INTRODUCTION:
VISION AND VISUAL ANALOGY DURING
THE LATER MIDDLE AGES

> In some country everyone is blind from birth. Some are eager for knowl-
> edge and aspire after truth. Sooner or later one of them will say, "You see,
> sirs, how we cannot walk straight along our way, but rather we frequently
> fall into holes. But I do not believe that the whole human race is under
> such a handicap, for the natural desire that we have to walk straight is not
> frustrated in the whole race. So I believe that there are some men who are
> endowed with a faculty for setting themselves straight."
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> Nicholas of Autrecourt, *Exigit ordo* (ca. 1330)[1]

Tired of falling into holes, someone in a country where everyone is blind
from birth dreams of the ability to avoid falling into holes. Unfortunately,
nothing is foolproof and Thales, reputed to have been the very first of
the Presocratic philosophers and someone who, I imagine, could see as
well as the next person, still had his problems with holes. As an ancient
and probably apocryphal anecdote would have it, one day Thales fell
into a well while looking up at the stars. We know all this because a
witty servant girl just happened to be on the scene, ready with a quip
and eager to gossip.[2] Late in the sixteenth century, Michel de Montaigne
would include this anecdote in his *Apology for Raymond Sebond*. According
to Montaigne, Thales does not simply fall into the well. The servant girl
places a rock in the philosopher's path to teach him a lesson. Before he
worries about things in the clouds, he had better first worry about the
things around him. Montaigne, however, has doubts about the value of
the girl's advice. "Our condition," he writes, "makes the knowledge of
what we have in our hands as remote from us and as far above the clouds

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[1] Nicholas of Autrecourt, *Exigit ordo executionis*, ed. Reginald O'Donnell, in *Mediaeval Studies* 1,
(1939), 189. *The Universal Treatise of Nicholas of Autrecourt*, trans. Leonard A. Kennedy, Richard E.
Arnold and Arthur E. Millard (Milwaukee: Marquette University Press, 1971). I have both relied
upon and emended this translation where necessary.

[2] The anecdote comes from Plato's *Theaetetus* 174a and is included in G. S. Kirk, J. E. Raven and
M. Schofield (eds.), *The Presocratic Philosophers*, 2nd. edn. (Cambridge: Cambridge University
Press, 1983), p. 80.

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as that of the stars."[3] Had he been staring at the servant girl, Thales most likely would still have fallen in the well.

Nicholas of Autrecourt, who was undoubtedly among the most inno-vative and controversial of fourteenth-century thinkers, would have appreciated Montaigne's sentiments. After all, Nicholas did not generate his little thought experiment concerning the country of blind people in order to extol the virtues of sight, but rather to alert his readers to the potential insufficiency of vision and visual evidence. While the blind dreamer imagines a faculty that would allow him to somehow avoid the holes that all too frequently interrupt his walks, Nicholas tells us that his peers chastise him. "Your supposition goes right against experience," they say, "What would that faculty be? Not intellect, for we have that and we still do not walk straight. Not taste, not smell – these senses effect nothing." Perhaps experience provides no evidence for the exis-tence of such a faculty, but does that mean it does not or could not exist? The blind man appeals to something Nicholas will call a "metaphysical argument," an argument that looks to non-evidential, non-experiential, criteria for its support. Given our natural desire to walk straight, he argues, it only makes sense that someone, somewhere, has this ability. The blind dreamer's argument is not evident and nothing his visually-impaired countrymen have ever experienced supports it. But then again, nothing they have experienced argues decisively against the existence of such a faculty. His supposition is possible and, given his metaphysical argument, it might even be probable. Nicholas believes there is a simple lesson to be gleaned from this anecdote – sensory evidence, all sensory evidence, is inconclusive for "many things can exist which are not natu-rally fitted to reach" the senses.[4] Maybe we, possessed of sight as we are, can see the holes and wells that block our paths, but that certainly does not mean we see everything or see things for what they really are.

