

CHAUCER'S VISUAL WORLD:
A Study of his Poetry and
the Medieval Optical Tradition

2 volumes

Volume 2

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3. See above, vol.1, ch.9.
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5. Ibid., vol.3, pp.3-9.
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7. Ibid., vol.3, p.18.
8. Ibid., vol.3, pp.16-29. For a more detailed discussion of the philosophy of light in Grosseteste, see above, vol.1, pp.104-9.
9. de Bruyne, Etudes d'esthétique, vol.3, pp.142-44 and 147.
10. See above, vol.1, pp.90-100 for a fuller account of Alhazen.
11. de Bruyne, Etudes d'esthétique, vol.3, p.243.
12. Ibid., vol.3, pp.245-51.
13. Ibid., vol.3, p.251; see also p.248.
14. Opticae thesaurus: Alhazeni arabis libri septem, nunc primum editi. Eiusdem liber de crepusculis et nubium ascensionibus. Item Vitellonis Thuringopoloni libri X. Omnes instaurati, figuris illustrati et aucti, adiectis etiam in Alhazenum commentaris, a Federico Risnero, ptd. Episcopios, (Basel: 1572). With an Introduction to the Reprint Edition by David C. Lindberg. Sources of Science, no.94, (New York: Johnson, 1972).
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18. This idea is especially developed in ibid., ch.2.
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21. Ibid., p.131.
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27. Ibid., p.78.
28. Ibid., pp.53-54.
29. James J. Gibson, The Perception of the Visual World, (1950; rpt. Westport, Conn.: Greenwood Press, 1974).
30. Rudolf Arnheim, Art and Visual Perception: A Psychology of the Creative Eye, rev. edn. (1954; Berkeley: Univ. of California Press, 1974), chs.5 and 6; Jan B. Deregowski, 'Illusion and Culture', in R.L. Gregory and E.H. Gombrich, eds., Illusion in Nature and Art, (London: Duckworth, 1973), pp.160-91; and his 'Orientation and Perception of Pictorial Depth', Int. J. Psychol., vol.6 (1971), pp.111-14; James J. Gibson, 'A Theory of Pictorial Perception', A V. Commun. Rev., vol.2 (1954), pp.3-23; his 'The Information Available in Pictures', Leon., vol.4 (1971), pp.27-35; his 'Pictures, Perspective, and Perception', Daed., vol. 89 (1960), pp.216-27; and his The Senses Considered as Perceptual Systems, (1966; London: Allen and Unwin, 1968); E.H. Gombrich, 'Illusion and Art', in Gregory and Gombrich, eds., Illusion in Nature and Art, pp.192-243; his 'Visual Discovery through Art', Arts Mag., vol.39 (1965), pp.17-28; rpt. in James Hogg, ed., Psychology and the Visual Arts: Selected Readings, (Harmondsworth: Penguin, 1969) pp.215-38; his 'The "What" and the "How": Perspective Representation and the Phenomenal World', in Richard Rudner and Israel Scheffler, eds., Logic and Art: Essays in Honor of Nelson Goodman, (Indianapolis and New York: Bobbs-Merrill, 1972), pp.129-49; his The Sense of Order: A Study in the Psychology of Decorative Art. Wrightsman Lectures, vol.9, (London: Phaidon, 1979), ch.4; R.L. Gregory, Eye and Brain: The Psychology of Seeing, 3rd edn. (1966; London: Weidenfeld and Nicolson, 1977); his The Intelligent Eye. World University, (1970; London, Weidenfeld and Nicolson, 1971); and his Concepts and Mechanisms of Perception, (London: Duckworth, 1974), chs. 27, 54 and 55; John M. Kennedy, A Psychology of Picture Perception: Images and Information. Jossey-Bass Behavioral Science ser., (San Francisco and London: Jossey-

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38. This is evident in Warton's footnotes where, apart from using Jebb's edition of the Opus maius, he is obliged to refer to MSS. and secondary sources. Warton appears not to be aware of Risner's edition of Alhazen and Witelo of 1572.
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42. Ibid., p.xviii.
43. Ibid., pp.xxi-xxii.
44. Ibid., p.xxii.
45. Ibid., ch.1.
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55. Parronchi, 'Prospettiva dantesca', pp.5-15.
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57. Ibid., pp.15-16 and 21-23.
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60. Ibid., p.44.
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62. Note the concluding remarks in ibid., p.102.
63. Patricia J. Eberle, 'The Lovers' Glass: Nature's Discourse on Optics and the Optical Design of the Romance of the Rose', UTQ, vol.46 (1976-1977), pp.241-62.
64. For a fuller discussion of this article, see above, vol.1, pp.208-9.
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66. Ibid., p.188.
67. Gerhard Joseph, 'Chaucerian "Game"- "Earnest" and the "Argument of Herbergage" in the Canterbury Tales', ChauR, vol.5 (1970-1971), p.83.
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70. For further discussion of the article, see above, vol.1, pp.405-6.

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72. See below, vol.2, p.89, nn.126 and 127.
73. Charles Muscatine, 'Locus of Action in Medieval Narrative', RP, vol.17 (1963-1964), pp.115-22.
74. Ibid., p.116 (author's emphasis).
75. Ibid., p.117.
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77. Loc. cit. (author's emphasis).
78. Ibid., p.119. For further discussion by Muscatine of this aspect of Dante, see above, vol.1, pp.221-23.
79. Muscatine, 'Locus of Action', p.120.
80. Erwin Panofsky, 'Die Perspektive als "Symbolische Form"', VBW, 1924-1925, (Leipzig and Berlin: 1927), pp.258-330. No English trans. has appeared in print, but I am fortunate in possessing one in MS., done by Christine Cowan of the University of York Library.
81. For commentary on Panofsky's article, see Samuel Y. Edgerton, Jr., The Renaissance Rediscovery of Linear Perspective. Icon Editions, (1975; New York: Harper and Row, 1976), ch.11.
82. Panofsky, 'Perspektive als "Symbolische Form"', p.268.
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88. Ibid., pp.14-17.
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96. Ibid., pp.103-4.
97. See above, vol.1, pp.156-63.
98. Charles Monroe Coffin, John Donne and the New Philosophy. Columbia Univ. Studies in English and Comparative Literature, no.126, (New York: Columbia Univ. Press, 1937), p.3.
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100. Ibid., p.176. See also Marjorie Hope Nicolson, Science and Imagination, (Ithaca, N.Y.: Great Seal Books, 1956), ch.1.
101. Marjorie Hope Nicolson, Mountain Gloom and Mountain Glory: The Development of the Aesthetics of the Infinite, (1959; rpt. New York: Norton, 1963). For an earlier statement of some of the ideas developed in this book, see her The Breaking of the Circle: Studies in the Effect of the 'New Science' upon Seventeenth-Century Poetry, rev.edn., (1950; New York: Columbia Univ. Press, 1960), ch.4.
102. Nicolson, Mountain Gloom, p.1.
103. Ibid., p.20.
104. Ibid., p.22.
105. Ibid., p.25.
106. Ibid., p.45.
107. Ibid., p.109.
108. Ibid., p.134.
109. Ibid., p.139.
110. Ibid., p.143.
111. Ibid., p.273 and see p.275.
112. Ibid., p.309.
113. Marjorie Hope Nicolson, Newton Demands the Muse: Newton's 'Opticks' and the Eighteenth Century Poets. History of Ideas ser., no.2, (1946; rpt. Hamden, Conn.: Archon Books, 1963).
114. Nicolson, Mountain Gloom, p.ix.
115. Nicolson, Newton, p.12, cites James Thomson, 'To the Memory of Newton', as an example.
116. Nicolson, Newton, pp.15-17.

117. Ibid., pp.17 and 25.
118. Ibid., p.23.
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120. Ibid., p.42, where Thomson's 'The Seasons' is cited as an example. For a study of the effect of Newton's Opticks and the camera obscura on Pope's work, see Marjorie Hope Nicolson and G.S. Rousseau, "This Long Disease, My Life": Alexander Pope and the Sciences, (Princeton: Princeton Univ. Press, 1968), pp.222-27 and 266-94.

Theories of Light, Vision and Space from Plato to Pecham

1. For a lucid account of what the modern usage of 'optics' implies, see Vasco Ronchi, Optics: The Science of Vision, trans. and rev. Edward Rosen, (1955; New York: New York Univ. Press, 1957), ch.1.
2. Ronchi argues on historical grounds that optics should still be anthropomorphic: "Optics should be designated the science of vision. It is not a chapter of physics, nor of physiology, nor of psychology. It is a complex science that must take into account the contribution of all three of these disciplines. In every optical operation there is always a physical, a physiological, and a psychological phase. For a process to be truly optical, all three of these phases must be represented." Ibid., p.20.
3. R.E. Latham, comp., Revised Medieval Latin Word-List from British and Irish Sources, (London: Oxford Univ. Press for the British Academy, 1965), p.346; and Erwin Panofsky, Early Netherlandish Painting: Its Origins and Character. Charles Eliot Norton Lectures 1947-1948, 2 vols., (Cambridge Mass.: Harvard Univ. Press, 1953), vol.1, p.3.
4. This is the definition provided by OED for the vernacular cognate perspective (I.1). Occurrences are noted from 1380 to 1658.
5. In ancient optics, catoptrica could include both reflection and refraction: "... l'optique ... cherche à expliquer la perception visuelle de l'espace, les phénomènes de perspective et la plupart des illusions visuelles ... La catoptrique ... S'est réservée les cas où le rayon est brisé; elle s'occupe de tous les faits relatifs à la réflexion et à la réfraction." Albert Lejeune, Recherches sur la catoptrique grecque d'après les sources antiques et médiévales. Académie Royale de Belgique: Classe des Lettres, Mémoires, 2nd. ser., vol.52, (Brussels: 1956-1957), p.3. Lejeune also notes (ibid., p.4) that the term optica sometimes refers both to direct and to broken vision. Lindberg observes that it was Chalcidius, the 4th. cent. commentator on Plato's Timaeus, who "In reporting that the geometers and peripatetics classified vision according to the three modes of radiation - direct, reflected and refracted - ... supplies what would become the standard organizing principle of later medieval optics". Lindberg, Theories of Vision, p.89.
6. I owe an especial debt of gratitude to David C. Lindberg for the numerous articles, books and editions of medieval optical texts which he has supervised and produced over the last 10 years. Through stringent and energetic scholarship he has done much to make medieval optics accessible to specialist and non-specialist alike. His Theories of Vision is an indispensable guide, as will be evident from my footnotes. For a recent summary of perspectiva, see his 'The Science of Optics' in David C. Lindberg, ed., Science in the Middle Ages. Chicago History of Science and Medicine, (Chicago: Univ. of Chicago Press, 1978), pp.338-68.

7. For a general account of the methodology and content of Greek physical science, see Marshall Clagett, Greek Science in Antiquity, (New York: Abelard-Schuman, 1955), chs.2, 3 and 6; Samuel Sambursky, The Physical World of the Greeks, trans. Merton Dagut, 2nd edn., (1956; London: Routledge, 1963), esp. pp.213-18; and his The Physical World of Late Antiquity, (London: Routledge, 1962), esp. pp.110-17. On Greek theories of vision, there is a general account by Vasco Ronchi, Storia della luce, 2nd edn., (1939; Bologna: Zanichelli, 1952), ch.1; French version as Histoire de la lumière, trans. Juliette Taton, (Paris: Colin, 1956); and English version with new material by the author as The Nature of Light: An Historical Survey, trans. V. Barocas, (London: Heinemann, 1970). Note the review of the English edn. in which Ronchi's reliability is questioned: David C. Lindberg, 'New Light on an Old Story', Isis, vol.62 (1971), pp.522-24. Lindberg's own Theories of Vision, ch.1, has excellent notes and bibliography. See also S.L. Polyak, The Retina: The Anatomy and the Histology of the Retina in Man, Ape, and Monkey, including the Consideration of Visual Functions, the History of Physiological Optics, and the Histological Laboratory Technique. Fiftieth Anniversary Publications of the Univ. of Chicago Press, (Chicago: Univ. of Chicago Press, 1941), ch.7; and Willem van Hoorn, As Images Unwind: Ancient and Modern Theories of Visual Perception, (Amsterdam: Amsterdam Univ. Press, 1972), chs. 2 and 3; and, for a comprehensive study, Bernard Saint-Pierre, 'La Physique de la vision dans l'antiquité: contribution à l'établissement des sources anciennes de l'optique médiévale', Diss. Univ. de Montréal, Institut d'Etudes Médiévales, 1972, esp. ch.8. M. Saint-Pierre kindly sent me a copy of his thesis. Studies with a more philosophical bias include John I. Beare, Greek Theories of Elementary Cognition from Alcmaeon to Aristotle, (Oxford: Clarendon Press, 1906), pp.9-92; George Malcolm Stratton, Theophrastus and the Greek Physiological Psychology before Aristotle, (London: Allen and Unwin, 1917), pp.27-32; Cyril Bailey, The Greek Atomists and Epicurus: A Study, (Oxford: Clarendon Press, 1928), pp.53-55, 103-5, 165-70, 242-67 and 406-13; and David Hahn, 'Early Hellenistic Theories of Vision and the Perception of Color', in Peter-K. Machamer and Robert G. Turnbull, eds., Studies in Perception: Interrelations in the History of Philosophy and Science, (Columbus: Ohio State Univ. Press, 1978), pp.60-95. Some short extracts from Greek optical writings appear in translation in G.S. Kirk and J.E. Raven, The Presocratic Philosophers: A Critical History with a Selection of Texts, 2nd. edn., (1957; London: Cambridge Univ. Press, 1960), pp. 343 and 421-22; and in Morris R. Cohen and I.E. Drabkin, A Source Book in Greek Science, (Cambridge, Mass.: Harvard Univ. Press, 1948), pp.257-86 and 543-46. Earlier books on the history of ancient optics are included in the list by George Sarton, Horus: A Guide to the History of Science, (Waltham, Mass.: Chronica Botanica, 1952), p.162; and by Lindberg, Theories of Vision, p.215, n.4. To these should be added N.G. Poudra, Histoire de la perspective ancienne et moderne, (Paris: Corréard, 1864).
8. Unless otherwise stated, dates are taken from DSB.
9. George Sarton, 'A Note on the Ancient and Mediaeval Tradition of the Timaios', in his A History of Science, 2 vols., (Cambridge, Mass.: Harvard Univ. Press, 1952-1959), vol.1 (1952): Ancient Science through the Golden Age of Greece, pp.428-30.

10. The Platonic theory of vision was prevalent during the early middle ages, and the large number of manuscripts of the Timaeus from all periods attests to its continuing influence. Charles Homer Haskins, Studies in the History of Mediaeval Science, (Cambridge, Mass.: Harvard Univ. Press, 1924), p.88; and Lindberg, Theories of Vision, pp.88-89. For a list of MSS., see Timaeus a Calcidio translatus commentarioque instructus, ed. P.J. Jensen and J.H. Waszing. Corpus Platonicum Medii Aevi: Plato Latinus, vol.4, (London: Warburg Institute; Leiden; Brill, 1962) pp.cvii-cxxxii.
11. A. C. Crombie, Augustine to Galileo, 2nd edn., 2 vols., (1952; London: Heinemann, 1961), vol.1: Science in the Middle Ages V-XIII Centuries, pp. 14 and 27.
12. George Sarton, Introduction to the History of Science, 3 vols. in 5, (Baltimore: Williams and Wilkins for the Carnegie Institution, [1927] - 1948), vol.2, pt. 1 (1931): From Rabbi ben Ezra to Roger Bacon, pp.346-47; and Haskins Mediaeval Science, pp.165-69.
13. On Plato's theory of vision, see Lindberg, Theories of Vision, pp.3-6; Beare, Greek Theories, pp.42-56; van Hoorn, As Images Unwind, pp.57-64; Rudolph E. Siegel, Galen on Sense Perception: His Doctrines, Observations and Experiments on Vision, Hearing, Smell, Taste, Touch and Pain, and their Historical Sources, (Basel and New York: Karger, 1970), pp.23-26; Saint-Pierre, 'Physique de la vision', pp.117-26; and Robert G. Turnbull, 'The Role of the "Special Sensibles" in the Perception Theories of Plato and Aristotle', in Machamer and Turnbull, eds., Studies in Perception, pp.9-20.
14. Plato, Timaeus, 45c; ed. Jensen and Waszing, p.41. For translation and further commentary, see Francis MacDonald Cornford, Plato's Cosmology: The 'Timaeus' of Plato, (London: Kegan Paul, 1937).
15. Lindberg, Theories of Vision, p.5 and p.217, n.30., claims that commentators have tended to ignore the prerequisite union of internal fire and daylight, thereby representing Plato's theory as a direct coalescence of the stream of vision and the light issuing from the visible object. He cites Beare, Greek Theories, p.49, as an offender, but Beare earlier affirms (ibid., pp.44-45) that the coalescence producing vision comprises all three forms of light. On what Plato meant by motion in the visual process, see van Hoorn, As Images Unwind, p.61.
16. Plato, Timaeus, 45d; ed. Jensen and Waszing, p.42.
17. Ibid., 67c; trans. Cornford, p.276.
18. van Hoorn, As Images Unwind, p.63.
19. Beare, Greek Theories, pp.48-56; and Lindberg, Theories of Vision, pp.5-6.
20. Plato, Meno, 76D; ed. Victor Kondeuter and Carlotta Labowsky. Corpus Platonicum Medii Aevi: Plato Latinus, vol.1, (London: Warburg Institute, 1940), p.16; trans. W.R. Lamb in Plato, Laches, Protagoras, Meno, Euthydemus. Loeb Classical Library: Plato, vol.4, (London: Heinemann, 1924).

21. On the transmission of Aristotle scientific writings to the West, see S.D. Wingate, The Mediaeval Latin Versions of the Aristotelian Scientific Corpus with Special Reference to the Biological Works, (London and Leamington Spa: Courier Press, 1931).
22. The pseudo-Aristotelian Problemata also contains optical questions. See Aristotle, Problems, ed. and trans. W.S. Hett, rev. edn. Loeb Classical Library, 2 vols., (vol.2 bound with Aristotle, Rhetorica and Alexandrum, ed. and trans. H. Rackham), (1936-1937; London: Heinemann, 1953-1957), vol.1 (1953): XV.5-13, pp.333-45; XVI.7 -XVII.1, pp.355-65; and vol.2 (1957): XXXI, pp.183-201. The text of the Problemata may not have been complete until the 5th. or 6th. cent. It was translated into Latin by Bartholomew of Messina between 1258 and 1264, and by the 14th. cent. it was also available in Hebrew and French. See Sarton, Introduction, vol.3, pt. 2: Science and Learning in the Fourteenth Century (1948), p.1123; and J.T. Muckle, 'Greek Works Translated Directly into Latin before 1350', Med. Stud., vol.5 (1943), p.108. Some texts of a commentary of 1310 on the Problemata by Peter of Abano are listed by Lynn Thorndike, A History of Magic and Experimental Science, 8 vols., (New York: Columbia Univ. Press, 1923-1958), vol. 2 (1923): During the First Thirteenth Centuries of Our Era, pp.921-22.
23. Haskins, Mediaeval Science, pp.61-62,66, 149, 245 and 261; Wingate, Mediaeval Latin Versions, p.96; and see L. Minio-Paluello, 'Aristotle: Tradition and Influence', DSB, vol. 1 (1970), pp.270-73. Note the translation of William of Moerbeke's version and commentary on Aquinas, cited below, vol.2, p.44, n.353.
24. Haskins, Mediaeval Science, p.223; Muckle, 'Greek Works', p.106; and Wingate, Mediaeval Latin Versions, pp.27 and 48-52.
25. Haskins, Mediaeval Science, pp.66, 143 and 261. On the history of the translations, see F.H. Fobes, 'Mediaeval Versions of Aristotle's Meteorology', Class. Phil., vol. 10 (1915), pp.297-314.
26. Thorndike, History of Magic, vol.2: First Thirteen Centuries, pp.249-50; and Minio-Paluello, 'Aristotle', p.272.
27. Crombie, Augustine to Galileo, vol.2: Science in the Later Middle Ages and Early Modern Times XIII-XVII Centuries, p.113; and see Sarton, Introduction, vol.2, pt. 1: Rabbi ben Ezra to Roger Bacon, p.23.
28. There may once have been an Aristotelian treatise devoted exclusively to optics and now lost. See Carl B. Boyer, 'Aristotelian References to the Law of Reflection', Isis, vol.36 (1945), p.93 and n.14. For detailed accounts of all aspects of Aristotle's theory of vision, see Beare, Greek Theories, pp. 56-92; Lindberg, Theories of Vision, pp.6-9; Siegel, Galen, pp.27-33; van Hoorn, As Images Unwind, ch.3; Harold Cherniss, Aristotle's Criticism of Pre-Socratic Philosophy, (Baltimore: Johns Hopkins, 1935), pp.313-22; Saint-Pierre, 'Physique de la vision', ch.5; Turnbull, 'Role of the "Special Sensibles"', pp.20-26; and Judith Marti Baumrin, 'Active Power and Causal Flow in Aristotle's Theory of Vision', J. Hist. Behav. Sci., vol.12 (1976), pp.254-59.

