

The Other Rhinoceroses That Dürer Did Not Know

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Abstract

Using a morphometric approach, we have compared fifteen sixteenth-century representations of rhinoceroses from Italy, Portugal, and Germany, including Dürer's drawing and woodcut. In the comparisons, we also included ten samples of the real Indian species, *Rhinoceros unicornis*. Comparisons revealed at least three types of sixteenth-century representations. One corresponds to that of Dürer, another to Penni-Granacci, and the third to Antonio de Holanda. A drawing found in the *Vaticani latini* section of the Vatican Apostolic Library appears to be the one made in Lisbon that was used by Penni and Granacci as a model. Comparisons with the real *Rhinoceros unicornis* indicated that the well-known Burgkmair rhinoceros is not as realistic as is generally believed. In contrast, Dürer's rhinoceros is not as fanciful as most authors claim. This softens criticism of the implausibility of Dürer's image reproduced in Renaissance natural science treatises, when it was considered as a faithful portrait of the animal.

Keywords

Dürer Rhinoceros – morphometry of rhino representations – rhinoceros depictions in history of science

1 Introduction

Albrecht Dürer's rhinoceros of 1515 (Fig. 1) is one of the most widespread images in history, the rhinoceros canon in natural history until the eighteenth century, and an aesthetic icon to this day. Among the many works that contributed to establishing this idea, those by Francis Cole, Erwin Panofsky, Donald Lach and Tim Clarke have been especially influential.¹ However, Dürer never saw a rhinoceros. The model for his drawing and his famous woodcut was a sketch made in Lisbon of a rhinoceros that arrived from India in 1515, a sketch that has been lost. The reasons explaining the fascination for Dürer's rhinoceros include the bizarre journey of the animal from India to Lisbon, the mystery of the sketch used by Dürer, and the beauty of the image, based on the sketch although seasoned with details exaggerated or invented by Dürer that enhance the image but make it apparently fanciful. Only a few authors, such as Joseph Koerner, find the morphology quite realistic, not far from that of the real Indian species, *Rhinoceros unicornis*.²

- 1 Francis J. Cole, "The History of Albrecht Dürer's Rhinoceros in Zoological Literature," in *Science, Medicine and History: Essays of the Evolution of Scientific Thought and Medical Practice Written in Honour of Charles Singer*, ed. Edgard Ashworth Underwood (London: Oxford University Press, 1953), vol. 1, 337–356; Erwin Panofsky, *The Life and Art of Albrecht Dürer*, 4th ed. (Princeton: Princeton University Press, 1955); Donald F. Lach, *Asia in the Making of Europe, Volume 2: A Century of Wonder, Book 1: The Visual Arts* (Chicago: University of Chicago Press, 1970); Tim H. Clarke, *The Rhinoceros, from Dürer to Stubbs, 1515–1799* (London: Sotheby's Publications, 1986). The following works are also important for their comprehensive content: Giulia Bartrum, *Albrecht Dürer and His Legacy: The Graphic Work of a Renaissance Artist* (London: British Museum, 2002); Juan Pimentel, *El rinoceronte y el megaterio, un ensayo de morfología histórica* (Madrid: Abada Ediciones, 2010), of which there is an English translation by Peter Mason: *The Rhinoceros and the Megatherium* (Cambridge: Harvard University Press, 2017); Susan Dackerman, "Dürer's Indexical Fantasy: The Rhinoceros and Printmaking," in *Prints and the Pursuit of Knowledge in Early Modern Europe*, ed. Susan Dackerman (Cambridge, MA, and New Haven: Harvard Art Museums and Yale University Press, 2011), 164–171; Roberto A. Martins, "O rinoceronte de Dürer e suas lições para a historiografia da ciência," *Filosofia e História da Biologia* 9, no. 2 (2014): 199–238. Arguably, the best source on Dürer's talent for depicting animals and plants is Fritz Koreny, *Albrecht Dürer und die Tier- und Pflanzenstudien der Renaissance* (Munich: Prestel-Verlag, 1985), of which there is an English translation by Pamela Marwood: *Albrecht Dürer and the Animal and Plant Studies of the Renaissance* (Boston: Bulfinch Press and Little, Brown and Company, 1988).
- 2 Koerner points out that "most observers unfairly accuse Dürer of concocting the animal's armor from his own imagination." He adds that the Indian *Rhinoceros unicornis* "has, in fact, the faceted appearance that Dürer gives it, with the folds in just the spots he represents them." Koerner concludes that Dürer must have worked from a very careful image to produce his drawing. Joseph Koerner, "Albrecht Dürer: A Sixteenth-Century Influenza," in Bartrum, *Albrecht Dürer and His Legacy*, 31.

The mystery of the Lisbon sketch has unleashed the most varied hypotheses about the origin of Dürer's drawing, about the interpretation of the details that seem unrealistic, and about the relationships of the woodcut of Dürer with other contemporary images. One of the most notable is the rhinoceros of Hans Burgkmair the Elder, also from 1515, which is reputed to be a more realistic representation of the animal, as first claimed by Cole in 1953, and then followed by all subsequent authors.³

Further contributions brought new images of sixteenth-century rhinoceros. In 1969, Wilma George reported depictions of Indian rhinoceroses appearing in sixteenth-century maps, notably the relatively realistic images included on Martin Waldseemüller's *Carta marina* (1516) and the Vallard Atlas (1547), and the rough copies of these represented in the maps of Lorenz Fries of 1520 and 1524, and in the *Ptolemaeus Argentorata* of 1525. In 1970, Donald Lach commented on a rhinoceros depicted in the Book of Hours of Don Manuel I (1517–ca. 1538), the woodcut of the animal by Giovanni Giacomo Penni (1515) and the drawing of a rhinoceros in the Prayer Book of Maximilian I (ca. 1515), attributed to Albrecht Altdorfer. In 1986, Clarke introduced a rhinoceros that appears in a painting by Francesco Granacci (ca. 1516), and another frescoed in one of the Raphael Loggias of the Apostolic Palace, attributed to Giovanni da Udine (1518–1519). In 1989, Hermann Walter added two new rhinoceroses drawn by anonymous authors: one in a Natural History by Pliny the Elder, and the other, preserved in the *Biblioteca Chigiana* of Vatican Apostolic Library that had been discovered a year earlier by Ingrid Rowland. Five years later, the same Hermann Walter reported a second rhinoceros from the *Vaticani latini* section of the Vatican Apostolic Library, which had also been communicated to him by Ingrid Rowland, as well as the atypical rhinoceros or “Hellfantsmeister” (Master of Elephants) appearing in Michael Herr's *Gründtlicher Unodeerriccht* (1546). In 2009, Palmira Fontes Da Costa recalled the miniature of two rhinoceroses in the Book of Hours of Don Manuel I, which she attributed to Antonio de Holanda, and added to the list of rhinoceros of this artist those of the Book of Hours of the Countess of Bertandos (1515–1534) and the Genealogy of the

3 Cole, “The History of Albrecht Dürer's Rhinoceros,” 339. Cole states that Burgkmair woodcut “appears to be relatable to the Portuguese sketch, but has none of Dürer's embellishments; and it may well be that the first valid representation of the animal.” Almost all subsequent authors consider that Burgkmair's rhinoceros is more realistic than that of Dürer. These include Lach, *Asia in the Making of Europe*; Clarke, *The Rhinoceros, from Dürer to Stubbs*; Martins, “O rinoceronte de Dürer e suas lições para a historiografia da ciência”; Elke Anna Werner, “Pictures Migrating and Mutating,” in *Double Vision. Albrecht Dürer/William Kentridge*, ed. Klaus Krüger, Andreas Schallhorn, and Elke Anna Werner, with the collaboration of Nadine Rottau (Munich: Sieveking Verlag, 2015), 68–90.

Infante Don Fernando (1530–1534). In 2014, Roberto Martins added another rhinoceros attributed to Antonio de Holanda that appears in the Miller Atlas (1519). Finally, Kees Rookmaaker, Jim Monson and Emmanuel Billia, in addition to revisit most of the images mentioned above, have added the bizarre rhinoceroses appearing in the Portuguese booklets (*Cartinhas*) printed by Germão Galharde between 1534 and 1544.⁴ In the present paper, we add another sixteenth-century rhinoceros depiction which is part of a fresco painted in 1582 by Bernardino Campi in the Giardino Palace of Sabbioneta, near Mantua, in Italy.⁵

Of the sixteenth-century rhinoceros images mentioned above, we have selected a total of fifteen, including Dürer's drawing and woodcut, that are reliable representations that directly or indirectly derive from the Lisbon rhinoceros, in order to carry out a morphological study, including morphometric measurements. Various available images were excluded from our study because they were too small to be analyzed, such as some miniatures by Antonio de Holanda, or that showed in the Vatican fresco attributed to Giovanni da Udine, because it only shows the anterior part of the animal, or those that are blatantly fanciful, such as the ones appearing in the *Cartinhas* by the printer Germão Galharde or in the work of Michael Herr. We have compared the selected fifteen representations to establish different typologies and identified the affinity relationships between them. We have also made comparisons with images of the real Indian animal, *Rhinoceros unicornis*, to evaluate the realism of the representations.

4 Wilma George, *Animals and Maps* (London: Secker and Warburg, 1969); Lach, *Asia in the Making of Europe*; Clarke, *The Rhinoceros, from Dürer to Stubbs*; Hermann Walter, "Contributi sulla recezione umanistica della zoologia antica. Nuovi documenti per la genesi del '1515 Rhinocervs' di Albrecht Dürer," *Res Publica Litterarum* 12 (1989): 267–277; Hermann Walter, "Un ritratto sconosciuto della 'signorina Clara' in Palazzo Ducale di Venezia: nota sulle mappe geografiche di Giambattista Ramusio e Giacomo Gastaldi," *Studi Umanistici Piceni* 14 (1994): 207–228; Martins, "O rinoceronte de Dürer e suas lições para a historiografia da ciência"; Palmira Fontes Da Costa, "Secrecy, Ostentation, and the Illustration of Exotic Animals in Sixteenth-Century Portugal," *Annales of Science* 66, no. 1 (2009): 59–82; Kees Rookmaaker, Jim Monson, and Emmanuel M.E. Billia, "Early Depictions of the First Lisbon Rhinoceros in the 16th Century," *Pachyderm* 65 (2024): 168–179.

