

## REVIEW ESSAY

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# Knowing Images

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TWENTY YEARS OR so ago, this review essay would have been titled “Art and Science.” In the mid-1990s a series of trailblazing publications by the likes of Horst Bredekamp, Lorraine Daston and Katherine Park, Paula Findlen, Martin Kemp, and Eileen Reeves brought the relationship between the history of art and the history of science to a new level of intimacy. These, and a host of other scholars, built on the legacies of Julius von Schlosser, Edgar Zilsel, Erwin Panofsky, and, more recently, Michael Baxandall and Svetlana Alpers, in order to probe the relationship between the pictorial arts and the mathematical disciplines, the worlds of collecting, wonder, and the study of nature. Objects that had previously been dismissed or overlooked were brought to the fore: natural-historical drawings and specimens, geometrical diagrams, scientific instruments, and mechanical marvels were placed in dialogue with paintings and sculptures. In an approach influenced by Marxist traditions in the history of science and art, as well as by anthropology as practiced by Clifford Geertz and Marcel Mauss, these artifacts were carefully situated in their economic, social, and intellectual contexts. Most importantly, searching questions were posed about cultures and practices writ large. Modes of observing, recording, and representing; the technologies of investigating nature and producing art; the mixed communities in which such activities took place — all these took center stage. The net result was a radical expansion not only in the types of objects to be studied, but also in the range of the academic disciplines to be embraced and the kinds of historical narratives that could be written. The resulting drift away from the canon — be it of artworks, media, individuals, or notions such as progress — mirrored the wider disciplinary change brought about by the rise of visual culture, the rumblings of which were just then starting to be heard. James Elkins’s provocative *Art Bulletin* essay “Art History and Images That Are not Art” (1995) and *October*’s “Visual Culture Questionnaire” (1996) offered a taste of things to come, but the German variety of visual studies — *Bildwissenschaft* (literally, “science of the image”) — was only dimly on the horizon of most anglophone scholars at the time.

Since the millennium, this new research into early modern art and science has grown to such an extent that it warrants an analytical overview. This essay will

discuss some of the key trends and publications that have appeared in recent years, alongside the common research questions and varied methods deployed to address them. I will be concerned chiefly with images that relate in some way or another to the acquisition, production, and presentation of knowledge, but one should bear in mind that much recent work has cautioned against separating the visual from the material in the early modern period. Indeed, the story tells not only of a gradual shift in emphasis away from histories of art and science toward images, objects, and knowledge, but also of fresh claims for the importance of materials and techniques — in short, for making as well as representing.

It is tempting to attribute these trends to an inevitable rebound from the linguistic turn, now replaced by an obsession with the visual and the material. While one may agree with Ludmilla Jordanova that talk of such “turns” smacks of academic faddism and historiographical nearsightedness, something is clearly afoot. Notably, Ulinka Rublack has identified common ground between scholars such as Horst Bredekamp, Lorraine Daston, and Pamela Smith through a perceived rejection of sociological determinism. She cites historians’ engagement with early modern matter and crafting skill as putting “pressure on Arjun Appadurai’s contention that ‘things have no meaning apart from those that human transactions, attributions, and motivations endow them with.’”<sup>1</sup> In the loquacious objects of Daston’s *Things That Talk* or the living images of Bredekamp’s notion of the *Bildakt*, some sort of collective yearning for reenchantment may well be discerned (while disputed, in Bredekamp’s case this is perhaps traceable to Aby Warburg’s mystical tendencies). There is, of course, a difference between asserting that all images and objects are alive, whatever their location in space and time, and observing that a given group of people at a certain historical moment believed this to be so. Pamela Smith’s account of early modern ideas about “active matter” in *The Body of the Artisan* is a rich and scrupulous example of the latter,<sup>2</sup> while Caroline van Eck’s *Art, Agency and Living Presence* is a particularly sophisticated account of these issues, focused chiefly on early modern sculpture. Nevertheless, a familiar fault line is opening up again between those who (with Warburg) wish to endow images and objects with independent life and those who (with Gombrich) dismiss such talk as a “purely mythological and unscientific” form of animistic nonsense.<sup>3</sup>

Clearly, much depends on where agency is seen to lie, be it in images, materials, or individuals, and on whether scholars should be concerned with processes of production or of reception. On these terms, research in the field diverges as much as it converges. For example, while Bredekamp and Smith share a preoccupation with the generative capacity of nature, the former’s

<sup>1</sup>Quoted in Rublack, 43, citing Appadurai.