29. Aristotle, De anima, II.vii.418a; in Averrois Cordubensis commentarium magnum in Aristotelis de anima libros, ed. F. Stuart Crawford. Corpus Commentariorum Averrois in Aristotelem, vol.6.1, (Cambridge, Mass.: Mediaeval Academy of America, 1953), II.66, p.229. For an English version of De anima, see Aristotle, On the Soul; Parva naturalia; On Breath, ed. and trans. W.S. Hett, rev. edn. Loeb Classical Library, (1936; London: Heinemann, 1957). In the words of Beare, Greek Theories, p.57, "the object of sight is colour" (author's emphases).
30. Aristotle, De anima, II.vii.418b; ed. Crawford, II.67-69, pp.230-35.
31. Ibid., II.vii.419a; ed. Crawford, II.73, p.240.
32. Ibid., II.vii.419a; ed. Crawford, II.74, p.242. The medium "is not something that we see, but something through which we see". Lindberg, Theories of Vision, p.7. See also van Hoorn, As Images Unwind, p.90, on the importance of the continuity of the medium, which allows for the apprehension of form without matter.
33. Aristotle, De anima, II.vii.419a-419b; ed. Crawford, II. 75-76, pp.244-45. For a discussion of Aristotle's theory of touch in relation to visual perception, see Thomas J. Slakey, 'Aristotle on Sense Perception', Phil. Rev., vol. 70 (1961), pp.470-84; and Cherniss, Aristotle's Criticism, pp.320-22. According to Kahn, Aristotle considers perception to be completed in the soul or psyche, which is not separable from the sense-organs themselves: "When he describes vision, for example, as the reception of visible forms without their matter, he does not tell us whether he is referring to the arrival of light rays in the eye or the conscious perception of shapes and colors in the 'mind'." Charles H. Kahn, 'Sensation and Consciousness in Aristotle's Psychology', Arch. Gesh. Phil., vol. 48 (1966), p.44 and passim, pp.43-81.
34. The relative positions of De sensu and De anima in the chronology of Aristotle's work have been discussed by Irving Block, 'The Order of Aristotle's Psychological Writings', Am. J. Philol., vol.82 (1961), pp.50-77.
35. Aristotle, De sensu, II.437a-437b; in Aristotelis parva naturalia graece et latine, ed. Paul Siwek. Collectio Philosophica Lateranensis, no.5, (Rome: Desclée, 1963), pp.7-9; trans. Hett, On the Soul; Parva naturalia. On Empedocles' theory of vision, see Beare, Greek Theories, pp.14-23.
36. Aristotle, De sensu, II. 438a-438b; ed. Siwek, pp.11-13. See Kurt von Fritz, 'Democritus' Theory of Vision', in E. Ashworth Underwood, ed., Science, Medicine and History: Essays on the Evolution of Scientific Thought and Medical Practice Written in Honour of Charles Singer, 2 vols., (London: Oxford Univ. Press, 1953), vol.1, pp.83-99.
37. Aristotle, De sensu, III.440a; ed. Siwek, p.21.
38. Ibid., II.438b; ed. Siwek, p.13.
39. Loc. cit. Note van Hoorn, As Images Unwind, p.92: "According to Aristotle, eye-emitted rays do not play any role in the perceptual act."

40. Aristotle, De sensu, VI.446a; ed. Siwek, p.49.
41. Ibid., VI.446a-447a; ed. Siwek, pp.49-53.
42. Ibid., III.439a-439b; ed. Siwek, pp.15-19.
43. Ibid., VI.445b; ed. Siwek, pp.45-47.
44. Ibid., VII.448b; ed. Siwek, pp.59-61.
45. Aristotle, Meteorologica, II.9.370a; in Aristotelis meteorologicarum libro quatuor, ed. Ioachim Perion and Nicolaus Grouchius, (Paris: du Puys, 1577), f.43v; trans. H.D.P. Lee. Loeb Classical Library, (London: Heinemann, 1952).
46. Aristotle Meteorologica, III.4.373a; ed. Perion and Grouchius, f.46r.
47. Ibid., III.4.374b; ed. Perion and Grouchius, f.49r.
48. On authenticity and date, see the 'Introduction' to Lee's edn., pp.ix-xxv.
49. Assigning the Meteorologica to an early period, when the author was still under Plato's influence, Lindberg comments: "In any case, the universal teaching of Aristotle's psychological works is that sight does not occur through the extramission of an ocular ray." Theories of Vision, p.218, n.39.
50. Crombie, Augustine to Galileo, vol.1: V-XIII Centuries, pp.98-99.
51. On the life and work of Euclid, see Wilfred Robert Theisen, 'The Mediaeval Tradition of Euclid's Optics', Diss. Univ. of Wisconsin, 1972, pp.2-7; and see DAI, vol.32 (1972-1973), p.5697A.
52. Haskins, Mediaeval Science, p.191.
53. Theisen, 'Mediaeval Tradition', p.10.
54. Haskins, Mediaeval Science, p.191.
55. Theisen, 'Mediaeval Tradition', pp.11-17 and ed. by him, pp.336-84 (Liber de aspectibus) and pp.403-22 (Liber de radiis visualibus).
56. Haskins, Mediaeval Science, pp.178-79; Theisen, 'Mediaeval Tradition', pp.5 and 14-15. The Liber de visu, although it became widespread, was only one of several different versions from the Greek text. On the complex MS. tradition, see Lindberg, Theories of Vision, pp.210-11; and Theisen, 'Mediaeval Tradition', pp.11-15.
57. Ibid., pp.321-23 on the differences between De visu and its Arabo-Latin counterparts. There are 7 different versions of De visu extant, totalling 35 MSS.; 3 MSS. of De aspectibus; and 6 of De radiis visualibus. David C. Lindberg, A Catalogue of Medieval and Renaissance Optical Manuscripts. Pontifical Institute of Mediaeval Studies: Subsidia Mediaevaliana, no.4, (Toronto: Pontifical Institute of Mediaeval Studies, 1975), pp.50-54. Prior to the publication of this catalogue, the best sources of information on surviving

insert: Lynn Thorndike, 'Additional Addenda et
Corrigenda to the Revised Edition of Lynn
Thorndike and Pearl Kibre, A Catalogue of
Incipits of Mediaeval Scientific Writings
in Latin, 1963' Spec., vol. 40 (1965), pp.116-22.

- optical MSS. were Lynn Thorndike and Pearl Kibre, A Catalogue of Incipits of Mediaeval Scientific Writings in Latin, rev. edn. Mediaeval Academy of America: Publication no. 29, (1937; London: Mediaeval Academy of America, 1963); ^{*see attached note} and Pearl Kibre, 'Further Addenda and Corrigenda to the Revised Edition of Lynn Thorndike and Pearl Kibre, A Catalogue of Incipits of Mediaeval Scientific Writings in Latin, 1963', Spec., vol. 43 (1968), pp. 78-114.
58. "... Euclid has a special claim to the title of the originator of the science of optics. With him optics became an independent science." Theisen, 'Mediaeval Tradition', p. 23. I have used Theisen's edn., translation and commentary on De visu in ibid., pp. 66-109 and 185-319. For another, more accessible English translation, see Harry Edwin Burton, 'The Optics of Euclid', J. Opt. Soc. Am., vol. 35 (1945), pp. 357-72.
59. "Le modèle suivant lequel Euclide s'efforce visiblement de bâtir son Optique est le traité de géométrie pure. Ramener la sensation visuelle à deux ou trois postulats géométriquement utilisables et tirer de là, par voie strictement déductive et sous forme de théorèmes, l'explication des phénomènes de perspective, tel est son idéal." Albert Lejeune, Euclide et Ptolémée: deux stades de l'optique grecque. Université de Louvain Recueil de Travaux d'Histoire et de Philologie, 3^e sér., fasc. 31, (Louvain: Bibliothèque de l'Université, 1948), p. 122. For further commentary, see Euclid, L'Optique et la catoptrique; [with] La Recension de l'optique d'Euclide par Théon d'Alexandrie, trans. with intro. and notes by Paul ver Eecke, (Paris and Bruges: de Brouwer, 1938), pp. IX-XXVIII.
60. Lindberg, Theories of Vision, p. 13. Loc. cit. and p. 220, n. 80, Lindberg notes that Euclid's penultimate proposition, which does consider objective depth, is probably a later insertion. It examines concavity and convexity. Euclid, De visu, [Prop.] 60; ed. Theisen, p. 108.
61. Ibid., [Suppositiones]; ed. Theisen, p. 66. It is not clear whether or not Euclid held that rays issued from the eye. See Theisen, 'Mediaeval Tradition', pp. 30-35, who concludes that Euclid supports an extramission theory.
62. Euclid, De visu, [Suppositiones]; ed. Theisen, p. 66. One of the clearest expositions of visual rays and the formation of the visual cone is by Galen, De usu partium, X. 12; French trans. by Lejeune, Euclide et Ptolémée, pp. 18-19; English version in Galen, On the Usefulness of the Parts of the Body... 'De usu partium', trans. with intro. and commentary by Margaret Tallmadge May, 2 vols., (Ithaca, New York: Cornell Univ. Press, 1968), vol. 2, pp. 492-93.
63. Euclid, De visu, [Suppositiones]; ed. Theisen, p. 66.
64. Ibid., [Prop.] 1 and 3; ed. Theisen, pp. 66-67.
65. Theisen, 'Mediaeval Tradition', pp. 24-27; see also Lejeune, Euclide et Ptolémée, pp. 93-95; and above, vol. 1, pp. 412-14 for the treatment of space in classical painting.
66. Theisen, 'Mediaeval Tradition', p. 49.
67. Euclid, De visu, [Suppositiones]; ed. Theisen, p. 66.

168. Ibid., [Prop] 4, 5, 56 and 59; ed. Theisen, pp.67-68, 106 and 108.
69. Ibid., [Prop] 19-22; ed. Theisen, pp.75-77. Note Theisen's remark on their importance, pp.43-45.
70. "Faisant de la perception visuelle de l'espace une sensation immédiate complète en elle-même, l'Optique d'Euclide reste, en fait, un traité des illusions de perspective linéaire." Lejeune, Euclide et Ptolémée, p.174.
71. Euclid, De visu, [Prop] 3; ed. Theisen, p.67.
72. Ibid., [Prop] 6, 11-12 and 26-37; ed. Theisen, pp.68-69, 71-72 and 79-87.
73. Lejeune considers that Ptolemy's Optica was published 168-178 A.D., later than the publication of the Almagest, in 141-148 A.D. See Albert Lejeune, ed., L'Optique de Claude Ptolémée dans la version latine d'après l'arabe de l'émir Eugène de Sicile. Université de Louvain Recueil de Travaux d'Histoire et de Philologie, 4^e sér., fasc.8, (Louvain: Publications Universitaires, 1956), p.26*.
74. Lindberg, Theories of Vision, p.211; and Evelyn M. Jamison, Admiral Eugenius of Sicily: His Life and Work and the Authorship of the 'Epistola ad Petrum' and the 'Historia Hugonis Falcandi Siculi', (London: Oxford Univ. Press for the British Academy, 1957), pp.4-5.
75. Lejeune, ed., L'Optique, pp.9*-18*.
76. No ancient writers appear to have understood the importance of binocular vision for perception in depth. Seigel, Galen, pp.103 and 106-17.
77. Lejeune, Euclide et Ptolémée, pp.9-14.
78. Lejeune, ed., L'Optique, pp.31*-32*; and Jamison, Admiral Eugenius of Sicily, pp.302-3. Lindberg, Catalogue, p.74, lists the 15 known MSS. of Ptolemy's Optica.
79. Lejeune, Euclide et Ptolémée, pp.15-84; and Lindberg, Theories of Vision, pp.15-17.
80. Ptolemy, Optica, II.50; ed. Lejeune, p.37; partially trans. by Siegel, Galen, p.95.
81. Lejeune, Euclide et Ptolémée, pp.37-41 and 79-83; and see Rudolph E. Siegel, 'Principles and Contradictions of Galen's Doctrine of Vision', Sudhoffs Arch., vol. 54 (1970), p.267.
82. Lejeune, Euclide et Ptolémée, pp.18-21. On pp. 33-34, Lejeune notes that the visual cone is actually termed pyramis visibilis in Ptolemy's work, but that the term is equivalent to 'visual cone'.
83. Ibid., pp.35-37.
84. Ibid., pp.41-57.
85. Thorndike classes Ptolemy's Optica as "the most experimental in method of his writings" in his History of Magic, vol. 1; First Thirteen Centuries, p.107.

86. "Les trois directions auxquelles Ptolémée ramène la localisation visuelle de l'objet ne sont, en somme, que les trois dimensions de l'espace, mais exprimées en termes psychologiques et rapportées au sujet connaissant." Lejeune, Euclide et Ptolémée, p.88.
87. Ibid., pp.22-28.
88. Ibid., p.86.
89. Ptolemy, Optica, II.16; ed. Lejeune, p.18; and see Lejeune, Euclide et Ptolémée, p.32: "Sans lumière, pas de sensation visuelle. Sans la sensation fondamentale de couleur, pas de perception visuelle de l'espace."
90. I am indebted for the material in this paragraph to the second section of Lejeune, Euclide et Ptolémée, pp.85-171: 'La Perception visuelle de l'espace'.
91. Ptolemy, Optica, II.26; ed. Lejeune, p.25. See Lejeune's partial trans. and paraphrase in his Euclide et Ptolémée, pp.87-88.
92. Ibid., pp.86-95.
93. Ptolemy, Optica, II.52-62; ed. Lejeune, pp.38-45.
94. "Une opération, plus au moins automatique, acquise par expérience, tend à éliminer de la grandeur apparente les effets de la distance et de l'orientation de l'objet et à restituer les grandeurs objectives." Lejeune, Euclide et Ptolémée, p.99.
95. Ibid., pp. 108-16.
96. Ptolemy, Optica, II.64; ed. Lejeune, p.46. For Ptolemy's theory of the perception of form, see Lejeune, Euclide et Ptolémée, pp.103-8.
97. Ptolemy, Optica, II.67 and 69-70; ed. Lejeune, pp. 47-49; and see Lejeune, Euclide et Ptolémée, pp.116-21.
98. Greek text with Latin translation in Carl Gottlob Kuhn, ed., Medicorum Graecorum opera quae exstant, 26 vols., (Leipzig: Cnobloch, 1821-1831), vol.5 (1823), pp.181-805. The earliest separate edition of De placitiis is placed at Paris, 1534, by Richard J. Durling, 'A Chronological Census of Renaissance Editions and Translations of Galen', JWCI, vol.24 (1961), p.258.
99. On the Latin translations, see Lynn Thorndike, 'Translations of Works of Galen from the Greek by Peter of Abano', Isis, vol.33 (1941-1942), pp.649-50; and his 'Translations of Works of Galen from the Greek by Niccolò da Reggìo (c.1308-1345)', Byz. Metabyz., vol.1 (1946-1949), pp.214, 217-18 and 232. English version from the Greek as Galen, Usefulness of the Parts, trans. May, vol.2, pp.463-503. For some general observations on De usu partium, see George Sarton, Galen of Pergamon. Logan Clendening Lectures on the History and Philosophy of Medicine, 3rd ser., (Lawrence: Univ. of Kansas Press, 1954), pp.56-99.
100. 15 extant MSS. are recorded by Lindberg, Catalogue, pp.76-77.

101. Sarton, Introduction, vol.2, pt. 1: Rabbi ben Ezra to Roger Bacon, p.342.
102. See above, vol.1, pp.83-85.
103. Tideus, De speculis; ed. Axel Anthon Björnbo with commentary by Sebastian Vogl in their Alkindi, Tideus und Pseudo-Euklid: Drei Optische Werke. Abhandlungen zur Geschichte der Mathematischen Wissenschaften, vol. 26, pt.3, (Leipzig: 1912-1913), p.74.
104. On Galen's theory of vision, see Harold Cherniss, 'Galen and Posidonius' Theory of Vision', Am. J. Philol., vol.54 (1933), pp.154-61; Siegel, Galen, pp.40-117; his 'Principles and Contradictions', pp.261-76; and Saint-Pierre, 'Physique de la vision', pp.126-57. In his Galen, pp.17-23, Siegel describes how the atomist theory of vision, which influenced Galen, accounted for the transmission of images to the eye through three-dimensional eidola or films streaming from the object.
105. Ibid., pp.39 and 88-39; and his 'Principles and Contradictions', p.274.
106. " ... aer lucidus alteratur et convertitur propter diversitatem colorum rerum sensibilium, et ... quando convertitur, pervenit eius alteratio velocissime ad visum, et sentit eam visus et apprehendit eam ... " Tideus, De speculis; ed. Björnbo, p.74.
107. "Verumtamen haec apprehensio non significat cum colore quantitatem eius, quod aspicitur, neque ipsius situm in loco suo neque longitudinem spatii inter aspectum et eius, quod aspicitur, neque ipsius figuram, neque motum eius." Loc. cit. On the perception of distance according to Galen, see Siegel, 'Principles and Contradictions', p.271.
108. Tideus, De speculis; ed. Björnbo, p.75. This concept derives from the space-filling pneuma which in vision issues from the eye. See Siegel, Galen, pp.37-40, 46-47 and 71-78.
109. Tideus, De speculis; ed. Björnbo, p.75.
110. "Si ergo virtus visus pervenit ad sensatum ... non fit illud nisi per instrumentum aeris et eius conversionem ad naturam visus." Ibid.; ed. Björnbo, p.76.
111. Studies on Arabic optical theory in the middle ages include Eilhard Wiedemann, 'Sull'Ottica degli arabi', trans. Alfonso Sparagna, Bull. Bibl. Storia Sci. Matem. Fis., vol.14 (1881), pp.219-25 (Wiedemann's other more specialised writings on the subject are listed in H.J. Seeman, 'Eilhard Wiedemann geb.1. August 1852 - gest. 7. Januar 1928', Isis, vol.14 (1930), pp.166-86); Max Meyerhof, 'Die Optik der Araber', Z. Oph. Opt., vol. 8 (1920), pp.16-29, 42-54 and 86-90; Graziella Federici Vescovini, Studi sulla prospettiva medievale. Univ. di Torino: Pubblicazioni della Facoltà di Lettere e Filosofia, vol.16, fasc.1, (Turin: Giappichelli, 1965), chs.3, 5, 6 and 7; Lindberg, Theories of Vision, chs.2-4; and Joseph Schacht and C.E. Bosworth, eds., The Legacy of Islam, 2nd edn., (1931; Oxford: Clarendon Press, 1974), pp.482-85 for some general remarks. A representative

selection of translations from Alhazen and other Arabic and Western optical authors appears in Edward Grant, ed., A Source Book in Medieval Science, (Cambridge, Mass.: Harvard Univ. Press, 1974), pp.384-441. In what follows, I have adopted O'Leary's broad use of 'Arabic' to include all of those in the Middle East who shared the same cultural history and who shared in particular a common scientific heritage deriving from the Hellenistic world. De Lacy O'Leary, How Greek Science Passed to the Arabs, (London: Routledge, 1949), p.3.

