Aldrovandi and New World Volcanoes
The Discovery of a Sixteenth-Century Woodblock of Popocatepetl*

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Introduction

Bologna's Palazzo Poggi Museum holds 1,822 woodblocks from the sixteenth and early seventeenth centuries and the Bologna University Library (BUB) holds a further 1,950. They are part of a large bequest left by the celebrated naturalist Ulisse Aldrovandi (1522–1605), whose museum attracted visitors from across Europe and made Bologna one of Europe's natural history centres of excellence over the course of the sixteenth century.[1] Almost his entire legacy is now held by these two institutions in accordance with Aldrovandi's wishes, who left his museum, his manuscripts, his library and his watercolours to the Senate of Bologna. In 1742, the collection was merged with those of the Istituto delle Scienze di Palazzo Poggi founded by Luigi Ferdinando Marsili (1658–1730).[2] The woodblocks were drawn and carved in Aldrovandi's *bottega artistica* (artistic workshop).[3] Among those still held by the museum and the library is one of an American volcano, a woodblock that has so far never been the subject of scholarly investigation.

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* This work was supported by the DisComPoSE project, which has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 759829). I would like to thank the staff of the Palazzo Poggi Museum and the Biblioteca Universitaria di Bologna for their kind assistance during my research. This article would not have been possible without the generous intellectual support of Domenico Cecere. I am especially grateful to Noemi Di Tommaso, who drew my attention to the printing proof of the volcano while we were sharing a research table at the BUB. I also wish to thank my friends at the Bologna section of the INGV, Dmitri Rouwet and Carlos Caracciolo, for inviting me to share an important part of this research with the volcanology community. Davide Domenici, Eleonora Moronti, Umberto Signori, Milena Viceconte, and Antonio Perrone kindly read and commented on an earlier draft of this article. I am also grateful to the anonymous reviewers for their insightful comments and suggestions. Any remaining errors or misinterpretations are my sole responsibility.

[1] PAULA FINDLEN, *Possessing Nature: Museums, Collecting and Scientific Culture in Early Modern Italy* (Berkeley-Los Angeles: University of California Press, 1994); GIUSEPPE OLMI, *L'inventario del mondo: catalogazione della natura e luoghi del sapere nella prima età moderna* (Bologna: Il Mulino, 1992); SANDRA TUGNOLI PATTARO, *Metodo e sistema delle scienze nel pensiero di Ulisse Aldrovandi* (Bologna: Clueb, 1981); GIUSEPPE OLMI, *Ulisse Aldrovandi: scienza e natura nel secondo Cinquecento* (Trento: Università di Trento, 1976).

[2] MASSIMO ZINI, *Tre secoli di scienza: lineamenti della storia dell'Accademia delle Scienze dell'Istituto di Bologna attraverso gli studi e le vicende dei suoi membri più celebri* (Bologna: Accademia delle scienze dell'Istituto di Bologna, 2011).

[3] For the woodblocks, see MARIO CERMENATI, 'Ulisse Aldrovandi e l'America', *Annali di Botanica* 4 (1906): 313–66. The papers states that originally there must have been some 5,000 woodblocks. For a description of the artistic workshop, see OLMI, *L'inventario del mondo*, 'La 'bottega artistica' aldrovandiana', 61–90. See also GIUSEPPE OLMI and LUCIA TONGIORGI TOMASI, *De piscibus. La bottega artistica di Ulisse Aldrovandi e l'immagina naturalistica* (Rome: Edizioni dell'Elefante, 1993).

Cromohs (Cyber Review of Modern Historiography), ISSN 1123-7023, 27/2024

DOI: 10.36253/cromohs-15677

This essay will examine how knowledge about the geography of the New World, its natural world and in particular its volcanoes was disseminated in sixteenth-century Bologna.[4] The starting point for this paper is the history of how the woodblock of the volcano came to exist, based on an analysis of Aldrovandi's manuscripts and other works in his personal library. The micro-historical approach to these sources reveals the rich tapestry of people, manuscripts and books of the Italian and European courts and cities that Aldrovandi frequented.[5] As Monica Azzolini has observed in her discussion of Aldrovandi's *Historia admirandis*: 'Aldrovandi and his team selected and recomposed information from books and letters about marvellous and exotic artefacts. […] The result of all this research […] generated material for other works which were published during Aldrovandi's lifetime or after his death'.[6] This research methodology enabled him to systematically gather a huge amount of information, including about the New World, and to undertake a methodical and multifaceted study of it.[7]

Aldrovandi's interest in America and its natural world is well-known. From Mario Cermenati's pioneering work at the start of the twentieth century to Davide Domenici's recent papers, research has revealed the significant impact that the 'discovery' of the New World and its consequences in European scholarship had on the creation of what Aldrovandi called his *teatro di natura* (theatre of nature).[8] Recent historiographical work has taken this research to an international scale with the 'Global Aldrovandi' conference held in Bologna in June 2022.[9]

Starting from the recent discovery of the American volcano woodblock, this paper will therefore shed light on the communication network and the sources that lie behind the creation of this single woodblock. Thanks to this network, the relatively rapid dissemination of knowledge and images could satisfy the thirst for knowledge

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[4] On the spread of knowledge of the natural world in Italian courts in the early modern period, see SABINA BREVAGLIERI, *Natural desiderio di sapere. Roma barocca fra vecchi e nuovi mondi* (Rome: Viella, 2019), in particular the chapter entitled 'Itinerari naturalistici: Impero spagnolo, Viceregno, Roma', 31–82, where Brevaglieri also discusses Aldrovandi in detail. On the same topic in Bologna in particular, see LAURA LAURENCICH MINELLI (ed.), *Bologna e il Mondo Nuovo* (Bologna: Grafis, 1992).

[5] For Aldrovandi's relations with the Medici court in Florence, see LIA MARKEY, *Imagining the Americas in Medici Florence* (University Park: Pennsylvania State University Press, 2016).

[6] MONICA AZZOLINI, 'Aldrovandi's Planned History of Marvels: Writing the Preternatural into Nature', *Journal of the History of Collections* 2025, https://doi.org/10.1093/jhc/fhaf006, 5.

[7] On Aldrovandi's interest in America, see DAVIDE DOMENICI, 'Rediscovery of a Mesoamerican Greenstone Sculpture from the Collection of Ulisse Aldrovandi', *Journal of the History of Collections* 34, no. 1 (2022): 1–21, in particular the section entitled 'Ulisse Aldrovandi and the New World', 3–5.

[8] RAFFAELLA SIMILI (ed.), *Il teatro della natura di Ulisse Aldrovandi* (Bologna: Compositori, 2001). GIUSEPPE OLMI, 'Ulisse Aldrovandi e la natura del Nuovo Mondo', in *Tesoro mexicano: visioni della natura fra Vecchio e Nuovo Mondo*, ed. GIORGIO ANTEI (Fontanellato: Franco Maria Ricci, 2015), 185–89.

[9] On the conference, see 'Global Aldrovandi: Exchanging Nature in the Early Modern World: 3rd Brill Seminar: Bologna, June 16–17, 2002', *Aldrovandiana* 1 (2022): 116–119; DAVIDE DOMENICI, 'Global Aldrovandi. Exchanging Nature in the Early Modern World, International conference, Bologna, University of Bologna, 16-17 June 2022', *Annali di Storia delle università italiane* 26, no. 2 (2022): 410. On the conference's results see LIA MARKEY and DAVIDE DOMENICI, eds, *Global Aldrovandi. Exchanging Knowledge in the Early Modern World* (Leiden: Brill, forthcoming). On the global dimension of Aldrovandi's collections, see PETER MASON, *Ulisse Aldrovandi. Naturalist and Collector* (London: Reaktion, 2023).

generated by the emerging discipline of natural history.[10] As Sachiko Kusukawa has shown, images were fundamental to the practice of natural history in the early modern world.[11] They were equally essential to Aldrovandi's analysis of the natural world of Europe, the Americas and other continents, as evidenced by the roughly 8,000 illustrations preserved in his collections.[12] These illustrations also served as an integral part of Aldrovandi's scientific approach.[13]

A unique woodblock of a volcano in Aldrovandi's collection

We start with an analysis of a pearwood woodblock 12 cm long, 12.4 cm wide and 1.9 cm high that was probably carved by Cristoph Lederlein (Cristoforo Coriolano). He was one of the workshop's most important carvers and worked with Aldrovandi from the mid-1580s.[14] As far as we know, the image has never been published, though this is not an isolated case, as many of Aldrovandi's woodblocks remained unpublished.[15] The recto (Fig. 1) shows a volcano whose summit is engulfed in flame and the verso bears an inscription in Latin arguably written when the recto was carved.[16] (Fig. 2)

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[10] This network often spread Aldrovandi's results to other major natural history research centres, such as, for example, Valencia. See EMMA SALLENT DEL COLOMBO, 'Natural History Illustration between Bologna and Valencia: The Aldrovandi-Pomar Case', *Early Science and Medicine* 21, no. 2–3 (2016): 182–213; EMMA SALLENT DEL COLOMBO and JOSÉ PARDO-TOMÁS, 'Materiali aldrovandiani in Spagna: l'enigmatico caso del Códice Pomar', in *Ulisse Aldrovandi: libri e immagini di storia naturale nella prima età moderna*, eds GIUSEPPE OLMI and FULVIO SIMONI (Bologna: Bononia University Press, 2018), 37–48.

[11] SACHIKO KUSUKAWA, *Picturing the Book of Nature. Image, Text, and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago: The Chicago University Press, 2012), especially the first part 'Printing Pictures'.

[12] On the role of images in Early Modern Europe see also JANICE NERI, *The Insect and the Image: Visualizing Nature in Early Modern Europe, 1500-1700* (Minneapolis: University of Minnesota Press, 2011) and FLORIKE EGMOND, *Eye for Detail. Images of Plants and Animals in Art and Science, 1500-1630* (London: Reaktion Books, 2017).

[13] DAVIDE DOMENICI, 'Rediscovery', 3. On the role of the images in Aldrovandi's works, see OLMI and SIMONI (eds), *Ulisse Aldrovandi*; GIUSEPPE OLMI, 'Osservazione della natura e raffigurazione in Ulisse Aldrovandi', *Annali dell'Istituto Storico Italo-Germanico in Trento* 3 (1977): 105–81 (150–51); ANGELA FISCHEL, 'Drawing and the Contemplation of Nature – Natural History around 1600: The Case of Aldrovandi's Images', in *The Technical Image. A History of Styles in Scientific Imagery*, eds HORST BREDEKAMP, VERA DÜNKEL, BIRGIT SCHNEIDER (Chicago: The University of Chicago Press, 2015), 170–81. On the rhetorical function of Aldrovandi's imagen see also MONICA AZZOLINI, 'Retorica e autopsia negli scritti di Ulisse Aldrovandi: il draco bolognese tra *historia* e rappresentazione *ad vivum*', in *Poetica e retorica del discorso scientifico nelle letterature europee dell'età moderna*, ed. ELISABETTA MENGALDO (Padua: Padova University Press, 2023), 33–61.