Whether or not falling into a hole is a fit metaphor for the practice of philosophy, Nicholas was certainly not the only scholastic thinker to recognize that our senses sometimes deceive us. It was a topic of much discussion at Paris and Oxford during the fourteenth century, a topic most famously associated with the English Franciscan William Ockham. Imagine you are looking at a star. Now imagine that God, who can do anything, destroys the star while maintaining your vision of it. What you

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[3] Michel de Montaigne, *The Complete Essays of Montaigne*, trans. Donald M. Frame (Stanford: Stanford University Press, 1965), p. 402.
[4] Nicholas of Autrecourt, *Exigit*, p. 189 (lines 16–25): "Dicet alius: tu ponis directe contra sensum; quale esset illud principium, non intellectus quia illum habemus, non tamen recte incedimus; non gustus, non olfactus; isti sensus nihil faciunt . . . et tamen ille habebit certitudinem per suum medium metaphysicum et sciet quod multa possunt esse quae non sunt nata pervenire apud sensum eorum, saltem non est repugnantia."

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now see is a non-existent star. In other words, there is no necessary con-
nection between the act of seeing and the seen object. What appears need
not exist.[5] Three hundred years later, René Descartes would transform
Ockham's omnipotent God into an evil demon and use this argument
to great sceptical effect. With it, he thought he could clear away the
deadweight of scholastic philosophy and build "a firm and permanent
foundation in the sciences."[6] That Descartes ultimately failed is of less
importance than that he tried and that he thought such an undertaking
was both necessary and, in principle at least, achievable. For their part,
scholastic thinkers had reacted quite differently to the problem of sensory
error.

The distinction between what appears and what exists (however they
phrased it, and they phrased it in a bewildering variety of ways) certainly
fascinated scholastic theologians. Henry of Ghent, Duns Scotus, Peter
Aureol and Walter Chatton are only a few of the academics during this
period to devote large sections of their commentaries on Peter Lombard's
Sentences to problems concerning vision and visual error. What is the
relation between the intellect and its object? What is the relation between
what appears to the senses and what exists in the world? Could God cause
us to see a non-existent star and, if so, would we be deceived? Despite
their almost obsessive interest in these sorts of questions and problems,
medieval thinkers did not believe that the mere possibility of visual error
posed the sort of absolute epistemological threat that Descartes thought
it posed. While Nicholas was more than happy to overturn past authority
and to argue that the senses could provide us with little certitude, he never
considered this a problem that needed to be corrected. In the pages and
chapters that follow, I hope to explain what made these different attitudes
towards visual error possible.

No doubt these are the sorts of abstract philosophical questions Thales
was warned against considering too deeply, at least not before looking
where his next step was about to land. But falling in a hole can have
its advantages, and sometimes when we are in a hole we can see things
previously invisible to us. At least this was the opinion of Aristotle, who
once observed that during the day, a man deep down in a well and

[5] William of Ockham, *Quodlibeta* VI, quodlibet 6, in Gedeon Gál *et al.* (eds.), *Opera philosophica et
theologica*, vol. 9 (St. Bonaventure: The Franciscan Institute, 1967–), p. 605. Philotheus Boehner,
"The *Notitia intuitiva* of Non-Existents According to William Ockham," in Eligius Buytaert (ed.),
Collected Articles on Ockham (St. Bonaventure: The Franciscan Institute, 1958), pp. 274-87, offers
the clearest account of how Ockham situates this scenario within his broader epistemological and
cognitive theories. Compare with Katherine Tachau, *Vision and Certitude in the Age of Ockham*
(Leiden: E. J. Brill, 1988), pp. 115-29, for a somewhat different interpretation.

[6] René Descartes, "Prima," in George Heffernan (ed. and trans.), *Meditationes de prima philosophia*
(Notre Dame: University of Notre Dame Press, 1990), p. 86.

