



Introduction

The New World and the new science

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Abstract

Traditional historical reconstructions regarding the circulation and production of knowledge in the Spanish colonies in the New World have focused on their participation in the birth of Early Modern Science in Europe. Although recent studies have revised this approach by examining how knowledge production in the Americas contributed to the development of seventeenth-century Spanish scientific culture, this focus section intends to enlarge the scope of this revisionist approach by considering study cases that show that the circulation of knowledge informed the development of local contexts in the Americas. This introduction depicts this panorama by considering it in the light of the iconography produced by Europeans after the discovery of the New World.

Keywords

colonial science, centre-periphery model, scientific revolution, Spanish Black Legend

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In the print entitled “America” of the *Nova Reperta* series, (Fig. 1) Giovanni Stradano depicts Vespucci’s contact with the Americas as the gest of an almost mythological navigator who brought civilised Europe into contact with a savage, unknown New World. In this print Stradano reproduces the narratives of explorers and *conquistadores* which circulated in Europe regarding the nature of the Americas and its inhabitants.¹ Exotic animals and plants, rudimentary weaponry, nudity, matriliney and cannibalism are depicted in this engraving, thus affirming the superiority of European civilisation, represented in the plate by a Vespucci armed only with Christian tradition, astronomical knowledge and scientific instruments.² In Stradano’s vision, the encounter between European explorers, navigators and *conquistadores* with the Americas, its nature and inhabitants, entailed a civilising mission that used European science and Christianity as tools to inform and shape the colonisation of the New World.

Regretfully, by reproducing the so-called centre-periphery model and a stagnated conception of the Scientific Revolution, historical narratives about the earliest development of colonial science in the Americas have inherited Stradano’s perspective.³ Following George Basalla’s interpretation of the dissemination of European science, the historiography regarding the colonial science in the New World has focused either on the particular ways in which European science was appropriated in the Americas or on the contributions of the latter to the birth of Early Modern Science in Europe. In this scenario, just like Stradano’s engraving, the peripheral American context has been depicted as passive, merely receiving the elements of the European scientific culture in the form of curricular activities in the newly created universities and colleges, and as a part of the European imperial policies for administering and ruling the New World’s territories.⁴ Likewise, as the dissemination of knowledge to and from the New World happened in the same period as the Scientific Revolution and the subsequent birth of Early Modern Science in Europe, historians have identified the participation of the New World in these events as a result of this global network in which data and information run toward the European centres of knowl-

¹ Studies on Stradano’s *Nova Reperta* series are in McGinty, “Stradanus (Jan Van der Straet)”, 28-78; Van der Sman, “A Fertile Imagination”, 99-123; Markey, “Stradano’s Allegorical Invention of the Americas”.

² Markey traces the Medicean collections as possible source of Stradano’s knowledge of the diverse elements of American material culture. *Ibid.*, 419-429.

³ The original formulation of the centre-periphery model is in Basalla, “The Spread of Western Science”. Reconstructions of the model are in Bertomeu Sánchez, García-Belmar, Lundgren, et al., “Introduction”; Patiniotis, “Between the Local and the Global”.

⁴ The revisionist version of the centre-periphery model has been largely characterised in thematic numbers on Global History of Science in journals such as *Isis* and *Centaurus*. See, Sivasundaram, “Introduction”; McCook, “Introduction”; Davids, “Introduction”; Antonio Sánchez and Henrique Leitao, “Artisanal culture”.



Fig. 1 – Stradanus, *Allegory of America* (1587-89), The Metropolitan Museum of Art, New York.

edge production.⁵ While this perspective has allowed to examine the emergence of the complex, global scientific networks that propitiated the Scientific Revolution and the way in which the New World participated in it, it is based on a conception of the Scientific revolution as a historical phenomenon that has been ruled out in the literature since the 1990s.⁶

Building upon a rather contextualist approach and the criticism of these historical categories, historians such as Arndt Brendecke and Maria Portuondo have pointed out how Spanish imperial policies for the administration and ruling of the New World's territory

⁵ In the case of the Spanish Atlantic World, this narrative has largely contributed to defend the participation of Spain in the Scientific Revolution and to criticise the *Black Legend* of Spanish Science. An exemplary case of the use of the New World's scientific production in this sense is Víctor Navarro Brotóns & William Eamon (eds.) *Beyond the Black Legend*. A reconstruction of the recent uses of this approach is in Juan Pimentel and Pardo-Tomás, "And yet, we were modern".

⁶ The criticism of the utility of the "Scientific Revolution" as a historiographic category mostly emerged after Cunningham's and William's *De-centring the "big picture"*. An account of the historiographic trend emerging after their publication is in Teich, *The Scientific Revolution Revisited*, 83-100.

developed an instrumental conception of scientific knowledge and an institutional framework of circulation of information. As these historians have demonstrated, in order to control their new overseas possessions, the Spanish monarchs framed networks that controlled the industry of knowledge and information production, whose centres were at the royal institutions in Spain (the *Casa de la Contratación* and the *Consejo de Indias*) and were administered in the New World by the viceregal courts.⁷ In this scenario, the information that explorers, navigators, *encomenderos*, religious orders, and *vecinos* gathered in situ was used to construct an image of the New World for the royal court in Madrid. This approach has created a historiographic trend that has evidenced the particular ways in which science was transformed in the New World and how it helped to shape the development of a local scientific culture.

The purpose of this focus section is to contribute to this revisionist agenda by examining specific cases of knowledge production and circulation that took place out of the institutional framework that this revisionist approach has amply described. In their essays, the authors of this dossier examine particular historical cases in which knowledge about the New World's nature and its inhabitants was transformed in the New World itself by agents who produced their works in local contexts, with specific purposes and concerns that were not necessarily connected to the institutional agenda of the Spanish court, universities, and colleges. In other words, the contributions collected here contain evidence to depict how transformations of scientific knowledge in the New World led to important transformations in the New World's societies and culture.