[14] FULVIO SIMONI, 'La natura incisa nel legno: la collezione di matrici xilografiche di Ulisse Aldrovandi conservata all'Università di Bologna', *Studi di Memofonte* 17, no. 2 (2016): 129–44.

[15] Alessandro Ceregato, who has worked on cataloguing surviving woodblocks, has kindly told me in a personal communication that 'There is sparse information about this woodblock. It has never been inked or, to the best of my knowledge, used for the *Museum Metallicum* or other of Aldrovandi's works. Unlike published images, the woodblock shows no signs of printing and there is no indication to the page numbers of a volume'. Personal communication via email (12 May 2022).

[16] Images of the woodblocks are held at the Palazzo Poggi Museum and are accessible online. For the 'Volcano' woodblock see https://bbcc.regione.emilia-romagna.it/pater/loadcard.do?id_card=205161, last accessed 1st December 2024. Recently, a new online catalogue has been published by the Sistema Museale di Ateneo of the University of Bologna: see the catalogue entry for the American volcano woodblock, with more details about its characteristics, at https://catalogo.sma.unibo.it/it/29/ricerca/detailiccd/2053/, last accessed on 4 December 2024.

Thanks to new palaeographic interpretation the inscription reads as follows:

> Hic mons est in America flammivomus ac sunt qui reperiuntur in Europa, ignum emittentur et flammas, ut est mons Aetna qui quidam mons ut lumineis flammas, cineris, lapidis horrenda factu eructat, idia ut noctu latissime ultra centus millia passium videris. Huius figura est depicta apud Corn. Jud. in tab. Americae eius descript. ut d. to. 13. 2966. Observat.
>
> This ignivomous mountain is located in America, and is similar to those found in Europe which emit fire and flames, like Mount Etna when it spews out luminous flames, ash and rocks so terrible that at night you might see them hurled more than a hundred thousand paces. The image was created by Corn. Jud., in *Tabula Americae*, as noted in volume 13. 2966. Observat.

The words 'Corn. Jud. in tab. Americae' suggest that the inscription is a significant clue to the source consulted by Aldrovandi and his team for the creation of the woodblock. A thorough analysis of manuscript 136, volume 13, has revealed no reference to the image of the American volcano. As will be discussed in detail later, however, a single 'Mons Flammivomus' annotation was found in volume 26 of the same manuscript, within a list of images copied on 2 December 1596 during Aldrovandi's consultation of Cornelis de Jode's wall maps, including America. It is therefore plausible that the inscription on the woodblock contains an error in the indication of the volume in which the annotation is to be found.

In addition, although the image never appeared in any of his published works, either during his lifetime or posthumously, an examination of Aldrovandi's manuscripts has uncovered a printing proof, which is published here for the first time as Figure 3.[17] This demonstrates that the woodblock was conceived and carved for actual use. The image of the volcano was to be included in one of Aldrovandi's many works. Despite the existence of the printing proof, no ink is visible to the naked eye on the woodblock, nor are there any marks left by printing, which shows the care that Aldrovandi demanded in how everything produced in his workshop was to be handled. The meticulous cleaning of the woodblock also explains the exceptionally good state of conservation of most of the woodblocks, that are still preserved in the Palazzo Poggi Museum and the University Library in Bologna. In addition, the absence of ink may also be explained by two restoration interventions on the material conditions of the woodblock. The first, carried out in 1969 by the restorer Otello Caprara, involved pest control, consolidation, and restoration, while the second, a few years later in 1983, by Marisa Caprara, is described by the Museum of Palazzo Poggi website as a 'restoration with washing'.[18] It is therefore possible that these maintenance and cleaning interventions on the woodblock contributed to the removal of any ink traces that may have remained from its use to obtain the printing proof.

[17] BUB, Aldr. ms. 108, Tomo I, Icon. Varior.
[18] For these details, see the catalogue entry of the Sistema Museale di Ateneo of the University of Bologna at https://catalogo.sma.unibo.it/it/29/ricerca/detailiccd/2053/, accessed 04 December 2024.

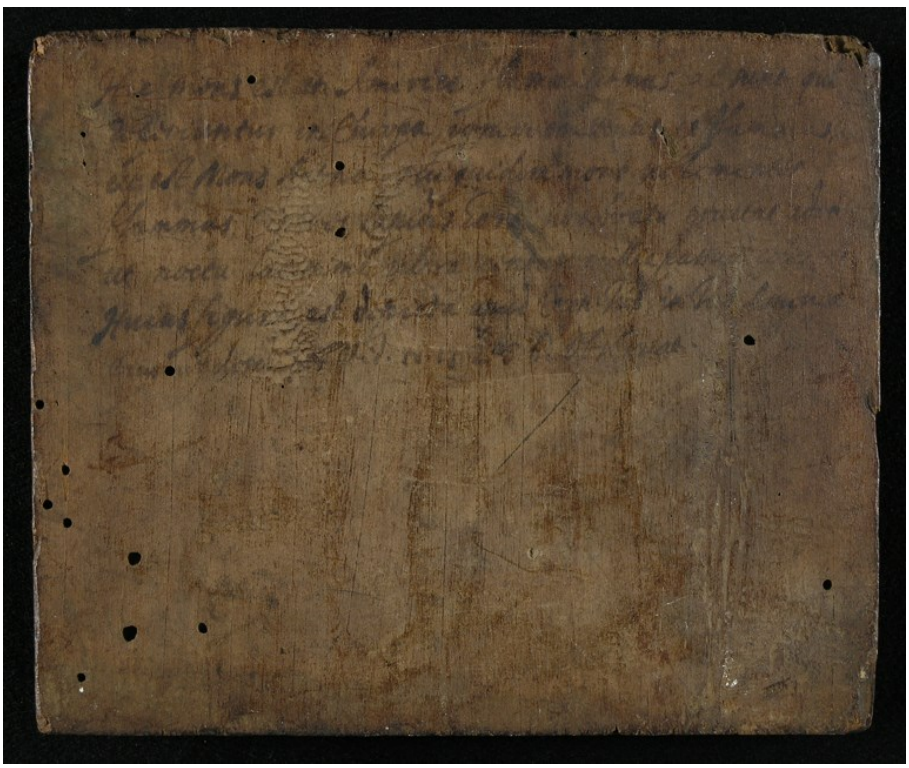

Figure 1 and 2. *Mons Flammivomus ex Americae*, woodblock, recto and verso. Courtesy of the Palazzo Poggi Museum, Bologna. Photo: Fulvio Simoni.

Figure 3. Printing proof of *Mons Flammivomus ex Americae*, BUB, Aldr. ms. 108, Tomo I, Icon. Varior, f. 171r. © Alma Mater Studiorum Università di Bologna – Biblioteca Universitaria di Bologna (further reproduction or duplication by any means is prohibited). Photo by the Author.

Aldrovandi's sources for the creation of the woodblock

Reading was at the heart of Aldrovandi's quest for knowledge, in the century that saw an explosion of the printed matter market.[19] He gleaned information not only from the works in his extensive library, but also from the rich correspondence he maintained with a wide circle of scholars, as well as from the large number of people who visited his museum.[20] This was not just an institution designed to display naturalia and artificialia but also a place where information and knowledge could be shared informally.[21] Some of the visitors probably showed Aldrovandi prints that they might

[19] DANIEL BELLINGRADT, PAUL NELLES, and JEROEN SALMAN (eds), *Books in Motion in Early Modern Europe. Beyond Production, Circulation, and Consumption* (Cham: Palgrave Macmillan, 2017).

[20] On Aldrovandi's correspondence see NOEMI DI TOMMASO, 'Censimento preliminare della corrispondenza di Ulisse Aldrovandi', *Aldrovandiana* 1, no. 2 (2022): 29–174, and NOEMI DI TOMMASO, 'Costruire un microcosmo vegetale attraverso le lettere: Ulisse Aldrovandi e l'istituzione dell'orto pubblico di Bologna (1567-1568)', in *Ad limina. Frontiere e contaminazioni transdisciplinari nella storia delle scienze*, ed. CLAUDIA ADDABBO, ELENA CANADELLI, LUIGI INGALISO, DANIELE MUSUMECI, LUCA TONETTI, VALENTINA VIGNERI, and MARTA VILARDO (Milano: Editrice Bibliografica, 2023), 182–195. See also NOEMI DI TOMMASO, 'African Plants in Ulisse Aldrovandi's Correspondence', in *Global Aldrovandi*, eds MARKEY and DOMENICI, forthcoming. On Aldrovandi's museum see CRISTIANA SCAPPINI, MARIA PIA TORRICELLI, and SANDRA TUGNOLI PÀTTARO, *Lo studio Aldrovandi in Palazzo Pubblico: 1617-1742* (Bologna: CLUEB, 1993).

[21] OLIVER IMPEY and ARTHUR MACGREGOR, eds, *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-century Europe* (Oxford: Clarendon Press, 1985). In particular, see the chapter by LAURA LAURENCICH-MINELLI, 'Museography and Ethnographical Collections in Bologna during the Sixteenth and Seventeenth centuries', 17–23.

have acquired in locations catering to the flourishing publishing market. Antwerp in particular had a prominent role in the world of sixteenth-century publishing.

From Antwerp to Bologna: the work of the Belgian cartographer Cornelis de Jode

The inscription on the verso of the woodblock reveals that the source used by Aldrovandi was the *Tabula Americae* produced by Cornelis Judaeis, better known as Cornelis de Jode, a cartographer and printer of Antwerp. There is, however, no deep historiographical analysis of the influence of Cornelis de Jode on the works of Aldrovandi.[22] He therefore remains an unknown figure to most of the scholars researching Aldrovandi, despite the fact that his name recurs in Aldrovandi's manuscripts and in many of his works printed during his lifetime and later, as will be shown throughout the article.