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looking up could "sometimes see the stars."[7] While it is entirely beside
the point that Aristotle's observation was wrong, it is not at all beside the
point that, during the second half of the thirteenth century, Franciscan
natural philosophers like Roger Bacon and John Pecham believed they
had acquired and mastered a visual theory capable of explaining such
peculiar (if occasionally specious) phenomena as the alleged visibility of
stars during the day from the bottom of a well.[8] There is no doubt that
the science of perspective (as this visual theory was commonly called)
influenced theological debates concerning knowledge, vision and visual
error, but the nature and extent of this influence is not at all straightfor-
ward.[9] It is undeniable, for example, that perspectivist theory provided a
multi-faceted framework within which theologians worked to develop a
wide-ranging theory of cognition.[10] There is, however, another comple-
mentary, if different way to approach this history of intellectual debate,
one that does not treat these theologians in their role as cutting-edge natu-
ral philosophers, creatively mining the possibilities hidden within the ore
of Roger Bacon's nascent perspectivist paradigm. Rather, it treats them
as theologians (or theologians-in-training), as religious men immersed in
the religious practices and concerns of their day, men who found in per-
spectivist thought a way to articulate the implications of those practices
and concerns.

   As a starting point for this approach, it is important to recognize that the
problems that motivated theologians like Duns Scotus and Peter Aureol
were at times incidental to or entirely independent of perspectivist theory.
Whereas the perspectivists were interested in the actual causal processes
that made human visual cognition possible, theological debates concern-
ing the nature of vision and the relation between appearance and reality
were often framed within quite different concerns. Theological debates,
more often than not, began with ontological questions connected with

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[7] Aristotle, *On the Generation of Animals*, in Jonathan Barnes (ed.), *The Complete Works of Aristotle:
The Revised Oxford Translation* (Princeton: Princeton University Press, 1984), 780b. On the history
of this commonly accepted and untrue belief, see Aydin M. Saylii, "The Observation Well," *Actes
du VIIe Congrès international d'Histoire des Sciences* (Jerusalem, 1953), 542-50.

[8] See Roger Bacon, *Perspectiva*, Part 1, distinctio 1, chapter 1, in David C. Lindberg (ed. and trans.),
*Roger Bacon and the Origins of Perspectiva in the Middle Ages: A Critical Edition and English Translation
of Bacon's "Perspectiva" with Introduction and Notes* (Oxford: Clarendon Press, 1996), pp. 162-4.

[9] See David C. Lindberg, *Theories of Vision from Al-Kindi to Kepler* (Chicago: The University of
Chicago Press, 1976), pp. 139-42 and Gabriella Federici Vescovini, "Vision et réalité dans la
perspective au XIVe siècle," in *View and Vision in the Middle Ages* (Turnhout: Brepols, 1997),
pp. 161-73.

[10] In her excellent study, Tachau, *Vision and Certitude*, p. xvi, writes, "At least as early as Roger
Bacon . . . scholars perceived the whole range of optical concerns as lying not at the periphery
but at the nexus of natural philosophy and epistemology (all ultimately at the service of theology).
Hence from the mid-thirteenth century medieval intellectuals sought what might seem a 'unified
field theory' of light, vision, cognition, and our expression of what we know to be true."

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the principle of singularity, moral problems involving human free will, and theological problems arising from the nature of the beatific vision and God's omnipotence. In addressing these sorts of issues, theologians exploited perspectivist ideas and resorted to visual analogies. When considering some of the epistemological implications of his revolutionary ontology, for example, Duns Scotus suggests that in addition to sensory vision there must also exist an "intellectual vision."[11] The intellect and its capacities, in other words, are modelled after vision. Knowing something is somehow analogous to seeing something.

Before losing ourselves in the minutiae of these rather intricate medieval scientific and theological controversies, it might serve us well to step back from them for a moment in order to make a fairly broad observation. Whatever else it might indicate about later medieval intellectual life, the rise of perspectivist optics and the scholastic debates about the nature of sensory and intellectual cognition reveals a keen interest in vision and in the distinction between what appears and what exists. Not only were natural philosophers interested in the nature of vision, theologians found it useful to employ a rich variety of visual analogies to explain intellectual, spiritual and moral processes. Framing the issue in this way has the distinct advantage of cutting down on the glare of details that can all too easily blind us to whatever connection these arcane debates may have had to the rest of medieval society. After all, who besides a very few highly trained men at the universities in Paris and Oxford really cared whether vision occurred through the mediation of sensible species or through an immediate act of virtual attention or, for that matter, whether an intuitive cognition was similar to or radically distinct from an abstractive cognition? But if we put such complicated and terminologically daunting philosophical details aside for a moment, these seemingly abstract and rarefied debates can be seen as part of a much wider, more deeply felt set of concerns about the nature of appearances, about how the world appears to us and about how we appear to others and to ourselves.