5 The Sabbioneta rhinoceros is part of a fresco painted in 1582 by Bernardino Campi (1520–1595) in the ceiling of the Studiolo del Duca Vespasiano Gonzaga Colonna or "Camera di Enea" within the Giardino Palace of Sabbioneta (Mantua, Italy). See: Edgarda Ferri, *Il sogno del principe Vespasiano Gonzaga e l'invenzione di Sabbioneta* (Milan: Mondadori, 2006). The frescoed rhinoceros was noticed by the paleontologist Simone Ravara in 2018 as communicated to the Rhino Resource Center, www.rhinoresourcecenter.com, managed by Kees Rookmaaker.

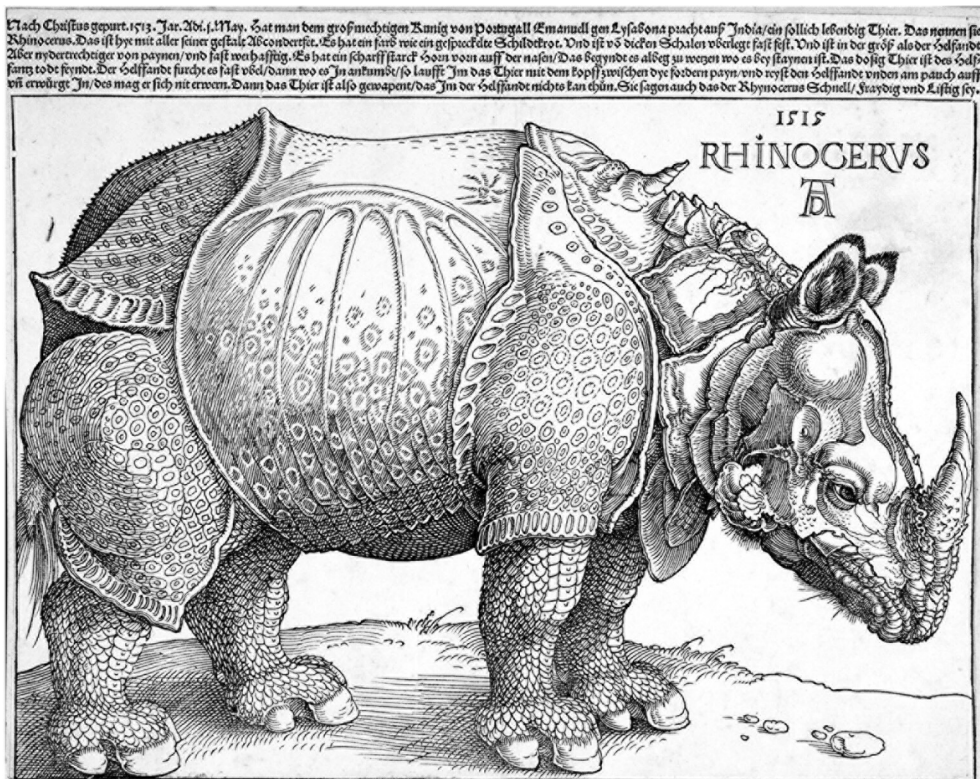


FIGURE 1 Woodcut of the rhinoceros by Albrecht Dürer, National Museum of Natural Sciences, MNCN-CSIC, Madrid, ACN10B/001/04553

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For our comparisons, we used morphometric measurements similar to those used in zoological classification works, such as that of Heidegger, von Houwald, Steck, and Clauss.⁶ The ratios used to establish typologies have been the following. Body length (length between the most anterior part of the shoulder and the insertion of the tail)/shoulder height (length between the tip of the most external front leg and the prominence in the anterior portion of the spine) (BL/SH);

⁶ A diversity of parameters is used to characterize the shape of a rhinoceros. See, for example: Eva M. Heidegger, Friederike von Houwald, Beatrice Steck, and Marcus Clauss, "Body Condition Scoring System for Greater One-Horned Rhino (*Rhinoceros unicornis*): Development and Application," *Zoo Biology* 35, no. 5 (2016): 432–443. We have used five ratios (BL/SH, BH/BL, HL/HW, EL/EW, and SH/FL, described in the text) that capture the general shape and distinctive features, and that can be calculated on any two-dimensional profile image regardless of its dimensions.

body height at midsection (length between the middle part of the spine and the middle part of the abdomen)/body length (BH/BL); head length/head width (at the base) (HL/HW); ear length/ear width (EL/EW); shoulder height/foreleg length (length of the most external front leg from the leg fold) (SH/FL). We have also used the following qualitative criteria: the presence of a supernumerary horn, forelegs tied or free, presence of a mane in the upper neck, ribs marked or not, horn insertion at the end or close to the end of the head, dorsal head flat or concave, and spine concave or convex.

2 Ganda in Europe

The rhinoceros represented by Dürer corresponds to an animal that arrived in Lisbon from India as a result of political negotiations. Afonso de Albuquerque, governor of Portuguese India since 1509, wanted to establish a fortress on the island of Diu, in the territory of Cambaia (present-day Gujarat), in West India. Thus, he entered into negotiations with Sultan Modafar (or Muzafar II), who ruled the region, and in 1514 sent a delegation headed by Diogo Fernandes to ask his permission to build the fortress. Modafar denied the request, reciprocating the delegation with the gift, among others, of a rhinoceros, or Ganda in the local language.⁷ In turn, Albuquerque decided to send Ganda to his king, Manuel I of Portugal. He took advantage of the arrival in Goa of a Portuguese fleet of five ships in September 1514, which, on its return to Portugal, around December or January, took Ganda to Lisbon, where it arrived in May 1515.

The gift must have pleased Manuel I, who already had a menagerie with several elephants amongst other animals. Remembering the Natural History of Pliny the Elder, which relates that the rhinoceros is the worst enemy of the elephant, Manuel I had the idea of confronting Ganda with one of his elephants. Thus, on Sunday, June 3, 1515, the day of the Holy Trinity, the fight was arranged in a large courtyard between the Paço da Ribeira and the Casa das Índias, in Lisbon. First, the rhinoceros, that had its legs tied with a chain, was covered by a large canvas. Then, the elephant was brought to the yard, and the canvas covering the rhinoceros was removed. However, after seeing the rhinoceros the

7 On the historical context of Ganda's arrival in Lisbon, see Damião de Gois, *Chronica do felicissimo Rei Dom Emanuel. Composta per Damiam de Goes, dividida em quatro partes*, 4 vols. (Lisbon: em casa de Francisco Correa, 1566–1567); and Afonso de Albuquerque, *Commentarios do grande Afonso Dalboquerque, capitão general que foi das Índias Orientaes em tempo do muito poderoso Rey D. Manuel, o primeiro deste nome* (Lisbon: Officina Typographica, 1774). For a modern synthesis, see Pimentel, *El rinoceronte y el megaterio*.

elephant fled from the yard. Although the expected fight did not take place, the King considered that the observed facts confirmed the beliefs popularized by Pliny.⁸

For political reasons, Manuel I subsequently decided to give the rhinoceros to the Pope, Leo X, also an enthusiast of exotic animals, to whom, a year earlier, he had already given a white elephant, the famous Hanno.⁹ Therefore, Ganda, wearing a gold chain and adorned with roses and gold carnations, embarked from Lisbon on his way to Rome. The ship, commanded by João de Pina, left Lisbon in December 1515 and anchored in Marseilles in January 1516, where the King of France Francis I could see the animal. Then, between the end of January and the beginning of February, the ship was off the coast of Italy, near La Spezia, being wrecked by a storm, drowning the rhinoceros. As Pimentel has recently narrated,¹⁰ some authors consider that the animal's corpse reached the shores of Villefranche-sur-Mer, in France, and that it was stuffed and thus sent to the Pope, although this information is doubtful.

3 Valentim Fernandes and the Model for Dürer's Drawing

The woodcut of Dürer representing Ganda (Fig. 1) was carved in Nuremberg in 1515, based on a drawing that he did in pen and brown ink (Fig. 2). What is still a mystery is what the model for Dürer's drawing would have been. The prevailing hypothesis is that Valentim Fernandes, a printer of Moravian origin

8 About the menagerie of Manuel I, see for example Almudena Pérez de Tudela and Annemarie Jordan Gschwend, "Renaissance Menageries. Exotic Animals and Pets at the Habsburg Courts in Iberia and central Europe," in *Early Modern Zoology. The Construction of Animals in Science, Literature and the Visual Arts*, ed. Karl Enenkel and Paul Smith (Leiden: Brill, 2007), 419–447. Damião de Gois, a witness to Ganda's encounter with the elephant in Lisbon, describes it in his *Chronica do felicissimo Rei Dom Emanuel*. Pliny recounts the hostility between the rhinoceros and the elephant in Pliny, *Natural History, Volume 11: Books 8–11*, transl. H. Rackham, Loeb Classical Library 353 (Cambridge, MA: Harvard University Press, 1940), bk. 8, ch. 29.

9 Silvio A. Bedini, *The Pope's Elephant* (Manchester: Carcanet Press, 1997); Silvio A. Bedini, "The Papal Pachyderms," *Proceedings of the American Philosophical Society* 125, no. 2 (1981): 75–90.