Cornelis de Jode was born in Antwerp in 1571 and died in Mons in 1600.[23] He was the second son of Pascale van Gelder and Gerard de Jode (ca. 1511–1591), a wealthy engraver and publisher of maps and prints. Gerard de Jode was commissioned by Philip II to print his 1578 atlas, the *Speculum Orbis Terrarum*. However, its reputation was eclipsed by the superior quality and accuracy of *Theatrum Orbis Terrarum*, the illustrious atlas produced in 1570 by Abraham Ortelius.[24] Gerard de Jode had started his business in 1555, publishing copies of maps of the world produced by the Venetian cartographer Giacomo Gastaldi, and then, in 1564, Ortelius's eight-sheet world maps.[25] The business was a resounding success in a market that yielded good revenues, and he became Antwerp's leading seller of maps. He then started a project producing his own wall maps of the Four Continents. According to the sales records of the Plantin-Moretus Museum, these maps were best-sellers from 1582 to 1590.[26] However, despite how widespread they became, they did not withstand the wear and tear of time and today are extremely rare. Indeed, none exist from the years 1555–1560 and only three

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[22] MAURIZIO SERRA, *Ulisse Aldrovandi americanista e i suoi manoscritti*, PhD. diss. (Bologna, 1985–1986). The thesis frequently emphasises the use of de Jode's atlas as a source for Aldrovandi's research yet without ever delving into his figure.

[23] The most up-to-date biographical information is in PIETER VAN DER COELEN and MARJOLEIN LEESBERG, *The New Hollstein Dutch and Flemish Etchings, Engravings and Woodcuts, 1450-1700. The De Jode Dynasty. Part IV. Gerard de Jode* (Ouderkerk aan den IJssel: Sound & Vision, 2018), lxv. His date of birth was previously noted incorrectly as 1568.

[24] CORNELIS KOEMAN, *The History of Abraham Ortelius and His Theatrum Orbis Terrarum* (New York: American Elsevier, 1964); TINE MEGANCK, *Erudite Eyes: Friendship, Art and Erudition in the Network of Abraham Ortelius (1527–1598)* (Leiden: Brill, 2017).

[25] RODNEY W. SHIRLEY, *The Mapping of the New World. Early Printed World Maps, 1472-1700* (London: New Holland, 1984). For Gastaldi's World Map, see 113–14. On Gastaldi, see also ELIZABETH HORODOWICH, *The Venetian Discovery of America. Geographic Imagination and Print Culture in the Age of Encounters* (Cambridge: Cambridge University Press, 2021), in particular the chapter entitled 'The Venetian Mapping of the Americas', 89–142. Two copies of Gerard de Jode's 1555 edition are currently known, held at the Geographical Institute of the University of Utrecht and the Bibliothèque Nationale de France in Paris. For Ortelius's eight-sheet map, of which three copies exist, at the British Library in London, the Maritime Museum in Rotterdam and the University Library in Basle, see 129–33.

[26] VAN DER COELEN and LEESBERG, *The De Jode Dynasty*, lxv.

from 1576–1584.[27] One is held at the Library of Congress in Washington, but it is only a part of the 1576 wall map of America by Gerard de Jode, just a single sheet measuring 55cm by 43cm showing western parts of South America. (Fig. 4)

Figure 4. Gerard de Jode, wall map of South America, single sheet. Library of Congress, Geography and Map Division, Washington. https://www.loc.gov/resource/g5200.ct006058/

[27] VAN DER COELEN and LEESBERG, *The De Jode Dynasty*, lv.

This map was initially attributed to Gerhard Mercator, but Surekha Davies has shown that it was in fact produced by Gerard de Jode.[28] The sheet was part of a much larger wall map of probably six sheets that have not survived. It showed the whole American continent and was embellished with detailed information and illustrations, some linked to the realm of marvel, others, instead, more plausible.

In 1585, Gerard de Jode started working on an enlarged and revised version of his 1578 atlas. However, he died in early 1591, leaving his works, his workshop and all its tools to his wife and his son Cornelis. Cornelis continued his father's work, publishing the second edition of the atlas in 1593 under the slightly amended title of *Speculum Orbis Terrae* and then travelling across Europe to draft, promote and sell his maps.[29] A letter written in Rome on 18 March 1595 by Jean l'Heureux, known as Macarius, reveals that he was in the Italian Peninsula at that point.[30] We do not know how long he stayed in Italy, but he was back to Antwerp for his niece Anna's baptism on 18 February 1597.[31]

Cornelis De Jode had also turned his attention back to the father's project of the Maps of the Four Continents, with the intention of producing an edition that was revised 'cum Splendore' (with splendour).[32] He published the updated maps between 1595 and 1596, adding an introduction in 1595 of which no copy is known to exist: the *Introductionem geographicam in tabulas Europae, Asiae, Africae, et Americae*.[33] Karen Bowen and Dirk Imhof have demonstrated that Gerard de Jode, and later his son Cornelis, enlisted the services of the printer Plantin 'to print the accompanying texts for his next print-book publications'.[34] These were not cartographic works, but texts of various kinds: it is possible that among these were the introductions to the wall maps of the four continents that have since been lost, due to their independent circulation apart from the maps.

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[28] SUREKHA DAVIES, *Renaissance Ethnography and the Invention of the Human. New Worlds, Maps and Monsters* (Cambridge: Cambridge University Press, 2016), 167–71.

[29] GERARD DE JODE, *Speculum Orbis Terrarum*, introduction by R. A. SKELTON (Amsterdam: World Publishing Company, 1965), ix. For a comparative analysis of the two editions of the de Jode atlas, see PETER VAN DE KRUGT, ed., *Koeman's Atlantes Neerlandici*, 4 vols, vol. 3 t. 2 (MS't Goy-Houten: HES & De Graaf, 2003), in particular the chapter entitled 'The *Speculum Orbis Terrarum* by Gerard and Cornelis de Jode', 255–66.

[30] FERNAND VON ORTROY, *L'oeuvre cartographique de Gérard et Corneille De Jode* (Amsterdam: E. van Goethem et Compagnie, 1914), xxvii.

[31] Cornelis de Jode also produced globes. For an analysis of his 1594 globe, see VLADIMIRO VALERIO, 'Report on a globe by Cornelis de Jode, Antwerp 1594', *Geostorie. Bollettino e notiziario* 25, no. 1 (2017): 43–62.

[32] VAN DER COELEN and LEESBERG, *The De Jode*, lxvii.

[33] Cited in VAN DER COELEN and LEESBERG, *The De Jode Dynasty*, lxvi. VALERIUS ANDREAS, *Bibliotheca Belgica* (Leuven: Iacob Zegers, 1643) is available online on Google Books. Cornelis de Jode is discussed on pages 155–56.

[34] KAREN L. BOWEN and DIRK IMHOF, *Christopher Plantin and Engraved Book Illustrations in Sixteenth-Century Europe* (New York: Cambridge University Press, 2008), 300–305 (303).

There are also no known copies of these maps except for one single sheet measuring 47 cm by 33 cm that was part of the 1596 wall map of Africa, now held by the Plantin-Moretus Museum.[35] (Fig. 5)

Figure 5. Cornelis de Jode, wall map of Africa, single sheet. Collectie Stad Antwerpen, Museum Plantin-Moretus. https://dams.antwerpen.be/asset/a1MPSKUQbbbKRShnuJs2O1TK#id

[35] Joost Depuydt, curator of typographical and technical collections at the museum, has kindly provided me with valuable information confirming that nothing is known about how the wall map was created. Personal communication via email (21 November 2022). For further details about the map, see VAN ORTROY, *L'oeuvre cartographique*, 27–28.

Much better known is the map of Africa he had published in the 1593 edition of the *Speculum*, which clearly shows the influence of Gastaldi's work.[36] Actually, this was a reprint of a map originally produced by his father, copying Gastaldi's one.[37] It is likely that Italian cartography had a significant influence on the Africa and Europe parts of the Four Continents wall maps, as most of the names in the table are in Italian.[38]

Aldrovandi came across de Jode's work towards the end of the sixteenth century. He kept a handwritten register of visitors to his museum, the *Catalogus virorum, qui visitarunt museum nostrum* (Catalogue of men who visited our museum).[39] Among many others, the long list includes this entry: 'Antuerpiensis Cornelis J. […] Belga 475' (Belgian Cornelis J. from Antwerp).[40] This suggests that de Jode passed through Bologna when he was in Italy, as it was an almost obligatory stop en route to Rome, and that he visited Aldrovandi's museum to meet the distinguished naturalist so that he could show him also his maps. This hypothesis is supported by a note written by a member of Aldrovandi's team uncovered among the observations that Aldrovandi recorded during the days of intensive work in the artistic workshop:

> Ricordo di comittire, che in Anversa siasi comprate le tavole quattro del mondo, cioè Asia, Africa, Europa, et Mondo Novo. Venalis reperiuntur hac tabulas apud Cornelius de Iudaeis, cuius opera, et industria, editae sunt anno 1596.
>
> (I remind you to commission the purchase of the four maps of the world in Antwerp, that is, the maps of Asia, Africa, Europe and the New World. The maps can be purchased from Cornelis de Jode, whose works were published in 1596).[41]

It is plausible that de Jode showed Aldrovandi the Four Continents wall maps and presumably also the above-mentioned introduction. It is clear that they were recognised as being of excellent artistic quality from the lengthy catalogue descriptions written by members of Aldrovandi's team, which list the illustrations examined and then reproduced as woodblocks to illustrate his works. For example, Davies has shown that the model for depicting the giants of Patagonia in the *Monstrorum historia* of 1642 (Fig. 6) was de Jode's 1576 edition of the map of South America. The wall maps were

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[36] RENATO BIASUTTI, 'La carta dell'Africa del De Jode (1593) e l'influsso del Gastaldi sulla cartografia olandese', in *Atti dell'ottavo congresso geografico italiano* (Florence: Istituto di edizioni artistiche Fratelli Alinari, 1923), 307–10.

[37] It is worth remembering that Gerard de Jode started his business reprinting or copying the maps of Gastaldi. See CORNELIS KOEMAN, GÜNTER SCHILDER, MARCO VAN EGMOND, and PETER VAN DER KROGT, 'Commercial Cartography and Map Production in the Low Countries, 1500-ca. 1672', in *The History of Cartography,* ed. DAVID WOODWARD, 6 vols, vol. 3, *Cartography in the European Renaissance* (Chicago: The University of Chicago Press, 2007), 1296–383. The authors refer to de Jode's special affinity with Gastaldi at p. 1301.