Roger Bacon himself suggests some of these connections in the *Perspectiva*. Included as part of his *Opus maius*, a work he cobbled together around 1268 at the request of Pope Clement IV, Bacon's *Perspectiva* represents the first European effort to master the visual and optical theories of the Islamic natural philosopher Alhacen. As far as Bacon was concerned, the value of this science far exceeded all others. Vision, he claims, is the noblest of our senses. It is the sense upon which all human science depends. To understand how vision operates is to understand how

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[11] Cited in Allan Wolter, "Duns Scotus on Intuition, Memory, and Our Knowledge of Individuals," in *The Philosophical Theology of John Duns Scotus* (Ithaca: Cornell University Press, 1990), p. 98.

human science is possible, how it can be improved and how errors can be avoided.[12] But to Bacon's mind the science of perspective was capable of much more. And so, towards the very end of the *Perspectiva*, Bacon writes, "Now, in conclusion, I wish to reveal how this science has inexpressible utility with respect to divine wisdom." The science of vision, quite simply, is the key to interpreting and understanding scripture. "For in divine scripture," he continues, "nothing is dealt with as frequently as matters pertaining to the eye and vision . . . and therefore nothing is as essential to [a grasp of] the literal and spiritual sense than the certitude supplied by this science." For example, we cannot hope to understand a passage like, "Preserve me oh Lord, as the pupil of your eye," Bacon explains, "unless we first consider how the preservation of the pupil is achieved, to the point where God would consider it worthy to preserve us in like manner."[13]

Now this rather odd approach to biblical interpretation might not really seem to move us all that far from the medieval university and its complicated theoretical debates. Admittedly, if it had never moved beyond the back pages of the *Perspectiva*, Bacon's plea for the spiritual significance of this science would be interesting, but not terribly representative of anything but the peculiarities of the medieval intellectual. However, Peter of Limoges, a prominent member of the Sorbonne (where he became a master in theology) and a fairly well-known astrologer, found Bacon's plea quite compelling. Peter was well versed in the newly emergent science of perspective and in the 1280s he put that knowledge to good use. The result was the *Tractatus moralis de oculo*, or *The Moral Treatise on the Eye*, a lengthy, at times repetitive, almost always fascinating attempt to articulate the moral and spiritual implications of perspectivist optics. Most significantly, the *Moral Treatise* was composed with an eminently practical goal in mind. Despite the occasional detailed foray into perspectivist theory, the *Tractatus* was first and foremost a preaching manual, a manual designed to assist preachers with their sermons. Divided into fifteen books, each one subdivided into numerous chapters and filled with illustrative exempla, Peter's manual proved popular throughout Europe, not only among members of the university, but also among the religious of all sorts. Over 150 manuscript copies still exist and records indicate that at least another 100 copies were made. It was still popular enough in the late

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[12] Roger Bacon, *Perspectiva*, Part I, distinction 1, chapter 1, pp. 2–4 (lines 12–50).

[13] Roger Bacon, *Perspectiva*, Part III, distinction 3, chapter 1, pp. 320–2 (lines 21–5): "Volo nunc in fine innuere quomodo hec scientia habet ineffabilem utilitatem respectu sapientie divine . . . Cum enim dicitur, 'Custodi nos, Domine, ut pupillam oculi,' impossibile est scire sensum Dei in hoc verbo nisi primo consideret homo quomodo pupille custodia perficitur, quatenus ad eius similitudinem Deus nos custodire dignetur."