10 For information on Ganda's trip to Rome, see: Abel Fontoura da Costa, *Deambulações da ganda de Modafar, rei de Cambaia de 1514 a 1516* (Lisbon: Agência Geral das Colónias, 1937); Paolo Giovio, *Il Dialogo dell'impresa militari et amorose di Paolo Giovio* (Rome: Antoine Barré, 1555). The storytelling that Ganda's corpse was recovered after drowning, stuffed, and thus sent to the Pope, has been told by various authors using secondary sources. See Pimentel, *El rinoceronte y el megaterio*.

living in Portugal, had sent a letter to Nuremberg with a sketch of the Lisbon rhinoceros, which would have reached Dürer's hands.¹¹ Valentim Fernandes was born in Olmütz, Moravia, lived for some time in Nuremberg, where a number of his relatives settled, passed through Seville, and arrived in Portugal in 1495.¹² The letter that he sent to Nuremberg has been lost, but an Italian translation is preserved in the National Library of Florence.¹³ The letter has two well-differentiated parts. In the first one, Fernandes briefly comments on the arrival of the rhinoceros to Lisbon to immediately refer to classical authors, such as Pliny, describing how the rhinoceros fights the elephant. The second part remembers the lands conquered by the Portuguese in the east. The references to Ganda are very few, as can be seen in the translation of the initial part of the letter:

Letter written by Valentino Moravio, German, to the merchants of Nuremberg. Dearest brothers, on the 20th of this month of May, 1515, arrived here in Lisbon, the noblest city in all of Lusitania, an excellent emporium at present, an animal called Rhynoceros by the Greeks, and Ganda by the Indians, sent by the most powerful king of India, city of Cambaia, as a donation to this most Serene Manuel, king of Portugal. In the time of the

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- 11 Artur Anselmo specifically states that Valentim Fernandes sent a descriptive letter accompanied by a drawing and that the two elements were used by Dürer. Although it is implausible, Randy Malamud even claims that Dürer made the drawing on the only basis of the Valentim Fernandes' letter. Artur Anselmo, *História da edição em Portugal* (Porto: Lello & Irmão, 1991), 200; Randy Malamud, "Beyond Zoos: Marianne Moore and Albrecht Dürer," in *Metamorphoses of the Zoo: Animal Encounter After Noah*, ed. Ralph R. Acampora (Lanham: Lexington Books, 2010), 67–82.
 - 12 About Valentim Fernandes, the most complete biography is by Pavel Štěpánek, *Valentim Fernandes de Morávia. Poznámky k životu a dílu významného moravského knihtiskaře Lisbonu na přelomu 15. a 16. století—představitel manuelského umění* [Valentim Fernandes de Moravia. Notes on the Life and Work of an Important Moravian Book Printer of Lisbon at the Turn of the 15th and 16th Centuries. A Representative of Manual Art] (Brno: L. Marek, 2006). See also: João José Alves Dias, "Os primeiro impressores alemães em Portugal," in *No quinto centenário da Vita Christi: os primeiros impressores alemães em Portugal*, ed. João José Alves Dias (Lisbon: Instituto da Biblioteca Nacional e do Livro, 1995), 15–27.
 - 13 A fragment of the Italian translation of the Fernandes letter was published by Angelo de Gubernatis, *Storia dei viaggiatori italiani nelle Indie Orientali* (Livorno: Francesco Vigo Editore, 1875). A full translation into Portuguese was published by Fontoura da Costa, *Deambulações da ganda de Modafar*. The complete transcription of the Italian document has been published by Ugo Serani, "La realtà virtuale nel Cinquecento: il rinoceronte di Dürer," in *E vós, Tágides minhas: miscellanea di studi in omaggio a Luciana Stegagno Picchio*, ed. Maria José de Lancaster, Silvano Peloso, and Ugo Serani (Viareggio: Baroni Editore, 1999), 649–665.

Romans, this animal was shown in the games of Pompey the Great, as Pliny says, with other diverse animals; this Rhinoceros, he says, has a horn in the nose and is one of the enemies of the elephant, and, when having to fight him, sharpens his horn on a stone, and in the fight strives to wound him in the belly because it is the weakest and most tender place; he says he is as long as the elephant but have shorter legs and is similar in color to boxwood.¹⁴

The letter continues with other information derived from Strabo, finally adding further data about Lisbon rhinoceros:

And what the said Strabo says agrees with what we have seen and especially with regard to the enmity he has with the elephant, for on the day of the Holy Trinity, the elephant being trapped in a certain place near the King's palace, and being brought the aforementioned Rhinoceros to such a spot, I saw that the said elephant immediately when he saw him began furiously to turn hither and thither fleeing and then approaching a barred window with irons as thick as the arm, took it with his teeth and his proboscis, that is, nose in the shape of a trunk, he broke it and fled.¹⁵

That's all the information that the letter provides about Ganda in Portugal. Significantly, Valentim Fernandes's letter does not say that it is accompanied by a

14 "Lettera scripta da Valentino Moravio, germano, a li mercatanti di Norimberga. Carissimi fratelli, nelli di 20 di questo mese di Magio 1515 giunse qui in Lisbona, cita nobilissima di tuta la Lusitania, emporio al presente excellentissimo, uno animale chiamato da greci Rhynoceros et dalli Indi Ganda, mandato dal re potentissimo de India della cita di Combaia a donare a questo Serenissimo Emanuel Re di Portogallo. Il quale animale, al tempo de Romani, Pompeo Magno ne suoi zuochi, come dice Plinio, fu mostrato nel circo con altri diversi animali questo Rhynoceron el quale dice haver uno corno nel naso et esser un altro inimico allo helephante che havendo a combattere con loro aguzia el corno a una prieta et nella bataglia se ingegna ferire nella panza per esser loco molto più debole et tenero dice esser lungo quanto uno helephante ma haver più curte gambe et esser di color simile al bosso." Quoted in Serani, "La realtà virtuale nel Cinquecento," 652. Unless otherwise stated, translations from Italian and the punctuation are mine.

15 "Et quanto dice il ditto Strabone il qual se concorda con questo che habiamo visto et maxime circa alla inimicicia ha con lo helephante perché il di de Santa Trinita essendo lo helephante incluso in cierto circolo apreso al palazzo dil Re Et essendo menato il tal loco lo sopraditto Rhynoceron; lo vidi immediate che il ditto helephante lebbe vista comincio con furore volgersi hor diqua hor dila fuggiendo et aproximandose corente a una finestra ferata di ferri grossi come il brazo la prese con sui denti et sua probosido cio e narre in guisa di tromba et quella rupe et fracaso." Quoted in Serani, "La realtà virtuale nel Cinquecento," 653.

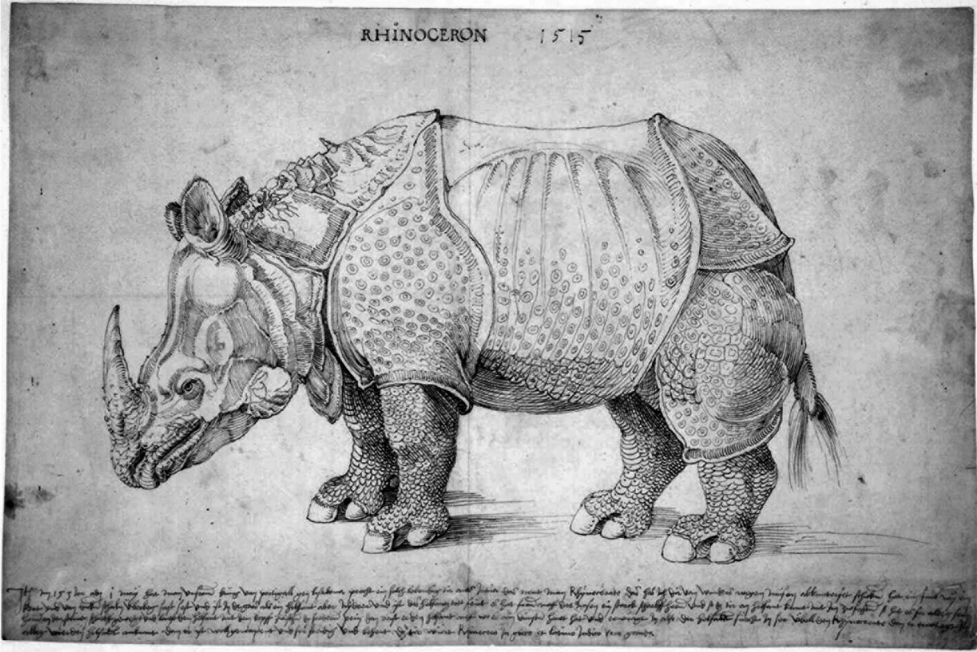


FIGURE 2 Albrecht Dürer, *Rhinoceros (preparatory study)*, 1515, drawing, pen and brown ink, The British Museum, London, SL, 5218.161
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sketch of the rhinoceros. It seems, thus, that there were two sources of information that reached Nuremberg, one was the letter from Valentim Fernandes and the other, independent of that letter, a sketch of the rhinoceros.

4 Dürer's Rhinoceros

Dürer's drawing (Fig. 2) agrees in general morphology with that of a male of the real animal, *Rhinoceros unicornis* (Fig. 3). The Indian rhinoceros has a single horn that can reach 60 cm long, showing thick, grey-brown skin that conspicuously folds around the shoulder, back, rump, and neck, giving the animal an armored appearance. The upper legs and shoulders show wart-like bumps, and the animal is practically hairless, aside from ear fringes, eyelashes, and tail brush. Males are bigger and more robust than females and show conspicuous neck folds.¹⁶

16 W.A. Laurie, E.M. Lang, and C.P. Groves, "*Rhinoceros unicornis*," *Mammalian Species* 211

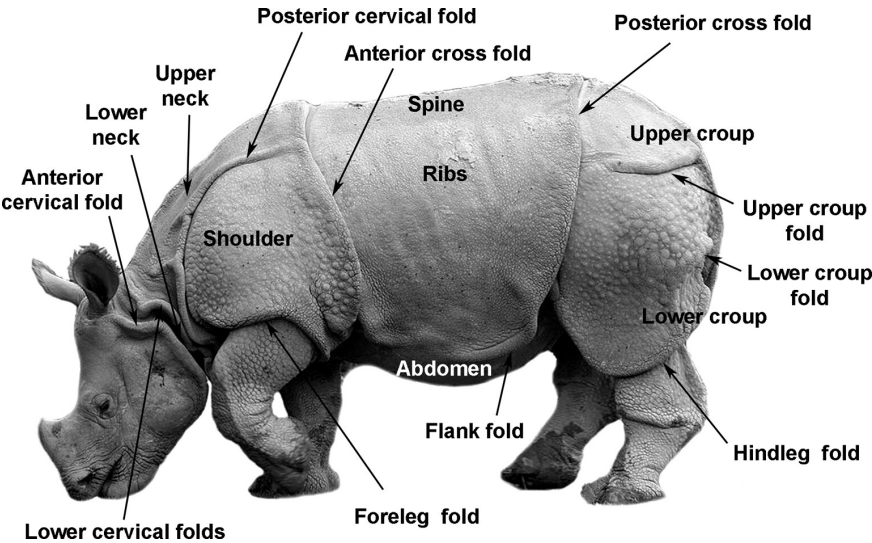


FIGURE 3 *Rhinoceros unicornis* Linnaeus, 1758. The image shows the main body parts and skin folds
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The comparison of Dürer’s drawing with images of males of *Rhinoceros unicornis* indicates that body proportions are similar. For example, the BL/SH is 1.1 in the drawing, which is close to the ratio in *Rhinoceros unicornis* (1.3–1.4), while the BH/BL is 0.6 in both Dürer’s drawing and the real animal (Table 1). Moreover, the different parts of the body in the drawing are also quite faithful to reality. In the hindquarters, the upper croup and the lower croup are well defined, with the corresponding separator folds; the midsection shows the abdomen below the flank fold, and the spine and ribs (although in Dürer’s drawing, the ribs are exaggeratedly marked and arranged radially instead of approximately parallel to each other); the forequarters, with the shoulder, upper and lower neck appear delimited by the corresponding folds; and a well-shaped head. Other realistic details of Dürer’s drawing are the legs, quite well proportioned and with three hooves on each foot, the wart-like bumps covering the body but being denser on the legs, and the furry tail. The small spiral horn on the neck is especially noteworthy as a detail invented by Dürer. As indicated above, the thick folds on the lower neck suggest that the specimen drawn is a male, and the notable length of the horn and the excrescences and roughness of the upper neck ridge suggest that it would be an aged specimen.