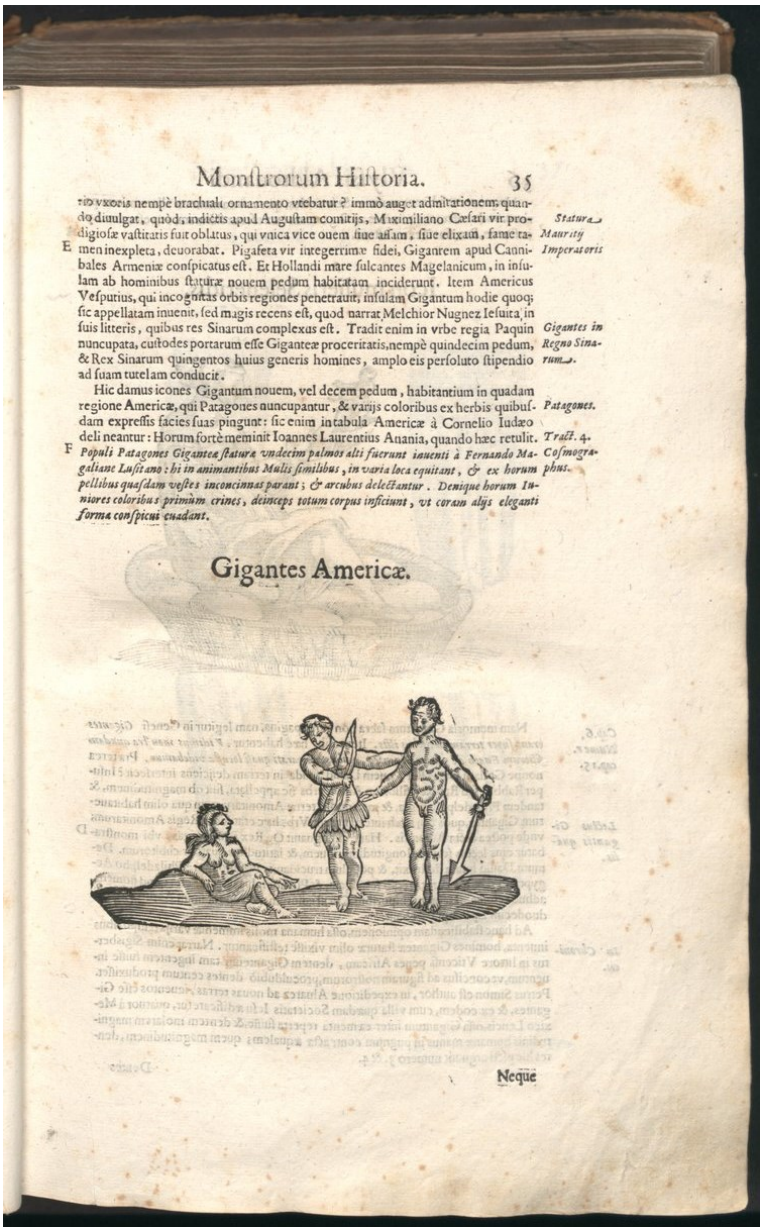
[38] LUCIANO LAGO and CLAUDIO ROSSIT, 'Le raffigurazioni della penisola istriana negli atlanti cinquecenteschi dell'Ortelio, de Jode e Mercatore', in *Centro di Ricerche Storiche Rovigno, Atti Volume IX* (Trieste: Università popolare, 1978–1979), 91–182. The authors note Gastaldi's influence on de Jode's maps at p. 118.

[39] BUB, Aldr. Ms. 110, Tomo I.

[40] BUB, Aldr. Ms. 110, Tomo I, 3r.

[41] BUB, Aldr. Ms. 136, Tomo XXVI, 138r.

also the inspiration for the woodblock depicting a Libyan dromedary and for *Numidia, Camelia alia differentia picta à Cornelio Iudaeo in Tabula Africae*, published posthumously in the section of the *Monstrorum historia* entitled *Paralipomena accuratissima historiae omnium animalium*.[42] (Fig. 7)



Monstrorum Historia. 35

rio vxoris nempè brachiali ornamento vtebatur? immò augere admirationem quando diuulgat, quòd, indictis apud Augustam comitijs, Maximiliano Cæsari vir prodigiosæ vastitatis fuit oblatus, qui vnica vice ouem siue asinam, siue elixam, fame tamen inexpleta, deuorabat. Pigafeta vir integerrimæ fidei, Giganrem apud Cannibales Armeniæ conspicatus est. Et Hollandi mare fulcantes Magelanicum, in insulam ab hominibus staturæ nouem pedum habitatam inciderunt. Item Americus Vesputius, qui incognitas orbis regiones penetrauit, insulam Gigantum hodie quoq; sic appellatam inuenit, sed magis recens est, quod narrat Melchior Nugnez Iesuita in suis litteris, quibus res Sinarum complexus est. Tradit enim in vrbe regia Paquin nuncupata, custodes portarum esse Giganteæ proceritatis, nempè quindecim pedum, & Rex Sinarum quingentos huius generis homines, amplo eis persoluto stipendio ad suam tutelam conducit.

Statura Mauritij Imperatoris

Gigantes in Regno Sinarum.

Hic damus icones Gigantum nouem, vel decem pedum, habitantium in quadam regione Americæ, qui Patagones nuncupantur, & variis coloribus ex herbis quibusdam expressis facies suas pingunt: sic enim in tabula Americæ à Cornelio Iudæo deli neantur: Horum fortè meminit Ioannes Laurentius Anania, quando hæc retulit. *Populi Patagones Giganteæ statura undecim palmos alti fuerunt inuenti à Fernando Magaliane Lusitano: hi in animantibus Multis similibus, in varia loca equitant, & ex horum pellibus quasdam vestes inconcinnas parant; & arcubus delectantur. Denique horum Iuniores coloribus primùm crines, deinceps totum corpus inficiunt, vt coram alijs eleganti forma conspicui euadant.*

Patagones.

Tract. 4. Cosmographiæ.

Gigantes Americæ.

Neque

Figure 6. 'Gigantes Americae', in Ulisse Aldrovandi, *Monstrorum historia*, 35. Vienna, Österreichische Nationalbibliothek, 264838-D/FKB 18-022 FID MAG. NoC-NC 1.0. https://data.onb.ac.at/rep/10351590

[42] ULISSE ALDROVANDI, *Monstrorum historia cum paralipomenis historiae omnium animalium* (Bologna: Marcus Antonius Berna, 1642), 132.

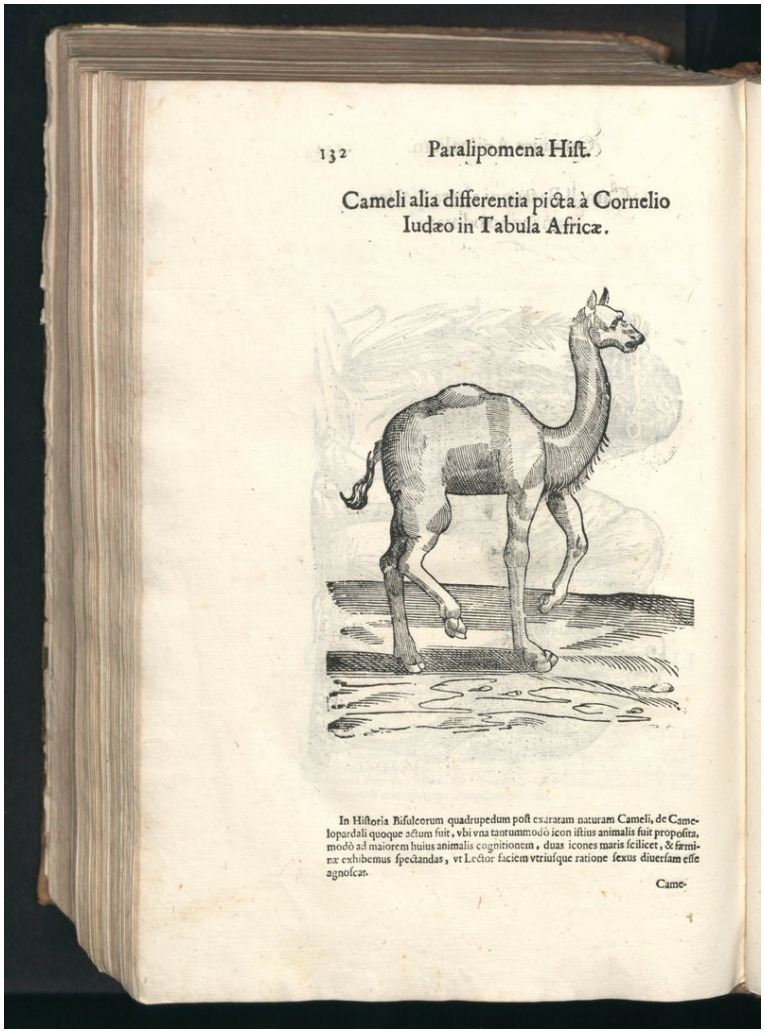


Figure 7. 'Cameli alia differentia', Ulisse Aldrovandi, *Monstrorum historia*, 132. Vienna, Österreichische Nationalbibliothek, 264838-D/FKB 18-022 FID MAG. NoC-NC 1.0. https://data.onb.ac.at/rep/10351590

As Aldrovandi only saw the 1596 wall maps, it is likely that many of the illustrations were based on those of Gerard de Jode and only partially modified or embellished to achieve the splendour that had been promised for the map of Africa and probably also for Cornelis de Jode's introduction. We know that Aldrovandi saw the introduction from the many transcriptions he made, which can be found in his notes and in his catalogues.[43] These transcriptions do not in fact always match the descriptions found in the atlas.[44] This indicates that the transcriptions found in Aldrovandi's manuscripts

[43] For the transcription of Cornelis de Jode's lines regarding the New World, see BUB, Aldr. ms. 136, Tomo XXVI, 'Tab. Americae', 136r–157r; Aldr. ms. 143, Tomo IV, 'De America ex Corn. Jd in sua Tab.', 166r–170r; 282v; 328r.
[44] MAURIZIO SERRA, *Ulisse Aldrovandi*, 'Appendice', cxlvi.

came from a different source, that is, from the lost introduction, and as far as we know are now the only source that could be used to reconstruct parts of the introduction. The same reasoning can be applied to the sources used for the woodblocks. For example, Rudolph Wittkower concludes that 'Aldrovandi reports that he got the picture of the roc "ex tabulis geographicis Cornelii de Judaeis". Only the *Speculum* of Cornelis de Jode from 1593 can be meant. But this work does not contain any such picture. Confusions are not rare in Aldrovandi's work'.[45] However, it is clear that Aldrovandi did not make an error here. The image was not taken from the 1593 atlas but from the wall maps that have since been lost. This confirms that the woodblocks and the illustrations are one of the few tools available to try to understand the artistic sophistication of de Jode's cartography.