112. Clagett, Greek Science in Antiquity, ch.9; G.E.R. Lloyd, Greek Science after Aristotle. Ancient Culture and Society ser., (London: Chatto and Windus, 1973), ch.10; A.I. Sabra, 'The Scientific Enterprise', in Bernard Lewis, ed., The World of Islam: Faith, People, Culture, (London: Thames and Hudson, 1976), pp.181-83; and David C. Lindberg, 'The Transmission of Greek and Arabic Learning to the West', in Lindberg, ed., Science in the Middle Ages, pp.55-58.
113. O'Leary, Greek Science p.164. For other Arab translators of Greek optical texts, see Meyerhof, 'Optik der Araber', pp.17-19.
114. Christian communities were tolerated by the Muhammedan rulers. See Richard Walzer, 'Arabic Transmission of Greek Thought to Medieval Europe', Bull. John Ryk. Lib., vol.29 (1945-1946), pp.168-69. On Basra and Baghdad as intellectual centres, see O'Leary, Greek Science, pp.148-54.
115. Hunain Ibn Ishaq, The Book of the Ten Treatises on the Eye Ascribed to Hunain Ibn Is-haq (809-877 A.D.): The Earliest Existing Systematic Text-Book of Ophthalmology /Arabic text with English trans./ ed. and trans. Max Meyerhof, (Cairo: Government Press, 1928), p.vi. On the historical background, see O'Leary, Greek Science, pp.146-48.
116. Hunain, Ten Treatises; ed. Meyerhof, pp.xvii-xx; and Walzer, 'Arabic Transmission', p.167.
117. Ibid., pp.163-64; and O'Leary, Greek Science, chs.12-13.
118. Sabra, 'Scientific Enterprise', p.188: "It was in the field of optics ... that a concept of experiment clearly emerged as an identifiable method of procedure in empirical enquiry." On the translation of Aristotle, see F.E. Peters, Aristotle and the Arabs: The Aristotelian Tradition in Islam. New York Univ. Studies in Near Eastern Civilization, no.1, (New York: New York Univ. Press; London: Univ. of London Press, 1968), ch.3; and his Aristoteles Arabus: The Oriental Translations and Commentaries of the Aristotelian Corpus. New York Univ. Department of Classics: Monographs on Mediterranean Antiquity, (Leiden: Brill, 1968), esp. pp.39-47.
119. Hunain, Ten Treatises; ed. Meyerhof, p.xxxiv, where Meyerhof says that Demetrius was probably a Sicilian Greek; and see Thorndike, History of Magic, vol.1: First Thirteen Centuries, ch.32
120. Lindberg, Theories of Vision, p.41. In his Catalogue, p.99, Lindberg notes 10 MSS.

121. The Latin text is printed as Constantinus, Liber de oculis, ch.9, in Ishak Ibn Sulaiman, Omnia opera Ysaac in hoc volumine contenta. Cum quibusdam aliis opusculis ... liber de oculis, Constantini, [ed. A. Turinus], 2 pts., ([Lyons]: 1515), pt. 2, f.173v (a-b). For other Latin edns., see Lindberg, Theories of Vision, p.232, n.58. For a comparison of Hunain and Galen, see ibid., pp.37-41; and Meyerhof's 'Introduction' to Hunain, Ten Treatises, pp.xli-xlii.
122. Constantinus, Liber de oculis, ch.9; [ed. Turinus], f.173v (b).
123. Ibid., ch.9; [ed. Turinus], f.174r (a).
124. Ibid., ch.9; [ed. Turinus], f.173v (b).
125. Loc. cit.
126. Walzer, 'Arabic Transmission', p.172, places Alkindi's death at c.873 A.D.; but see Lindberg, Theories of Vision, p.222, n.1.
127. Walzer, 'Arabic Transmission', pp.172-78; and Peters, Aristotle and the Arabs, pp.158-60.
128. 15 surviving MSS. of De radiis stellarum are listed in Francis J. Carmody, Arabic Astronomical and Astrological Sciences in Latin Translation: A Critical Bibliography, (Berkeley: Univ. of California Press, 1956), p.82.
129. Lindberg, Catalogue, pp.21-22, lists 14 surviving MSS. On other optical writings by Alkindi, see Lindberg, Theories of Vision, p.222, n.6.
130. Meyerhof, 'Optik der Araber', p.20.
131. Lindberg, Theories of Vision, p.31; and note Vescovini, Prospettiva medievale, p.38: "Un esame, sia pure rapido, dell'opera latina di Alkindi ... è quasi d'obbligo per uno studio che abbia per argomento i problemi della prospettiva medievale."
132. In the absence of a full printed text in Latin, some extract from De radiis may be read in Vescovini, Prospettiva medievale, pp.44-47. She used Paris, Bibliothèque nationale, MS. Latin nouv. acq. 616, ff. 1r-17r.
133. Note the cautionary remarks of Lindberg, Theories of Vision, p.223, n.11; see also the comments of Thorndike, History of Magic, vol.1: First Thirteen Centuries, pp.643-46; Vescovini, Prospettiva medievale, pp.40, 45 and 47; and see above, vol.1, pp.106-8 and 109-12.
134. Alkindi, De aspectibus; cited in Vescovini, Prospettiva medievale p.46; trans. David C. Lindberg, 'Alkindi's Critique of Euclid's Theory of Vision', Isis, vol.62 (1971), pp.470-71. This article is similar in content to his Theories of Vision, ch.2, though containing as here, some supplementary material. For additional commentary, see his 'The Intromission-Extramission Controversy in Islamic Visual Theory: Alkindi versus Avicenna', in Machamer and Turnbull, eds., Studies in Perception, pp.138-41.
135. Lindberg, 'Alkindi's Critique', p.471.

136. Vescovini, Prospettiva medievale, p.45.
137. Alkindi, De aspectibus, [Prop.] 11; ed. Björnbo and Vogl in their Alkindi, Tideus und Psuedo-Euklid, p.13. For a summary of De aspectibus, see Meyerhof, 'Optik der Araber', p.20.
138. Alkindi, De aspectibus, [Prop.] 11; ed. Björnbo and Vogl, p.13.
139. Ibid., [Prop.] 11; ed. Björnbo and Vogl, p.15.
140. Alkindi also counteracts the idea that the only efficacious ray is the one that forms the axis of the visual pyramid. Vescovini, Prospettiva medievale, p.51.
141. Ibid., p.48: "... egli conduce una polemica contro i sostenitori dell'ottica geometrica euclidea per i quali i raggi sono entità matematiche, astratte, e non fisiche."
142. Alkindi, De aspectibus, [Prop.] 11; ed. Björnbo and Vogl, p.13.
143. On Avicenna's general influence on scientific thought in Europe, see A.C. Crombie, 'Avicenna's Influence on the Medieval Scientific Tradition', in G.M. Wickens, ed., Avicenna, Scientist and Philosopher: A Millenary Symposium, (London: Luzac, 1952), ch.5.
144. Lindberg, Theories of Vision, p.234, n.70. On the translation of Avicenna's works into Latin, see Marie-Thérèse d'Alverny, 'Notes sur les traductions médiévales d'Avicenne', Arch. Hist. Doct. Litt. Moyen Age, vol. 19 (1952), pp. 337-58.
145. The dedication to De anima states that Avendauth translated the text from the Arabic into the vernacular, Dominicus then rendering it into Latin. Simone van Riet, 'La Traduction latine du De anima d'Avicenne', Rev. Phil. Louvain, vol.61 (1963), pp.600-5. This article, pp.583-626, notes that 49 MSS. of De anima still survive, details some of the variant readings of the original and revised versions, and discusses the relation of the Arabic text to the Latin translation. See also d'Alverny, 'Notes sur les traductions', pp.341-46 and 355-56; her 'Les Traductions d'Avicenne (moyen age et renaissance)', in Avicenna nella storia della cultura medioevale. Accademia Nazionale dei Lincei: Problemi Attuali di Scienza e di Cultura, quaderno 40, (Rome: 1957), pp.71-87; and her 'Avicenna Latinus', Arch. Hist. Doct. Litt. Moyen Age, vol.28 (1961), pp.284-85 and 292-93.
146. Liber canonis Avicenne revisus ... (Venice: 1507), bk.3, fen. 3, ch.1, 203v (a); trans. Lindberg, Theories of Vision, p.51.
147. Vescovini, Prospettiva medievale, pp.89-90.
148. For detailed discussions of Avicenna's arguments, see Lindberg, Theories of Vision, pp.43-52; his 'Alkindi versus Avicenna', pp.141-52; Vescovini, Prospettiva medievale, ch.5; and G. Verbeke, 'Introduction sur la doctrine psychologique d'Avicenne', in Avicenna Latinus: liber de anime seu sextus de naturalibus I-V, ed. S. van Riet, 2 vols., (Louvain: Peeters; Leiden: Brill, 1972), vol.1, pp.63*-90*. A brief general summary of Avicenna's theory appears in Meyerhof, 'Optik der Araber', pp.22-24.

149. Avicenna, De anima, III.1; ed. van Riet, vol.1, pp.169-283. There is a French translation from the Arabic by Jan Bakòs, Psychologie d'Ibn Sina (Avicenne) d'après son oeuvre 'As-Sifa', 2 vols., (Prague: Editions de l'Académie Tchecoslovaque des Sciences, 1956), vol.2: As-Sifa: Sixième livre des choses naturelles (traduction et notes).
150. Avicenna, De anima, III.5; ed. van Riet, vol.1, pp.212-14.
151. Ibid., III.5; ed. van Riet, vol.1, pp.226-27; and see Lindberg, Theories of Vision, p.45.
152. Avicenna, De anima, I.5; ed. van Riet, vol.1, pp.221-22; and see Verbeke, 'Doctrines psychologiques', pp.63*-68*.
153. Avicenna, De anima, I.5; ed. van Riet, vol.1, p.226.
154. Ibid., III.2; ed. van Riet, vol.1, pp.180-81; and see Verbeke, 'Doctrines psychologiques', pp.69*-70*; and Vescovini, Prospettiva medievale, pp.85-86.
155. Ibid., p.49.
156. Ibid., p.85: "Essa si riduce ad essere una semplice operazione biologica che viene spiegata da Avicenna con l'aiuto delle nozioni della medicina galenica da un lato, e dell'altro di quelle della psicologia aristotelica." For Avicenna's relation to Aristotelianism, see Peters, Aristotle and the Arabs, pp.165-68.
157. "La vista è così una azione naturale che riguarda la sfera potenziale, o sensibile, e consiste nel passaggio dalla potenza all'atto, dell'organo per un agente esterno." Vescovini, Prospettiva medievale, p.86.
158. Verbeke, 'Doctrines psychologiques', pp.71*-75*.
159. Avicenna, De anima, III.3; ed. van Riet, vol.1, p.192.
160. Ibid., III.5; ed. van Riet, vol.1, p.225.
161. Ibid., III.7; ed. van Riet, vol.1, p.254; and see Verbeke, 'Doctrines psychologiques', pp.83*-85*.
162. Avicenna, De anima, III.7; ed. van Riet, vol.1, p.255. Alhazen made a similar appeal to empirical evidence. See above, vol.1, pp.91-93.
163. Vescovini, Prospettiva medievale, p.87.
164. Avicenna, De anima, III.8; ed. van Riet, vol.1, pp.280-83.
165. Lindberg, Theories of Vision, pp. 49-50.
166. Lindberg, Catalogue, pp.17-18, lists 20 MSS. For Alhazen's influence, see Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., pp.xxi-xxii and xiv-xv; and his 'Alhazen's Theory of Vision and its Reception in the West', Isis, vol.58 (1967), pp.331-41. For Alhazen's other optical writings, which include treatises on Euclid, Ptolemy, Aristotle and Galen, see Lindberg, Theories of Vision,

- pp.60-61; his 'Introduction' to Opticae thesaurus, rpt. edn., pp.v-vi; and Giorgio Nebbia, 'Ibn al-Haytham nel millesimo anniversario della nascita', Phys., vol.9 (1967), pp.169-201. Some of Alhazen's other optical writings have been listed and summarised by Meyerhof, 'Optik der Araber', pp.45-51. Of these, only De speculis comburentibus was translated into Latin during the middle ages. Alhazen's treatise on light, written after De aspectibus, is useful as an introduction to his theory of vision. It has been trans. into German by J. Baarman, 'Abhandlung über das Licht von Ibn al-Haitham', ZdtMG, vol.36 (1882), pp.195-237 (and see the review by Eilhard Wiedemann, ZdtMG, vol. 38 (1884), pp.145-48); then into English from Baarman's rendering by Thomas H. Shastid in his 'History of Ophthalmology', Am. Encycl. Dic. Ophthal., vol.11 (1917), pp.8701-17; and there is a French trans. and commentary by R. Rashed, 'Le Discours de la lumière d'Ibn al-Haytham (Alhazen): traduction française critique', Rev. Hist. Sci. vol.21 (1968), pp.197-224.
167. Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., pp.vi-vii.
168. Lindberg, Theories of Vision, pp.209-10.
169. On the Italian version, see Graziella Federici Vescovini, 'Contributo per la storia della fortuna di Alhazen in Italia: il volgarizzamento del MS. Vat. 4595 e il Commentario terzo del Ghiberti', Rin., ser.2, vol.5 (1965), pp.17-49; Enrico Narducci, 'Intorno ad una traduzione italiana, fatta nel secolo decimoquarto, del trattato d'ottica d'Alhazen, matematico del secolo undecimo, e ad altri lavori di questo scienziato', Bull. Bibl. Storia Sci. Matem. Fis., vol.4 (1871), pp.1-13; and see above, vol.1, pp.477-78.
170. A.I. Sabra, 'Ibn Al-Haytham's Criticisms of Ptolemy's Optics', J. Hist. Phil., vol.4 (1966), pp.145-49.
171. The fullest commentary on Alhazen of which I am aware is that by Hans Bauer, Die Psychologie Alhazens auf Grund von Alhazens Optik, BGPM, vol.10, pt.5 (Münster: 1911). See also Lindberg, Theories of Vision, ch.4; A.I. Sabra, 'Sensation and Inference in Alhazen's Theory of Visual Perception', in Machamer and Turnbull, eds., Studies in Perception, pp.160-85; Ronchi, Nature of Light, pp.45-57; Vescovini, Prospettiva medievale, pp.113-32 (substantially the same as her 'Storia della fortuna di Alhazen in Italia', pp.23-30); and, for a general introduction, H.J.J. Winter 'The Optical Researches of Ibn al-Haitham', Cent., vol.3 (1954), pp.190-210.
172. "Invenimus quod visus, quando inspexerit luces valde fortes, fortiter dolebit ex eis, et habebit nocumentum ..." Alhazen, De aspectibus, I.1.1; ed. Risner in Opticae thesaurus, p.1. In this edn., which includes Witelo's Perspectiva, Risner added chapter divisions, rubrics and cross-references between the two works, but stayed close to the medieval texts. See Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., pp.xxvii-xxxix; and George Sarton, rev. of Al-Hasan ibn al-Haitham: His Optical Studies and Discoveries, by Mustafa Nazif Bey, Isis, vol.34 (1943), p.217. A.I. Sabra is preparing an English trans. of the Arabic text of De aspectibus.

173. Alhazen, De aspectibus, I.1.1; ed Risner, p.1; and see Bauer, Psychologie Alhazens, pp.23-25.
174. "Omnia ergo ista significant, quod lux operetur in visum aliquam operationem ... Ista ergo significant quod colores illuminati operentur in visum." Alhazen, De aspectibus, I.1.1; ed. Risner, p.1.
175. Ibid., I.5.19; ed. Risner, p.10. This proposition is treated at greater length in the first 3 chaps. of the Arabic text, which were not trans. into Latin. Lindberg, Theories of Vision, pp.240-41, n.31. On the propagation of light according to Alhazen, see Roshdi Rashed, 'Optique géométrique et doctrine optique chez Ibn Al Haytham', Arch. Hist. Exact Sci., vol.6 (1970), pp.273-81.
176. "Et ex proprietate lucis est pertransire in quodlibet corpus diaphanum: et similiter est proprietas formae coloris, quae associatur lumini, pertransire in corpus diaphanum, et ideo extenditur in aere diaphano, sicut extenditur lumine." Alhazen, De aspectibus, I.5.14; ed. Risner, p.7.
177. Loc. cit. There is an English translation of Alhazen, De aspectibus, I.4.14; ed. Risner, p.3, in which the structure of the eye is described, in Polyak, The Retina, pp.109-11, where it is printed with a parallel translation from the Arabic text. The four tunics are clearly visible in the eye diagram printed in Risner's Opticae thesaurus, p.6: the consolidativa (adhaerens), cornea, uvea and aranaea. The diagram, however, represents a 16th.cent. concept of the eye and is in some ways unreliable. See Bauer, Psychologie Alhazens, pp.12-14 and 19-20 on the tunics. For further medieval Arabic and Latin diagrams of the eye, see Polyak, The Retina, figs.7-20.
178. Alhazen, De aspectibus, I.5.14; ed. Risner, p.7; trans. Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., p.xv.
179. "Ponentes autem radios exire a visu, opinantur hoc, quod illi invenerunt: quod visus comprehendit rem visam, et inter illa est spatium, et magnum est hominibus, quod sensum non est, nisi per contactum." Alhazen, De aspectibus, I.5.23; ed. Risner, p.14; and see Lindberg, Theories of Vision, pp.64-65.
180. Alhazen, De aspectibus, I.5.23; ed. Risner, p.14. Ronchi, Nature of Light, p.52, has suggested that Alhazen adopted a combined intromission-extramission theory. The confusion arises from Risner's heading to Alhazen, De aspectibus, I.5.24; ed. Risner, p.15: "Visio videtur fieri per ... receptos simul et emissos radios." See Lindberg, Theories of Vision, pp.65-66.
181. Alhazen, De aspectibus, I.5.23; ed. Risner, p.15; and see Bauer, Psychologie Alhazens, pp.7-8.
182. Alhazen, De aspectibus, I.5.14; ed. Risner, pp.7-8.
183. "Si vero comprehendet eos permixtos, non distinguuntur, nec ordinabuntur ab eo partes sive colores partium. Et si nihil comprehendit ex istis formis, nihil comprehendit ex istis partibus: et si nihil comprehendit ex partibus, nihil comprehendit ex re visa: sed visus comprehendit rem visam sibi oppositam illuminatam, et comprehendit partes eius diversi coloris ordinatas, et distinctas." Ibid., I.5.14; ed. Risner, p.8.

184. Ibid., I.5.16; ed. Risner, pp.8-9. On the crystalline humour as the light-sensitive part of the eye, see Bauer, Psychologie Alhazens, pp.23-27; and Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., p.xvi.
185. Alhazen, De aspectibus, I.5.17; ed. Risner, p.9.
186. Ibid., I.5.18; ed. Risner, p.9.
187. Loc. cit. For Alhazen's not always convincing discussion of oblique rays, see Lindberg, Theories of Vision, pp.74-78.
188. Alhazen, De aspectibus, I.5.18; ed. Risner, p.10.
189. "... et in quolibet puncto superficiei visus transunt in eodem tempore formae omnium punctorum, quae sunt in superficiebus omnium visibilium oppositorum in illo tempore: et forma unius puncti tantum transit recte per diaphanitatem tunicarum visus: et est punctum, quod est apud extremitatem perpendicularis exeuntis ab illo puncto superficiei visus: et formae omnium punctorum reliquorum refringuntur apud illum punctum superficiei visus, et transeunt per diaphanitatem tunicarum visus secundum lineas declinantes ad superficiem visus." Ibid., I.5.18; ed. Risner p.9.
190. Ibid., I.5.19; ed. Risner, p.10.
191. "Forma ergo lucis et coloris cuiuslibet corporis colorati et illuminati cum quolibet lumine, extenditur a sua superficie ad quodlibet punctum oppositum illi superficiei secundum verticationem pyramidis, quae formatur inter illud punctum et illam superficiem: et erit forma ordinata in illa pyramide per lineas illas concurrentes ad illud punctum, quod est vertex pyramidis, sicut est ordinatio in partibus coloris, qui est in superficie illius corporis." Loc. cit.; and see Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., p.xvii. For Alhazen's geometry of vision, see Bauer, Psychologie Alhazens, pp.15-19; Lindberg, Theories of Vision, pp.80-85 and fig.12; Vescovini, Prospettiva medievale, pp.120-21; and A.C. Crombie, 'The Mechanistic Hypothesis and the Scientific Study of Vision: Some Optical Ideas as a Background to the Invention of the Microscope', in S. Bradbury and G. L'E. Turner, eds., Historical Aspects of Microscopy: Papers Read at a One-Day Conference Held by the Royal Microscopical Society at Oxford, 18 March, 1966, (Cambridge: Heffer for the Royal Microscopical Society, 1967), pp.17-22.
192. Alhazen, De aspectibus, II.1.1; ed. Risner, pp.24-25.
193. Ibid., II.1.8; ed. Risner, p.29.
194. For a lucid account of Alhazen on the perception of space, see Gary C. Hatfield and William Epstein, 'The Sensory Core and the Medieval Foundations of Early Modern Perceptual Theory', Isis., vol.70 (1979), pp.367-71.
195. Summarised in Alhazen, De aspectibus, I.7.36; ed. Risner, p.22. To these 6 prerequisites may be added a further 2 - time for the object to be perceived, and a healthy eye: ibid., III.7.18; ed. Risner, p.88. On all 8 requirements, see Bauer, Psychologie Alhazens, pp.34-38.