(1983): 1–6; Heidegger, von Houwald, Steck, and Clauss, “Body Condition Scoring System.”

TABLE 1 Morphometric ratios calculated in fifteen representations of the Lisbon rhinoceros and in ten real *Rhinoceros unicornis*. For the measurements of the ten real *Rhinoceros unicornis* (Real rhino 1–10), we used images of old males in profile view published in different media. Source of images is available from the author upon request

Sample	Body length/shoulder height (BL/SH)	Body height at midsection/body length (BH/BL)	Head length/head width (HL/HW)	Ear length/ear width (EL/EW)	Shoulder height/foreleg length (SH/FL)
Dürer drawing	1.1	0.6	1.3	1.8	2.6
Dürer woodcut	1.0	0.5	1.4	1.6	2.8
Burgkmair woodcut	1.1	0.6	1.4	1.8	2.7
Anonymous	1.0	0.6	1.2	1.8	2.6
<i>Biblioteca Chigiana</i>					
Altdorfer drawing	1.1	0.5	1.4	1.8	2.5
Parma drawing	1.2	0.5	1.2	1.4	3.4
<i>Carta marina</i>	1.1	0.6	1.3	1.6	2.7
Vallard Atlas	1.0	0.6	1.4	1.3	2.7
Fries map	1.1	0.6	1.2	?	2.9
Anonymous	1.1	0.7	1.6	2.8	3.6
<i>Vaticani latini</i>					
Penni woodcut	1.0	0.8	1.5	2.4	4.6
Granacci painting	1.1	0.7	1.6	4.3	4.7
Sabbioneta fresco	1.0	0.6	1.5	1.8	2.8
Miller Atlas	1.2	0.6	1.3	1.5	4.0
Book Hours Manuel I	1.2	0.6	1.3	2.8	3.9
Real rhino 1	1.3	0.5	1.5	2.1	2.3
Real rhino 2	1.3	0.6	1.4	2.2	2.4
Real rhino 3	1.3	0.6	1.3	1.8	2.5
Real rhino 4	1.3	0.6	1.3	2.0	2.3
Real rhino 5	1.3	0.6	1.4	2.0	2.3
Real rhino 6	1.4	0.6	1.3	2.1	2.4
Real rhino 7	1.4	0.5	1.4	2.0	2.2
Real rhino 8	1.4	0.5	1.4	2.0	2.3
Real rhino 9	1.3	0.5	1.4	2.0	2.3
Real rhino 10	1.3	0.5	1.4	2.1	2.3
Real rhinos 1–10 mean±SD	1.33±0.05	0.56±0.05	1.38±0.06	2.03±0.10	2.33±0.08

In any case, the drawing’s similarities to a real rhinoceros suggest that the anonymous author of the Lisbon sketch used by Dürer as a model was an expert artist. Significantly, the legend of Dürer’s drawing suggests that it reproduces a text that apparently accompanied the sketch, a text that is different from the letter of Valentim Fernandes mentioned in the previous section. This legend reads as follows:

In the year 15[1]3, on 1 May was brought to our King of Portugal to Lisbon such a living animal from India called a rhinoceros. Because it is such a marvel, I had to send it to you in representation made after it. It has the color of a toad and is covered and well-protected with thick scales, in size it is as large as an elephant, but lower, and is the deadly enemy of the elephant. It has on the front of the nose a strong sharp horn: and when this animal comes near the elephant to fight, it always first whets its horn on the stones and runs at the elephant pushing its head between his forelegs. Then it rips the elephant open where the skin is thinnest and then gores him. Therefore, the elephant fears the rhinoceros; for he always gores him whenever he meets an elephant. For he is well-armed, very lively and alert. The animal is called rhinoceros in Greek and Latin but in India, gomda.¹⁷

In his *Deambulações da ganda de Modafar, rei de Cambaia de 1514 a 1516*, Abel Fontoura da Costa even suggested that Dürer's drawing (Fig. 2) was the original sketch that arrived from Portugal. However, the watermark on the paper indicates the Nuremberg origin, and the style and calligraphy of the drawing correspond to Dürer, so Fontoura da Costa's hypothesis has been discarded.¹⁸ In any case, we contend that the rhinoceros of Dürer is not as fanciful as most authors claim. In particular, it is the arrangement of the skin folds what gives it the armored appearance, which does not make necessary to resort to similarities with pieces of armor, as suggested by different authors.¹⁹

The woodcut differs significantly from the drawing (compare Fig. 1 and Fig. 2), partly because the woodcutting technique imposes limitations on precision,²⁰ and also because Dürer decided to make the image more powerful,

17 Quoted and translated in Dackerman, "Dürer's Indexical Fantasy," 167.

18 Fontoura da Costa considers that the drawing attributed to Dürer preserved in the British Museum would be the original sketch made by a Portuguese artist. Fontoura da Costa, *Deambulações da ganda de Modafar*, 19. See, however: Serani, "La realtà virtuale nel Cinquecento," 657.

19 In Clarke's monograph *The Rhinoceros, from Dürer to Stubbs*, the structure of Dürer's rhinoceros is compared to contemporary armor. This comparison has been evoked later by various authors, but the most prolix and speculative has been proposed by Glynis Ridley. Ridley considers that the breastplate of Dürer's rhinoceros is similar to horse armor from the early sixteenth century, and suggests that perhaps this rhinoceros had a breastplate, also gifted by Sultan Modafar, adding that the supernumerary horn of Dürer's rhinoceros might belong to it. Glynis Ridley, *Clara's Grand Tour: Travels With a Rhinoceros in Eighteenth Century Europe* (New York: Atlantic, 2005), 87–89. No document supports this speculation.

20 Werner, "Pictures Migrating and Mutating," 83. As commented by Werner, the differences

exaggerating the textures. Moreover, he slightly shortened the body of the animal, as shown by the measurements, where the ratios BL/SH, and BH/BL are 1.0 and 0.5, respectively, values that are lower than those of the drawing (Table 1). The text that heads the woodcut²¹ follows that of the drawing, but has a more general tone, for example, eliminating the expression “our king in Portugal,” which would not make sense here.

5 The Woodcut of Burgkmair and the *Biblioteca Chigiana* Drawing

Contemporary with the rhinoceros of Dürer is the woodcut made by Hans Burgkmair in 1515 (Fig. 4). Burgkmair, a well-known artist based in Augsburg, had a close professional relationship with Dürer, especially between 1508 and 1519, when they were both working for the Emperor Maximilian I on the woodcuts of the Triumphal Procession and the Triumphal Arch. According to William Bell Scott and Jeffrey Ashcroft, Dürer visited the court of Maximilian I in Augsburg at least once in 1515 and another in 1518.²² There is only one copy

between the drawing and the woodcut may be largely due to the conditions of the printing technique. In the woodcut, the lines are wider and less differentiated than the lines made with a fine quill and ink in a drawing on paper. Whether a by-product or an intentional process, the strong black lines against white paper create the impression of hard, lustrous metal.

21 The text heading the woodcut, translated into English, reads: “After Christ’s birth, year 1513 Adi. May 1. such a living animal was brought to Lisbon from India for the mighty King Manuel of Portugal. They call it Rhinocerus. That is here reproduced in its entire form. It has a color like a speckled turtle. And is overlaid with thick shells, almost fixed. And is the size of an elephant. But shorter in the legs and almost armored. It has a sharp, strong horn out front on its nose. It begins to whet it whenever it is near stones. This animal is the deadly enemy of the elephant. The elephant fears it terribly for when it meets him, the animal runs at him between the front legs with his head and rips the elephant open below on the stomach and slays him, against which he cannot defend himself. Since the animal is armed such that the elephant can do nothing to him. They also say that the rhinoceros is swift, bold, and cunning.” Quoted and translated in Werner, “Pictures Migrating and Mutating,” 82.

22 On the Triumphal Procession and the Triumphal Arch, see Willi Kurth, *The Complete Woodcuts of Albrecht Dürer* (New York: Dover Publications, 1927), 37. On the visits of Dürer to the court of Maximilian I in Augsburg, see: William Bell Scott, *Albert Dürer: his Life and Works. Including Autobiographical Papers* (London: Longmans, Green, 1869), 103. The most recent and exhaustive source on the comings and goings in Dürer’s life is Jeffrey Ashcroft, ed. and trans., *Albrecht Dürer: Documentary Biography: Dürer’s Personal and Aesthetic Writings, Words on Pictures, Family, Legal and Business Documents, the Artist in the Writings of Contemporaries*, 2 vols. (New Haven: Yale University Press, 2017).