As established before, we know that Cornelis de Jode was in Italy in 1595 and in Antwerp in February 1597. However, we cannot establish a firm date within this two-year window for when de Jode and Aldrovandi met in Bologna. The available documentation suggests that they might have met in late 1596, as the earliest date in the manuscript containing Aldrovandi's notes on the wall maps is 2 December 1596. In that case, it would have been de Jode himself that showed them to Aldrovandi and indicated how they could be purchased. However, another possibility is that they met in 1595, with de Jode showing his publishing projects to Aldrovandi with a view to selling them to him. Unfortunately, we do not know whether the purchase was concluded. Neither de Jode's *Speculum* nor the 'tavole quattro del mondo' (four maps of the world) were ever recorded as part of Aldrovandi's library. Indeed, neither the University of Bologna library nor Bologna's Biblioteca comunale dell'Archiginnasio (Archiginnasio Municipal Library) hold any wall maps made by Gerard de Jode or Cornelius de Jode. The only printed volumes associated with Cornelis de Jode are *De Quadrante Geometrico* and *Veterum Romanorum ornatissimi amplissimique triumphi*, but the absence of Aldrovandi's ex libris shows that neither were ever part of his library. Two of de Jode's world maps were sold in Antwerp to Marco Antonio Merello in 1598.[46] However, it has so far proved impossible to identify this individual or to link him to anyone who might have been purchasing maps on behalf of Aldrovandi.[47] In any case, the wall maps provided Aldrovandi with visual material about the world beyond

[45] RUDOLPH WITTKOWER, "Roc': An Eastern Prodigy in a Dutch Engraving', *Journal of the Warburg Institute* 1 (1938): 255–257. The Latin phrase cited by Wittkower is from ULISSE ALDROVANDI, *Ornithologiae hoc est de avibus historiae libri XII* (Bologna: Franciscum de Franciscis Senensem, 1599), book X, 61.

[46] VAN DER COELEN and LEESBERG, *The De Jode*, lxvi.

[47] New information may emerge from further research in the archives of the Plantin-Moretus Museum in Antwerp, or from Aldrovandi's many manuscripts in Bologna. Moreover, Aldrovandi had already purchased books printed in Antwerp. See RITA DE TATA, 'Il commercio librario a Bologna tra '500 e '600: i librai di Ulisse Aldrovandi', *Bibliothecae.it* 6 (2017): 39–91. See also CAROLINE DUROSELLE-MELISH, 'A Local-Transnational Business: The Book Trade in Late Renaissance Bologna', in *Bologna: Cultural Crossroads from the Medieval to the Baroque. Recent Anglo-American Scholarship*, eds ANGELA DE BENEDICTIS, GIAN MARIO ANSELMI, and NICHOLAS TERPSTRA (Bologna: Bononia University Press, 2013), 27–42.

Europe which must have piqued his curiosity and interest in the natural world made of flora and fauna, geological features, topography and so on.

Aldrovandi's team made a list of the noteworthy elements of the natural world depicted in the wall maps and then reproduced some of them as woodblocks.[48] One of these elements is marked as a '*mons flammivomus*', the Latin for 'ignivomous mountain', or a mountain that is spewing out flames.[49] There is no doubt that this is the volcano featured on the woodblock. As there is no surviving wall map of America—except the single sheet of the Library of Congress—that includes the image on which the woodblock is based, it would appear difficult if not impossible to identify the volcano. However, three well-known sources come to the rescue: the 1562 map entitled *Americae Sive Quartae Orbis Partis Nova Et Exactissima Descriptio* and the 1578 and 1593 editions of the *Speculum* by de Jode father and son. (Fig. 8)

The 1562 map was produced by the Spanish cartographer Diego Gutiérrez, who worked on the master map known as the *Padrón Real* (royal register) of the Casa de la Contratación in Seville. It was illustrated by the Flemish artist Hieronymus Cock, who belonged to the same Antwerp guild as Gerard and Cornelis de Jode. Gerard de Jode was working on the publication of the wall maps at the time, and Cock was from Antwerp and was directly involved in the production of the first wall map of America. It is therefore highly probable that the map produced by Gutiérrez was the model for Gerard de Jode's 1576 map of the New World. Careful examination of the map of the American continent reveals that it shows just a single volcano, close to Mexico City in the Viceroyalty of New Spain.[50]

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[48] In the cartographic tradition of the sixteenth century, it was common practice to copy and adapt elements from existing maps when producing new ones. This suggests that the more maps one owned or consulted, the more details—sometimes recurring, sometimes entirely new—could be extracted. On this topic see RONALD REES, 'Historical Links between Cartography and Art', *Geographical Review* 1 (1980): 60–78 and especially GENEVIEVE CARLTON, 'The World Drawn from Nature: Imitation and Authority in Sixteenth-century Cartography', *Intellectual History Review* 24, no. 1 (2013): 21–37.

[49] BUB, Aldr. ms. 136, Tomo XXVI, 136v.

[50] On the role of the Casa de la Contratación in spreading geographical knowledge, see DUCCIO SACCHI, *Mappe dal Nuovo Mondo. Cartografie locali e definizione del territorio in Nuova Spagna (secoli XVI-XVII)* (Milano: FrancoAngeli, 1997), 45–55; on the importance of the growth of nautical skills, see Luisa Martín-Merás, 'Las enseñanzas náuticas en la Casa de la Contratación de Sevilla', in *La Casa de la Contratación, la navegación y el comercio entre España y las Indias*, eds ANTONIO ACOSTA RODRÍGUEZ, ADOLFO GONZÁLEZ RODRÍGUEZ, and ENRIQUETA VILA (Seville: Universidad de Sevilla, 2003), 667–93; LUISA MARTÍN-MERÁS, *Cartografía marítima hispana. La imagen de América* (Barcelona: Lunwerg, 1993) and RICARDO CEREZO MARTÍNEZ, *La cartografía náutica española en los siglos XIV, XV y XVI* (Madrid: CSIC, 1994). For the history of the founding of the Casa de la Contratación, see MIGUEL-ÁNGEL LADERO QUESADA, *El primer oro de América. Los comienzos de la Casa de la Contratación de las Yndias (1503-1511)* (Madrid: Real Academia de la Historia, 2002).

Figure 8. Diego Gutiérrez, *Americae sive Quartae Orbis Partis Nova et Exactissima Descriptio*, 1562. Library of Congress, Geography and Map Division, Washington. http://hdl.loc.gov/loc.gmd/g3290.ct000342

The same is true of the two editions of the *Speculum*. Both include a map of South America that extends as far as parts of New Spain and shows an erupting volcano near Mexico City whose features resemble those of the woodblock. (Fig. 9) The atlas used for this illustration is held at the National Museum of Warsaw. We can therefore conclude that Aldrovandi's woodblock depicts the Popocatepetl volcano and that it is highly likely to have been carved in late 1596 or early 1597.

Figure 9. The volcano represented close to Mexico City and Cholula, detail from *Brasilia et Peruvia*, in Cornelis De Jode, *Speculum Orbis Terrae*, 1593. Muzeum Narodowe w Warszawie Biblioteka, Kart.425. Public Domain. https://mbc.cyfrowemazowsze.pl/publication/87151

The volcanoes of the New World in the Aldrovandi library

Aldrovandi's huge library reflected the broad range of interests he had developed over the course of his research.[51] To appreciate his interest in volcanoes, it is worth focusing on a number of volumes that would have provided him with much food for thought about the nature of the volcanoes of the Americas. First and foremost, a series of atlases and cartographic works that allowed Aldrovandi to spatialise the presence of volcanoes within the geography of the New Worls. Indeed, the library held several volumes published by the Belgian cartographer Abraham Ortelius. It definitely held the 1579 edition of the *Theatrum orbis terrarum* and the enlarged 1584 edition, *Additamentum 3. Theatri orbis terrarum*.[52] Ortelius had added the map entitled *Peruviae Auriferae Regionis Typus*—now held at the BUB—to this edition. The map was created by Didaco Mendezio (or Diego Méndez), cartographer to the Viceroy of Peru and

[51] CAROLINE DUROSELLE-MELISH and DAVID A. LINES, 'The Library of Ulisse Aldrovandi: Acquiring and Organizing Books in Sixteenth-Century Bologna', *The Library* 16, no. 2 (2015): 133–61. DAVID A. LINES, 'La biblioteca di Ulisse Aldrovandi in Palazzo Pubblico: Un inventario seicentesco', in *Biblioteche filosofiche private. Strumenti e prospettive di ricerca*, eds RENZO RAGGHIANTI and ALESSANDRO SAVORELLI (Pisa: Edizioni della Normale, 2014), 133–52. MARIA CRISTINA BACCHI, 'Ulisse Aldrovandi e i suoi libri', *L'Archiginnasio. Bollettino della biblioteca comunale di Bologna* 100 (2005): 255–366. ALDO ADVERSI, 'Ulisse Aldrovandi, bibliofilo, bibliografo e bibliologo del Cinquecento', *Annali della scuola speciale per archivisti e bibliotecari dell'Università di Roma* 8, no. 1–2 (1968): 85–181.

[52] On how the American continent was represented in the atlases of Ortelius, see DENNIS REINHARTZ, 'The Americas Revealed in the "Theatrum"', in *Abraham Ortelius and the First Atlas: Essays Commemorating the Quadricentennial of his Death, 1598–1998*, eds PETER VAN DER KROGT, PETER H. MEURER, and MARCEL VAN DEN BROECKE (Houten: HES, 1998), 209–20.

chaplain of Lima's Monasterio de la Encarnación (Monastery of the Incarnation).[53] Ortelius's maps also include a map of Florida by Géronimo de Chaves, royal cosmographer to the court of Philip II at the Casa de la Contratación in Seville, which was responsible for producing maps of the American viceroyalties and territories. It may be that Méndez's map was sent from Peru to Seville and that Ortelius managed to acquire both it and Chaves's map for inclusion in the 1584 edition.[54] Ortelius, as royal cartographer, was definitely in close contact with the Casa de la Contratación, a key institution of the Catholic Monarchy for the production of maps to improve knowledge and guard information about the geography of the New World.[55] Although Méndez's map focuses on the Viceroyalty of Peru, it also shows part of Central America (Fig. 10). In particular, it shows two volcanoes, represented as a mountain labelled with the Spanish toponym *Volcan* (volcano). One can definitely be identified as the Masaya volcano in Nicaragua, near the cities of León and Granada.