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fifteenth century to justify several incunabula editions, including one
translated into Italian.[14]

It would be too much to claim that the *Tractatus*' popular success indi-
cated a general hunger for perspectivist theory. Nevertheless, its success is
indicative of something quite interesting and quite important. Scholastic
natural philosophers and theologians were not the only medieval Euro-
peans interested in vision, in visual analogies and visual metaphors. At
least one reason why the *Tractatus* resonated so loudly with the reli-
gious throughout Europe is that developments in religious practice and
life had changed the way that many people understood both themselves
and those around them. In many respects, people had come to think
about themselves primarily in visual terms, in terms of a somewhat amor-
phous distinction between what appears and what exists. Perhaps Peter
of Limoges' preaching aid most explicitly addresses these ideas, but they
inform a wide variety of literature in a wide variety of ways. In particular,
they inform two significant developments in medieval religious life: the
growing popularity of personal confession and the rise of the mendicant
religious orders.

Confessional treatises from as early as the late eleventh century, as well as
thirteenth- and fourteenth-century religious pastoralia of all sorts, reveal
an overwhelming and systematically conceived interest in appearances.
Confessional manuals, for example, are full of instructions to ensure that
penitents and their sins will be fully revealed to their confessors. Not only
does the confessor see the penitent, the penitent is taught to see himself
through the confessor's gaze. Likewise, Dominican and Franciscan train-
ing books constantly urge their members to adapt their appearance, their
self-presentation, to the demands of the moment. Religious novices and
preachers alike are taught how to behave and how to present themselves
in any given setting, in the refectory, for example, in the library or on
the road, before different sorts of audiences. "At no time should you ever
be careless or secretive" writes the thirteenth-century Franciscan David
of Augsburg in the *De institutione novitiorum*, "rather you should always
maintain yourself with discipline and chastity in sight, taste, touch and in
everything else, as if you were being watched by someone." According
to David, the novice was, in fact, always under observation, if not by his

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[14] Richard Newhauser, "Der *Tractatus moralis de oculo* des Petrus von Limoges und seine *exempla*," in
Walter Haug and Burghart Wachinger (eds.), *Exempel und Exempelsammlungen* (Tübingen: Max
Niemeyer Verlag, 1991), pp. 95-136 and "Nature's Moral Eye: Peter of Limoges' *Tractatus moralis
de oculo*," in Susan J. Ridyard and Robert G. Benson (eds.), *Man and Nature in the Middle Ages*,
Sewanee Mediaeval Studies 6 (Sewanee: University of the South Press, 1995), pp. 125-36. Given
the sheer volume of surviving witnesses, Newhauser, pp. 133-4, remarks that Peter's manual was
as popular as Thomas of Cantimpré's better remembered *Bonum universale de apibus.*

peers or his masters, certainly by the "holy angels who are always with us and who see every act we commit."[15]

None of this is meant to imply that an interest in vision and visual analogy was unique to people during the later Middle Ages, between say, 1150 and 1400. A great deal has been written in recent years concerning the power of visual metaphors and modes of thought throughout much, if not all, of Western history. Roger Bacon was only one in a long line of theologians, philosophers and scientists extending all the way back to the Presocratics to praise vision as the noblest and most useful of all the senses.[16] Aristotle gave particularly clear voice to this tradition at the very start of his *Metaphysics* when he wrote, "All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. For not only with a view to action, but even when we are not doing anything, we prefer sight to almost everything else. The reason is that this, most of all the senses, makes us know and brings to light many differences between things."[17] However innocent such reflections on vision may appear at first glance, philosophers, historians and psychologists have long noted the many ways that this emphasis on vision has shaped and determined conceptions of truth and knowledge. The tendency to equate knowing with seeing has, among other things, fostered a Western intellectual predilection for the eternal over the temporal, being over becoming, and a peculiar distinction between knower and known that inevitably led to what John Dewey famously referred to as "the spectator theory of knowledge."[18]

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[15] David of Augsburg, *De institutione novitiorum*, Part I, chapter 16, in Bonaventure, *Opera omnia*, vol. 12 (Paris: Vivès, 1868), p. 298: "Nunquam ita securus sis et absconsus, quin ita disciplinate et caste te habeas in visu, gestu, tactu, et in omnibus aliis, ac si ab aliquo videreris: quia sancti angeli, qui nobiscum sunt, semper vident omnia opera quae facimus: quorum aspectus debemus ubique vereri, et praesentiam revereri."