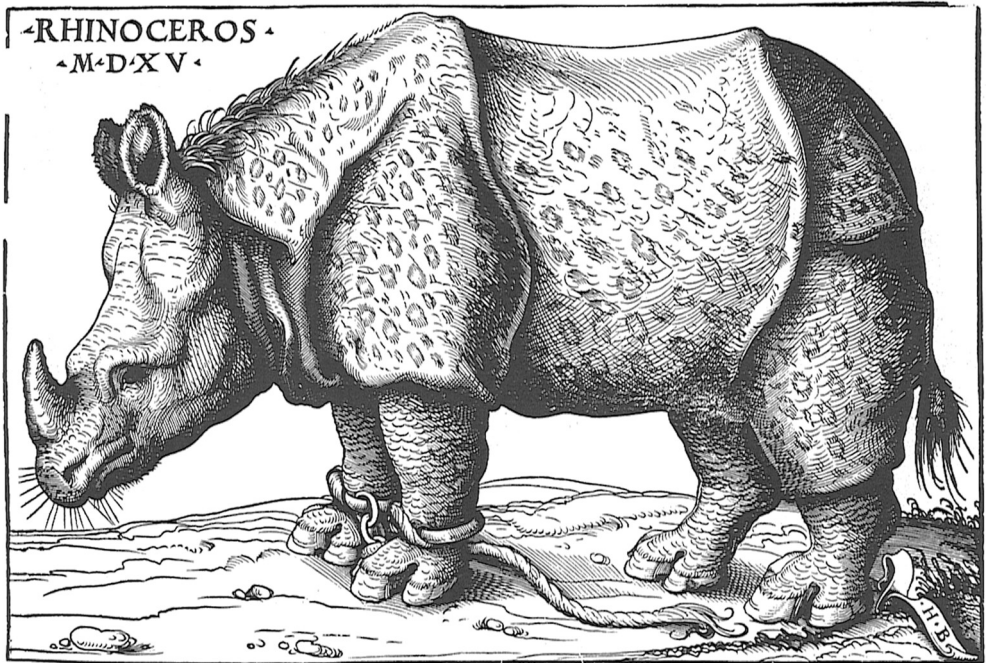


FIGURE 4 Hans Burgkmair the Elder, *Rhinoceros*, 1515, print, woodcut, Graphische Sammlung Albertina, Vienna, Inv. DG 1934/123

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of Burgkmair's woodcut, preserved in the Albertina, in Vienna, which suggests that it was much less widespread than that of Dürer. In the woodcut, the animal faces left and has proportions similar to those of Dürer's rhinoceros and, thus, to the real animal. For example, the ratios BL/SH , and BH/BL are identical to Dürer's drawing and similar to Dürer's woodcut (Table 1). Apart from the proportions, there are other similarities to Dürer's rhinoceros, including the distribution of the skin folds and the shape of the head, legs, ears, and tail. As differences, the most notable are the simpler upper neck, without the super-numerary horn and with a conspicuous mane; the midsection without marked ribs; and the inclusion of a rope that ties the forelegs (Table 2). The Burgkmair rhinoceros looks more realistic, as agreed by most of the authors who have commented on it (see above). However, a comparison with a real rhinoceros shows that it is not as realistic as it seems. The soft appearance of the skin, without marked ribs, and the long hairs on the snout are unrealistic, and the mane on the upper neck spine is imaginary. The leftward orientation of Burgkmair's woodcut indicates that the template drawing faced the right. This, and the similarities with Dürer's rhinoceros, suggests that Burgkmair's template might have

TABLE 2 Qualitative features observed in fifteen representations of the Lisbon rhinoceros and in the real *Rhinoceros unicornis*. The sources of the real *Rhinoceros unicornis* images used are available from the author upon request

Sample	Extra horn	Forelegs tied	Mane in the upper neck	Marked ribs	Horn insertion	Dorsal head	Spine
Dürer drawing	Yes	No	No	Yes	Close to the end of the head	Practically flat	Slightly concave
Dürer woodcut	Yes	No	No	Yes	Close to the end of the head	Practically flat	Slightly concave
Burgkmair woodcut	No	Yes	Yes	No	Close to the end of the head	Practically flat	Slightly concave
Anonymous <i>Biblioteca Chigiana</i>	No	Yes	No	Yes	Close to the end of the head	Practically flat	Slightly concave
Altdorfer drawing	Yes	Yes	No	No	Close to the end of the head	Practically flat	Slightly concave
Parma drawing	No	No	Yes	No	Close to the end of the head	Practically flat	Markedly concave
<i>Carta marina</i>	No	No	Yes	No	At the end of the head	Practically flat	Slightly concave
Vallard Atlas	No	No	?	No	At the end of the head	Practically flat	Markedly concave
Fries map	No	No	?	No	At the end of the head	Practically flat	Markedly concave
Anonymous <i>Vaticani latini</i>	No	Yes	No	Yes	At the end of the head	Markedly concave	Convex
Penni woodcut	No	Yes	No	No	At the end of the head	Markedly concave	Convex
Granacci painting	No	No	No	No	At the end of the head	Markedly concave	Convex
Sabbioneta fresco	Yes	No	No	Yes	Close to the end of the head	Practically flat	Slightly concave
Miller Atlas	No	No	No	No	Close to the end of the head	Practically flat	Slightly concave
Book Hours Manuel I	No	No	?	No	Close to the end of the head	Practically flat	Practically flat
Real rhinos 1–10	No	No	No	No	Close to the end of the head	Practically flat	Practically flat

been inspired by Dürer’s woodcut, which has the same orientation. According to Walter, we cannot exclude, however, that Burgkmair could also have seen the opposite oriented Dürer red ink drawing or the original sketch from Lisbon,²³

23 The hypothesis that the drawing used as a template for the Burgkmair woodcut could be

which would have provided details like the rope that binds the forelegs that are not present in the Dürer's images.

Related to the Burgkmair and Dürer images is a drawing of a rhinoceros preserved in the *Biblioteca Chigiana* in the Vatican Apostolic Library, dated to 1515 (Fig. 5). It appears next to an account of the Lisbon rhinoceros that belongs to a ten-volume manuscript entitled *Historia Senensium*, written by Sigismondo Ticci. The drawing is headed by a cartouche with the name for rhinoceros, first written in Greek, then as *Naricornis*, then with the Hebrew word, and then as Ganda, and a final line written in Latin that says *Sunt qui dicant habite duo cornua* ("There are those who say that it has two horns"). On the left side, written sideways and headed by the date M.D.XV, there is a four-line Latin text about the rhinoceros, mentioning the Indian origin of Ganda and referring to the works by Strabo and Pliny. This drawing was discovered by Ingrid Rowland in 1988 but was published by Hermann Walter one year later. In 2004, Jim Monson published a description and comparisons with Dürer and Burgkmair rhinoceroses.²⁴ Walter conjectured that the *Biblioteca Chigiana* drawing might derive from a hypothetical sketch made by Dürer before his well-known drawing in pen and brown ink. Monson, based on a detailed comparison of the *Biblioteca Chigiana* rhinoceros with those of Dürer and Burgkmair, wondered whether "an image like this modest pen drawing was the instigator and not an emulator of these well-known prints."²⁵ The *Biblioteca Chigiana* rhinoceros is generally rough but shows quite realistic proportions, the ratios BL/SH, and BH/BL are similar to those of the Dürer's and Burgkmair rhinoceroses, and close to the real animal (Table 1). The length of the legs is close to that of the real animal (Table 1), but the feet are abnormally big. Considering the general morphology and proportions, it resembles Dürer's drawing. In particular, they share the complex structure of the upper neck, including the division into parts, the crest excrescences (but not the supernumerary horn, which is unique to the Dürer image). Importantly, both share a small triangular plate that protrudes behind the ears (compare Fig. 2 and Fig. 5), a plate that disappeared in Dürer's woodcut (Fig. 1). Moreover, the folds of the skin, the spine, and the ribs of the *Biblioteca Chigiana* rhinoceros closely resemble those of Dürer's drawing and woodcut, even being more marked. Interestingly, the *Biblioteca Chigiana*

based on Dürer's woodcut and the original drawing from Lisbon has been previously proposed by Hermann Walter. Walter, "Contributi sulla recezione umanistica della zoologia antica."

24 Walter, "Contributi sulla recezione umanistica della zoologia antica"; Jim Monson, "The Source for the Rhinoceros," *Print Quarterly* 21, no. 1 (2004): 50–53.

25 Monson, "The Source for the Rhinoceros," 53.

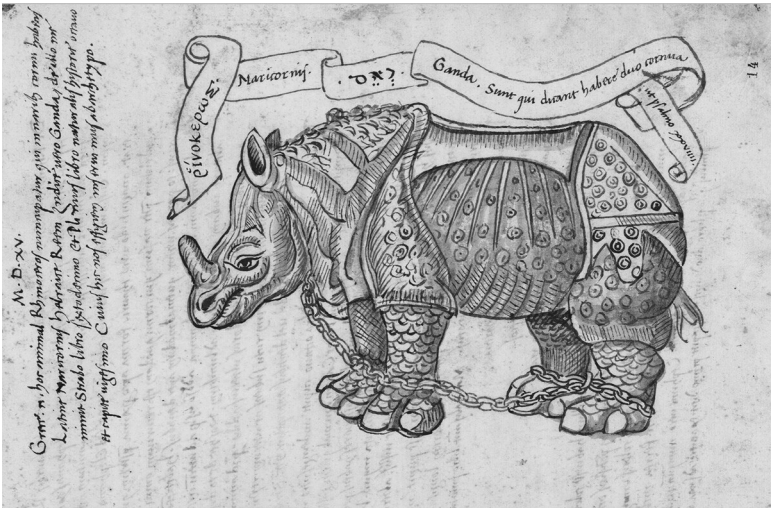


FIGURE 5 The drawing of the rhinoceros from the *Biblioteca Chigiana*, Biblioteca Apostolica Vaticana, Rome, Ms Chigi G-II-38, fol. 14
© BIBLIOTECA APOSTOLICA VATICANA

rhinoceros has the legs chained and linked to a collar, and the lower croup shows a curious wavy shape that suggests the model could wear a short saddlecloth. With Burgkmair's woodcut, the *Biblioteca Chigiana* rhinoceros bears fewer similarities. They share the general morphology (as does with Dürer's rhinoceros) and the absence of the supernumerary horn, while the long chain of the *Biblioteca Chigiana* rhinoceros recalls the rope and some chain links in the forelegs of Burgkmair's woodcut (Fig. 4). In our comparison, apart from the morphometric data, we have considered the roughness of the drawing, the unique coincidence with Dürer's drawing of the small triangular plate that protrudes behind the ears, and the presence of details that are not in Dürer's drawing, such as the chain that ties the collar to the legs. With this evidence, we conjecture that the *Biblioteca Chigiana* rhinoceros could have been inspired by the Lisbon sketch that had been used by Dürer.

