biagioli draws an analogy between the construction of scientific authority and investment decisions. What is most surprising, he argues, is that the Medici invested in Galileo's claims on the basis of partial information. Biagioli concludes that geographic distance, which allows for this partial perception, is constitutive of knowledge.

In chapter 2, Biagioli shows that Galileo's concerns in the wake of the publication of the *Sidereus Nuncius* were not with the replication of his telescopic discoveries, but with keeping others from catching up with him and, thus, with monopolizing these discoveries. These monopolistic tactics made Galileo secretive about the telescope. Biagioli contextualizes Galileo's uncooperative attitude within the economy of the early modern inventor. The conventions of early modern

patents shed substantially new light on Galileo's secrecy about telescope-making skills, but Biagioli is too enthusiastic when he makes them responsible for the absence of "a description of the optical processes of image formation through a telescope" (126), an optical theory which would have been little helpful in building a better telescope.

The *Sidereus Nuncius* was, of course, no patent application, and Biagioli analyzes the narrative and pictorial tactics which Galileo used to convince his readers of the existence of his celestial discoveries. These pictorial tactics — movie-like visual sequences, the innovative character of which Biagioli overestimates— which represent periodicity and change in time, are the central focus of chapter 3, on the sunspot controversy between Galileo and Christoph Scheiner. Finally, in chapter 4, Biagioli attempts to show how Galileo's use of the metaphor of the book of nature emerged in response to theologians' criticisms of Galileo's portrayal of the relationship between astronomical knowledge and scriptural exegesis.

Despite shortcomings — which arise from Biagioli's attention to tactics of secrecy and disclosure at the expense of the content of the disclosure and the historicity of its packaging — this well-researched book brings fresh insights, especially regarding the concept of intellectual property, in a seemingly all-too-familiar episode in the history of science. Its sweeping style will appeal to broader audiences than that made up by the Galileo Industry.

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