[16] For a comprehensive overview of this tradition from the Presocratics through to the European Enlightenment see, Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley: University of California Press, 1993), pp. 21–147.

[17] Aristotle, *Metaphysics*, I.I, trans. W. D. Ross, in Barnes (ed.), *Complete Works*, vol. 2, p. 1552.

[18] John Dewey, *The Quest for Certainty* (New York: G. P. Putnam and Sons, 1980), p. 23, "The theory of knowing is modeled after what was supposed to take place in the act of vision. The object refracts light to the eye and is seen; it makes a difference to the eye and to the person having an optical apparatus, but none to the thing seen. The real object is the object so fixed in its regal aloofness that it is a king to any beholding mind that may gaze upon it. A spectator theory of knowledge is the inevitable outcome." Richard Rorty, *Philosophy and the Mirror of Nature* (Princeton: Princeton University Press, 1980), p. 39, who cites Dewey, popularized many of these themes. For a survey of contemporary studies on vision see the two volumes edited by David Michael Levin, *Modernity and the Hegemony of Vision* (Berkeley: University of California Press, 1993) and *Sites of Vision: The Discursive Construction of Sight in the History of Philosophy* (Cambridge: The MIT Press, 1997). The literature on this topic is immense and I will limit further citations to two classic and commonly referenced works, Hans Jonas, "The Nobility of Sight: A Study in the

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Whatever such grand theorizing lacks in nuance, it certainly makes up for in the sheer breadth of its explanatory scope. It is, however, important to recognize that this overarching visual bias has revealed itself in any number of different ways since its initial appearance in ancient Greece. The precise development of this Western visual favouritism (or "ocularcentrism"), in short, can only be grasped through its specific historical manifestations, that is, through the various "scopic regimes" to which it has given rise and within which it has achieved its concrete historical reality.[19]

The specific historical manifestation that has most interested historians of western vision and visuality is one that seems to have coalesced during the fifteenth through seventeenth centuries. Erwin Panofsky did much to jumpstart this line of inquiry in his seminal work, *Perspective as Symbolic Form*, in which he argued that the rise of linear perspective during the fifteenth century marked "the conquest over the medieval representational principle." According to Panofsky, linear perspective of the sort described by Alberti and put into painterly practice by Masaccio and Piero della Francesca not only constituted a new way of artistically representing space (and objects in space) but was itself reflective of contemporary advances "in epistemology or natural philosophy." The homogeneous, geometrically organized space of a painting drawn in linear perspective went hand in hand with the overthrow of Aristotle's hierarchized cosmos and the establishment of the homogeneous, geometrically describable and infinite space of early modern science.[20] This pictorial "rationalization of sight," to borrow a phrase from another historian of perspective, William Ivins, is only one of many developments that historians have cited in arguing for a visual turn during these centuries.[21] In a work whose influence matches that of Panofsky's, Walter Ong has argued for a European-wide visual turn during this period, "a profound reorientation

Phenomenology of the Senses," in *The Phenomenon of Life: Toward a Philosophical Biology* (Chicago: The University of Chicago Press, 1982) and Maurice Merleau-Ponty, "Eye and Mind," in James M. Edie (ed.) and Carleton Dallery (trans.), *The Primacy of Perception* (Evanston: Northwestern University Press, 1964). Although Jay's book, *Downcast Eyes*, does not include a bibliography, the footnotes are full to overflowing with citations from much of the relevant literature.

[19] Christian Metz, *The Imaginary Signifier: Psychoanalysis and the Cinema*, trans. Celia Britton, (Bloomington: Indiana University Press, 1982), pp. 61-3, introduced the expression "scopic regime" to name dominant and structuring relations between observer, image and object. The scopic regime of the cinema, for example, is defined by the absence of the seen object (which simply means when we see something on the silver screen, we really only see its projected image, not the thing itself).