6 Dürer's Supernumerary Horn, Burgkmair's Mane, and the Excrecences of the *Biblioteca Chigiana* Rhinoceros

The biologist Heini Hediger reports that rhinoceroses often have hard skin outgrowths called hyperkeratosis, usually resulting from local wounds. They may be conical in shape, and Hediger records the case of a rhinoceros at the San Francisco Zoo in the 1960s that had a severe hyperkeratosis in the same place

where Dürer drew the supernumerary horn in his rhinoceros. Consequently, Hediger proposes that this supernumerary horn would be reminiscent of a horn-like hyperkeratosis, a hypothesis that has been discussed by Kees Rookmaaker, Naoki Sato, and Francis Jarman. Rookmaaker comments that he has also seen rhinoceroses with horn-like outgrowths, but objects that the Burgkmair's woodcut does not depict this small horn, so he concludes that since the latter represents the rhinoceros in a more realistic way, Dürer only imagined that the little horn was there, consciously or unconsciously. Sato suggests that Dürer was influenced by readings of classical authors, such as Pausanias and Martial, who described the rhinoceros as having two horns. Finally, Jarman additionally hypothesizes that Dürer may have been aware of the two-horned African rhinoceros through Roman coins from the Emperor Domitian depicting it, which may have influenced his decision to add the supernumerary horn to the rhinoceros.²⁶ The explanation of hyperkeratosis makes sense since numerous cases of this phenomenon have been reported in real rhinoceroses. As for the speculations of the influence of classical readings and Roman coins, it is plausible that Dürer knew the works of Pausanias and Martial, and even the Roman coins depicting the two-horned African rhinoceros. This knowledge might have been facilitated by his friendship with Willibald Pirckheimer, an illustrious personality in Nuremberg at the time who knew the works of classical Greece and Rome, and, in addition, a coin collector.²⁷

Interestingly, the *Biblioteca Chigiana* rhinoceros shows conspicuous hyperkeratosis on the upper neck (Fig. 5), one of them quite prominent, whose position coincides with that of the supernumerary horn on Dürer's rhinoceros, which additionally shows numerous other excrescences on the upper neck (Figs. 1 and 2). The most parsimonious hypothesis is that Dürer would have transformed a particularly conspicuous excrescence present in the Lisbon

26 The hypothesis that the supernumerary horn would be inspired or derived from hyperkeratosis has been proposed by Heini Hediger, "Ein Nashorn mit Dürer-Hörnlein," *Der Zoologische Garten* 39 (1970): 101–106. The following three essays have commented on Hediger's hypothesis: Kees Rookmaaker, "Captive Rhinoceroses in Europe From 1500 Until 1810," *Bijdragen tot de Dierkunde* 43, no. 1 (1973): 39–63; Naoki Sato, "Die Verwandlung von Dürers Rhinoceros und sein emblematischer Charakter," in *Aus Albrecht Dürers Welt: Festschrift für Fedja Anzelewsky*, ed. Bodo Brinkmann, Harmut Krohm, and Michael Roth (Turnhout: Brepols, 2001), 91–98; Francis Jarman, *White Skin, Dark Skin, Power, Dream. Collected Essays on Literature and Culture* (Holicong, PA: Wildside Press, 2005).

27 On Dürer's friendship with Willibald Pirckheimer and the latter's numismatic interests, see Mónica Rodríguez Gijón, "Los humanistas alemanes retratados en Virorum Doctorum de Disciplinis Benemerentium Effigies XLIII. De benito Arias Montano y Philips Galle," *Etiópicas* 9 (2013): 75–103.

sketch into a small spiral horn. In the case of the Burgkmair's woodcut, whatever the model used, the artist transformed the upper-neck excrescences of the rhinoceros into a fanciful mane.

7 The Descendants of Dürer and Burgkmair Rhinoceroses

There is no need to insist on the success of Dürer's woodcut. Eight or nine editions have been recorded, and around 4000 to 5000 copies were probably sold in Dürer's lifetime. A large number was printed in the sixteenth century, after Dürer's death. Then, over the next two centuries, many artists used it as an illustration of their descriptions of the rhinoceros. In the sixteenth century, it was reproduced in widely distributed works, such as the *Cosmographia*, by Sebastian Münster, a most popular book printed in 1544. The Dürer's rhinoceros was also reproduced in the first volume of the *Historia animalium* by Conrad Gessner, an animal encyclopedia published between 1551 and 1587, which is the precursor of modern zoology treatises. The inclusion of Dürer's rhinoceros in the encyclopedia of Gessner had a notable impact on zoological sciences. With all its exaggerations and the uniqueness of the horn invented in the upper neck, Dürer's rhinoceros became the archetype of rhinoceros in zoology in the following two centuries.²⁸ The image even survived in various natural history works of the seventeenth and eighteenth centuries, despite faithful depictions of Indian rhinoceroses exhibited in Madrid (ca. 1579–1587), London (in 1685, 1739, and 1741), and Holland (1741–1758). Finally, a drawing of the Dutch rhinoceros made by Jean-Baptiste Oudry was included in the influential *Histoire naturelle, générale et particulière*, published by Buffon between 1749 and 1788, which would banish the rhinoceros of Dürer from the treatises of natural history.²⁹

28 The influence of Dürer's woodcut as a representation of the rhinoceros in natural history, and as an aesthetic icon, has been discussed extensively by numerous authors (see above). On Dürer's woodcut editions, see: Rainer Schoch, Matthias Mende, and Anna Scherbaum, *Albrecht Dürer. Das druckgraphische Werk*, 3 vols. (Munich: Prestel Verlag, 2001–2004). On the spread of woodcut, see: Clarke, *The Rhinoceros, from Dürer to Stubbs*; Bartrum, *Albrecht Dürer and his Legacy*; Werner, "Pictures Migrating and Mutating." On Conrad Gessner and the influence of his *Historia animalium*, see Caroline Gmelig-Nijboer, "Conrad Gessner's *Historia animalium*. An Inventory of Renaissance Zoology" (PhD diss., Rijksuniversiteit te Utrecht, 1977); Urs B. Leu, *Conrad Gessner (1516–1565): Universal Scholar and Natural Scientist of the Renaissance* (Leiden: Brill, 2023).

29 The history of rhinoceroses arriving in Europe in the sixteenth, seventeenth, and eighteenth centuries has been narrated by Clarke, *The Rhinoceros, from Dürer to Stubbs*. See



FIGURE 6 Left: Rhinoceros from *Carta marina*, Library of Congress, Washington, Jay I. Kislak Collection; Right: Rhinoceros from the Vallard Atlas, Huntington Library, San Marino, HM 29, map 7
© LIBRARY OF CONGRESS, WASHINGTON; © HUNTINGTON LIBRARY, SAN MARINO

The single known copy of Burgkmair's woodcut suggests that it was not very widespread. However, while it is true that there is no parallel with Dürer's success, there are several sixteenth-century rhinoceros images that, according to our comparisons, derive from Burgkmair's. Thus, we propose that the rhinoceros that appears (in Africa!) in Martin Waldseemüller's *Carta marina* from 1516 (Fig. 6 left), which shows a conspicuous mane on the upper neck spine, derives from Burgkmair's woodcut. The rhinoceros that appears in the Vallard Atlas (1547) (Fig. 6 right) was probably copied from the *Carta marina*. Other descendants of *Carta marina* rhinoceros, although crudely copied, are that of Lorenz Fries map of North and West Africa (1520 and 1524), and that represented in the *Ptolemaeus Argentorata* (1525), which is reproduced by Wilma George in *Animals and Maps*. The same author reports that this rhinoceros, even more crudely copied, appears in two successive versions of the Desceliers' map, one from 1550 and another from 1553.³⁰

also Rookmaaker, "Captive Rhinoceroses in Europe From 1500 Until 1810." Cole describes with great bibliographical detail the history of the use of Dürer's rhinoceros in publications after the dissemination of the woodcut, and the advent of the *Histoire naturelle* by Buffon. Cole, "The History of Albrecht Dürer's Rhinoceros."

- 30 On the rhinoceros of *Carta marina*, see: George, *Animals and Maps*, figure 7.1, and Chet Van Duzer, *Martin Waldseemüller's 'Carta marina' of 1516. Study and Transcription of the Long Legends* (Cham: Springer Open, 2020). The rhinoceros of the Vallard Atlas has been commented and reproduced in George, *Animals and Maps*, figure 7.4, and Kees Rookmaaker, "Historical Distribution of the Black Rhinoceros (*Diceros bicornis*) in West Africa," *African Zoology* 39, no. 1 (2004): 64, figure 2. In *Animals and Maps*, Wilma George also comments and reproduces (figures 7.2, 7.5 and 7.7) the rhinoceros of the Lorenz Fries maps



FIGURE 7 Left: Rhinoceros from the *Natural History* by Pliny the Elder. Biblioteca Palatina di Parma, Inc. Pal. 1158; Right: Rhinoceros by Albrecht Altdorfer, Bibliothèque municipale de Besançon, Rés. 67633

© BIBLIOTECA PALATINA, PARMA; © BIBLIOTHÈQUE MUNICIPALE, BESANÇON

Then, there is a rhinoceros drawn in a *Natural History* by Pliny the Elder from the first half of the sixteenth century, which was discovered by Hermann Walter in 1999 at the Palatine Library in Parma (Fig. 7 left). Walter, after relating it to the rhinoceroses of Dürer and Burgkmair, proposes that it would have been drawn from the same sketch used by the two German artists.³¹ However, the characteristics of the Parma rhinoceros match those of Burgkmair's woodcut, as it also faces left, has similar proportions, prominent fore and hind withers, similar skin folds and texture, a furry tail well separated from the body, and what appears to be a sparse mane on the upper neck spine. Given these similarities, we propose that the anonymous artist of the Parma rhinoceros copied Burgkmair's woodcut.

The red ink drawing of a rhinoceros in the *Prayer Book* of Maximilian I (Fig. 7 right) deserves a separate comment. The drawing, dated from 1515, is attributed to Albrecht Altdorfer. Donald Lach states that Altdorfer's rhinoceros combines aspects of Dürer's woodcut with that of Burgkmair.³² Our morpho-

from 1520 and 1524, *Ptolemaeus Argentorata* from 1525, and Desceliers' maps from 1550 and 1553.