Figure 10. Volcano toponyms, detail from *Peruviae Auriferae Regionis Typus*, in Diego Méndez, *Theatrum Orbis Terrarum*, 1584. Biblioteca Nacional de Portugal, CA-148-V. Public Domain. https://purl.pt/27803

[53] Diego Méndez is not well-known in historical cartography, but some information is available on the catalogue of the Renaissance Exploration Map Collection of Stanford University, at https://purl.stanford.edu/zs626pm4125, accessed 20 December 2022.
[54] Further research in the archives of the Casa de la Contratación held at the Archivo General de Indias in Seville could uncover more information about Diego Méndez.
[55] DAVID BUISSERET, 'Spanish Colonial Cartography, 1450-1700', in *The History of Cartography*, ed. WOODWARD, 1143–71.

Ortelius's atlas also contains *Hispaniae Novae Sive Magnae, Recens et Vera Descriptio. 1579*. This map shows three volcanoes, for which Ortelius used the following toponyms: 'Popocatepec', 'Islactepec M.' and the more generic term 'Mons Flammivomus'[56] (Fig. 11).

The first is Popocatepetl, the second is Iztaccihuatl and the third appears to be Citlaltepetl, also known as Pico de Orizaba. We can conclude that the *Mons Flammivomus* displayed in Ortelius's map is the Citlaltepetl volcano from its vicinity to Matlatlán and Acultzingo and from the presence of sugar plantations marked by the Spanish toponym '*ingenio*' (Fig. 12). There were widespread sugar plantations in the area of Veracruz where Pico de Orizaba is located.[57]

Figure 11. Volcanoes Popocatepetl and Iztaccihuatl, detail from *Hispaniae Novae Sive Magnae, Recens et Vera Descriptio. 1579*, in Ortelius, *Additamentum 3. Theatri orbis terrarium,* 1584. BUB, A.M.B.2. 30. © Alma Mater Studiorum Università di Bologna – Biblioteca Universitaria di Bologna (further reproduction or duplication by any means is prohibited). Photo by the Author.

[56] The toponym *Islactepec* used by Ortelius is incorrect. The name of the volcano is *Istatepec*, or *Iztactepetl*, which means 'white mountain' in Nahuatl.

[57] The geographical information is from PETER GERHARD, *A Guide to the Historical Geography of New Spain* (Cambridge: Cambridge University Press, 1972), 205–207 (Orizaba). Gerhard also provides information about the sugar plantations in the Veracruz area. Ortelius's use of the term *mons flammivomus* is unsurprising given that Pico de Orizaba was in fact last active in the sixteenth century.

Figure 12. Volcano 'Mons Flammivomus', detail from *Hispaniae Novae Sive Magnae, Recens et Vera Descriptio. 1579*, in Ortelius, *Additamentum 3. Theatri orbis terrarium,* 1584. BUB, A.M.B.2. 30. © Alma Mater Studiorum Università di Bologna – Biblioteca Universitaria di Bologna (further reproduction or duplication by any means is prohibited). Photo by the Author.

It is worth noting the toponym *Mons flammivomus*. As no name is provided for the volcano, this appears to reflect a volcano typology that was emerging at the time.[58] It is clearly the same typology that Aldrovandi used in the inscription on the woodblock. As a result, arguably the term served to describe an active volcano, one that was erupting when it was described and depicted.

The second important volume is *Historia dell'India America detta altramente Francia antartica* by André Thevet, royal cosmographer from 1559, whose works were used extensively by Ortelius and de Jode for the descriptive parts of their atlases.[59] The Italian edition was published in Venice in 1561 but Aldrovandi only finished reading it in June 1590. It contains passages about Mount Etna and the volcanoes of the Canary Islands.[60] It notes that Mount Etna 'getta alle volte fuoco con un strepito maraviglioso' (sometimes hurls out fire with an extraordinary din), and that 'alcuni Scrittori moderni, hanno voluto dire che una delle Canarie getta continuamente fuoco' (some modern writers have said that one of the Canaries continuously spews out fire), and then goes on to describe the presence of sulphur near these and other volcanoes.[61] However, Aldrovandi did not highlight these passages or base his observations on them. The main work of Thevet that Aldrovandi drew on significantly was the *Cosmographie Universelle* of 1575, which was a fundamental source also for several images included in the *Monstruorum historia*.[62] There is no surviving copy in the Bologna University Library, but we know that Aldrovandi read it as he cites it extensively in his works and uses some of the images it contains, such as that of a toucan.[63]

Aldrovandi showed great interest in Francisco López de Gómara's *Historia di don Ferdinando Cortes*. The Italian edition was published in Venice in 1560. Aldrovandi finished reading it on 9 January 1561, making notes on many passages in his manuscripts. He had a complete copy made of the chapter entitled 'Del monte che chiamano Popocatepec' (On the mountain called Popocatepec).[64] Gómara described the volcano thus:[65]

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[58] SOPHIE BROCKMANN, 'Volcano', in *New World Objects of Knowledge. A Cabinet of Curiosities*, ed. MARK THURNER and JUAN PIMENTEL (London: Institute of Latin American Studies, SAS, University of London, 2021), 213–16.

[59] On the relationship and cross-fertilisation between the works of Ortelius and Thevet, see FRANK LESTRINGANT, *Mapping the Renaissance World: The Geographical Imagination in the Age of Discoveries* (Cambridge: Polity Press, 1994), 175.

[60] THEVET, *Historia dell'India America detta altramente Francia antartica* (Venice: Gabriel Giolito de' Ferrari, 1561), 61–64.

[61] THEVET, *Historia*, 62.

[62] DAVIDE DOMENICI, 'Ulisse Aldrovandi and Indigenous American Featherwork', *Aldrovandiana. Historical Studies in Natural History* 3, no. 2 (2024): 7–39 (13). A discussion of Aldrovandi's use of Thevet can be found here.

[63] DAVIDE DOMENICI, 'Rediscovery', 5 and endnote 23.

[64] FRANCISCO LOPEZ DE GOMARA, *Historia di don Ferdinando Cortes* (Venice: Francesco Lorenzini da Turino, 1560), 92v–93v.

[65] FRANCISCO LOPEZ DE GOMARA, *Historia*, 92v–93r.

> era un monte vintiquattro miglia di Ciololla che chiamano Popocatepec, che vuol dire monte di fummo, perché ributta molte volte fummo, et fuoco, Cortes mandò la dieci Spagnuoli […] ma non ardirno di montare nell'alto a vederlo, perché tremava la terra, et cera tanta cenere, che impediva la via, et cosi se ne volevano ritornare, però gli dua che devevano essere più animosi o curiosi, deliberorno di vedere il fine o misterio di si ammirabile, et spaventoso fuoco. […] Saglirno su per mezzo della cenere et arrivorno all'ultimo per disotto di un spesso fummo, guardorno un pezzo, et gli parse che havesse fino a due miglia di bocca quale concavità dove rimbombava il rumore, che faceva tremare la terra del monte.
>
> there was a mountain twenty-four miles from Ciololla which they call Popocatepec, which means mountain of smoke, as it often hurls out smoke, and fire, Cortes sent there ten Spaniards […] but they dared not scale it to view it, because the ground was shaking, and there was much ash, which blocked the way, and so they wanted to turn back, but the two that must have been more courageous or curious, decided to have a look at the mysterious source of the fire that was so wondrous, and terrifying. […] They climbed up through the ash and reached the top under thick smoke, they observed it, and it looked to them as though the crater was up to two miles across where the noise resounded in the concavity and made the mountain shake.

After recounting the conquistadors' expedition to the Popocatepetl crater, Gómara added a passage that influenced how Aldrovandi subsequently categorised the volcano. Gómara wrote that the mountain was called 'Vulcano, per la simiglianza che ha con quello di Sicilia, e alto et tondo, et che mai gli manca neve, appare molto di lontano, le notti che butta fiamma' (Vulcano, because of its similarity to the one in Sicily, tall and round, never free of snow, visible from afar, emitting flames at night), and described a presumed eruption in 1540 after a decade of inactivity.[66] It is this passage that led Aldrovandi to note that the volcano resembled Mount Etna. Gómara had established a direct link between the volcanoes of the New World with those of the Old World. This allowed what was conceived as the exotic natural world of the Americas to be captured using more familiar categories.[67] Gómara had also provided a further element that was essential to Aldrovandi, namely the translation of the Nahuatl name *Popocatepetl* as 'monte di fummo, perché ributta molte volte fummo, et fuoco' (mountain of smoke, as it often hurls out smoke, and fire). Classifying it as a *mons flammivomus* (mountain that spews out flames) was therefore perfect in terms of conveying the volcano's essence and true nature.

Giovanni Botero published his treatise *Relazioni universali* in 1591, which Aldrovandi purchased immediately and finished reading on 5 April 1593.[68] The fourth and fifth volumes of the work address the New World and contain many passages

[66] FRANCISCO LOPEZ DE GOMARA, *Historia*, 93v.
[67] PAMELA H. SMITH and PAULA FINDLEN, eds, *Merchants and Marvels. Commerce, Science, and Art in Early Modern Europe* (New York: Routledge, 2002). STEPHEN J. GREENBLATT, *Marvelous Possessions: The Wonder of the New World* (Chicago: The University of Chicago Press, 1991).
[68] For recent work on Botero, see ELISA ANDRETTA, ROMAIN DESCENDRE, and ANTONELLA ROMANO, eds, *Un mondo di relazioni. Giovanni Botero e i saperi nella Roma del Cinquecento* (Rome: Viella, 2021).