[20] Erwin Panofsky, *Perspective as Symbolic Form*, trans. Christopher S. Wood (New York, Zone Books, 1991), pp. 55 and 65. For a superb critique of Panofsky's theoretical claims, see James Elkins, *The Poetics of Perspective* (Ithaca: Cornell University Press, 1994), pp. 181-216.

[21] William M. Ivins, Jr., *On the Rationalization of Sight: With an Examination of Three Renaissance Texts on Perspective* (New York: Da Capo Press, Inc., 1975), p. 7.

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within the human spirit which made it possible to think of all the pos-
sessions of the mind, that is, of knowledge and expression, in terms
more committed to space than those of earlier times." Ong contends
that transformations in university curriculum and logic textbooks, the
rise of Humanism and the printing press attest to an increasing tendency
to perceive and, therefore, to reduce and think about all problems, as
problems of spatial relations and vision.[22]

Narratives about vision and visuality during the fifteenth through
seventeenth centuries, in other words, have long since become part and
parcel of the larger story of Europe's transformation from a medieval to
a Renaissance or (more recently) from a pre-modern to an early modern
society. According to this line of thought, early modern Europe bears
witness to, perhaps is even constituted through, a new scopic regime,
a new understanding of vision, its physics, its limits and its metaphori-
cal powers to encompass, explain and control both the world and human
beings. It is, scholars contend, a regime made manifest in everything from
the rise of the individual and mercantile capitalism to the development
of the mathematical sciences and the centralized absolutist state.[23] What-
ever problems these accounts may have (and whether we interpret them
as signs of rationalization or disenchantment, progress or decline), all of
them posit some sort of break or rupture with the past, with medieval
or pre-modern visual discourse.[24] There is a good reason to take these

[22] Walter J. Ong, *Ramus, Method and the Decay of Dialogue* (Cambridge: Harvard University Press,
1958), pp. 306-10. While Ong suggests that the real reorientation in the European "sensorium"
occurred during the fifteenth and sixteenth centuries, he acknowledges that a slowly growing
visual bias had long been underway and is already somewhat evident in medieval manuscript and
university culture. For his part, Alfred W. Crosby, *The Measure of Reality: Quantification and Western
Society, 1250-1600* (Cambridge: Cambridge University Press, 1997), has pushed back the actual date
of this transformation to the decades surrounding 1300. Citing innovations like monetization,
double-entry bookkeeping, and Giotto's paintings, Crosby writes, pp. 227-8, "Beginning in the
miraculous decades around the turn of the century (decades unmatched in their radical changes
in perception until the era of Einstein and Picasso) . . . Western Europeans evolved a new
way, more purely visual and quantitative than the old, of perceiving time, space, and material
environment." For a critique of these visualist approaches to early modern history, see Timothy
J. Reiss, *Knowledge, Discovery and Imagination in Early Modern Europe* (Cambridge: Cambridge
University Press, 1997), pp. xii–xiii and 127. Joel Kaye, *Economy and Nature in the Fourteenth Century*
(Cambridge: Cambridge University Press, 1998), circumventing all arguments about vision and
visuality, links the rise of science to the influence of a monetized European marketplace. Kaye
writes, p. 14, "Scholastic natural philosophers began to create a new model of nature, one that
could comprehend the order and logic of the marketplace - dynamic, self-equalizing, relativistic,
probabilistic, and geometrical - a nature constructed and bound together by lines in constant
expansion and contraction. It was within this new model of nature that science emerged."

[23] For a summary of these sorts of arguments see Jay, *Downcast Eyes*, pp. 57-69.

[24] Suzannah Biernoff, *Sight and Embodiment in the Middle Ages* (New York: Palgrave Macmillan,
2001), pp. 6-13, critiques the tendency to interpret the shift from medieval to later visual culture
in terms of a move from primitive or pathological modes to increasingly advanced or normalized
modes of seeing.