31 The rhinoceros drawn in the *Natural History* by Pliny the Elder preserved in the Palatine Library of Parma was described by Walter, "Contributi sulla recezione umanistica della zoologia antica," 267. Walter says that it would be a cousin or brother ("cugini o fratelli") of the rhinoceroses of Dürer and Burgkmair.

32 For Altdorfer's work on the Triumphal Arch, see: Max Spindler and Andreas Kraus, eds., *Handbuch der bayerischen Geschichte. Band 11. Das Alte Bayern. Der Territorialstaat* (Munich: C.H. Beck, 1988), 1047. The idea that Altdorfer's drawing combines the character-

logical observations (Tables 1 and 2) support this view. Altdorfer also worked on the Triumphal Arch, as Dürer and Burgkmair, and it is very likely that he was familiar with the respective rhinoceros woodcuts.

8 The Rhinoceros of Penni

On July 13, 1515, a little less than two months after Ganda's arrival in Lisbon, a doctor of Florentine origin, named Giovanni Giacomo Penni, published a booklet with the long title *Forma e natura e costumi de lo Rinocerotohe stato condotto im Portogallo dal capitano de la armata del re e altre belle cose condutte dalle insule novamente trovate*. The booklet includes a 21-verse poem in *ottava rima* that was commented on and translated into Spanish by Ugo Serani in 2006.³³ At the Colombina Institution in Seville there is a copy of Penni's booklet that belonged to Ferdinand Columbus, the youngest child of Christopher Columbus. The cover features a crude woodcut showing a rhinoceros represented very schematically, looking to the right (Fig. 8 left). The BL/SH (1.0) is similar to that of Dürer's and Burgkmair's rhinoceroses, and close to the real animal (Table 1). However, the body is uniquely robust (BH/BL=0.8, while in other representations and the real animal this ratio is between 0.5–0.6). Moreover, the head is very long (HL/HW=1.5), the ears are long and pointed (EL/EW=2.4), and the legs are very short (SH/FL=4.6) (Table 1). There are also qualitative features characterizing the Penni's woodcut, namely the spine slightly convex, the dorsal head markedly concave, and the horn placed at the very end of the head (Table 2). The skin is covered with small notches that appear to represent scales and shows two large folds, one in the hindquarters, divided transversely into two parts, and another in the front half. In the center of the spine, there are a series of lines that descend longitudinally from the anterior edge to approximately one-third of the height of the body. The tail is relatively long and hairy, and the forelegs appear fastened with a chain.

istics of Dürer's and Burgkmair's rhinoceros, with more elements of the latter, was initially proposed by Lach, *Asia in the Making of Europe*, 164–165.

- 33 The Spanish translation of Penni's poem has been published by Ugo Serani, "Forma e natura e costumi de lo rinocerote, de Giovanni Giacomo Penni. Texto y traducción," *Etiópicas* 2 (2006): 146–171. Penni's rhinoceros woodcut has been extensively commented on by Lach, *Asia in the Making of Europe*; Clarke, *The Rhinoceros, from Dürer to Stubbs*; Martins, "O rinoceronte de Dürer e suas lições para a historiografia da ciência"; and István Orosz, "A Rhino Remembered. On the 500th Anniversary of a Shipwreck," *Hungarian Review* 7, no. 3 (2016): 85–106.



FIGURE 8 Left: Rhinoceros by Penni, Institución Colombina, Seville, sign. 6-3-29 (29); Right: Rhinoceros from Francesco Granacci's painting *Joseph Presents his Father and Brothers to Pharaoh*, Gallerie degli Uffizi, Florence, Inv. 2152-1890

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From the Italian Peninsula there is another rhinoceros, represented in the painting *Joseph Presents his Father and Brothers to Pharaoh* by Francesco Granacci, painted around 1516, which is now at the Uffizi, in Florence (Fig. 8 right). The rhinoceros faces to the left and shows the essential characteristics of the Penni's woodcut: body robust ($BH/BL=0.7$), long head and ears ($HL/HW=1.6$ and $EL/EW=4.3$) and short legs ($SH/FL=4.7$) (Table 1), spine convex, dorsal head markedly concave, and horn placed at the end of the head (Table 2). Equally, it shows the two conspicuous skin folds equal to Penni's woodcut and the forelegs fastened with a chain (despite it is being depicted walking).

One question that arises is what model Penni and Granacci used for his woodcut. In 2024, Rookmaaker, Monson and Billia conclude that the *Vaticani latini* rhinoceros (Fig. 9), previously reported by Hermann Walter in 1994, might be the model of the representations of Penni and Granacci.³⁴ We agree with this hypothesis. The *Vaticani latini* rhinoceros looks to the right, and the morphometric similarities with the Penni and Granacci rhinoceroses are remarkable, coinciding a robust body ($BH/BL=0.7$), long head and ears ($HL/HW=1.6$ and $EL/EW=2.8$) and short legs ($SH/FL=3.6$) (Table 1). The general morphological similarities are also remarkable, including the coincidence of the two large skin

34 The *Vaticani latini* rhinoceros was discovered by Ingrid Rowland and first reported by Hermann Walter in 1994. Walter, "Un ritratto sconosciuto della "signorina Clara" in Palazzo Ducale di Venezia." In 2024, Kees Rookmaaker, Jim Monson and Emmanuel M.E. Billia proposed that it could be the prototype of the Penni and Granacci representations. Rookmaaker, Monson, and Billia, "Early Depictions of the First Lisbon Rhinoceros in the 16th Century."

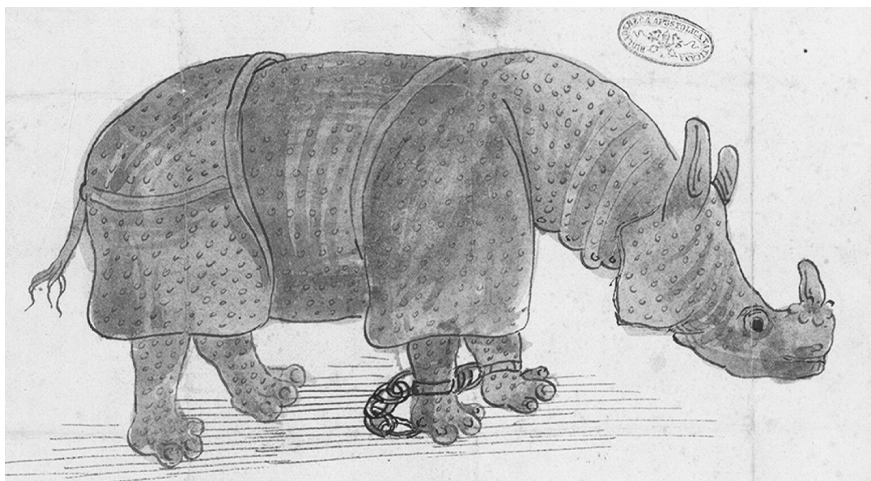


FIGURE 9 The drawing of the rhinoceros from the *Vaticani latini* section, Biblioteca Apostolica Vaticana, Rome, section *Vaticani latini*, sign. Vat.lat.2847 f. 190^r

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folds, the forelegs fastened with a chain, the dorsal head markedly concave, and the horn placed at the end of the head (Table 2).

Still in the Italian Peninsula, there is a rhinoceros in the fresco *The Creation of Animals* designed by Raphael but possibly painted by Giovanni da Udine, one of his pupils, between 1518 and 1519 in the Raphael Loggias of the Apostolic Palace in the Vatican. The fresco only shows the anterior portion of the rhinoceros with the complete head, so it is difficult to assign it to any of the three types described here. Despite the incompleteness of the representation, Clarke suggests that it could follow the style of Penni and Granacci rhinoceroses.³⁵ In contrast, another rhinoceros painted in 1582 by Bernardino Campi in the Giardino Palace of Sabbioneta (Fig. 10 left),³⁶ undoubtedly corresponds to Dürer's model. The morphometric data (Table 1) and the distribution of the folds of the Sabbioneta rhinoceros are very similar, and the upper neck clearly shows a supernumerary horn (Table 2). The case of the Sabbioneta rhinoceros points to the penetration of Dürer's rhinoceros into Italy, despite the *Vaticani latini* model, and the Italian antecedents of Penni and Granacci.

35 The rhinoceros represented in the Vatican fresco *The Creation of Animals* has been commented on by Clarke, who suggested that it is related to the rhinoceroses of Penni and Granacci. Clarke, *The Rhinoceros, from Dürer to Stubbs*, 27.

36 Regarding the Sabbioneta rhinoceros, see Ferri, *Il sogno del principe Vespasiano Gonzaga*.

9 The Rhinoceros of Antonio de Holanda

The renowned miniaturist Antonio de Holanda was born around 1480, and although his name suggests a Dutch origin, it is unknown where he came from. What is known is that he was active in Portugal from 1500 until he died in 1557. Among other works, he was one of the miniaturists of the Miller Atlas (1519), the Book of Hours of the Countess of Bertandos (between 1515 and 1534), the Book of Hours of Don Manuel I (between 1517 and ca. 1538), and the Genealogy of the Infante Don Fernando of Portugal (between 1530 and 1534).³⁷ In all these works, a particularly shaped rhinoceros (Fig. 10 right) is represented. We only measured the rhinoceroses from the Miller Atlas and the Book of Hours of Don Manuel I, since that from the Genealogy of the Infante Don Fernando is so small (ca. 3 mm) that it was not possible to make reliable measurements and identify the details, whereas that of the Book of Hours of the Countess of Bertandos shows only the front part of the animal. The measurements reflect a massive but quite long body (BL/SH=1.2), and short legs (SH/FL=3.9–4.0) (Table 1). The spine is practically flat (Table 2), the feet are small and little differentiated from the legs. The fact that Antonio de Holanda is the only miniaturist that worked in all of the above four works, and that each of them contains a rhinoceros of the same typology, suggests that he painted all four rhinoceroses. We do not know what model he may have used, but it could be that he saw Ganda with his own eyes. In 1515, Antonio de Holanda was already established in Portugal, and in 1518 was retainer of arms of King Manuel I. It is probable, therefore, that he would have seen Ganda in Lisbon, at least during the celebrations of June 3, 1515, when the famous encounter with the elephant took place.