196. "Et cum inter visum et rem visam fuerit aliquod spatium, poterit rem visam comprehendere in eodem tempore totam ex parte parva, quamvis sit res visa magna: et potest comprehendere res visas multas simul in eodem tempore: et cum res visa fuerit remota a visu, erit possibile oriri lucem super superficiem visus oppositam visui." Alhazen, De aspectibus, I.7.37; ed. Risner, p.22.
197. " ... non comprehendit visus rem, nisi sit inter ea linea recta. Et si secuerint corpora densa media omnes lineas, quae sunt inter ea, latebunt res visae visum: et si secuerit illud corpus quaedam illarum linearum rectarum, latebit visum quaedam pars ..." Ibid., I.7.38; ed. Risner, p.22.
198. "Quare vero visus non comprehendat rem visam, nisi sit in ea lux, est propter duas causas: aut qua formae visae non extenduntur in aere, nisi sit lux cum colore ... aut qua forma coloris extenditur in aere, quamvis non sit cum ea lux: sed non operatur in visum operatione sensibili, nisi per lucem." Ibid., I.7.39; ed. Risner, p.22. On the connection between colour and light in Alhazen's theory, see Rashed, 'Optique géométrique', pp.278-80; and Bauer, 'Psychologie Alhazens', pp.41-44.
199. "Res ergo visa, quae potest comprehendi a visu, est illa, in qua pyramis, quae figuratur inter rem visam et centrum visus, distinguet ex superficie glacialis partem quantitatis sensibilis respectu totius superficiei glacialis." Alhazen, De aspectibus, I.7.40; ed. Risner, p.23.
200. " ... visus non comprehendat rem visam, nisi quando corpus medium inter ipsum visum et rem visam fuerit diaphanum: est: quia visio non est nisi ex forma veniente ex re visa ad visum ... formae autem non extenduntur nisi in corporibus diaphanis ..." Ibid., I.7.41; ed. Risner, p.23.
201. "Et cum res visa fuerit densa, erit colorata, et cum super ipsam oritur lux, figetur in sua superficie, et erit ex colore eius, et ex luce, quae oritur super ipsam, forma, quae extenditur in aere, et in corporibus diaphanis: et cum ista forma pervenerit ad ipsum visum, operabitur in eo, et ex ea sentiet visus rem visam." Ibid., I.7.42; ed. Risner, p.23.
202. "Intentiones particulares, quae comprehenduntur sensu visu, sunt multae, sed generaliter dividuntur in 22: et sunt lux, color, remotio, situs, corporeitas, figura, magnitudo, continuum, discretio et separatio, numerus, motus, quies, asperitas, levitas, diaphanitas, spissitudo, umbra, obscuritas, pulchritudo, turpitudine, consimilitudo, et diversitas in omnibus intentionibus particularibus, et in omnibus formis compositis ex omnibus intentionibus particularibus." Ibid., II.2.15; ed. Risner, p.34. It should be noted that Alhazen includes pulchritudo and turpitudine in his list. They are examined at greater length in ibid., II.2.59-60; ed. Risner, pp.63-66. For the aesthetic implications of Alhazen's work, see de Bruyne, Etudes d'esthétique médiévale, vol.3, pp.243-51; Vescovini, Prospettiva medievale, p.124, n.40; Bauer, Psychologie Alhazens, pp.39-40 and 69-71; and above, vol.1, pp.32-33.

203. " ... rectitudo, et curvitas, et concavitas, et convexitus, quae collocantur sub figura ... " Alhazen, De aspectibus, II.2.15; ed. Risner, p.34.
204. "Et comprehensio omnium istorum non est secundum unum modum, neque comprehensio cuiuslibet istorum est solo sensu ... Comprehensio ergo visus, quod altera viriditas est fortior altera, et quod duae sunt unius generis, est distinctio colorationis, quae est in visu, non ipse sensus coloris ... Et similiter est dispositio lucis apud visum, quoniam visus comprehendit lucem, et distinguit inter lucem fortem et debilem ... Comprehensio ergo visus quoad consimilitudinem colorum, et diversitatem eorum, et consimilitudinem lucis et diversitatem eius, et consimilitudinem lineationum formarum rerum visibilium, et figurae, et situs earum, et diversitates earum, non est, nisi ex comparatione illarum inter se, non solu sensu." Ibid., II.1.10; ed. Risner, p.30.
205. Ibid., II.1.10; ed. Risner, pp.30-31. On the visual process of reading according to Alhazen, see Bauer, Psychologie Alhazens, pp.66-67.
206. For a fuller account of Alhazen's psychology of vision see Bauer, Psychologie Alhazens, pp.48-53; and Vescovini, Prospettiva medievale, pp.122-32.
207. Bauer, Psychologie Alhazens, pp.53-55.
208. "Visus ergo comprehendit quantitatem remotionis rerum visibilium (quarum remotio respicit corpora ordinata continuata) ex comprehensione mensurarum corporum ordinatorum respicientium remotiones earum." Alhazen, De aspectibus, II.2.25; ed. Risner p.40.
209. Loc. cit.
210. Loc. cit.
211. Ibid., II.2.25; ed. Risner, p.41; and see Bauer, Psychologie Alhazens; pp.57-61.
212. Alhazen, De aspectibus, II.2.25; ed. Risner, p.41.
213. "Remotiones ergo visibilium a visu non comprehenduntur, nisi ex comprehensione virtutis distinctivae: quoniam illud, quod accidit in visu apud visionem, non accidit, nisi per aliquid extrinsecum." Loc. cit.
214. "Et cum remotio rei visae fuerit mediocris, non erit inter aestimationem remotionis, et inter veram remotionem magna diversitas." Ibid., II.2.25; ed. Risner, p.42.
215. Loc. cit.
216. "Secondo questa dottrina la visione è una attività sensibile e razionale insieme, capace mediante il calcolo delle distanze delle cose rispetto all'occhio e la rettificazione e la integrazione delle percezioni mediante l'esperienza di cogliere le proprietà qualitative (luce e colore) e quantitative delle cose." Vescovini, Prospettiva medievale, p.124.

217. Alhazen, De aspectibus, II.2.31; ed. Risner, p.47; and see Bauer, Psychologie Alhazens, pp.55-56.
218. "Cum ergo comprehenderit superficiem corporis, sciendo quod illud visibile est corpus: comprehendet statim extensionem illius corporis secundum longitudinem et latitudinem, et non remanet nisi dimensio tertia." Alhazen, De aspectibus, II.2.31; ed. Risner, p.47.
219. A convex surface is a special case since it is seen to have depth through the relative nearness of its central portion; but a concave surface is only seen in two dimensions because at its centre there is not extension of the body but of emptiness. Its depth is only apprehended through prior knowledge. Ibid., II.2.31; ed. Risner, p.48.
220. "Corpus autem, quod continetur a superficiebus secantibus se; quando superficies eius fuerit opposita visui, sed non secundum directam oppositionem, et fuerit sectio istius superficiei cum alia superficiei illius corporis, comprehensa a visu, ita ut possit comprehendere duas superficies simul: comprehendetur a visu tunc eius corporeitas: quoniam comprehendet obliquationem superficiei corporis ad eius profunditatem: quare comprehendet extensionem corporis secundum profunditatem, cum comprehenderit ex superficie obliqua extensionem in longum et latum. Et sic comprehendet corporeitem huiusmodi corporum." Loc. cit.
221. Loc. cit.
222. "In corporibus autem maxime remotionis, quorum remotio non certificatur a visu, non comprehendit visus obliquationes superficierum: et sic non comprehendit corporeitatem eius per sensum visus ... Et praeter istorum visibilium corporeitatem, non comprehendit corporeitatem visus, nisi per scientiam antecedentem tantum." Loc. cit.
223. Sarton, Introduction, vol.2, pt.1: Rabbi ben Ezra to Roger Bacon, p.356; Peters, Aristotle and the Arabs, pp.217-20; and Fernand van Steenberghen, La Philosophie au XIIIe siècle. Philosophes Médiévaux, vol.9, (Louvain: Publications Universitaires; Paris: Béatrice-Nauwelaerts, 1966), pp.110-17. The commentaries of Averroes exist in three forms: the epitome or short, middle and long, "the first of these not being really a commentary in the true sense of the term". Harry A Wolfson, 'Plan for the Publication of a Corpus commentariorum Averrois in Aristotelem Submitted to the Mediaeval Academy of America', Spec., vol.6 (1931), pp.415-16; and see his 'The Twice-Revealed Averroes', Spec., vol.36 (1961), pp.373-75. Blumberg comments: "Averroes' epitomes bear the stamp of originality insofar as they are not limited to the Aristotelian sequence or arrangement of topics or to a verbatim reproduction of the detailed arguments given by Aristotle for his theories or views." Averroes, Epitome of 'Parva naturalia', trans. Harry Blumberg. Corpus Philosophorum Medii Aevi: Corpus Commentariorum Averrois in Aristotelem, ed. H.A. Wolfson, versio anglicana, vol.7. Mediaeval Academy of America: Publication no.71, (Cambridge Mass.: Mediaeval Academy of America, 1961), p.xiv.
224. Haskins, Mediaeval Science, pp.245, 261 and 278; and R. de Vaux, 'La Première entrée d'Averroès chez les latins', Rev. Sci. Phil. Th., vol.22 (1933), pp.194-96 and 238-43.

225. Averrois Cordubensis, Compendia librorum Aristotelis qui parva naturalis vocantur, ed. Emily Ledyard Shields and Harry Blumberg. Corpus Philosophorum Medii Aevi: Corpus Commentariorum Averrois in Aristotelem, versionum latinarum, vol.7. Mediaeval Academy of America: Publication no.54, (Cambridge Mass.: Mediaeval Academy of America, 1949), p.11. On the theory of vision proposed by Averroes, see Léon Gauthier, Ibn Rochd (Averroès). Les Grands Philosophes, (Paris: Presses Universitaires, 1948), ch.7. Little of what Averroes says significantly extends Aristotle's notion of how light passes through the space between object and eye. His greater contribution is to ideas about the inner workings of the eye, but this is outside the present field of enquiry. See Lindberg, Theories of Vision, pp.54-56.;
226. "Ne serait-ce pas qu'en parlant ici de 'couleur propre' nos deux auteurs [Aristotele and Averroès] entendent par là non pas tant la coloration de ces objets que leurs limites, contours, dimensions, reliefs, toutes choses qui sont fonctions des couleurs et des ombres, de leurs diversifications, de leur répartition, et que seule peut rendre visibles une lumière ambiante?" Gauthier, Ibn Rochd, p.131.
227. Averroes, Compendia parva naturalia; ed. Shields and Blumberg, p.17.
228. Ibid., ed. Shields and Blumberg, p.40.
229. Averroes, Commentarium magnum in Aristotelis de anima, II.74; ed. Crawford, p.243 and see p.xi.
230. Surveys of the optical theory of medieval European authorities from the 13th. century may be found in Lindberg, Theories of Vision, chs.5, 6 and 7; his 'Lines of Influence in Thirteenth Century Optics: Bacon, Witelo and Pecham', Spec., vol.46 (1971), pp.66-83; Vescovini, Prospettiva medievale, chs. 1 and 4 ; and E.J. Dijksterhuis, The Mechanization of the World Picture, trans. C. Dikshoorn, (1950; Oxford: Clarendon Press, 1961), pp.145-52.
231. H.J.J. Winter, 'The Arabic Achievement in Physics', Endeav., vol.9 (1950), pp.76 and 79; and Haskins, Mediaeval Science, ch.10.
232. Ibid., chs.9 and 12; and see Aldo Mieli, La Science arabe et son rôle dans l'évolution scientifique mondiale, (Leiden: Brill, 1938), pp.225-30. The importance of Sicily as a cultural crossroads has been questioned by N. Daniel, The Arabs and Mediaeval Europe, (London: Longman, 1975), p.147: "The final tally of achievement was rather slight. Historical accident alone brought the three cultures side by side, but they never blended." See also ibid., ch.6.
233. Brian Lawn, The Salernitan Questions: An Introduction to the History of Medieval and Renaissance Problem Literature, (Oxford: Clarendon Press 1963), ch.2.
234. Haskins, Mediaeval Science, ch.1. On the cultural importance of Spain in this respect, see Daniel, Arabs and Mediaeval Europe, ch.4. For Gerard's translations, see Moritz Steinschneider, 'Die Europäischen Übersetzungen aus dem Arabischen bis Mitte des 17. Jahrhunderts', Sitz. Phil.-Hist. Kl. (Vienna Academy), vol.120, pt.4 (1905), pp.16-32.

235. Charles Homer Haskins, The Renaissance of the Twelfth Century, (Cambridge, Mass.: Harvard Univ. Press, 1927). This book repeats in condensed and convenient form much of the material in his more detailed Mediaeval Science (1924); see also Dijksterhuis, Mechanization, ch.3.
236. Haskins, Mediaeval Sciences, chs. 2, 6 and 13; A.B. Cobban, The Medieval Universities: Their Development and Organization, (London: Methuen, 1975), pp.16-17; R.W. Hunt, 'English Learning in the Late Twelfth Century', in R.W. Southern, ed., Essays in Medieval History: Selected from the Transactions of the Royal Historical Society on the Occasion of its Centenary, (London: Macmillan, 1968), pp. 106-13; Charles Homer Haskins, 'The Reception of Arabic Science in England', EHR, vol.30 (1915), pp.56-59; Charles Singer, 'Daniel of Morley: An English Philosopher of the Twelfth Century', Isis, vol.3 (1921), pp.263-69; and on Scot as a translator, see Lynn Thorndike, Michael Scot, (London: Nelson, 1965), ch.3.
237. For accounts of the whole process of transmission, see Haskins, Renaissance, ch.9; Daniel, Arabs and Mediaeval Europe, ch.10; Edward Grant, Physical Science in the Middle Ages. History of Science ser., (New York; Wiley, 1971), ch.2; Maurice de Wulf, History of Mediaeval Philosophy, trans. Ernest C. Messenger, 3rd. English edn. based on 6th.French edn., 2 vols., (1900; London: Longmans, 1935), vol.2: The Thirteenth Century, pp.21-24; and Lindberg, 'Transmission of Greek and Arabic Learning', pp.58-90.
238. Crombie, 'Avicenna's Influence', pp.86-87.
239. Haskins, Renaissance, ch.12; F.C. Copleston, A History of Medieval Philosophy, (London: Methuen, 1972), ch.10; and Pearl Kibre and Nancy G. Siraisi, 'The Institutional Setting: The Universities', in Lindberg, ed., Science in the Middle Ages, pp.120-44.
240. Copleston, Medieval Philosophy, pp.200-2 and 206-12. On the relations between the papacy and the University of Paris, see Cobban Medieval Universities, ch.4. On the early reception of Aristotle and the natural sciences, see Stephen d'Irsay, 'Les Sciences de la nature et les universités médiévales', Arch., vol.12 (1933), pp.216-20; Etienne Gilson, La Philosophie au moyen âge des origines patristiques à la fin du XIV^e siècle, 2nd edn. (1922; Paris: Payot, 1962), pp.386-400; Dijksterhuis, Mechanization, pp.126-35; Grant, Physical Science, ch.3; de Wulf, Mediaeval Philosophy, vol.2, pp.24-26; Hastings Rashdall, The Universities of Europe in the Middle Ages, ed. F.M. Powicke and A.B. Emden, new edn., 3 vols.; (1895; London: Oxford Univ. Press, 1936), vol.1: Salerno-Bologna-Paris, pp.349-60; Fernand van Steenberghen, Aristotle in the West: The Origins of Latin Aristotelianism, trans. Leonard Johnston, (1946; Louvain: Nauwelaerts, 1955), chs.4 and 6; his Philosophie au XIII^e siècle, pp.81-110; Grant, ed., Source Book, pp.42-50; and Charles H. Lohr, 'Aristotle in the West: Some Recent Books', Trad., vol.25 (1969), pp.417-31.
241. On the differences between the monastic and cathedral schools, see Guy Beaujouan, 'Motives and Opportunities for Science in the Medieval Universities', in A.C. Crombie, ed., Scientific Change: Historical Studies in the Intellectual, Social and Technical Conditions for Scientific Discovery and Technical Invention, from Antiquity to the Present. Symposium on the History of Science,

- Univ. of Oxford 9-15 July, 1961, (London: Heinemann, 1963), pp.219-24. On Worcester and the West Country schools, see R.W. Southern, Medieval Humanism and Other Studies, (Oxford: Blackwell, 1970), pp.166-71; and Haskins, 'Reception of Arabic Science', pp. 56-61. On Hereford science, see Lawn, Salernitan Questions, p.xi; Josiah C. Russell, 'Hereford and Arabic Science in England about 1175-1200', Isis, vol. 18 (1932), pp.14-25; and Kathleen Edwards, The English Secular Cathedrals in the Middle Ages, (Manchester: Manchester Univ. Press, 1949), pp.192-93.
242. Daniel A. Callus, 'Introduction of Aristotelian Learning to Oxford', Pro. Br. Ac., vol.29 (1943), pp.229-81; Beaujouan, 'Motives and Opportunities', p.221; and Cobban, Medieval Universities, ch.5, who remarks, p.107: "... Oxford achieved, in the first half of the thirteenth century, a European reputation in the mathematics and the natural sciences founded upon the vast corpus of new Aristotelian material absorbed piecemeal into Europe in the century or so after c.1150." Gilson, Philosophie au moyen âge, p.398, says of the scientific studies pursued at Oxford, as opposed to those at Paris: "... le type même de la science était aux yeux des maîtres d'Oxford beaucoup moins Aristote lui-même que la Perspective de l'Arabe Alhacen." See also A.C. Crombie, Oxford's Contribution to the Origins of Modern Science: A Paper Read to the British Association for the Advancement of Science at Oxford on 6 September 1954, (Oxford: Blackwell, [1955]), pp.3-12.
243. For the history of Grosseteste's life, scholarship and influence, see A.C. Crombie, Robert Grosseteste and the Origins of Experimental Science 1100-1700, (Oxford: Clarendon Press, 1953); Daniel A. Callus, 'Robert Grosseteste as a Scholar', in Daniel A. Callus, ed., Robert Grosseteste, Scholar and Bishop: Essays in Commemoration of the Seventh Centenary of his Death, (Oxford: Clarendon Press, 1955), pp.1-11; Josiah C. Russell, 'Phases of Grosseteste's Intellectual Life', Harv. Th. R., vol.43 (1950), pp.93-116; Gilson, Philosophie au moyen âge, pp.469-73; and de Wulf, Mediaeval Philosophy, vol.2, pp.55-60.
244. Callus, 'Robert Grosseteste', pp.12-15 and 25-28; his 'Introduction of Aristotelian Learning', pp.253-55; and Cobban, Medieval Universities, pp.107-8. A bibliography of Grosseteste's writings has been published by S. Harrison Thomson, The Writings of Robert Grosseteste Bishop of Lincoln 1235-1253, (Cambridge: Cambridge Univ. Press, 1940).
245. A.C. Crombie, 'Grosseteste's Position in the History of Science' in Callus, ed., Grosseteste Scholar and Bishop, p.111.
246. On the dating of the treatises, see Richard C. Dales, 'Robert Grosseteste's Scientific Works', Isis, vol.52 (1961), pp.394-401. The number of extant MSS. are: De lineis: 14; De iride: 12; De colore: 10; De natura locurum: 9. See Lindberg, Catalogue, pp.57-62.
247. On the dating of the Commentary, see Dales, 'Scientific Works', p.395. Of De luce there are 13 MSS. extant. See Lindberg, Catalogue, pp.60-61.
248. Crombie, Robert Grosseteste, pp.116-17. For an assessment of Grosseteste's optical thought in relation to the medieval tradition see Lindberg, Theories of Vision, pp. 100-2.