<sup>2</sup>P. Smith, 114–20.

<sup>3</sup>Freyberg and Blühm, 52. See also Bredekamp, 2014, especially the notes at 4–5.

emphasis (in *Theorie des Bildakts*) on the autonomy of images and their formal properties may be distinguished from the latter's concern for the nature of materials and the embodied knowledge of early modern artisans. Likewise, the agency that Matthew C. Hunter and Francesco Lucchini attribute to so-called "clever objects" is a far cry from Sachiko Kusukawa's insistence (in *Picturing the Book of Nature*) on the significance of communities, of personal and professional relations, and of economic pressures in the production of knowledge and its images.<sup>4</sup> To put it crudely, for some scholars things matter most. For others, people and societies do.

The genealogy of these issues is complex, but at its heart lies art history: a discipline that nurtures and antagonizes the field in equal measure. Traditional art historical questions about form and content are bubbling to the surface. Do epistemic images have a style, and if so how do we describe and assess it? Does attribution (and thus connoisseurship) matter, particularly for informational images in a reproductive medium? Are such images art? What roles should aesthesis, symbolism, tactility, and technique play in our interpretations?

One of the few scholars to have proposed answers to such questions is Horst Bredekamp, one of the leading practitioners of *Bildwissenschaft*. In a series of books and articles (underpinned by large-scale research projects at Humboldt University such as "Bildakt und Verkörperung"), Bredekamp has argued that *Bildwissenschaft* not only has the capacity to open up the visual field in exciting ways, but also the requisite methodological tools to analyze images in a sufficiently sophisticated manner. This, he has claimed, derives from the historiographical inseparability of *Bildwissenschaft* from art history, at least in the tradition exemplified by Warburg and his followers.<sup>5</sup> Published mainly in German, the subtlety and complexity of some of Bredekamp's arguments — not least how his version of *Bildwissenschaft* differs from that of others in this domain, such as Hans Belting — have yet to be grasped fully in the anglophone academy. Furthermore, the controversy over the Martayan Lan copy of Galileo's *Sidereus Nuncius*, which was at the heart of Bredekamp's *Galilei der Künstler* but proven to be a fake by Nick Wilding, has colored perceptions of his contribution.

*Galilei der Künstler* presents sound arguments for the importance of the visual in Galileo's work, building interestingly on Panofsky's insights (which have been elaborated upon by numerous scholars, most recently John Heilbron).<sup>6</sup> Yet as Wilding noted in his recent *Renaissance Quarterly* review of a volume by Bredekamp and colleagues Irene Brückle and Paul Needham, *A Galileo Forgery*,

<sup>4</sup>See Hunter and Lucchini, 475, for whom clever objects are "difficult, even intractable, artefacts" that both provoke and are the product of ingenuity.

<sup>5</sup>See, e.g., Bredekamp, 2003.

<sup>6</sup>See Marr, 296n7.

the unfortunate episode of the Martayan Lan copy prompts uncomfortable questions about expertise, the current state of the *Bildwissenschaft* version of art history, and the conduct of academic disputes. In particular, it affirms the continuing need for connoisseurship, particularly in the study of premodern images — an aspect of art history that visual studies has regularly opposed. It raises questions, too, about the sweeping transhistoricity of some of the theories underlying *Bildwissenschaft* and whether the conclusions stand up to forensic scrutiny.

The recent translation into English of Bredekamp, Dünkel, and Schneider's *Das Technische Bild (The Technical Image)* is, as Peter Miller notes in his foreword to the book, an important opportunity to give “an English-reading public access to a German-language initiative that helps make sense of the future of art history as well as of art history's relationship to its neighboring disciplines.”<sup>7</sup> Whether the book is indeed so oracular for the future of art history remains to be seen. Its value lies, rather, in providing an easily digestible account of the methods and types of objects pursued by Bredekamp and one of his research teams, organized as a series of methodological set pieces and case studies of these methods in practice.