about volcanoes. Aldrovandi highlighted what he read about the Mexican city of Puebla de los Ángeles, today's Puebla, which Botero referred to as the *città degli Angeli* (city of angels): 'nel cui contado distinto in valli, e in piani amenissimi […] è il monte Popocanpeche, dalla cui cima esce continoua fiamma' (between the valleys and pleasant flatlands of the surrounding area lies a mountain called Popocanpeche, from whose peak constant flames emerge).[69] He also noted passages about the volcanoes of Santiago de Guatemala, the Masaya volcano in Nicaragua and the many volcanoes near Quito in South America.[70] The sixth volume addresses the world's islands and mentions a volcano in the San Lazzaro archipelago, that is, the Philippines.[71] Aldrovandi also noted the descriptions of the numerous volcanoes of the Aeolian Islands and Mount Etna, which was a recurrent theme and touchstone of sixteenth-century volcanology.[72] Botero's work enriched Aldrovandi's knowledge of these little-studied elements of nature. Indeed, a perusal of the volumes in his library reveals that as his knowledge grew so did his desire to glean any information he could from his reading. This is confirmed by two other volumes in his collection. One is the Italian edition of Sebastian Munster's *Cosmographia Universale*, published in Cologne in 1575. Munster's work described the marvels that emerge from the bowels of the earth, in particular with reference to Icelandic volcanoes and, once again, Mount Etna.[73] It also contains illustrations of erupting volcanoes, which must have caught Aldrovandi's attention. As he completed his reading of it on 15 June 1596, this work and its small woodcut prints is probably what prompted him to produce one that was just as informative but more accurate scientifically and unencumbered by any desire simply to generate awe in the reader. He was in search of realistic images that could serve as models for his woodblock when he met de Jode and saw his wall maps, an unanticipated and decisive meeting. Aldrovandi had started meticulously collecting information about American volcanoes years earlier but had never had the opportunity to travel to America, so the information had to come to him in other ways. The arrival of the *mons flammivomus* in his workshop was a veritable eruption of information about many aspects of the Americas's natural world. Furthermore, the New World's nature was such a magnet for Aldrovandi that reading another work that was seminal in the study of the natural history of the West Indies turned out to be decisive in

[69] GIOVANNI BOTERO, *Relationi universali* (Rome: Georgio Ferrari, 1591), 172.
[70] BOTERO, *Relationi*, 176–77 (Santiago, Masaya), 190 (Quito).
[71] BOTERO, *Relationi*, 198.
[72] BOTERO, *Relationi*, 247–49. On the history of Mount Etna and how it was perceived, see EMANUELA GUIDOBONI and CECILIA CIUCCARELLI, eds, *L'Etna nella storia. Catalogo delle eruzioni dall'antichità alla fine del XVII secolo* (Bologna: Bononia University Press, 2014). BUB, Aldr. ms. 143, 3r–3v; 287r–287v.
[73] SEBASTIAN MUNSTER, *Cosmographia Universale* (Cologne: gli heredi d'Adolfo Byrckmanno, 1575), 4–6.

consolidating his interest in America.[74] The work was José de Acosta's *Historia naturale e morale delle Indie*. Aldrovandi purchased the Italian translation, an edition printed in Venice in 1596, and completed reading it rapidly on 11 July 1596. The book contains a wealth of information, with Acosta devoting entire chapters to the volcanoes of America. For example, in chapter 18, *Dei Bolcani, ò bocche da fuogo*, he writes:[75]

> Quantunque in altre parti si ritrovino bocche di fuogo, come nel monte Etna, et nel Vesevo […] nell'India nondimeno è cosa molto notabile quello, che vi è di questo. Sono le Bolcane per ordinario monti molto alti, che si dimostrano fra le cime degli altri monti. Nella parte, superiore hanno una pianura, et nel mezo una fossa, ò bocca grande, che và fino al profondo: il mirare la quale, è cosa di huomo temerario. Da queste bocche viene fumo, et alcune volte fuogo, in alcune è poco il fumo, che ne uscisse, et quasi non hanno più della forma dei Bolcani. […] Il Bolcano del Messico, ch'è vicino alla Puebla delli Angeli è cosi alto, che salisse trenta leghe al diritto. Uscisse di questa bocca non continuamente, ma à tempo quasi ogni giorno un grande viluppo di fumo, et sale diritto in alto come una saetta. Dipoi si fa pian piano come un penacchio molto grande, fin che del tutto cessa, et subito si muta, come in una negra nuvola. Il più ordinario è salire per la mattina quando il sole è levato, et nella notte quando tramonta: quantunque io l'habbia visto ancora nelle altre hore. [...] A questa bolcana sono saliti, et anco entrati in quella Spagnuoli, et cavato solfare per fare polvere.
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> Although fiery craters exist elsewhere, such as on Mount Etna, and on Mount Vesuvius […] it is nevertheless very notable that there is much more of this in the Indies. Volcanoes are usually very tall mountains, visible among the peaks of the other mountains. There is a flat part at the top, with a pit or large opening at the centre, which runs very deep: just to observe it is a thing of a reckless man. Smoke emerges from these pits, and sometimes fire, in some little smoke emerges, and they almost no longer have the shape of a volcano. […] The volcano of Mexico, which is near Puebla delli Angeli is so tall that it rises thirty leagues into the sky. From this crater, not continuously but sometimes almost every day, a large amount of smoke emerges, rising straight up like an arrow. It then slowly takes on the form of a huge plume, until everything stops, and it swiftly changes, as if into a black cloud. Usually it rises in the morning when the sun has risen, or at night when it has set: however I have also seen it at other times of day. [...] This volcano has been scaled, and even entered, by Spaniards, to extract sulphur to make gunpowder.

[74] Before Acosta, two other people were fundamental to the observation of the natural environment of the New World: Gonzalo Fernández de Oviedo and Francisco Hernández. ANTONELLO GERBI, *Nature in the New World: From Christopher Columbus to Gonzalo Fernández de Oviedo* (Pittsburgh: University of Pittsburgh Press, 1985); JESÚS CARRILLO CASTILLO, *Naturaleza e imperio. La representación del mundo natural en la Historia General y Natural de las Indias de Gonzalo Fernández de Oviedo* (Madrid: Fundación Carolina, Centro de estudios hispánicos e iberoamericanos, 2004); ANTONIO BARRERA-OSORIO, 'Knowledge and Empiricism in the Sixteenth-Century Spanish Atlantic World', in *Science in the Spanish and Portuguese Empires*, eds DANIELA BLEICHMAR, PAULA DE VOS, KRISTINE HUFFINE, and KEVIN SHEEHAN (Stanford: Stanford University Press, 2009), 219–32.

[75] JOSÉ DE ACOSTA, *Historia naturale e morale delle Indie* (Venice: Bernardo Basa, 1596), 57r–57v.

Chapter 25 entitled *Quale sia la cagione, che in queste bocche duri il fuogo tanto tempo* has a brief passage on the 'pietre abbruggiate' (burnt rocks) extracted from volcanoes, which Aldrovandi transcribed faithfully.[76]

Once he had gathered this information on the American volcanoes, although the image derived from De Jode's wall map did not depict a cone, a crater, or an eruption, it can be argued that, given the geographical distance from the Americas, Aldrovandi deemed the illustration sufficiently true to life to meet his requirements.[77] After creating the woodblock, now he wanted to insert the American volcano appropriately into his microcosm of nature.[78]

Volcanoes in Aldrovandi's natural world

The constant flow of information about the natural world of America stimulated comparisons with the Old World in the sixteenth century. Volcanoes were certainly among the 'prodotti meravigliosi della grandiosa attività creatrice della natura' (marvellous products of nature's majestic creativity).[79] However, the study of these mysterious entities had not yet deeply developed beyond simply marvelling in awe.

Aldrovandi owned a book that Lando Ortensio had translated into Italian and published in Venice in 1553, the *Commentario delle più notabili, et mostruose cose d'Italia*.[80] Etna is mentioned in the volume:[81]

> Verso Sicilia indrizzammo il camin nostro: non fummo lontani di dugento miglia, che incominciammo a vedere molte cose, che ne dettero tanto sbigottimento, che anchora ci sudano le tempie […] entrammo nel porto di Messina [dove] soggiornammo molti giorni […] e provedutoci de cavalli, ci ponemmo curiosamente à cercare tutta l'isola. […] Montati finalmente à cavallo […] primieramente n'andammo à vedere il miracoloso monte di Etna, le cui faville ben cocenti arrivano sovente fiate sin'a Catania, e sino Taurominio. (We set off for Sicily: at a distance of less than two hundred miles, we started observing many things, which caused us such alarm, that our temples are still sweating […] we sailed into Messina [where] we stayed for several days […] and when horses had been provided, we planned to explore the whole island with great curiosity. […] Once on horseback […] we first went to see the miraculous mountain Etna, whose scorching sparks often arrive to Catania, and even Taurominio.)

[76] BUB, Aldr. Ms. 143, Tomo IV, 340v.
[77] LIA MARKEY, 'Aldrovandi's New World Natives in Bologna (Or How to Draw the Unseen *al vivo*)', in *The New World in Early Modern Italy, 1492-1750,* eds ELIZABETH HORODOWICH and LIA MARKEY (Cambridge: Cambridge University Press, 2017), 225–47.
[78] OLMI, *L'inventario del mondo*. See the chapter entitled 'Natura morta e illustrazione scientifica', esp. 152–56.
[79] OLMI, *L'inventario del mondo*, 261.
[80] LANDO ORTENSIO, *Commentario delle più notabili e mostruose cose d'Italia e altri luoghi* (Venice: Bartholomeo Cesano, 1553). For further details on Lando Ortensio, see SILVANA SEIDEL MENCHI, 'Chi fu Ortensio Lando?', *Rivista Storica Italiana* 106, no 3 (1994): 501–64.
[81] LANDO ORTENSIO, *Commentario*, 9r–9v.