249. It has been assumed that a marginal note by Grosseteste to "Perspectiva" is a reference to Alhazen's work. See Richard William Hunt, 'The Library of Robert Grosseteste', in Callus, ed., Grosseteste Scholar and Bishop, p.114. The reference is discounted by Lindberg, Theories of Vision, pp.94-95.
250. "La perspectiva nasce con dignità di scienza filosofica nel XIII secolo per opera di Roberto Grossatesta." Vescovini, Prospettiva medievale, p.7. See also Gezenius ten Doesschate, 'Oxford and the Revival of Optics in the Thirteenth Century', Vis. Res., vol.1 (1962), pp.313-42. For the attitude of the Church Fathers towards science, see Clagett, Greek Science in Antiquity, ch.10.
251. Grosseteste, De iride; in Ludwig Baur, ed., Die Philosophischen Werke des Robert Grosseteste, Bischofs von Lincoln. BGPM, vol.9, (Münster: 1912), p.73. The optical writings with the exception of De colore and De luce have been trans. into English by Bruce S. Eastwood, 'The Geometrical Optics of Robert Grosseteste', Diss. Univ. of Wisconsin, 1964; and see DAI, vol. 25 (1964-1965), p.2467. Complete trans. by David C. Lindberg of De lineis, angulis, et figuris and De iride also appear in Grant, ed., Source Book, pp. 385-91. For commentary, see Ludwig Baur, Die Philosophie des Robert Grosseteste Bischofs von Lincoln. BGPM, vol.18, pts. 4-6, (Munster: 1917), pp.111-19.
252. Grosseteste, De iride; ed. Baur, p.73.
253. Grosseteste, De lineis; ed. Baur, p.60; and see A.G. Molland, 'The Geometrical Background to the "Merton School": An Exploration into the Application of Mathematics to Natural Philosophy in the Fourteenth Century', Brit.J. Hist. Sci., vol.4 (1968), pp.109-10.
254. Grosseteste, De iride; ed. Baur, p.72.
255. Grosseteste, De lineis; ed. Baur, p.64.
256. Loc. cit. See Baur, Philosophie des Robert Grosseteste, pp.106-9.
257. Grosseteste, De lineis; ed. Baur, pp.64-65. In De natura locorum Grosseteste, following Averroes, considers how the effect of the sun is more powerful when the pyramid formed between it and a point on the earth is shortest. The sun is hotter when it is in Cancer because " ... tunc cadunt radii eius magis ad angulos rectos, et etiam radii et pyramides sunt breviores et magis accedunt ad reflexionem in se ipsis fiendam, et minus fracti super nos, quam quando est alibi in zodiaco ..." Grosseteste, De natura locorum; ed. Baur, p.69.
258. Grosseteste, De lineis; ed. Baur, p.60; and see above, vol.1, p.85.
259. Grosseteste, De luce; ed. Baur, pp.51-52; trans. Clare C. Riedl, On Light (De luce), (Milwaukee: Marquette Univ. Press, 1942). There exists another translation of De Luce by C.G. Wallis, On Light, Or: The Incoming of Forms, (Annapolis: St John's Bookstore, 1939); rpt. as 'Robert Grosseteste on Light', in Herman Shapiro, ed.,

- Medieval Philosophy: Selected Readings from Augustine to Buridan (New York: Random House, 1964), pp.254-63. On the three-dimensional propagation of light, see Eastwood, 'Geometrical Optics', pp.18-20; Baur, Philosophie des Robert Grosseteste, pp.80-84; and his 'Das Licht in der Naturphilosophie des Robert Grosseteste', in Abhandlungen aus dem Gebiete der Philosophie und Ihrer Geschichte eine Festgabe zum 70. Geburtstag Georg Freiherrn von Hertling, (Freiburg: Herdesche, 1913), pp.50-51.
260. Grosseteste, De luce; ed. Baur, p.52. For commentary, see Baur, Philosophie des Robert Grosseteste, pp.85-93; Daniel A. Callus, 'Robert Grosseteste's Place in the History of Philosophy', Actes du XIème Congrès Internationale de Philosophie, vol.12, (Brussels: 1953), pp.161-65; Crombie, Robert Grosseteste, pp.104-31; Eastwood, 'Geometrical Optics', pp.16-18 and 21-25; Lindberg, Theories of Vision, pp.95-99; Lawrence E. Lynch, 'The Doctrine of Divine Ideas and Illumination in Robert Grosseteste, Bishop of Lincoln', Med. Stud., vol.3 (1941), pp.161-73; and Vescovini, Prospettiva medievale, pp.16-17.
261. Grosseteste, De luce; ed. Baur, p.54.
262. Ibid.; ed. Baur, p.55.
263. Ibid.; ed. Baur, pp.55-56; and see Baur, 'Das Licht', p.52.
264. Baur, Philosophie des Robert Grosseteste, p.88.
265. Genesis 1: 1-4.
266. Grosseteste, Hexameron, pt.7, chs.3-4; in J.T. Muckle, ed. 'The Hexameron of Robert Grosseteste: The First Twelve Chapters of Part Seven', Med. Stud., vol.6 (1944), pp.160-63 and see pp.153-54. The relation of Grosseteste to the expository tradition, particularly to St. Basil's commentary on the Hexameron, is also described in Baur, Philosophie des Robert Grosseteste, pp.76-81; and see his 'Das Licht', passim.
267. "Grosseteste, by giving his 'light metaphysics' a new physical meaning and by relating it to geometrical optics, transformed it into mathematical physics and brought it within the realm of experimental verifiability." Crombie, Robert Grosseteste, p.106. See Vescovini, Prospettiva medievale, pp.13-14; and Lindberg, Theories of Vision, p.99: "Because optics could reveal the essential nature of material reality, of cognition, and indeed of God himself, its pursuit became not only legitimate, but obligatory." On the traditions of light symbolism, see Edwyn Bevan, Symbolism and Belief. Gifford Lectures, (London: Allen and Unwin, 1938), lecture 6; and note the useful bibliography by Dieter Bremer, 'Licht als Universales Darstellungsmedium: Materialien und Bibliographie', Arch. Begriffsgesch., vol.18, pt.2 (1974), pp.185-206.
268. Baur, 'Das Licht', p.48; Crombie, Robert Grosseteste, pp.128-31; Bruce S. Eastwood, 'Mediaeval Empiricism: The Case of Grosseteste's Optics', Spec., vol.43 (1968), pp.306-21; and see above, vol.1, pp.147-49.

269. Lindberg, Theories of Vision, pp.108-9 and 116: "Roger Bacon has brought all the optical traditions of the past - Greek, Islamic, and Christian - into a rough unity under the leadership of Alhazen." See also Robert Steele, 'Roger Bacon and the State of Science in the Thirteenth Century', in Charles Singer, ed., Studies in the History and Method of Science, 2 vols., (Oxford: Clarendon Press, 1917-1921), vol.2 (1921), pp.121-50.
270. On Bacon's life and thought, see Theodore Crowley, Roger Bacon: The Problem of the Soul in his Philosophical Discourses, pref. by Fernand van Steenberghen, (Louvain: Institut Supérieur de Philosophie; Dublin: Duffy, 1950), ch.1; Stewart C. Easton, Roger Bacon and his Search for a Universal Science: A Reconsideration of the Life and Work of Roger Bacon in the Light of his Own Stated Purposes, (New York: Columbia Univ. Press, 1952); Gilson, Philosophie au moyen âge, pp.476-82; and de Wulf, Mediaeval Philosophy, vol.2 pp.236-48.
271. On the patronage of Clement, see Crowley, Roger Bacon: The Problem of the Soul, pp.34-55; and Easton, Roger Bacon and his Search, ch.8.
272. 26 MSS. of De multiplicatione specierum survive, and 39 of Perspectiva, which circulated independently of the Opus maius: Lindberg, Catalogue, pp.37-38 and 40-42. Lindberg, 'Lines of Influence', pp.68-69, notes further optical material, with edns., in Opus maius, pts.4 and 6; Opus tertium; Communia naturalium, pt.1; and De speculis comburentibus. See also Roger Bacon, Liber de sensu et sensato, chs. 2-3, 8-17 and 23-24; ed. Robert Steele in his Opera hactenus inedita Rogeri Baconi, fasc.14, (Oxford: Clarendon Press, 1937), pp.5-13, 25-79 and 114-128.
273. For an account of Bacon's theories in relations to Alhazen's, see Lindberg, Theories of Vision, pp.109-12. For a complete summary of Bacon's optical theory, see Eilhard Wiedemann, 'Roger Bacon und seine Verdienste um die Optik', in A.G. Little, ed., Roger Bacon Essays Contributed by Various Writers on the Occasion of the Seventh Centenary of his Birth, (Oxford: Clarendon Press, 1914), pp.185-203. See also Gareth B. Matthews, 'A Medieval Theory of Vision', in Machamer and Turnbull, eds., Studies in Perception, pp.186-99; and John Henry Bridges, The Life and Work of Roger Bacon: An Introduction to the 'Opus Majus', ed. H. Gordon Jones, (London: Williams and Norgate, 1914), pp.101-11.
274. Directly or indirectly, the influence of Grosseteste on Bacon was considerable. See Crowley, Roger Bacon: The Problem of the Soul, pp.21-32; and Crombie, Robert Grosseteste, pp.139-62.
275. See above, vol. I, pp. 106-7.
276. (See Page 38 - Note 276)
277. Note Grosseteste, Commentary on the Posterior Analytics, I. 14; in Divi Roberti Lincolnensis archiepiscopi Parisiensis ordinis praedicatorum in Aristotelis peripatheticorum principis posteriorum analeticorum librum, (Venice: 1521), ff. 20v - 21r; cited in Eastwood, 'Geometrical Optics', p.228: "... ratio vero expergefata

279. This theory appears to have certain similarities with the classical concept of the eidola, but see Lindberg, 'Alhazen's Theory of Vision', pp.332-41; and Siegel, Galen, pp.124-25. Passages on species by various authors are translated in Grant, ed., Source Book, pp.393-97.

dividit colorem a magnitudine et figura et corpore, et iterum figuram et magnitudinem a corpore subiecta et ita per divisionem et abstractionem provenit in cognitionem corporis subiecti deferentis magnitudinem et figuram et colorem."

276. "Et haec virtus secunda habet multa nomina; vocatur enim similitudo agentis, et imago, et species, et idolum, et simulacrum, et phantasma, et forma, et intentio, et passio, et impressio, et umbra philosophorum apud auctores de aspectibus." Roger Bacon, De multiplicatione specierum, I.i; in Opus maius, ed. John Henry Bridges, 3 vols., (London: Williams and Norgate, 1897-1900), vol. 2 (1897), p.409. On Bacon's doctrine of species, see Lindberg, Theories of Vision, pp.112-14; Vescovini, Prospettiva medievale, pp.57-76; Crombie, Robert Grosseteste, pp.144-47; and Sebastian Vogl, 'Roger Bacons Lehre von der Sinnlichen Spezies und von Sehvorgange', in Little, ed., Roger Bacon Essays, pp.205-27. Vogl's article is a commentary closely keyed to Bridges' edn. of De multiplicatione specierum.
277. (page 31).
278. Bacon, De multiplicatione specierum, I.i; ed. Bridges, p.410. Vescovini, Prospettiva medievale, p.58, defines species as:
" ... l'effeto (o azione) provocato da un agente su un paziente in modo tale che la materia del paziente non risulta totalmente modificata ..."
280. Bacon, Opus maius, pt.4, dist.2, ch.1; ed. Bridges, vol.1 (1897), p.111. English version as The Opus Majus of Roger Bacon, trans. Robert Belle Burke, 2 vols., (Philadelphia: Univ. of Pennsylvania Press, 1928).
281. " ... quando aspiciamus radios penetrantes vitra bene colorata, videmus in opaco juxta vitrum colorem sensibilem qui visum immutat per se et sensibiliter, et tamen scimus quod est species et similitudo coloris vitri." Bacon, De multiplicatione specierum, I.i; ed. Bridges, p.412.
282. Ibid., I.ii; ed. Bridges, p.426.
283. Bacon uses the example of wood catching fire: " ... cum ignis invalescit super ligna, et corrumpit naturam specificam ligneam, inducens completam ignis essentiam, tunc quod generatum est vocatur ignis, et non species, nec virtus, sed sit carbo vel flamma; et ideo species ignis et ignis completus non differunt, nisi sicut incompletum et completum." Ibid., I.i; ed. Bridges, p.414. See Vogl, 'Roger Bacons Lehre', pp.208-13.
284. Bacon, De multiplicatione specierum, I.iii; ed. Bridges p.433. See Vogl, 'Roger Bacons Lehre', pp.216-19.
285. Bacon, Opus maius, pt.5.1, dist.9, ch.4; ed. Bridges, vol.2, p.72. See also Bacon, De multiplicatione specierum, I.iii; ed. Bridges, p.436 and ibid., II.i; ed. Bridges, p.457.
286. Bacon, Opus maius, pt.4, dist.2, ch.2; ed. Bridges, vol.1, p.112.
287. " ... species coloris venientes a singulis partibus rei visae non confunduntur in una parte pupillae, sed distinguuntur et ordinantur in superficie pupillae, in quantitate sensibili secundum numerum partium in re visa, ut visus distincte comprehendat totum colorem vel lucem rei visae." Bacon, De multiplicatione specierum, I.ii; ed. Bridges, p.429. See Vogl, 'Roger Bacons Lehre', pp.213-15.

288. Bacon, De multiplicatione specierum, I.ii; ed. Bridges p.425. See Vogl, 'Roger Bacons Lehre', pp.213 and 225-26; Crombie, Robert Grosseteste, pp.151-52; and Lindberg, Theories of Vision, pp.14-16.
289. Bacon, Opus maius, pt.5.1, dist.7, ch.4; ed. Bridges, vol. 2, p.52.
290. Ibid., pt.5.1, dist.9, ch.4; ed. Bridges, vol.2, p.72.
291. See above, vol.1, pp.85-87.
292. Bacon, De multiplicatione specierum, II.i; ed. Bridges, pp.459-60; trans. Lindberg in Grant, ed., Source Book, pp.394-95.
293. On Witelo's name and background, see Maximilien Curtze, 'Sur l'Orthographe du nom et sur la patrie de Witelo (Vitellion)', Bull. Bibl. Storia Sci. Matem. Fis., vol.4 (1871), pp.49-76; Eva Tea, 'Witelo prospettico del secolo XIII', L'Arte, vol.30 (1927), pp.3-4; Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., pp.vii-xiii; and esp. Aleksander Birkenmajer, 'Etudes sur Witelo, 4^e partie: Witelo et l'université de Padoue' (1922); and his 'Witelo, le plus ancien savant silesian' (1936), in his Etudes d'histoire des sciences en Pologne, trans. Claire Brendel et al. Polska Akademia Nauk. Zaklad Historii Nauki i Techniki: Studia Copernica, vol.4, (Wroclaw: Zaklad Nardowy imienina Ossolinskiych, 1972), pp.361-407 and 413-20.
294. Padua is mentioned in Witelo, Perspectiva, X.42 and X.69; ed. Risner in the second part of his Opticae thesaurus as Vitellonis thuringpoloni libri X [separate pagination], pp.440 and 464. Experts from Witelo's Perspectiva are printed in Clemens Baeumker, Witelo, ein Philosoph und Naturforscher des XIII. Jahrhunderts. BGPM, vol.3, pt.2, (Munster: 1908), pp.127-79. For commentary, see ibid., pp.606-39; Tea, 'Witelo', pp.11-19; and Birkenmajer, 'Witelo, le plus ancien savant', pp.424-33. See Wilfred R.Theisen, 'Witelo's Recension of Euclid's De visu', Trad., vol.33 (1977), pp.394-302 for further evidence of Witelo's early optical interests.
295. Moerbeke's translations included the De speculis of Hero of Alexandria, completed at Viterbo in 1269. Lindberg, 'Introduction' to Opticae thesaurus, rpt. edn., p. ix. In the 1260's and 1270's the papal court, partly through Moerbeke's activities, was a centre for the transmission of optical literature. See ibid., pp.vii-xiii; and Lindberg 'Lines of Influence', p.67.
296. Lindberg, Theories of Vision, pp.118-20. For Bacon's influence on Witelo, see his 'Lines of Influence', pp.72-75; and Crombie, Robert Grosseteste, pp.213-14.
297. Lindberg, Catalogue, pp.77-79, lists 25 surviving MSS.
298. Vescovini, Prospettiva medievale, pp.132-35. For an explication of the neoplatonic content of Witelo's epistle, see Baeumker, Witelo, pp.606-9; and Birkenmajer, 'Witelo, le plus ancien savant', pp.420-24.
299. Witelo, Perspectiva; ed. Risner, p.1; trans. K. Kraft and F.J. LeMoine in Lindberg, Theories of Vision, p.119. The letter is translated at greater length in Crombie, Robert Grosseteste, p.215.

300. Witelo, Perspectiva, II. 3; ed. Risner, pp.63-64.
301. Baeumker, Witelo, pp.621-39. Baeumker suggests, pp.622-23, that neither Alhazen nor Witelo confronted the general problem of the optical awareness of space. Presumably he means that they did not consider in detail how the impression of 3 dimensions is effected within the eye. On the relation between Alhazen and Witelo, see Lindberg, 'Alhazen's Theory of Vision', pp.330-34.
302. Witelo, Perspectiva, IV.9; ed. Risner, p.121.
303. Loc. cit.
304. Ibid., IV.10; ed. Risner, p.121.
305. Ibid., IV.10; ed. Risner, p.122.
306. "Cum enim quis arbores valde remotas inspexerit, licet illae plurimum distent inter se, videbuntur tamen quasi coniunctae vel quasi propinquae ad invicem ..." Ibid., IV.16; ed. Risner, p.125.
307. Loc. cit.
308. Ibid., IV.18; ed. Risner, p.126.
309. Ibid., IV.63; ed. Risner, p.146.
310. On Pecham's life, see Decima L. Douie, Archbishop Pecham, (Oxford: Clarendon Press, 1952), which has little to say about his interest in optics; and David C. Lindberg, ed. and trans., John Pecham and the Science of Optics: 'Perspectiva communis', Univ. of Wisconsin Publications in Medieval Science, (Madison, Milwaukee and London: Univ. of Wisconsin Press, 1970), pp.3-9.
311. Ibid., pp.10-11; his 'Lines of Influence', pp.75-77; and his 'A Reconsideration of Roger Bacon's Theory of Pinhole Images', Arch. Hist. Exact Sci., vol.6 (1970), pp.214-15 and 222-23.
312. Lindberg, 'Lines of Influence', pp.77-83; and his edn. of Pecham, Perspectiva communis, pp.15-18.
313. John Pecham, Tractatus de perspectiva, ed. David C. Lindberg. Franciscan Institute Publications, text ser., no. 16, (St. Bonaventure, N.Y.: Franciscan Institute, 1972). Lindberg notes on p.10 that the earlier Tractatus contains teaching on optics almost identical to that found in Perspectiva communis. For further discussion of the Tractatus, see above, vol.1, p.154.
314. Lindberg, Catalogue, pp.69-71, lists a total of 64 surviving MSS. of Perspectiva communis, including fragments; and see his edn. of ibid., pp.29-32. There are 8 extant MSS. of the Tractatus: Lindberg, Catalogue, p.72.
315. Pecham, Perspectiva communis; ed. Lindberg, p.20.
316. Ibid., Pref.; ed. Lindberg, p.60.