Tellingly, many of the objects discussed in *Das Technische Bild* are modern images, although it does include pieces on early microscopy (Stefan Ditzen) and on Athanasius Kircher's musical automata (Angela Mayer-Deutsch). There is also a fine essay on Aldrovandi's drawings by Angela Fischel, whose monograph *Natur im Bild* is an important contribution to the currently buoyant field of natural-historical images in context (see, e.g., Brian Ogilvie's *The Science of Describing* and Janice Neri's *The Insect and the Image*). Most revealing are the methodological interventions, which include a strong defense of the value of iconology, a discussion of style and visual knowledge, and a brief account of formal comparison. In his contribution, staged as a conversation with the *Technical Image* team, Bredekamp identifies the descent of these themes, citing some familiar heroes of German-language art history: Semper, Riegl, Wölfflin, Panofsky, and, of course, Warburg. Indeed, *The Technical Image* is in many respects an apology for nineteenth- and twentieth-century *Kunstwissenschaft*, a plea for its methods and insights to be taken seriously and applied, in a loosely joined-up way, to the wider range of images recently embraced by visual studies. As the editors explain in their introduction: “Unlike Visual Culture Studies, we do not first look at the social construction of images, but rather at their material form; and unlike the strain of *Bildwissenschaft* rooted in the philosophy of aesthetics, we follow an inductive and historical approach in the analysis of pictures. *Bildwissenschaft* taken from our perspective originates from art historical traditions.”<sup>8</sup>

<sup>7</sup>Bredekamp, Dünkel, and Schneider, ix.

<sup>8</sup>Ibid., 1–2.

Ironically, this approach, with its emphasis on formal properties, places *The Technical Image* at odds with some recent anglophone work that has claimed inspiration from *Bildwissenschaft*. Notably, Susan Dackerman explicitly situated her highly accomplished *Prints and the Pursuit of Knowledge* within “the German branch of visual studies that encompasses images and objects across art historical hierarchies of subjects and media, without a predisposed notion of high and low art forms.”<sup>9</sup> So far, so good, and in gathering together such a varied (and, in many cases, overlooked) group of objects we are all in Dackerman’s debt. However, Dackerman’s concern to rehabilitate “objects that have been neglected in the art historical discourse because they were considered in aesthetic terms with little attention to their content” and on scrutinizing “the work that prints do, and how their early modern makers activated them to generate the knowledge they embody and engender” diverges from the program of *The Technical Image*.<sup>10</sup> The range and type of images may be common to both, but in *The Technical Image* form and style are promoted at the expense of human agency, while in *Prints and the Pursuit of Knowledge* function and human activities are stressed over and above aesthetic properties.

Nevertheless, both projects purport to align via a mutual concern for process: their attention to the making of images and knowledge. This has a bearing on terminology. In each book *science* is eschewed in favor of the more capacious, less anachronistic *knowledge* and *technical*. For Dackerman, technique should influence how one interprets images, as she shows to excellent effect in her account of Dürer’s famous *Rhinoceros*, in which the “textured hardness” of the animal’s skin “resonates with the materials of Dürer’s craft — printing plates and woodblocks.”<sup>11</sup> Bredekamp and his colleagues claim to follow a similar logic, designating their images as “technical” since “it implies different levels of *techne*. Our objects of study are ‘technical images’ in the sense that they are not artistic . . . they are predominately instrument-based or the result of imaging procedures.”<sup>12</sup> This seems to imply that the images concerned are those that have been in some way technologically mediated, but the water is muddied by the inclusion of representations of technologies. In this, the volume appears to be connected to recent work on machine drawings, so expertly assessed in *Picturing Machines 1400–1700*, edited by Wolfgang Lefèvre. But where that latter volume is concerned with drawings made by “technical experts,” whose

<sup>9</sup>Dackerman, 2011b, 19.

<sup>10</sup>Ibid., 19–20. Contrast this with: “The project set out from the research hypothesis that the forms of imagery are of no less import than the content and objects they show”: Bredekamp, Dünkel, and Schneider, 1.

<sup>11</sup>Dackerman, 2011a, 168.

<sup>12</sup>Bredekamp, Dünkel, and Schneider, 1.

“knowledge far exceeded the *tacit knowledge* of the artisan,”<sup>13</sup> *The Technical Image* is not clear as to whether such expertise matters. This may be because its authors prefer to remain at the level of form, from which meaning is supposed to be inferred, hesitating to drill down beneath the surface to get at technique.