37 On Antonio de Holanda and his work as a miniaturist in the four mentioned works, see: Jorge Faro, "O Livro de Horas chamado de D. Manuel," *Panorama* 6 (1957): 79–86; Alfredo Pinheiro Marques, Luís Filipe F.R. Thomaz, and Bernardo Sá Nogueira, *Atlas Miller, facsímil del original conservado en la Bibliothèque nationale de France, Paris* (Barcelona: Moleiro, 2002); Miguel Téllez Antunez and Antonio García Masegosa, *Livro de horas da condessa de Bertandos* (A Coruña: Boreal ediciones, 2004); António de Aguiar, *A genealogia iluminada do infante Dom Fernando por António de Holanda e Simão Bening: estudo histórico e crítico* (Lisbon: Gráfica Santelmo, 1962); Antonio de Holanda and Simão Bening, *A genealogia do Infante Dom Fernando de Portugal*, ed. Martim de Albuquerque and Joao Paulo Abreu e Lima (Porto: Banco Borges & Irmão, 1984). See also: Fontes Da Costa, "Secrecy, Ostentation, and the Illustration of Exotic Animals in Sixteenth-Century Portugal." The fame of the artist and the possibility that he had seen Ganda with his own eyes suggested to Markl Dagoberto that Antonio de Holanda was the author of the sketch that came into Dürer's hands. This hypothesis is implausible since Antonio de Holanda's type of rhinoceros is very different from Dürer's. Markl Dagoberto, "O Rinoceronte do nosso rei de Portugal: estudo sobre a origem de uma gravura de Albrecht Dürer," in *Arte, História e Arqueologia*, ed. Pedro Gomes Barbosa (Lisbon: Êsquilo 2006), 161–176.

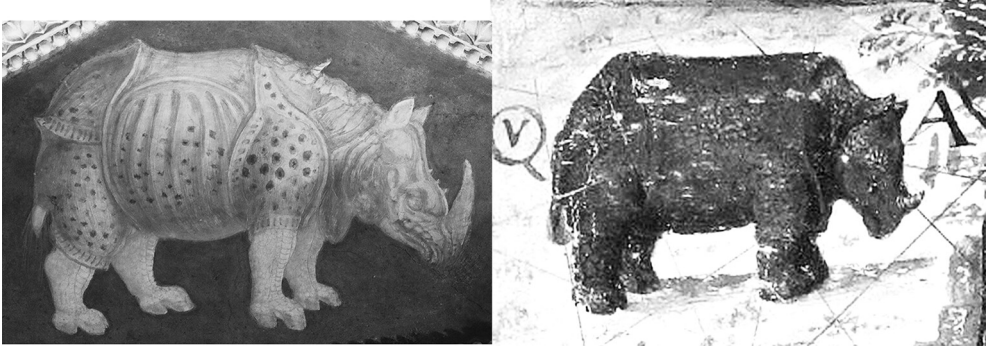


FIGURE 10 Left: Rhinoceros by Bernardino Campi, Palazzo Giardino, Sabbioneta; Right: Rhinoceros by Antonio de Holanda from the Miller Atlas, Bibliothèque nationale de France, GE D-26179 (RES)
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10 Conclusions: A Genealogy of the Representations of Lisbon Rhinoceros, and a New Look to the Dürer's Woodcut

Considering all the images studied, at least three types of Ganda representations can be distinguished. One is Dürer's, which best reproduces the proportions and characteristics of a real animal. The other is the rhinoceros of Penni and Granacci, which shows a robust body, long head and ears, short legs, spine convex, dorsal head markedly concave, and the horn placed at the end of the head. Finally, there is the representation of Antonio de Holanda, which shows a rhinoceros with a massive but quite long body, flat spine, and small feet. From these three types, we have traced the origin of other available representations of Ganda in the sixteenth century (Fig. 11).

Importantly, our comparisons of Dürer's drawing and woodcut with the real *Rhinoceros unicornis* has led us to propose that the rhinoceros represented by Dürer is not as fanciful as most authors claim. This conclusion is interesting for the history of science since the influence of Dürer's rhinoceros in Renaissance zoology has been very relevant. As various authors have pointed out, from William Ivins in 1953 to Sachiko Kusakawa in 2012, the image has become an essential element for the identification of the animal or vegetal species in natural history treatises since the sixteenth century.³⁸ The importance of Dürer's image of the rhinoceros in the history of zoology has been highlighted from the

38 William M. Ivins, *Prints and Visual Communication* (Cambridge, MA: Harvard University Press, 1953); Sachiko Kusakawa, *Picturing the Book of Nature. Image, Text, and Argument in Sixteenth-Century Human Anatomy and Medical Botany* (Chicago: University of Chicago Press, 2012).

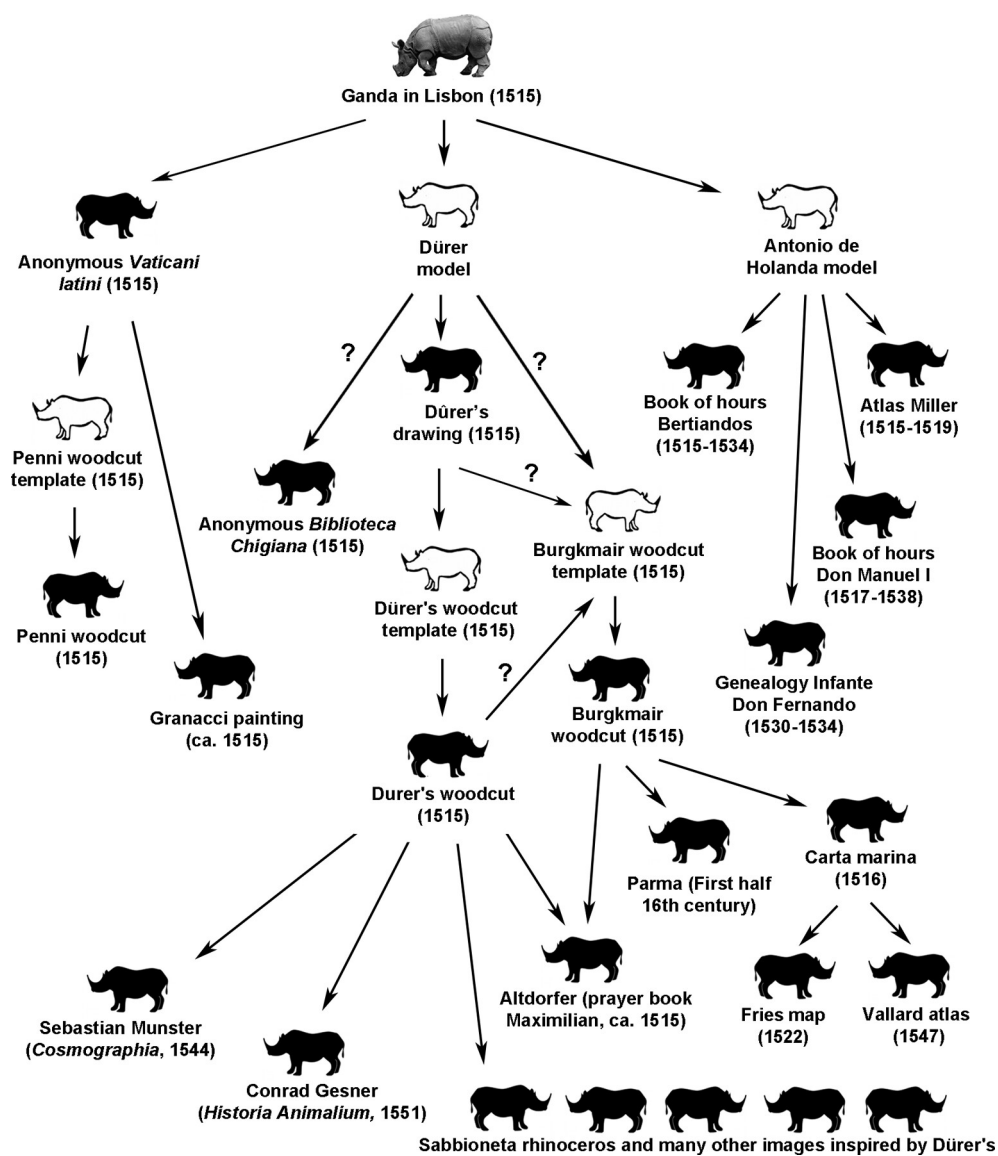


FIGURE 11 Genealogy of the representations derived from the rhinoceros arrived in Lisbon in 1515. Those shown in black indicate available documents, whereas those shown with a silhouette represent lost documents. The orientation is that of the rhinoceros in the document

classical works of Francis Cole and Tim Clarke until Juan Pimentel. The reproduction of this image in Conrad Gessner's influential *Historia animalium* in 1551 made Dürer's rhinoceros the official portrayal of the animal in natural history until the Enlightenment.³⁹ This was even though the image contained various details of doubtful authenticity, and the author had never seen the animal. Our proposal that Dürer's rhinoceros is not as fanciful as it seems softens these criticisms and gives a new slant of legitimacy to the image that Gessner presented as a faithful portrait of the rhinoceros for the zoology of the future.

Acknowledgments

I thank Dr Andreina Rita, of the Vatican Apostolic Library, for having found for me the two important rhinoceros images from this library that appear in the present work. Anne Blecksmith, from the Huntington Library (San Marino, California) provided me with information about the rhinoceros in the Martin Waldseemüller's *Carta marina*, and Kees Rookmaaker provided information about different rhinoceroses from the sixteenth century cataloged in the Rhino Resource Center, which he manages. Thanks are also due to Mónica Vergés and Isabel Morón, from the National Museum of Natural Sciences (MNCN-CSIC) in Madrid for having led me to study a sixteenth-century copy of the Dürer's rhinoceros woodcut in the archive of the museum, and for allowing me to reproduce it. I would also like to thank Elena Canadelli, editor-in-chief of *Nuncius*, for her constructive comments that have considerably improved the text.

39 See Cole, "The History of Albrecht Dürer's Rhinoceros"; Clarke, *The Rhinoceros, from Dürer to Stubbs*; Pimentel, *El rinoceronte y el megaterio*. On Conrad Gessner, see Gmelig-Nijboer, "Conrad Gessner's *Historia Animalium*"; Leu, *Conrad Gessner (1516–1565)*.