317. Ibid., pp.24-29; his 'Alhazen's Theory of Vision', pp.336-40; and Crombie, Robert Grosseteste, pp.165-67. Lindberg remarks in his Theories of Vision, p.117: "... it is safe to say that they [Pecham and Witelo] regarded themselves principally as followers of Alhazen - although it is equally clear that they frequently viewed Alhazen through Baconian glasses."
318. For a summary of Pecham's theory of vision, see Pecham, Perspectiva communis; ed. Lindberg, pp.34-39; and his earlier 'The Perspectiva communis of John Pecham: Its Influence, Sources, and Content', Arch. Int. Hist. Sci., vol.18 (1965), pp.44-53.
319. Pecham, Perspectiva communis, I.1-2; ed. Lindberg, p.62.
320. Ibid., I.3-6 and I.28; ed. Lindberg, pp.62-64 and 108-10.
321. Ibid., I.36-37; ed. Lindberg, p.120.
322. Ibid., I.45; ed. Lindberg, p.128. Note that Pecham finally defers to the superior wisdom of Alhazen: ibid., I.46; ed. Lindberg, pp.128-30.
323. Ibid., pp.39-41.
324. Ibid., I.63; ed. Lindberg, p.140.
325. "... Grosseteste believed that the study of optics was the key to the understanding of the physical world ..." Crombie, Robert Grosseteste, p.104. See also Vescovini, Prospettiva medievale, pp.13-14: "... cercando dell'universo una spegiamento scientifica in accordo con i data della fede e con l'ideale della scienza aristotelica, Roberto Grossatesta individua il fondamento, che ne permette la comprensione scientifica, nelle caratteristiche spirituali e materiali insieme, della luce intesa ontologicamente, come la prima forma corporale, tanto più pura e perfetta quanto più lontana della sfera lunare."
326. Bacon, Opus maius, pt.5.1, dist.1, ch.1; ed. Bridges, vol.2, p.3.
327. Witelo, Perspectiva; ed. Risner, p.2.
328. Pecham, Perspectiva communis, Pref.; ed. Lindberg, p.60.
329. Lindberg, Theories of Vision, pp.99-100.
330. This is precisely what Bacon does in Opus maius, pt.5, dist. 1, ch.1; ed. Bridges, vol.2, pp.1-3. On the traditional status of sight in medieval thought, see David C. Lindberg and Nicholas H. Steneck, 'The Sense of Vision and the Origins of Modern Science', in Allen G. Debus, ed., Science, Medicine and Society in the Renaissance: Essays to Honor Walter Pagel, 2 vols., (London: Heinemann, 1972), vol.1, pp.33-40. See also Vescovini, Prospettiva medievale, p.269; and Hans Jonas, 'The Nobility of Sight: A Study in the Phenomenology of the Senses', Philos. Phenom. Res., vol.14 (1954), pp.507-19.
331. See Lindberg's 'Introduction' to his Catalogue, pp.7-13, which stresses its provisional nature.

332. Crombie, Robert Grosseteste, pp.135-36; and his 'Grosseteste's Position', pp.112-13. For Grosseteste's influence on the Franciscans, see above, vol.1, pp.150-53.
333. For the optical writings of Bartholomaeus, see above, vol.1, pp.141-44.
334. Crombie, Robert Grosseteste, pp.138-39. On Kilwardby, note also Marshall Clagett, 'Some General Aspects of Physics in the Middle Ages', Isis, vol.39 (1948), pp. 35-36.
335. Crombie, Robert Grosseteste, pp.162-64; and see Charles King McKeon, A Study of the 'Summa philosophiae' of the Pseudo-Grosseteste, (New York: Columbia Univ. Press, 1948), pp.156-74 and 206-9.
336. Crombie, Robert Grosseteste, pp.181-87; and see James Weisheipl, 'The Place of John Dumbleton in the Merton School', Isis, vol. 50 (1959), pp.439-54.
337. Grosseteste, Commentary on Posterior Analytics, I.8; Venice edn., ff.10v-11r; also cited in Eastwood, 'Geometrical Optics', pp.223-25. See also ibid., pp.10-15; and Graziella Federici Vescovini, 'La Perspectiva nell'enciclopedia del sapere medievale', Vivar., vol.6 (1968), pp.35-45. The classification of the sciences was influenced by Arabic writings on the subject, e.g. the Enumeration of the Sciences by al-Farabi (c.870-c.950), trans. into Latin in the 12th. cent., in which optics was given a special emphasis: Clagett, 'General Aspects of Physics', pp.31-32. See also James A. Weisheipl, 'Classification of the Sciences in Medieval Thought', Med. Stud., vol.27 (1965), pp.68-72; and his 'The Nature, Scope and Classification of the Sciences', in Lindberg, ed. Science in the Middle Ages, pp.474-80.
338. Kibre and Siraisi, 'Institutional Setting: The Universities', p.129.
339. " ... Geometriam per duos anni terminos, videlicet librum Geometrie Euclidis, seu Alicen Vitulonemve in perspectivam ... " Strickland Gibson, ed., Statuta antiqua universitatis Oxoniensis, (Oxford: Clarendon Press, 1931), p.234.
340. James A. Weisheipl, 'Curriculum of the Faculty of Arts at Oxford in the Early Fourteenth Century', Med. Stud., vol.26 (1964), pp.171-72.
341. F.M. Powicke, The Medieval Books of Merton College, (Oxford: Clarendon Press, 1931), pp.23, 36, 47, 49, 50, 60-61, 64, 68, 84, 97, 100, 101-4, 121, 148, 173, 191, 214 and 241. On De oculo morali, see above, vol.1, pp.156-63.
342. The exceptions are Theodoric of Freiburg's treatise on the rainbow, De iride et radialibus impressionibus, and a commentary by Wigandus Durnheimer on Pecham's Perspectiva communis. See Lindberg, Theories of Vision, p.123; and his Catalogue, pp.75-76.
343. Franco Alessio, 'Per uno studio sull'ottica del trecento', Stud. Med., ser.3, vol.2 (1961), pp.444-504. Alessio detects a fragmentation of optical theories after the synthesis of the 13th. cent.

344. On the importance of optics in the philosophical thought of the 14th. cent., see Lindberg, Theories of Vision, pp. 140-42; and Vescovini, Prospettiva medievale, ch.11.
345. Edward Randal McCarthy, 'Medieval Light Theory and Optics and Duns Scotus' Treatment of Light in D.13 of Book II of his Commentary on the Sentences', Diss. City Univ. of New York, 1976; and see DAI, vol. 37 (1976-1977), pp.4525A-26A. For Grosseteste's influence on Scotus and Ockham, see Crombie, Robert Grosseteste, pp.167-77.
346. For Ockham's discussion of perception, see Gilson, Philosophie au moyen âge, pp.646-48; Copleston, Medieval Philosophy, pp.239-43; Ernest A. Moody, 'Ockham, Buridan, and Nicholas of Autrecourt: The Parisian Statutes of 1339 and 1340' (1947), in his Studies in Medieval Philosophy, Science, and Logic: Collected Papers 1933-1969, (Los Angeles and London: Univ. of California Press, 1975), pp.133-37; his 'William of Ockham' (1967), in ibid., pp.416-18; Alessio, 'Per uno studio', pp.474-90; and Vescovini, Prospettiva medievale, pp.219-21.
347. Ibid., ch.8 and pp.222-23; and Alessio, 'Per uno studio', pp.492-94.
348. On Oresme's reading of Witelo, see Aleksander Birkenmajer, 'Etudes sur Witelo, 1ère partie: deux écrits inconnus de Witelo' (1921), in his Etudes d'histoire des sciences en Pologne, pp.98-120; and Curtze, 'Orthographie du nom', pp.64-66. For commentary on Oresme's optics of meteorology, see Vescovini, Prospettiva medievale, pp.195-204; and Stephen Clement McLuskey, Jr., 'Nicole Oresme on Light, Color, and the Rainbow: an Edition and Translation, with Introduction and Critical Notes, of Part of Book Three of his Quaestiones super quatuor libros meteororum', Diss. Univ. of Wisconsin-Madison, 1974; and see DAI, vol.35 (1974-1975), p.6045A.
349. Lindberg, Theories of Vision, pp.122-32. Lindberg comments, p.132, that these writers " ... were engaged not in explaining or defending the perspectivist theory of vision, nor in extending and improving it, but in submitting it to criticism a piece at a time. They were not partisans of the theory, but investigators of it". For Blasius, Lindberg, (Catalogue, pp.43-44), lists 16 MSS.; for Dominicus (ibid., p.45), 1 MS.; and for Henry (ibid., pp.62-63), 5 MSS. For further discussion, see Vescovini, Prospettiva medievale, ch.9, pp.206-11 and ch.12. The first of the 6 questions in the unique MS. of Dominicus, whose main authority is Alhazen, has been edited with an introduction by Vescovini. The question concerns the purpose of perspectiva as a science: Federici Graziella Vescovini, 'Les Questions de perspective de Dominicus de Clivaxo', Cent., vol.10 (1964), pp.232-46; and see her 'Le Questione di perspectiva di Biagio Pelacani da Parma', Rin., ser.2, vol.1 (1961), pp.163-243; and Alessio, 'Per uno studio', pp.494-504.
350. Lindberg, Theories of Vision, pp.132-40.
351. Albertus Magnus, De anima, bk.2, tract 3, chs.7-16; ed. Clemens Stroick. Opera omnia, vol.7, pt.1, (Weisbaden: Monasterii Westfalorum, 1968), pp.108-23; and see Lindberg, Theories of Vision, pp.104-7; his 'Science of Optics', pp.349-50; his Catalogue, pp.16-17; and McCarthy, 'Medieval Light Theory', pp.154-64.

352. Crombie, Robert Grosseteste, pp.189-200; and Aleksander Birkenmajer, 'Robert Grosseteste and Richard Fournival', Med. Hum., vol.5 (1948), pp.36-41.
353. Aristotle, De anima, bk.2, chs. 7-8; in Aristotle's 'De anima' in the Version of William of Moerbeke and the Commentary of St Thomas Aquinas, trans. Kenelm Foster and Silvester Humphries with intro. by Ivo Thomas, (London: Routledge, 1951), pp.260-76; and see Lindberg, Catalogue, p.36; and McCarthy, 'Medieval Light Theory', pp.144-53.
354. Lindberg, Theories of Vision, p.144.

Two Lines of Influence - Encyclopedias and Sermons

1. Malcolm B. Parkes, 'The Literacy of the Laity', in David Daiches and Anthony Thorlby, eds., The Mediaeval World. Literature and Western Civilization ser., (London: Aldus, 1973), p.555. The present paragraph owes much to this article.
2. With the development in the 13th. cent. of such professions as law and estate management there was considerable growth of literacy among the expanding middle class. Parkes comments: "The problem is not whether there were literate laymen, but how far they used their literacy outside their professional activities." Ibid., p.561. From the late 13th. cent. the compilation of vernacular books in the cheap cursive script used in the professions itself indicates the growth of a bourgeois readership. See M.B. Parkes, English Cursive Book Hands 1250-1500, (Oxford: Clarendon Press, 1969), p.xvi. Parkes' point of view considerably modifies that of Deanesley, who could see little evidence of bourgeois literacy from the wills of the period. See M. Deanesley, 'Vernacular Books in England in the Fourteenth and Fifteenth Centuries', MLR, vol. 15 (1920), pp.349-58; and see Parkes, 'Literacy of the Laity', p.568.
3. For books generally available to clerics, see R.M. Wilson, 'The Contents of the Mediaeval Library', in Francis Wormald and C.E. Wright, eds., The English Library before 1700: Studies in its History, (London: Athlone Press, 1958), pp.85-111.
4. M.C. Seymour, 'Some Medieval English Owners of De proprietatibus rerum', Bodl. Libr. Rec., vol.9 (1973-1977), pp.158-65.
5. For instance, the vernacular encyclopedic poem Sidrak and Bokkus appears among the effects of Sir Simon de Burley (d.1388) and William de Walcote, a priest (fl.1348-1370). See V.J. Scattergood, 'Two Medieval Book Lists', Libr., 5th. ser., vol.23 (1969), pp.236-39. Sidrak also appears among 15th. cent. bequests made by London merchants. See Sylvia L. Thrupp, The Merchant Class of Medieval London (1300-1500), (Chicago: Univ. of Chicago Press, 1948), pp.162-63 and pp.155-63 on the literacy of the London merchant families. On the attractiveness of vernacular encyclopedias to the middle class, see also Parkes, 'Literacy of the Laity', p.566. For a discussion of optics in Sidrak, see above, vol.1, pp.144-46.
6. See above, vol.1, pp.150-54.
7. For the different audiences implied by individual poems, see Mary Elizabeth Giffin, Studies on Chaucer and his Audience, (privately ptd. Hull, Quebec: Editions "L'Eclair", 1956). There are some general comments on the expectations and education of Chaucer's audience in Wolfgang Clemen, Chaucer's Early Poetry, trans. C.A.M. Sym, author's rev. of Der junge Chaucer, (1938; London: Methuen, 1963), pp.13-14. A recent study identifies Chaucer's audience as the socially mobile lesser gentry, comprising knights and esquires but also lawyers and members of Chancery. See Paul Strohm, 'Chaucer's Audience', Lit. Hist., no.5 (Spring 1977), pp.26-41, esp. pp.30-34.

8. The article on 'Encyclopaedia', in The New Encyclopaedia Britannica, 15th. edn., 30 vols., (Chicago: Encyclopaedia Britannica, 1975), Macropaedia, vol.6, pp.779-99, provides a convenient summary of changing attitudes. See further Robert Collison, Encyclopaedias, their History throughout the Ages: A Bibliographical Guide with Extensive Historical Notes to the General Encyclopaedias Issued throughout the World from 350 B.C. to the Present Day, 2nd. edn., (1964; New York and London: Hafner, 1966); and his 'A Chronology of Encyclopaedias till 1900', JWH, vol.9 (1965-1966), pp.453-56. There is an attempt to define and classify types of medieval encyclopedia and their readership in Michel de Bouard, 'Encyclopédies médiévales: sur la "connaissance de la nature et du monde" au moyen âge', RQH, vol.112 (1930), pp.258-304.
9. Pierre Grimal, 'Encyclopédies antiques', JWH, vol.9 (1965-1966), pp.459-60: "... tandis qu'un 'encyclopédiste' peut, à la rigueur, n'être, de nos jours, qu'un collectionneur de faits, un abrégiateur, et, parfois, un simple vulgarisateur, il en va tout autrement de son lointain prédécesseur grec ou romain. Celui-ci mène son enquête au nom d'un système. Il se soucie moins d'exposer que de coordonner et, finalement, de découvrir le 'secret du monde'." On the scientific handbook tradition of Greece and Rome, see above, vol.1, pp.130-32.
10. James I. Wimsatt, Allegory and Mirror: Tradition and Structure in Middle English Literature, (New York: Pegasus, 1970), ch.6; Ritamary Bradley, 'Background of the Title Speculum in Mediaeval Studies', Spec., vol.29 (1954), pp.100-15. Bradley notes, p.112, that Alan of Lille (1114-1203) elaborated the idea of the mirror more than any previous writer. See, for example, the first stanza of a poem by Alan quoted in F.J.E. Raby, A History of Christian-Latin Poetry from the Beginnings to the Close of the Middle Ages, 2nd. edn., (1927; Oxford: Clarendon Press, 1953), pp.302 and 355; and the descriptions of mirrors in Alan's Anticlaudianus (1181), bk. 1, 436-510 and bk.6, 73-272; ed. R. Bossuat. Textes Philosophiques du Moyen Age, no.1, (Paris: Vrin, 1955); trans. James J. Sheridan as Anticlaudianus, or: The Good and Perfect Man, (Toronto: Pontifical Institute of Mediaeval Studies, 1973). For further comments on speculum, see Georgina Lea Morrill, 'Introduction' to her edn. of Speculum Gy de Warewyke: An English Poem. EETS, e.s. 75 (1898), pp.xviii-xxiv; and Frederick Goldin, 'The Mirror of Narcissus' in the Courtly Love Lyric, (Ithaca, New York: Cornell Univ. Press, 1967), pp.4-15.
11. Emile Mâle, L'Art religieux du XIII^e siècle en France: étude sur l'iconographie du moyen âge et sur ses sources d'inspiration, 4th edn., (1898; Paris: Colin, 1919), p.39 and see ch.2; trans. from 3rd. edn. by D. Nussey as Religious Art in France in the Thirteenth Century: A Study in Mediaeval Iconography and its Sources of Inspiration, (London: Dent, 1913) and reissued as The Gothic Image, (New York: Harper, 1958). For the optical content of Vincent's work, see above, vol.1, pp.138-41.

12. Vincent of Beauvais, Speculum naturale, prol., ch.3; in Bibliotheca mundi: Vincentii Bellovacensis speculum quadruplex; naturale, doctrinale, morale, historiale ... omnia nunc accurate recognita ... opera et studio theologorum Benedictorum collegii Vedastini in alma academia Duacensi..., 4 vols., ptd. B. Belleri, (Douai: 1624), vol.1, col.3. This is the most recent and accessible printed edn. of Speculum naturale. In view of its unreliability, all quotations have been collated with the earliest printed edn. of Speculum naturale at the British Library: Incipit speculum naturale Vincentii Belvacensis fratris ordinis praedicatorum, 2 vols., [1472?], shelf mark IC.682. On the text of Speculum maius, see B.L. Ullman, 'A Project for a New Edition of Vincent of Beauvais', Spec., vol.8 (1933), pp.325-26; and Carl Young, 'The Speculum majus of Vincent of Beauvais', YULG, vol.5 (1931), pp.2-3.
13. William H. Stahl, Roman Science: Origins, Development and Influence to the Later Middle Ages, (Madison: Univ. of Wisconsin Press, 1962), pp.16-19. On Roman and early medieval science, see also Clagett, Greek Science, chs. 8, 11 and 12.
14. Stahl, Roman Science, pp.26-28; and Grimal, 'Encyclopédies antiques', pp.460-61.
15. Stahl, Roman Science, pp.45-51.
16. Ibid., p.13. On encyclopedias in the Roman and early medieval phase see also Collison, Encyclopaedias, ch.1.
17. Stahl, Roman Science, pp.99-100.
18. Lindberg, Theories of Vision, p.87.
19. Seneca, Naturales quaestiones, I. Pref. 17.1 - I.2.11 and I.9.1 - I.15.8; in Lucius Annaeus Seneca, Naturales quaestiones, ed. and trans. Thomas H. Corcoran. Loeb Classical Library, 2 vols., (London: Heinemann, 1971-1972), vol.1 (1971), pp.14-31 and 66-83.
20. Ibid., I.3.1-I.3.8; ed. Corcoran, vol.1, pp.30-36.
21. Ibid., I.3.9; ed. Corcoran, vol.1, p.38.
22. Ibid., I.3.11; ed. Corcoran, vol.1, p.40.
23. Ibid., I.4.1-I.8.9; ed. Corcoran, vol.1, pp.42-64.
24. Ibid., I.16.1-I.17.10; ed. Corcoran, vol.1, pp.82-94.
25. Stahl comments, Roman Science, p.103: " ... [his] chief tools of scholarship seem to have been an abundant supply of books, index cards, paste, and scissors."
26. Pliny, Naturalis historia, XI.liv-lv; in Pliny, Natural History, ed. and trans. H. Rackham, W.H.S. Jones and D.E. Eichholz. Loeb Classical Library, 10 vols., (London: Heinemann, [1938]-1963), vol.3 (1956), ed. Rackham, p.524. See also Lindberg, Theories of Vision, p.88.
27. Pliny, Naturalis historia, XI.liv-lv; ed Rackham, vol.3, pp.520-26.