This approach certainly has value: we learn important things about the differing styles of technical images and how to read them. Yet *techne* itself is largely missing. By contrast, Pamela Long made this her focus in *Openness, Secrecy, Authorship*, and in the wake of her book, scholars have begun to explore diverse aspects of early modern *techne* in intriguing ways: Renzo Baldasso has written brilliantly in “Printing for the Doge” on the novel techniques used to create some of the earliest printed diagrams; Fabian Kraemer has reconstructed the “paper technologies” used by Ulisse Aldrovandi to manage his vast compendium of natural-history manuscripts; and Lori Anne Ferrell has discerned a form of “page *techne*” in early modern mathematical books with pop-up diagrams. *The Technical Image* is a very different beast from work of this kind, as well as from the type of research that gets its hands dirty with materials and their manipulation, such as Ursula Klein and E. C. Spary’s *Materials and Expertise* or Pamela Smith, Amy Meyers, and Harold Cook’s *Ways of Making and Knowing*. Despite its suggestive title, then, *techne* in *The Technical Image* is more conceptual than historical. Indeed, it seems that its technical images are really epistemic images in a different guise.

The phrase “epistemic images” is increasingly prominent in early modern studies, even more so in the wider realm of visual and media studies.<sup>14</sup> Unsurprisingly, given its relative youth and the dizzying range of definitions of *image* now available, there is no consensus yet as to its precise meaning. Rare attempts to define it have, however, been made by Christoph Lüthy and Alexis Smets in an important article on typologies of medieval and early modern scientific images, and by Lorraine Daston in a characteristically sharp account of images of nature before objectivity. Lüthy and Smets’s definition is capacious: “we use the term ‘epistemic image’ to refer to any image that was made with the intention of expressing, demonstrating or illustrating a theory.”<sup>15</sup> Daston’s is more restrictive: “An epistemic image is one made with the intent not only of depicting the object of scientific inquiry but also of replacing it. A successful epistemic image becomes a working object of science, a stand-in for the too-plentiful and too-various objects of nature, and one that can be shared by a dispersed community of naturalists.”<sup>16</sup> The differences are stark: Lüthy and Smets are concerned with theories expressed, Daston with objects observed; the

<sup>13</sup>Poplow, 48.

<sup>14</sup>See, e.g., Heßler and Mersch, 94–187, “Das epistemische Bild.”

<sup>15</sup>Lüthy and Smets, 399n2.

<sup>16</sup>Daston, 2015, 17–18.

former are content with what might be called an intention to show, while the latter emphasizes concrete substitutability.

Daston's account derives from her larger project on objectivity and its cousin, observation, recent products of which include the monograph *Objectivity*, coauthored with Peter Gallison, and a volume of essays, *Histories of Scientific Observation*, coedited with Elizabeth Lunbeck.<sup>17</sup> Daston focuses on representations of things observed in nature, in this instance botanical images from the sixteenth to the eighteenth century. Notably, her emphasis on substitutability connects to other work in *Bildwissenschaft* on substitution. Much of this, for instance by Hans Belting and scholars influenced by him, such as Alexander Nagel and Christopher S. Wood, has focused on religious art, icons especially. Bredekamp also treats this theme extensively in his methodological mission statement, *Theorie des Bildakts*, which deals not only with icons, but also the wider issue of substitution in social processes and in particular media. The latter includes *Naturselbstdrucke* (nature impressions), in which natural objects themselves are used to produce an exact, printed replica, thus meeting Daston's criteria for an epistemic image. These fascinating images, long neglected, have been treated in detail by Roderick Cave in *Impressions of Nature*.