Aldrovandi's work was marked by a fascination with monstrous things, which he studied throughout his long career.[82] In 1642, *Monstrorum Historia* was published posthumously. However, volcanoes did not feature as prominently as Mount Etna had for the unknown author of the *Commentario*. The *Monstrorum Historia* contained many classical references, such as Mount Etna's importance to the soothsayers of Ancient Rome or the suicide of Empedocles, the Sicilian philosopher said to have thrown himself 'in ardentes montis Aethnae cavernas' (into the fiery caverns of Mount Etna).[83] Soothsayers based their predictions on Mount Etna, often described as emitting 'great fireballs' (maiores flammarum globi).[84] Although the work also addressed comets and their observation, less space was devoted to volcanoes. This may provide a useful clue for understanding how the study of volcanoes developed, despite the continued entanglement of natural history and the history of marvels throughout the sixteenth century.[85]

Aldrovandi's *Historia Fossilium*, an unpublished treatise whose manuscript has survived, instead has a wealth of references to volcanoes.[86] Its description of sulphur not only considers Mount Etna and Mount Vesuvius but also the Masaya volcano in Nicaragua.[87] He defined Masaya as a *mons ignivomus* whose 'continuo fragores et strepitus' (continuous din and racket) struck terror because of the repeated emission of 'fumi et flammas' (smoke and flames).[88] The work was novel in that it placed significant emphasis on the elements that volcanoes consist of rather than focusing only on their terrifying aspect. Aldrovandi had produced a catalogue of sulphur mines which described the importance of the 'viscere' (bowels) of volcanoes as places where sulphur was produced.[89] As noted above, Aldrovandi had a copy made of Acosta's passage which emphasised the importance of lava rock to house-building in New Spain: 'Si cavano nel Messico pietre abbruggiate, et molto liggeri, molto forti, et eccellenti per fare edifici' (burnt rocks are extracted in Mexico, which are very light, very strong, and excellent for making buildings).[90] The treatment of volcanoes in *Museum Metallicum*, published posthumously in 1648, also contains many references to sulphur, which is the subject of the thirteenth chapter of the third volume, parts of

[82] MONICA AZZOLINI, 'Marvellous Natural Particulars: Testimony, Rumour, and Proof in Ulisse Aldrovandi's Work', *Micrologus* 32 (2024): 567–92.
[83] ALDROVANDI, *Monstrorum Historia*, 222.
[84] ALDROVANDI, *Monstrorum Historia*, 146.
[85] ALDROVANDI, *Monstrorum Historia*, esp. the chapter entitled *Monstrosa rerum inanimatarum ignitarum, et precipue cometarum varietas*, 721–38.
[86] ANDREA BAUCON, 'Ulisse Aldrovandi (1522–1605): The Study of Trace Fossils During the Renaissance', *Ichnos. An International Journal for Plant and Animal Traces* 16, no. 4 (2009): 245–56.
[87] BUB, Aldr. Ms. 94, *Historia Fossilium*, 78v.
[88] BUB, Aldr. Ms. 143, Tomo VIII, *Mesaya mons ignivomus*, 289r–289v.
[89] BUB, Aldr. Ms. 136, Tomo XIII, 279v–280r.
[90] BUB, Aldr. Ms. 143, Tomo IV, 340v. Acosta also mentions Mount Etna and Mount Vesuvius in connection with pumice in book 3, chap. 5, fol. 58. Aldr. ms. 143, Tomo VIII, 3r.–3v.

which replicate the *Historia Fossilium*.[91] The passage on Nicaragua in *Museum Metallicum* is identical to that in *Historia Fossilium*, but there are also other references to the New World, and in particular to Quito in Peru, Guatemala and the volcano on Tenerife in the Canary Islands.[92] However, all of these volcanoes were linked to a single touchstone against which their nature could be compared: their connection to sulphur, in particular, was evident in 'Insulis Aeolijs penes Siciliam, in Aethna monte et aliis locis huius generis' (in the Aeolian Islands near Sicily, Mount Etna, and other places of this type).[93] The type that Aldrovandi was referring to was *mons flammivomus/ignivomus*, but further research is needed in the history of science to shed light on their connection with the realm of geology.[94]

The printing proof of *Mons Flammivomus ex Americae* indicates that Aldrovandi intended to use the woodblock depicting the erupting volcano to produce an image for publication. Given the notable presence of illustrations based on de Jode's wall maps in works printed at the end of the sixteenth century, it is plausible that the woodblock was intended to be used to illustrate *De fossilibus*. In particular, Aldrovandi's interest appears to have been less in depicting specific volcanoes such as Popocatepetl or Masaya, and more in providing another illustration of the general taxonomic category of *mons flammivomus*—in this case American volcanoes—in geological terms.[95]

As established by a note found in one of the volumes of Aldrovandi's *Observationes*, 'Fossilium tabulae delineatae et sculptae sunt quadringentes continentes figuras 1200 usque ad diem ultimus junii an. 1598' (Four hundred plates for the Fossilium were drawn and engraved, containing 1200 figures, up to the last day of June in the year 1598'). [96] By the end of June 1598, 1200 illustrations had been completed for inclusion in the publication of the *Fossilium* manuscript. Among these, it is highly likely that the illustration of the American volcano was includes.

However, *De fossilibus* was never published as a result of the death of the printer with whom Aldrovandi had signed a contract in 1594. Had it been published, it would have been distributed widely after being promoted at the Frankfurt Book Fair, as was

[91] On the relationship between *Metallicum* and *Fossilium*, see GIAN BATTISTA VAI and WILLIAM CAVAZZA, *Four Centuries of the Word Geology. Ulisse Aldrovandi 1603 in Bologna* (Argelato: Minerva, 2003), chapter 3, 113–125.
[92] ALDROVANDI, *Museum Metallicum*, 364–68.
[93] ALDROVANDI, *Museum Metallicum*, 364.
[94] It should not be overlooked that Aldrovandi coined the term 'geology'. For the history of the word, see VAI and CAVAZZA, *Four Centuries*, 72–74. For the scientific study of the volcanoes of America in the early modern period, see MIGUEL LEÓN-GARRIDO, 'El estudio científico de los volcanes en la América colonial española', *Llull: Revista de la Sociedad Española de Historia de las Ciencias y de las Técnicas* 40, no. 84 (2017): 125–55.
[95] The taxonomic category of *mons flammivomus* was already widespread and used to refer to volcanoes in the sixteenth century. For a comprehensive history of the evolution of terms employed to designate volcanoes, in this case Etna, the essential reading is LINA TAUB, *Aetna and the Moon. Explaining Nature in Ancient Greece and Rome* (Corvallis: Oregon State University Press, 2008).
[96] BUB, Aldr. Ms. 136, Tomo XXVI, 88r.

the case with its companion work *De avibus*, which was covered by the same contract.[97] Aldrovandi's reference point for the study of volcanoes was certainly Etna, but the image of the American volcano would have had an enormous impact on scholars, collectors and anyone with a thirst for information about the New World and its nature. Moreover, the widely recognised authoritativeness and scientific approach of the scholars and observers on which the work was based, including de Jode and his wall maps, had enabled Aldrovandi to overcome the 'difetto della lontananza' (problem of distance) that hampered the portrayal of the natural world of America.[98] In 1595, Aldrovandi's museum held 18,000 items, of which some 7,000 came from the bowels of the earth.[99] The image of a *Mons flammivomus*, a volcano such as Popocatepetl was one of the pieces missing from Aldrovandi's exposition of nature. The volcano's cone and its crater were the channel through which the bowels of the earth communicated with humanity and the nature at the surface.

Conclusion

The striking eruption depicted in Aldrovandi's woodblock can be seen as a metaphor for the disruptive impact that the New World had on the Old World. This paper has demonstrated that behind the creation of a single woodblock lies an extensive network of channels disseminating knowledge about the natural world of America. Aldrovandi's objective in creating his *teatro di natura* was to provide an accessible setting for the images and information contained in maps, first-hand accounts and other items pertaining to the New World. This paper has also observed the key role of a government body like the Casa de la Contratación in creating, guarding, and disseminating geographical information. Knowledge about America spread from Seville to Antwerp, a major centre of excellence in sixteenth-century publishing. The cartographers and printers operating in Antwerp, including Abraham Ortelius and Gerard and Cornelis de Jode, played an equally decisive role in the spread of information about the natural world thanks to the burgeoning international book market. This allowed Aldrovandi to learn more about the New World in Bologna, having failed to mount an expedition to the Americas.[100] Bologna was at the heart of the political stage of sixteenth-century Europe, and was certainly not immune from the influence of the Americas on the Old World. For example, when Emperor Charles

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[97] VAI and CAVAZZA, *Four Centuries,* 113–25.
[98] VAI and CAVAZZA, *Four Centuries*, 18.
[99] The naturalia e artificialia related to volcanoes might also have been of interest to Aldrovandi for his museum and warrant further research. Indeed, the antiquarian, collector and publisher Pietro Stefanoni (ca. 1557–ca. 1642) wrote a letter to Aldrovandi on 23 January 1599 in which he referred to the collection of the scientist Giovanni Vincenzo Della Porta in Naples, in which he had examined closely a piece of petrified lace that was part of a female garment that had been 'trovato in una spiagia di quel mare, et lo tiene caro, come cosa di gran maraviglia' (found on a beach of that sea, and which he cherishes as an item of great wonder). Quoted in ISABELLA ROSSI, 'Pietro Stefanoni a Ulisse Aldrovandi: relazioni erudite tra Bologna e Napoli', *Studi di Memofonte* 8 (2012): 3–30 (16).
[100] MASSIMO DONATTINI, 'Il mondo portato a Bologna: viaggiatori, collezionisti, missionari', in *Storia di Bologna*, 4 vols., ed. RENATO ZANGHERI, vol. 3, t. 2, *Bologna nell'Età Moderna. Cultura, istituzioni culturali, Chiesa e vita religiosa*, ed. ADRIANO PROSPERI (Bologna: Bononia University Press, 2008), 537–682.

V and Pope Clement VII met for the second time in 1532–1533, the American continent impacted the two most important political figures of the day thanks to the Mesoamerican artefacts brought over to Europe by Domingo de Betanzos, a Dominican friar missionary to New Spain.[101] Aldrovandi did not resist the temptation to embark on the scientific study of many aspects of the nature of this intriguing New World. Indeed, he turned his artistic workshop in Bologna into one of the natural history centres of excellence of the early modern period, trying to cover not only the Americas but also every part of the known world.

This paper has also demonstrated the little-known Aldrovandi's interest in cartography and above all its importance for the study of volcanoes. His research focused on these elements of the natural world, eventually adopting the concept of the taxonomical category of *mons flammivomus* and incorporating it into his broader *teatro di natura*. Further research is needed to extend our understanding of the dynamics that saw the emergence of volcanology in the early modern period. Although the key reference point for the study of volcanoes was still Mount Etna, whose eruptions were well-known from classical times, Aldrovandi seemed to decide that the image of Popocatepetl, an American volcano marked on de Jode's map, was the perfect image for a woodblock—finally rediscovered—that best portrayed the essence of volcanoes. The enigmatic nature of American volcanoes of which Hernán Cortés spoke in his second report to Charles V thus began to lose some of its aura of mystery.[102]

[101] DAVIDE DOMENICI, 'Missionary Gift Records of Mexican Objects in Early Modern Italy', in *The New World in Early Modern Italy*, eds HORODOWICH and MARKEY, 86–102; LAURA LAURENCICH MINELLI and DAVIDE DOMENICI, 'Domingo de Betanzos' Gifts to Pope Clement VII in 1532-1533', *Estudios de cultura náhuatl* 47 (2014): 169–209; LAURA LARENCICH MINELLI, 'From the New World to Bologna, 1533: A Gift for Pope Clement VII and Bolognese Collections of the Sixteenth and Seventeenth Centuries', *Journal of the History of Collections* 24, no. 2 (2012): 145–58.
[102] HERNÁN CORTÉS, *Letters from Mexico*, ed. ANTHONY PAGDEN (Oxford: Oxford University Press, 1972).