These contributions were first presented and discussed at the workshop *The New World and the New Science* (November 17, 2021), promoted by the Department of Philosophy, Letters, and Communications of the Università degli Studi di Bergamo and the Museo Galileo. We find here different approaches to historical cases of colonial science that allow us to examine the interpretative variations of the Scientific Revolution as a historiographic category. In the first paper, Renée Raphael (University of California, Irvine) examines Capoché's *Relación general de la villa imperial de Potosí* (1585) and Juan Francisco de Hinstrosa's *Relación breue y sumaria del descubrimiento ... del çerro nuevo potossi* (1596). By comparing the content and form of both *relaciones*, Raphael argues that there were specific manners of knowledge production in mining and metallurgy in Potosí that were evidenced in the inscription of the mining techniques and the theory of metallurgical generation present in these *relaciones*. In the second paper, Sergio Orozco-Echeverri (University of Antioquia-University of Edinburgh) studies the case of a neglected Renaissance genre, the *repertorio de los tiempos*. By examining its development in the Iberian Peninsula during the sixteenth century, Orozco-Echeverri concludes that it was enlarged to include substantial cosmological, chronological, and astronomical features that redefined the genre.

⁷ Portuondo, *Secret Science*; Brendecke, *Empirical Empire*.

He completes his study by considering how *repertorios* influenced Antonio Sánchez de Cozar's *Tratado de Astronomía y de la Reformatión del Tiempo*. In the third paper, Nydia Pineda de Ávila (University of California, San Diego-Fletcher Jones Foundation Fellow in the Huntington-UC Program for the Advancement of the Humanities), leaves aside the heroic reconstructions of the works of the polymath Carlos de Sigüenza y Góngora, examining them as a node in a network of intellectuals, artisans, and artists connected by their religious beliefs and scientific practices. She does so by studying the iconography present in multiple celestial images that she considers visual and textual artefacts of the scientific and religious traditions present in late seventeenth-century New Spain.

Although their contributions were not included in this dossier, I would like to mention Jorge Cañizares Esguerra and Antonio Sánchez, who participated in the workshop with presentations that dealt with Magellan's travel around the globe and the relationship between the legal structure of the Spanish Monarchy and the production of knowledge.

As Juan Pimentel and José Pardo-Tomás have commented, differences in approaches to the problem of the participation of the Spanish World in the Scientific Revolution and the birth of Early Modern Science have been consequences of the multiple historiographic agendas of historians on both sides of the Atlantic. In their opinion, these agendas have been permeated by the degree of penetration of the criticism toward the very notions of Scientific Revolution and Early Modern Science as valid historiographic categories. Thus, while historians working in Spain have been struggling to construct narratives to highlight the participation of Spain in the Scientific Revolution, their American counterparts have used colonial science as an example of the problems of these categories.⁸ Taken together, the contributions to this focus section reveal that even this debate has moved forward and that the Grand Narratives are viewed either with a profound criticism or with the indifference with which we remember our old problems.

⁸ *Ibid.*, 133-134.

References

- Basalla, George. "The Spread of Western Science". *Science* 156, 3775 (1967), 611-622.
- Bertomeu-Sánchez, José Ramón, Antonio García-Belmar, Anders Lundgren, et al. "Introduction: Scientific and Technological Textbooks in the European Periphery". *Science & Education*, 15 (2006), 657-665.
- Brendecke, Arndt. *Empirical Empire. Spanish Colonial Rule and the Politics of Knowledge*. Berlin-Boston: De Gruyter Oldenbourg, 2016.
- Davids, Karel. "Introduction: Bridging Concepts". *Isis* 106, 4 (2015), 835-839.
- Lane, Kris. *Potosí: the Silver City that Changed the World*. Oakland: University of California Press, 2019.
- Markey, Lia. "Stradano's Allegorical Invention of the Americas in Late Sixteenth-Century Florence". *Renaissance Quarterly* 65, 2 (2012), 385-442.
- McCook, Stuart. "Introduction". *Isis* 104, 4 (2013), 773-776.
- McGinty, Alice Bonner. "Stradanus (Jan Van der Straet): His Role in the Visual Communication of Renaissance Discoveries, Technologies and Values" (PhD diss., Tufts University, 1974).
- Navarro Brotons, Víctor and William Eamon, eds. *Beyond the Black Legend: Spain and the Scientific Revolution*. Valencia: Universitat de València-CSIC, 2007.
- Patiniotis, Manolis. "Between the Local and the Global: History of Science in the European Periphery Meets Post-Colonial Studies". *Centaurus* 55, 4 (2013), 361-384.
- Pimentel, Juan and José Pardo-Tomás. "And yet, we were modern. The paradoxes of Iberian science after the Grand Narratives". *History of Science* 55, 2 (2017), 33-147.
- Portuondo, María. *Secret Science. Spanish Cosmography and the New World*. Chicago: The University of Chicago Press, 2009.
- Sánchez, Antonio and Henrique Leitao. "Artisanal culture in early modern Iberian and Atlantic worlds". *Centaurus* 60 (2018), 135-140.
- Sivasundaram, Sujit. "Introduction". *Isis* 101, 1 (2010), 95-97.
- Teich, Mikuláš. *The Scientific Revolution Revisited*. Cambridge: Open Book Publishers, 2015.
- Van der Sman, Gert Jan. "A Fertile Imagination: Stradanus as an Inventor of Prints". In *Stradanus (1523-1605), Court Artist of the Medici*, edited by Manfred Sellink, 99-123. Turnhout: Brepols, 2011.