Lüthy and Smets are motivated by a desire to counter the "supra-historical, essentialist" attitude of those seeking a systematic account of scientific imagery, in particular by emphasizing the historical contingency of images and ideas.<sup>18</sup> Taking their cue from John Murdoch's *Album of Science*, the authors are concerned less with things observed than with theories presented and proofs demonstrated in charts, tables, and diagrams. Images of this kind have received considerable attention in recent years. In addition to chronologically wide-ranging works such as John Bender and Michael Marrinan's *The Culture of Diagram*, research pursued at Cambridge by Nicholas Jardine and his team under the auspices of the project "Astronomical Images: Diagrams, Images and the Transformation of Astronomy, 1450–1650" has resulted in a useful database and several excellent volumes of essays, most recently *Observing the World through Images*, edited by Isla Fay and Jardine.<sup>19</sup> In the introduction to this volume, Fay and Jardine identify their ambition to explore "the explanatory and argumentative functions of visual representations; the relationships between

<sup>17</sup>In his introduction to *The Technical Image*, Peter Miller observes that Daston's research group at the Max-Planck-Institut für Wissenschaftsgeschichte (MPIWG) is both intellectually and geographically close to Bredekamp's at the Humboldt. We may note also that the MPIWG fostered the research leading to Lefèvre's *Picturing Machines*, as well as Sven Dupré's important research group "Art and Knowledge in Pre-Modern Europe" (<https://www.mpiwg-berlin.mpg.de/en/research/projects/MRGdupre>).

<sup>18</sup>Lüthy and Smets, 2009, 400.

<sup>19</sup>See <https://www.astronomicalimages.group.cam.ac.uk/index.html>.

images and texts; the production of images; and the extent to which images helped to drive the development of knowledge of the cosmos.<sup>20</sup> In case studies ranging from George Ripley's alchemical drawings (Jennifer Rampling) to printed images of instruments in the Arsenius circle (Samuel Gessner), the volume is a testament to what may be achieved through fine-grained research that thoroughly respects the complexity of contexts (professional identity, institutional setting, economic pressures, etc.) on the production and reception of epistemic images. Rather than establishing a priori taxonomical differences between types of images, distinctions and classifications emerge organically from the stories the authors tell about the objects and individuals concerned.

This approach is fully commensurate with that of Lüthy and Smets, although their article is distinguished by its ambition to pose big questions about definition and method. In a subtle account that cleverly combines rigorously researched case studies (images in the publications of Giordano Bruno and René Descartes, alchemical symbols, etc.) with careful methodological reflection, the authors identify five crucial problems in the study of epistemic images: the unclear boundary between words and images, morphological similarity, the intellectually commensurate expressed by different visual means, the gap between actors' categories and modern terminology in iconography, and the importance of epistemological, metaphysical, and social contexts. Theirs should be a model for the field: exacting and historically sensitive research, which makes full use of the recent theoretical apparatus of visual studies but is not determined by it. Some may chide that their definition of "epistemic image" is too expansive. This is a legitimate concern. If symbolic representations of theories, such as emblems and allegorical title pages (the latter nicely anatomized by Volker Remmert in *Picturing the Scientific Revolution*), are included within the definition, where does it stop? Lüthy and Smets are largely concerned with images in printed books, but what about works of art — the drawings, paintings, and sculptures — that speak symbolically of "knowledge" through narrative, allegory, and personification? Are early modern thesis prints, analyzed with great erudition by Susanna Berger, epistemic images? Which bits of Jacques de Gheyn II's oeuvre, powerfully interpreted by Claudia Swan, should be classified under this heading? Where triangles have been used to organize the compositions of Renaissance paintings, should those images be called epistemic along with the diagrams to which (according to Rebecca Zorach in *The Passionate Triangle*) they seem to relate?

Perhaps we should content ourselves in claiming epistemic images to be a heuristic phrase that helps us to get at unnamed intentions, relations, and meanings. Yet an alternative is to abandon this sort of strategic anachronism altogether in favor of actors' categories. After all, early moderns did not use the

<sup>20</sup>Fay and Jardine, 1.

phrase, but instead deployed a variety of terms such as *imagines contrafactae* or *verae icones* for what Angela Fischel, discussing Conrad Gessner's natural-history drawings, has called "documentary images."<sup>21</sup> Here may be observed a further tension in the field, between scholars invested in the value of period terminology and those, such as Daston, who warn — in an echo of Quentin Skinner — that we "need not make a fetish" of words.<sup>22</sup> But as Lüthy and Smets point out, there is surely a danger in treating early modern epistemic images apart from the language used to describe and define them, and which — given the early modern *mise-en-page* — is in some cases visually inseparable from them. Here the work of scholars such as Alexander Wragge-Morley on the importance of early modern verbal picturing (e.g., *enargeia*) is especially valuable, as is that of Eric Jorink on how early moderns read nature in the world and on the page.