28. Ibid., XI.lvi; ed. Rackham, vol.3, p.528.
29. Stahl, Roman Science, pp.100 and 119. Collison, Encyclopaedias, p.26, remarks of the Naturalis historia: "No self respecting mediaeval library was without a copy."
30. Maurice de Gandillac, 'Encyclopédies pre-médiévales et médiévales', JWH, vol.9 (1965-1966), pp.496-99; Jacques Fontaine, 'Isidore de Séville et la mutation de l'encyclopédisme antique', ibid., pp.519-38; and Fritz Saxl, 'Illustrated Mediaeval Encyclopedias I: The Classical Heritage', in his Lectures, 2 vols., (London: Warburg Institute, 1957), vol.1, pp.229-32. For an introductory survey of encyclopedias in the medieval period, see Collison, Encyclopaedias, ch.2.
31. "Rerum autem ignorantia facit obscuras figuratas locutiones, cum ignoramus vel animatum vel lapidum vel herbarum naturas aliarumve rerum quae plerumque in scripturis similitudinis alicuius gratia ponuntur." Augustine, De doctrina christiana, II.59; in De doctrina christiana libri quatuor, ed. William M. Green. Corpus Scriptorum Ecclesiasticorum Latinorum, vol. 80: Sancti Aureli Augustini opera, sect.6, pars 6, (Vienna: Hoelder-Pichler-Tempsky, 1963), p.50; trans. with intro. by D.W. Robertson, Jr., as St Augustine, On Christian Doctrine. Library of Liberal Arts, (Indianapolis and New York: Bobbs-Merrill, 1958). Augustine later suggests that such information ought to be gathered together in a single work. See De doctrina christiana, II.141; ed. Green, pp.74-75.
32. Fontaine, 'Isidore de Seville', p.527.
33. Ibid., pp.519-20 and 533.
34. Stahl, Roman Science, pp.215-16.
35. Isidore of Seville, Etymologiae, III. x-xiv; in Isidori Hispalensis episcopi etymologiarum sive originum libri XX, ed. W.M. Lindsay. Scriptorum Classicorum Bibliotheca Oxoniensis, 2 vols. (Oxford: Clarendon Press, 1911), vol.1.
36. Ernest Brehaut, An Encyclopedist of the Dark Ages: Isidore of Seville, (1912; rpt. New York: Burt Franklin, 1964), p.131.
37. Isidore, Etymologiae, III.x.1-3; ed. Lindsay, vol.1.
38. Ibid., III.xii.1; ed. Lindsay, vol.1.
39. Stahl, Roman Science, p.214: "Viewed against the disheartening background of contemporary letters, Isidore's Etymologies is one of the outstanding feats of scholarship of all time." See also Fontaine, 'Isidore de Séville', p.525.
40. Stahl, Roman Science, p.215. The major sources of the De natura rerum of Bede (672/3-735) were the Etymologiae of Isidore and Pliny's Naturalis historia. Bede's interest in science was confined in general to matters with some direct bearing on the Christian life. Astronomy is prominent since it is used to compute the date of Easter. Optics appears briefly in meteorological guise in the account of eclipses. See Bedae venerabilis de rerum natura, ed. J.-P. Migne. PL, vol.90 (1850), cols.187-278 and esp.ch.22, cols. 240-42. See also Stahl, Roman Science, pp.226 and 229-30.

41. Hugh of St Victor, Eruditionis didascalicon libri septem; ed. J.-P. Migne. PL, vol.176 (1854), cols.759-838. English version as The 'Didascalicon' of Hugh of St Victor: A Medieval Guide to the Arts, trans. Jerome Taylor. Records of Civilization Sources and Studies, no.64, (New York and London: Columbia Univ. Press, 1961). See also Jean Châtillon, 'Le Didascalicon de Hughes de Saint-Victor', JWH, vol.9 (1965-1966), pp.539-52. Châtillon observes, p.539, that Hugh was "animé d'une extraordinaire curiosité d'esprit". Note also Collison, Encyclopaedias, pp.47-49.
42. Taylor, 'Introduction' to his trans. of Didascalicon, pp.4-7.
43. Hugh of St. Victor, Didascalicon, bk.1, ch.2; ed. Migne, cols. 741-42.
44. Hugh of Saint Victor, Commentariorum in hierarchiam coelestem S. Dionysii Areopagitae secundum interpretationem Joannis Scoti ad Ludovicum..libri X, bk.1, ch.1; ed. J.-P, Migne. PL, vol. 175 (1854), col.925. The opening passages of this Commentary form a critique of encyclopedic knowledge. In itself, argues the author, the knowledge of things is inadequate. To be rightly understood, the external forms of the physical world should be seen as analogous to the internal, spiritual world where divine truth resides: "Duo enim simulacra erant proposita homini, in quibus invisibilia videre potuisset: unum naturae, et unum gratiae. Simulacrum naturae erat species huius mundi Simulacrum autem gratiae erat humanitas Verbi. Et in utroque Deus monstrabatur ..." Ibid., bk.1, ch.1; ed. Migne, col.926. This correct view of physical creation is itself a gift of grace. Through Christ it was vouchsafed to man. He made the blind man see, then taught him who he was. So God first sheds light, then instructs. Nature can teach, but it cannot shed light: "Natura enim demonstrare potuit, illuminare non potuit. Et mundus Creatorem suum specie praedicavit, sed intelligentiam veritatis cordibus hominum non infudit. Per simulacra igitur naturae, Creator tantum significabatur; in simulacris vero gratiae praesens Deus ostendebatur, quia illa operatus est ut intelligentur esse ..." Loc. cit. The theological tradition of light in which Hugh of St. Victor writes should not be seen as opposed to the scientific tradition. The two approaches are complementary and are recognised as such in the writings of Grosseteste, in the Speculum naturale of Vincent of Beauvais and in the sermons of Peter of Limoges. See above, vol.1, pp.104-9, 138-41, 147-54 and 156-63.
45. Bernadus Silvestris, De mundi universitate, bk.2, ch.11; ed. Carl Sigmund Barach and John Wrobel. Bibliotheca Philosophorum Mediae Aetatis, vol.1, (1876; rpt. Frankfurt: Minerva, 1964), p.57; trans. Winthrop Wetherbee as The 'Cosmographia' of Bernardus Silvestris. Records of Civilization Sources and Studies, no.89, (New York and London: Columbia Univ. Press, 1973).
46. William of Conches, Glosae super Platonem, ch.149; ed. Edouard Jeauneau. Textes Philosophiques du Moyen Age, no.13, (Paris: Vrin, 1965), p.252. See also ibid., ch.151; ed. Jeauneau, pp.254-55.
47. William's other major sources on vision are Constantinus, Africanus and Aristotle. See ibid., chs. 138, 142 and 145; ed. Jeauneau, pp.238, 244-45 and 247.

48. William's work spread quickly throughout Europe. Some 140 MSS. still exist, most of them dating from the 12th. and 13th. cents. Philosophia mundi was "the first attempt in the West to give a systematic account of the whole of nature on the basis of a few simple scientific ideas". See R.W Southern, Medieval Humanism and Other Studies, (Oxford: Blackwell, 1970), p.79 and see pp.79-81. In medicine if not in optics, Philosophia mundi registers the effect of the 'new' learning of the Arabs. See Lawn, Salernitan Questions, pp.50-57. Lawn observes, p.56, that Philosophia mundi, rather than Adelard of Bath's Quaestiones naturales, "must have been one of the very earliest writings to disseminate a knowledge of Arabic medicine and Salernitan physica north of the Alps".
49. William of Conches, De philosophia mundi, bk.4, ch.25; in Honorii Augustodunensis ... de philosophia mundi [i.e. attributed to Honorius of Autun], ed. J.-P. Migne. PL, vol.172 (1854), col.95.
50. Ibid., bk.4, chs.26 and 27; ed. Migne, cols.96-97.
51. " ... quia longius videmus quam audiamus, et longius audimus quam oderemus, longius etiam odoramur quam gustu sentiamus, instrumentum etiam videndi est super instrumentum audiendi ... De superiori instrumento, id est de oculis eorumque actione ..." William of Conches, Dragmaticon, bk.6; in Dialogus de substantiis physicis ante annos ducentos confectos, a Vuilhelmo Aneponymo philosopho..., ptd. Iosias Rihelius, (Strasbourg: 1567), p.280.
52. Ibid., bk.6; Strasbourg edn., pp.281-83.
53. Ibid., bk.6; Strasbourg edn., pp.283-92. Summarised in Lindberg, Theories of Vision, p.92. See also William of Conches, Glosae super Platonem, chs.137-38 and 142-45; ed. Jeuneau, pp.236-39 and 243-48. The questions of Dragmaticon are similar to those found in the Quaestiones naturales of Adelard of Bath. See above, vol.1, pp.135-36.
54. Southern, Medieval Humanism, pp.71-73.
55. Haskins, Mediaeval Science, ch.2.
56. "The point of special significance with respect to Adelard is that he stands at the meeting-point of three intellectual movements, the traditional learning of the French schools, the Greek culture of southern Italy, and the Arabic science of the East ..." Charles H. Haskins, 'Adelard of Bath', EHR, vol.26 (1911), pp.497-98. Adelard is customarily described as a pioneer or symbol of the assimilation of Greek and Arab learning into the West. See also Haskins, Mediaeval Science, pp.20 and 42; Lindberg, Theories of Vision, pp.92-93; Lawn, Salernitan Questions, p.30; and above, vol.1, pp.103-4.
57. Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.44, places the date later, a few years after 1116. The date I have quoted is that of Lawn, Salernitan Questions, p.27.

58. " ... nepos quidam meus, in rerum causis implicans quam explicans, aliquid Arabicorum studiorum novum me proponere exhortatus est." Adelard of Bath, Quaestiones naturales; ed. Martin Müller. BGPTM, vol.31, pt. 2, (Münster: 1934), p.1 and see pp.4-5. See also Des Adelard von Bath Traktat 'De eodem et diverso', ed. Hans Willner. BGPM, vol.4, pt. 1, (Münster: 1903), p.32.
59. Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.33.
60. Ibid., p.25; Haskins, Mediaeval Science, p.36; and Lawn, Salernitan Questions, pp.25-26.
61. Haskins, Mediaeval Science, p.41, notes that 20 MSS. of Quaestiones naturales still survive, and takes this as evidence of its popularity in the middle ages.
62. Most of the optical portions of the Quaestiones naturales have been printed in trans. with annotations by David C. Lindberg in Grant, ed., Source Book, pp.376-80. The trans. used is that of Hermann Gollancz from Dodi Venechdi (Uncle and Nephew): The Work of Berachya Hanakdan, Now Edited from MSS. at Munich and Oxford with an English Translation from the Latin of Adelard of Bath's 'Quaestiones naturales', (London: Oxford Univ. Press, 1920), pp.114-21. Other optical questions not included by Grant may be found in Adelard, Quaestiones naturales, chs. 12 and 28-30; ed. Müller, pp.15 and 34-36.
63. Ibid., ch.23; ed. Müller, p.27.
64. Ibid., ch.23; ed. Müller, p.28.
65. Ibid., ch.23; ed. Müller, pp.28-29.
66. Ibid., ch.23; ed. Müller, p.29.
67. Lindberg, Theories of Vision, p.93.
68. Adelard, Quaestiones naturales, ch.23; ed. Müller, p.30.
69. Ibid., ch.23; ed. Müller, pp.30-31.
70. Ibid., chs.25-27; ed. Müller, pp.31-34. For a discussion of these objections, see Lindberg, Theories of Vision, pp. 93-94.
71. Alexander Neckam, De naturis rerum, bk.2, chs.153-54; in 'Alexandri Neckam de naturis rerum libri duo', with the Poem of the Same Author: 'De laudibus divinae sapientiae', ed. Thomas Wright. Rolls ser. (1863), pp.234-40.
- The optical portions of De naturis rerum have been translated by David C. Lindberg and Greta J. Lindberg in Grant, ed., Source Book, pp.380-83.
72. Neckam's citations of Aristotle may be from an indirect acquaintance with the texts. See Haskins, Mediaeval Science, pp.128-29. In ibid., ch.18, Haskins prints the Sacerdos ad altare, a list, ascribed to Neckam, of books which may have been read in the schools of the day. Aristotle's De anima, Euclid on geometry and Galen on medicine are cited, but again it is doubtful whether they were directly known to Neckam. See Haskins, Mediaeval Science, p.371; and Thorndike, History of Magic, vol.2: First Thirteen Centuries, pp.194-95.

73. Neckam, De naturis rerum, bk.2, ch.154; ed. Wright, pp.239-40.
74. Ibid., bk.2, ch.153; ed. Wright, pp.236-37. Neckam elsewhere questions the legendary power of the lynx to see meat through nine walls; he believes that the animal responds through its sense of smell. See ibid., bk.2, ch.138; ed. Wright, p.219; and Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.200.
75. Neckam, De naturis rerum, bk.2, ch.153; ed. Wright, p.234.
76. Ibid., bk.2, ch.153; ed. Wright, pp.234-35.
77. Ibid., bk.2, ch.153; ed. Wright, p.235.
78. Loc. cit.
79. See above, vol.1, pp.147-66.
80. On the content and composition of Speculum maius, see Young, 'Speculum majus' pp.4-13; Ullman, 'Project for a New Edition', pp.313-24; Michel Lemoine, L'Oeuvre encyclopédique de Vincent de Beauvais', JWH, vol.9 (1965-1966), pp.571-79; Collison, Encyclopaedias, pp.60-63; and M.B. Parkes, 'The Influence of the Concepts of Ordinatio and Compilatio on the Development of the Book', in J.J.G. Alexander and M.T. Gibson, eds., Medieval Learning and Literature: Essays Presented to Richard William Hunt, (Oxford: Clarendon Press, 1976), pp.128-29. Ullman, 'Project for a New Edition', p.326, notes that Speculum maius exists in over 50 MSS.
81. On Vincent's treatment of science, see ibid., p.324.
82. See above, vol.1, pp.133 and 148.
83. "Ita ab uno bono omnia bona, et in uno bono omnia bona sunt; hoc enim bonum, nihil a se conditum alienum relinquit a se, nec tamen illuminat, nisi illa tantum, quae creavit ad se, et formavit secundum se." Vincent, Speculum naturale, bk.1, ch.34; Douai edn., vol.1, col.43.
84. Ibid., bk.1, ch.35; Douai edn., vol.1, cols. 43-44.
85. Ibid., bk.1, chs.53 and 58; Douai edn., vol.1, cols.54-55 and 58.
86. See also Hugh of St. Victor, commenting on a text from John 1: 9 in his De sapientia animae Christi; ed J.-P. Migne. PL, vol.176 (1854), col.848: "Erat ... lux vera, quae illuminat omnem hominem venientem in hunc mundum ... Quid est Verbum nisi sapientia? ... si verbum illuminat, sapientia illuminat; quia nec illuminare verbum poterat, si sapientia non erat. Quid enim facit verbum sine sapientia? Verbum sonat, sapientia illuminat. Nam et ipsa sapientia lux est, et Deus lux est, quia Deus sapientia est; et cum Deus illuminat, sapientia illuminat, et luce illuminat; nec alia luce illuminat, sed ea luce quae ipsa est; quia lux est, et verbum lux est, et sapientia lux est; quia verbum sapientia est et sapientia Deus est."

87. Vincent, Speculum naturale, bk.1, ch.73; Douai edn., vol. 1, col. 68. On light as analogous to the cognitive faculty see ibid., bk.2, ch.37; Douai edn., vol.1, cols.102-3.
88. Vincent, Speculum naturale, bk.2, ch.32; Douai edn., vol.1, col.99.
89. Ibid., bk.2, ch.33; Douai edn., vol.1, col.99.
90. Loc. cit.
91. Ibid., bk.2, ch.35; Douai edn., vol.1, cols.100-1
92. " ... virtus enim eius est, secundum expansionem, derivationem et multiplicationem: unde et fontis habet proprietatem." Ibid., bk.2, ch.35; Douai edn., vol.1, col.100.
93. Ibid., bk.2, ch.36; Douai edn., vol.1, cols.101-2.
94. Ibid., bk.2, ch.38; Douai edn., vol.1, col.103.
95. Ibid., prol., chs.8, 10, 12 and 18; Douai edn., vol.1, cols. 6-7, 8-9, 10 and 14-15.
96. Ibid., bk.2, ch.39; Douai edn., vol.1, col.104.
97. Loc. cit.
98. Ibid., bk.2, ch.40; Douai edn., vol.1, col.105.
99. " ... nulla substantia spiritualis mensurabilis est dimensione quantitatis: at vero lumen habet huiusmodi dimensionem. Nam in aere tricubiti lumen est tricubitum, in bicubito bicubitum." Ibid., bk.2, ch.42; Douai edn., vol.1, col.106.
100. Ibid., bk.2, chs.48, 49 and 52; Douai edn., vol.1, cols.109-10; 110-11 and 112-13.
101. Ibid., bk.2, ch.52; Douai edn., vol.1, col.113.
102. Ibid., bk.2, ch.60; Douai edn., vol.1, cols.117-18.
103. Ibid., bk.2, ch.43; Douai edn., vol.1, col.106.
104. Wilson, 'Contents of the Mediaeval Library', p.103; Pierre Michaud-Quantin, 'Les Petites encyclopédies du XIII^e siècle', JWH, vol.9 (1965-1966), pp.584-88; Thorndike, History of Magic, vol.2: First Thirteen Centuries, pp.402-3; and Collison, Encyclopaedias, pp.57-59. For Bartholomaeus' career, see Gerald E. Se Boyar, 'Bartholomaeus Anglicus and his Encyclopaedia', JEGP, vol.19 (1920), pp.174-77.
105. Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.405.
106. For a list, see Seymour 'Medieval Owners of De proprietatibus rerum', pp.156-58.
107. In the case of English wills, Seymour shows that the owners of this encyclopedia were almost invariably churchmen in high office. See ibid., pp.164-65.

108. Michaud-Quantin, 'Petites encyclopédies', p.587; and Se Boyar, 'Bartholomaeus Anglicus', pp.186-88, who also notes a Dutch trans.
109. Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.406.
110. Ibid., pp.404-5.
111. Bartholomaeus' bibliography also includes the name of Grosseteste. See ibid., p.404.
112. Bartholomaeus preceded Roger Bacon in citing Alhazen. See Lindberg, Theories of Vision, p.253, n.28.
113. Bartholomaei Anglici de genuinis rerum coelestium, terrestrium et inferarum proprietatibus, libri XVIII, (Frankfurt: Richter, 1601); rpt. as Bartholomaeus Angelicus, De rerum proprietatibus, (Frankfurt: Minerva GMBH, 1964). Note also the recent edn. of Trevisa's ME trans. which closely follows the original Latin texts: On the Properties of Things: John Trevisa's Translation of Bartholomaeus Anglicus 'De proprietatibus rerum', ed. M.C. Seymour et al., 2 vols., (Oxford: Clarendon Press, 1975), in which see vol.1, p.xv.
114. See above, vol.1, p.97.
115. Bartholomaeus, De proprietatibus rerum, III.17; Frankfurt edn., pp.63-64.
116. Ibid., III.17; Frankfurt edn., p.63.
117. Loc. cit.
118. Lindberg comments, Theories of Vision, p.253, n.26, that Bartholomaeus' attempt to reconcile these theories "anticipates, in a number of respects, Bacon's later synthesis".
119. Bartholomaeus, De proprietatibus rerum, III.17; Frankfurt edn., p.64.
120. Loc. cit.; and see Thorndike, History of Magic, vol.2: First Thirteen Centuries, p.409.
121. Bartholomaeus, De proprietatibus rerum, VIII.40; Frankfurt edn., p.426.
122. Ibid., VIII.40; Frankfurt edn., pp.426-30.
123. Ibid., VIII.40; Frankfurt edn., p.429.
124. Ibid., VIII.42; Frankfurt edn., p.431.
125. Ibid., XIX.8; Frankfurt edn., pp.1146-48.
126. Tom L. Burton, 'Sidrak on Reproduction and Sexual Love', Med. Hist., vol.19 (1975), p.286. The English version of Sidrak and Bokkus has recently been edited by Tom L. Burton, 'Sidrak and Bokkus: A Diplomatic Transcript of MS. Lansdowne 793 (British Museum) with an Introduction, Glossary and Notes (including Significant Variants from the Other English Manuscripts)', Diss. Univ. of Bristol, 1976. Dr. Burton has kindly supplied photocopies of the relevant pages. Prof. Elizabeth Salter suggested looking at Sidrak and I must also acknowledge the help of Dr. Burton's supervisor, Dr. V.J. Scattergood.