It is commonplace to assert that images have been used historically to communicate where words fail. If recent work in the field has achieved anything, it is to put the lie to this sort of reductive dualism. Increasingly, scholars such as Kusakawa, Maclean, and Banks have been at pains to address not only the complex relationship between visual and verbal systems, but also to examine early modern anxiety about the reliability of images (particularly when produced via instruments), and their capacity to record, persuade, demonstrate, and be classified. It is impossible to do justice to the range and quantity of recent work that has tackled these issues, but notable monographs include Robert Felfe's exploration of the imitation of nature in life casting and perspective drawing, learned accounts of images and knowledge in the Accademia dei Lincei by David Freedberg and Irene Baldriga, and Sachiko Kusakawa's interrogation of botanical and anatomical images published in the works of Leonhart Fuchs, Conrad Gessner, and Andreas Vesalius. In addition to these interventions, we may note certain research areas that have attracted particular attention. There has been a host of publications — by Anita Guerrini, Felicity Henderson, Alexander Marr, Matthew Hunter, Anna Marie Roos, and Sachiko Kusakawa — on the visual culture of early scientific societies such as the Académie royale des sciences and the Royal Society. The role of international commerce in the production and circulation of knowledge and its objects has been addressed for the Dutch case by Harold Cook, Daniel Margocsy, and Djoeke van Netten; and for Spain and the Atlantic world by Daniela Bleichmar and Peter Mancall, and by José Ramón Marcaida López. Images in Descartes's oeuvre have been examined by Christoph Lüthy and Melissa Lo, and in Claus Zittel's phenomenally wide-ranging and exacting *Theatrum philosophicum*.

Zittel's work is a salutary reminder that studying visual things that were intended to communicate knowledge should lead to research on the ways in

<sup>21</sup>Fischel, 2010, 147. See also Parshall.

<sup>22</sup>Daston, 2015, 15. For Skinner's "misleading fetishism of words," see Skinner, 39.

which vision itself was understood, debated, augmented, and put to use. Since Svetlana Alpers's *The Art of Describing*, a book regularly referred to in the literature under review, it has become unremarkable to claim that early modern vision has a history. Indeed, we may now comfortably speak of the historical epistemology of vision as well as of epistemic images. We are increasingly well informed about how vision was theorized in the period thanks to collections such as *Renaissance Theories of Vision*, edited by John Hendrix and Charles Carman. But vision is a cultural entity as much as a set of theories, as recent work by Sven Dupré and by the authors in Christine Göttler and Wolfgang Neuber's *Spirits Unseen* have shown. In *Visual Acuity*, Jeffrey Chipps Smith has introduced a form of visual attentiveness that, enmeshed with religious experience, encouraged precise thinking as well as sharp images, while Bret Rothstein has proposed "visual difficulty" — as presented by puzzles of all kinds — as a promising avenue for future research.

Difficulty, acuity, observation: all are apt for the domain of epistemic images. They reflect such images' role in differentiation, discrimination, and judgment — in short, in mental work of all kinds. But images, as Stuart Clark has shown in his fine account of the cultural and intellectual fortunes of vision, *Vanities of the Eye*, were fickle things in the early modern period. In their appeal to the senses of sight and touch, they were seducers as much as they were reliable informants, playing to man's natural yearning for beauty as much as to his thirst for knowledge. As Dürer put it, "A thing you behold is easier of belief than [one] that you hear. . . . Every form brought before our vision falls upon it as upon a mirror. By nature we regard one form and figure with more pleasure than any other, though the thing in itself is not necessarily better or worse. We like to behold beautiful things, for this gives us joy."<sup>23</sup> Beauty, it should be recalled, was for Dürer a necessary part of utility.<sup>24</sup> His words should give us pause for thought in the face of assertions such as Renzo Baldasso's — in a valuable account of early modern scientific visualization — that images should occupy "center stage, while their aesthetic value remains secondary, as it did in the eyes of those who prepared and used [them]."<sup>25</sup> We have become astute analysts of the relationship between early modern knowledge and its images. But we should not forget that for the makers and consumers of those images, the aesthetic was often just as important as the epistemic.

<sup>23</sup>Quoted in Stechow, 112.

<sup>24</sup>See Panofsky, 2005, 276.

<sup>25</sup>Baldasso, 2006, 70.

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