127. Sydrach, La Fontaine de toutes sciences du philozophe (Paris: [1496?]), resp.263; (unfoliated edn.); and see Robert E. Nichols, Jr., 'Sidrak and Bokkus on the Atmospheric and Earth Sciences', Cent., vol.12 (1968), pp.220-21.
128. Sydrach, Fontaine, resp.225.
129. Ibid., resp.268; and see resp.292.
130. Ibid., resp.330.
131. Ibid., resp.337.
132. Ibid., resp.338.
133. Ibid., resp. 366.
134. "Cum igitur naturalis spiritus, per nervos a cerebro prodeuntes ad oculos usque pervenerit, exiens, si aliquem splendorem, vel solis, vel alterius reperit, usque ad obstaculum dirigitur: quia offerens se, per ipsum se diffundit, formisque et illius coloribus informatus, per oculos, et per phantasticam cellam transit, visusque efficitur." William of Conches, De philosophia mundi, bk.4, ch.26; ed. Migne, col.96.
135. The metaphor is traced to Plato by Ernst Robert Curtius, European Literature and the Latin Middle Ages, trans. Willard R. Trask, (1948; London: Routledge, 1953), pp.136-37. On the history of the metaphor, see also V.A. Kolve, 'Chaucer and the Visual Arts', in Brewer, ed., Writers and their Background: Chaucer, pp.301-3.
136. John 1: 4-9; in Biblia sacra iuxta vulgatam Clementiam nova editio, ed. Alberto Colunga and Laurention Turrado, 4th. edn., (1946; Madrid: Biblioteca de Autores Cristianos, 1965).
137. Plotinus, Enneads, I. tract.6.9; trans. Stephen McKenna, 4th.edn., rev. by B.S.Page, foreword by E.R. Dodds and intro. by Paul Henry, (1952; London: Faber, 1969), pp.63-64.
138. Carolly Erickson, The Medieval Vision: Essays in History and Perception, (New York: Oxford Univ. Press, 1976), pp. 37-38; and Lindberg, Theories of Vision, pp.95-99.
139. Augustine, De trinitate, bk.11, ch.3; in S. Aurelii Augustinii Hipponensis episcopi de trinitate libri quindecim, ed. J.-P. Migne. PL, vol.42 (1845), col.988. English version of De trinitate by Marcus Dods and Arthur W. Haddan in A Select Library of the Nicene and Post-Nicene Fathers of the Christian Church, ed. Philip Schaff, 14 vols., (New York: Christian Literature Co., 1887-1892), vol.3 (1887). For a full discussion of Augustine's theories of light and vision, see Ronald H. Nash, The Light of the Mind: St. Augustine's Theory of Knowledge, (Lexington: Univ. Press of Kentucky, 1969); R. Jolivet, 'La Doctrine augustinienne de l'illumination', Rev. Phil., vol.1 (1930), pp.382-502 ; and Goldin, 'Mirror of Narcissus', pp.207-58.
140. Dionysius the Areopagite, De divinis nominibus, ch.4; in Dionysiaca: recueil donnant l'ensemble des traductions latines des ouvrages attribués au Denys de l'Aréopage, et synopse marquant

- la valeur de citations presque innombrables allant seules depuis trop longtemps, remises enfin dans leur contexte ... /Greek, Latin and French texts/ ed. Philippe Chevalier, 2 vols., (Bruges: de Brouwer, 1937), vol.1, pp.172-73. I have followed text R, the Latin trans. attributed to Grosseteste. For an English version, see Dionysius, The Divine Names and the Mystical Theology, trans. C.E. Rolt, new edn., (1920; London: SPCK, 1940); and further, Dionysius the Areopagite, The Celestial Hierarchies, trans. eds. of the Shrine of Wisdom, (London: Shrine of Wisdom, 1935). I am grateful to R. Ann Lees of the Centre for Medieval Studies, Univ. of York, for allowing me to read a chapter on Dionysius in her forthcoming doctoral thesis, 'The Negative Language of the Dionysian School of Mystical Theology: An Approach to the Cloud of Unknowing'.
141. Gregory, Moralia in Job, bk.2, ch.1; in Sancti Gregorii magni Romani pontificis moralium libri sive expositio in librum b. Job, ed. J.-P. Migne. PL, vol.75 (1849), col.553.
142. Taylor, 'Introduction' to 'Didascalicon' of Hugh of St. Victor, pp.14-15.
143. Hugh of St. Victor, Commentariorum in hierarchiam coelestem, bk.3; ed. Migne, col.976. The tradition of using metaphors of vision and light to describe mystical experience is found also at this time in the writings of Richard of St. Victor (d.1173). See Grover A. Zinn, Jr., 'Personification Allegory and Visions of Light in Richard of St. Victor's Teaching on Contemplation', UTQ, vol.46 (1976-1977), pp.198-208; and Robert Javelet, Image et ressemblance au douzième siècle, 2 vols., (Paris: Letouzey et Ané, 1967), vol.1, pp.376-90.
144. See above, vol.1, pp.136-38.
145. Grosseteste, Commentary on Posterior Analytics, bk.1, ch.17; Venice edn., f.26r. See further Grosseteste's comments on Genesis 1:4 in his Hexaameron, quoted and trans. by Beryl Smalley, 'The Biblical Scholar', in Callus, ed., Grosseteste Scholar and Bishop, p.85 and n.3; and Eastwood, 'Mediaeval Empiricism', pp.308-9. For Roger Bacon's ideas of interior illumination, see Vescovini, Prospettiva medievale, pp.55-57; more fully stated in Raoul Carton, L'Expérience mystique de l'illumination intérieure chez Roger Bacon, (Paris: Vrin, 1924), ch.1. For the general development of analogies between the inner and outer eye in the Franciscan tradition, see E. Gilson, The Philosophy of St. Bonaventure, trans. Illyd Trethowan and Frank J. Sheed, (1924; Patterson, N.J.: St. Anthony Guild Press, 1965), chs.9, 11 and 12.
146. Erickson, Medieval Vision, p.82.
147. G.R. Owst, Literature and Pulpit in Medieval England: A Neglected Chapter in the History of English Letters and of the English People, 2nd edn., (1933; Oxford: Blackwell, 1961), pp.190-92 and 194-95; and his Preaching in Medieval England: An Introduction to Sermon Manuscripts of the Period c.1350-1450, (Cambridge: Cambridge Univ. Press, 1926), p.349. On the extent to which sermons could draw on the mutual knowledge and experience of preacher and audience, see Charles H. Haskins, 'The University of Paris in the Sermons of the Thirteenth Century', AHR, vol.10 (1904-1905), pp.1-27.

148. I have adopted here a wider application of the term exemplum than that countenanced by Mosher, who views the exemplum as a distinct literary genre, defined as "a short narrative used to illustrate or confirm a general statement". See J.A. Mosher, The Exemplum in the Early Religious and Didactic Literature of England, (New York: Columbia Univ. Press, 1911), p.1 and see p.6. What seems fundamental to the genre, however, is not the narrative element but the moral and didactic application of the material that is used, be it narrative or scientific. Mosher admits that there was considerable latitude in the use of the term in the middle ages: "It is quite likely that some writers considered any illustration whatever an exemplum." Ibid., p.5. Certainly, optical exempla fulfil all the purposes of the genre as set out by Mosher: "... (1) to furnish a concrete illustration of the result of obeying or disobeying some religious or moral law; (2) to give proof or the confirmation of the proof of an assertion; (3) to arouse fear in the sinful or to stimulate the zeal of the godly; (4) to make clear the meaning of some abstruse statement; (5) to revive languid listeners, evoke interest or laughter; (6) to eke out a scant sermon ..." Ibid., p.8. A later definition of exemplum removes narrative as a prerequisite: "Par le mot exemplum, on entendait, au sens large du terme, un récit ou une hystoiriette, une fable ou une parabole, une moralité ou une description pouvant servir de preuve à l'appui d'un exposé doctrinal, religieux ou moral." J.-Th. Welter, L'Exemplum dans la littérature religieuse et didactique du moyen âge, (Paris and Toulouse: Guitard, 1927), p.1. Owst takes issue with Mosher's restrictive use of exemplum and maintains that it is "the general all-inclusive term for any kind of homiletic simile or illustration". He subdivides the genre into "narration" for stories of men and women, "fable" for animal tales and "figure" for similitudes from natural objects. Optical exempla thus fall under the last category. See Owst, Literature and Pulpit, pp.151-52. For further discussion, see M.M. Davy, Les Sermons universitaires parisiens de 1230-1231: contribution à l'histoire de la prédication médiévale. Etudes de Philosophie Médiévale, no.15, (Paris: Vrin, 1931) p.34; and Margaret D. Howie, Studies in the Use of Exempla with Special Reference to Middle High German Literature. Diss. Univ. of London, (London: Univ. of London Press, 1923), ch.1.
149. On the place of exempla within sermons, as recommended in the treatises on preaching, see esp. Th.-M. Charland, Artes praedicandi: contribution à l'histoire de la rhétorique au moyen âge. Publications de l'Institut d'Etudes Médiévales d'Ottawa, no.7, (Paris: Vrin; Ottawa: Institut d'Etudes Médiévales, 1936), pp.143-44, 194-95, 209-11, 282, 293 and 314-16. In ibid., p.284, Robert de Basevorn (fl.1322), in his Forma praedicandi, ch.36, comments on a Parisian practice of treating one part of the sermon; "... quomodo scilicet fit brevis introductio per exemplum ad sensum, quomodo illud exemplum per Scripturam confirmatur ..." For further discussion of the use of exempla in sermons, see Etienne Gilson, 'Michel Menot et la technique du sermon médiéval' (1925), in his Les Idées et les lettres, (Paris: Vrin, 1932), pp.132-34; Carlo Delcorno, L'Exemplum nella predicazione volgare di Giordano da Pisa. Istituto Veneto, Memorie: Classe di Scienze Morali, Lettere ed Arti, vol. 36, fasc. 1, (Venice: 1972), pp.3-13; T.F. Crane, 'Medieval Sermon-Books and Stories', Proc. Am. Phil. Soc., vol.21 (1883), pp.49-78; and A. Lecoy de la Marche, La Chaire française au moyen âge spécialement au XIII^e siècle d'après les manuscrits contemporains, 2nd.edn., (1868; Paris: Renouard, 1886), pp.298-307.

150. Welter, L'Exemplum, pp.133-49; Crane, 'Medieval Sermon-Books', p.55; Owst, Literature and Pulpit, p.24; and Jacques de Vitry, The Exempla or Illustrative Stories from the 'Sermones vulgares', ed. T.F. Crane. Publications of the Folk-Lore Society, no.26, (London: Nutt, 1890), pp.xvii-xxi. Crane cites, pp.xx-xxi, the unknown author of the Speculum exemplorum: "... exempla mentem efficacius movent, memoriae firmissime haerent, intellectui facile lucent, delectant auditum, fovent affectum, remouent taedium, vitam informant, mores instruunt, et dum sua novitate sensum permulcent, odiosam praedicatori somnolentiam fugant." Similar sentiments are expressed by Etienne de Bourbon (d.1260) in his Tractatus de diversis materiis praedicabilibus, quoted by Davy, Sermons universitaires, p.34 and n.3.
151. On exempla in the 12th. cent., see Welter, L'Exemplum, 1ère partie, ch.2; and Mosher, Exemplum, pp.54-74.
152. In 1236 the Dominicans were ordered by the general chapter to learn the language of the districts in which they worked. See W.A. Hinnebusch, The Early English Friars Preachers. Institutum Historicum FF. Praedicatorum Romae ad S.Sabinae: Dissertationes Historicae, fasc.14, (Rome: Istituto Storico Domenicano, 1951), p.308. See further Victor G. Green, The Franciscans in Medieval English Life (1224-1348). Franciscan Studies, vol.20, (Paterson, N.J.: St. Anthony Guild Press, 1939), pp.31-32; Owst, Preaching in England, pp.223-32; John Moorman, A History of the Franciscan Order from its Sources to the Year 1517, (Oxford: Clarendon Press, 1968), pp.272-77; and Beryl Smalley, English Friars and Antiquity in the Early Fourteenth Century, (Oxford: Blackwell, 1960), chs. 1 and 2.
153. Hinnebusch, English Friars Preachers, pp.313-18; and Anscar Zawart, The History of Franciscan Preaching and Franciscan Preachers (1209-1927): A Bio-Bibliographical Study. Franciscan Studies, no.7, (New York: Wagner, 1928), pp.257-58.
154. W. Gumbley, 'The English Dominicans II: In Public Life'; and his 'The English Dominicans VI: As Preachers', in Bede Jarrett et al., The English Dominican Province (1221-1921), (London: Catholic Truth Soc., 1921), pp.29 and 149-50; J. Sweet, 'Some Thirteenth-Century Sermons and their Authors', J. Eccl. Hist., vol.4 (1953), pp. 27-28; Owst, Preaching in England, p.76 and chs.4 and 5; and his Literature and Pulpit, pp.4-5. In time, the Dominicans constructed large churches which were specially designed for preaching. See Gumbley, 'Dominicans as Preachers', p.143; and A.G. Little, 'Popular Preaching: the Fasciculus morum', in his Studies in English Franciscan History: Being the Ford Lectures Delivered in the University of Oxford in 1916. Publications of the Univ. of Manchester, no.113, (Manchester: Manchester Univ. Press; London: Longmans, 1917), pp.132-33.
155. P. Glorieux, Répertoire des maîtres en théologie de Paris au XIII^e siècle. Etudes de Philosophie Médiévale, nos.17 and 18, 2 vols., (Paris: Vrin, 1933), vol.1, pp.119-22 and vol.2, pp.60-76 and 87-98; and his La Faculté des arts et ses maîtres au XIII^e siècle. Etudes de Philosophie Médiévale, no.59, (Paris: Vrin, 1971), pp.169-72, 231-32, 324-31, 338-42 and 386.

156. Lindberg, Theories of Vision, p.107. Witelo, Bacon and Pecham may have enjoyed some direct exchange of ideas at Paris, as almost certainly did Witelo and William of Moerbeke at the papal court in Viterbo. See Lindberg, 'Lines of Influence', passim; and his 'Introduction' to Opticae thesaurus, rpt. edn., pp.ix and xi-xiii. See also Douie, Pecham, pp.4-13.
157. Note Owst, Literature and Pulpit, p.3: "... it was the pulpit that provided the necessary channels by which the characteristic thought and expression of the churchmen flowed into the popular mind and were turned to secular advantage." The library of the Augustinian friar, John Erghome (fl.1362-1386), who was educated at Oxford, indicates the extent to which optical texts became part and parcel of convent learning. Erghome's books found their way to York, where a catalogue was compiled in 1372. To numerous items on Aristotelian natural science and the encyclopedias of Neckam and Bartholomaeus, Erghome added Tractatus de visu, (item 322), liber radiorum (item 364), Alkindus de impressionibus (items 375 and 641), libri Alkindi de radiis (item 385), ptholomeus de speculis libri duo (item 455), tractatus de oculo (item 526), tractatus de oculo morali (item 605), Perspectiva alacen in libris 7 (item 640) and Perspectiva peccham continens tres partes (item 641). See M.R. James, 'The Catalogue of the Library of the Augustinian Friars at York, Now First Edited from the MS. at Trinity College, Dublin', in Fasciculus Ioanni Willis Clark dicatus, (Cambridge: Cambridge Univ. Press, 1909), pp.2-96. I am grateful to Prof. Elizabeth Salter for drawing my attention to this catalogue.
158. Hinnebusch, English Friars Preachers, pp.333 and 335.
159. Ibid., ch.1; Bede Jarrett, 'The English Dominicans I.: The Foundation', in Jarrett et al., English Dominican Province, pp.1-24; and David Knowles, The Religious Orders in England, 2 vols., (Cambridge: Univ. Press, 1948), vol.1, ch.14.
160. Gumbley, 'Dominicans as Preachers', pp.144-47.
161. Hinnebusch, English Friars Preachers, ch.15 and pp.300-6.
162. Ibid., pp.314, 315 and 359-61; Beryl Smalley, 'Robert Bacon and the Early Dominican School at Oxford', TRHS, 4th. ser., vol.30 (1948), p.1; Francis Seymour Stevenson, Robert Grosseteste Bishop of Lincoln: A Contribution to the Religious, Political and Intellectual History of the Thirteenth Century, (London: Macmillan, 1899), ch.3, for Grosseteste's dealings with Dominicans and Franciscans; as also Knowles, Religious Orders in England, vol.1, pp.180-82.
163. Rosalind Beckford Brooke, The Coming of the Friars. Historical Problems: Studies and Documents, no.24, (London: Allen and Unwin, 1975), pp.36-37; Andrew G. Little, The Grey Friars in Oxford; Part I: A History of the Convent; Part II: Biographical Notices of the Friars together with Appendices of Original Documents. Oxford Historical Society, vol.20, (Oxford: Clarendon Press, 1892), p.29; and note Zawart, History of Franciscan Preaching, p.260: "... it is a false and now happily discarded assumption, a theory deduced from ignorance of Francis' character and misunderstanding of his purpose, that he was in principle opposed to study and the pursuit of science in the Order." See further ibid., p.263; and Moorman, History of the Franciscan Order, chs.13 and 21.

164. Little, Grey Friars in Oxford, pp.29-30. Writing in 1344, Richard de Bury paid tribute to the learning of the friars: "Et ut veritas honoretur, salvo praeiudicio cuiuscunque, licet hi nuper hora undecima vineam sint ingressi dominicam ... plus tamen in hac hora brevissima sacratorum librorum adiecerunt propagini quam omnes residui vinitores ..." Richard de Bury, Philobiblon, ch.8; ed. and trans. E.C. Thomas, foreword by M. Maclagan, (Oxford: Blackwell for the Shakespeare Head Press, 1970), p.92. On the growth of friars' libraries throughout England, see Ernest A. Savage, Old English Libraries: The Making, Collection and Use of Books during the Middle Ages. Antiquary's Books, (London: Methuen, 1911), pp.52-59; and on the general state of English libraries in the 14th. and 15th.cents., see James Westfall Thompson, et al., The Medieval Library. Univ. of Chicago Studies in Library Science, (Chicago: Univ. of Chicago Press, 1939), ch.13.
165. Knowles, Religious Orders in England, vol.2, ch.12; and A.G. Little, 'The Franciscan School at Oxford in the Thirteenth Century', Arch. Fran. Hist. vol.19 (1926), pp.803-5. This article is an expanded version of his 'The Franciscan School at Oxford: Grosseteste and Bacon', in his Studies in English Franciscan History, ch.6.
166. Russell, 'Grosseteste's Intellectual Life', p.100.
167. Little, 'Franciscan School at Oxford', pp.807-10; and his Grey Friars in Oxford, p.30. Note D.A. Callus, 'The Oxford Career of Robert Grosseteste', Oxon., vol.10 (1945), p.60: "Grosseteste aimed at giving his pupils a practical instruction for apostolic work, and especially for training them for popular preaching, rather than at preparing them for an university career."
168. Thomas of Eccleston, De adventu fratrum minorum, coll. 11; in Fratris Thomae vulgo dicti de Eccleston tractatus de adventu fratrum minorum in Angliam, ed. A.G. Little. Tout Memorial Publication Fund, (Manchester: Manchester Univ. Press 1951), p.49; trans. Little, 'Franciscan School at Oxford', p.807.
169. Russell, 'Grosseteste's Intellectual Life', p.94; Little, 'Franciscan School at Oxford', p.814; and Crombie, Robert Grosseteste, pp.135-36.
170. Little, 'Franciscan School at Oxford', p.810. Easton maintains that there is no evidence of the curriculum espoused by Grosseteste, but concedes that he "used mathematical and optical illustrations for his classes in theology". See Easton, Roger Bacon and his Search, Appendix A.
171. Owst, Preaching in Medieval England, pp.9-10. In a letter to the Dean and Chapter of Lincoln, arguing for his right as bishop to visit them, Grosseteste uses an optical metaphor to clarify the relationship between bishop and clergy. As a mirror reflects light, so illuminating dark places, so a bishop, by virtue of the power of his office, can clarify and reveal the errors and sins of the clergy. See Grosseteste, Epistolae, no.127; in Roberti Grosseteste episcopi quondam Lincolnensis epistolae, ed. Henry Richards Luard. Rolls ser., (1861), pp.360-61 and see pp.389-92.

172. Green, Franciscans in Medieval English Life, pp.26-27; Little, Grey Friars in Oxford, pp.57-58; and R.W. Hunt, 'The Library of Robert Grosseteste', in Callus, ed., Grosseteste Scholar and Bishop, p.130.
173. Thomson, Writings of Grosseteste, pp.214-32. The sermons are listed in ibid., pp.160-91. Grosseteste's own recapitulatio to the dicta testifies that they were delivered both to clerics and the populace. See ibid., p.214. Their usefulness to later preachers is indicated by the dates of the extant 38 MSS., the majority of which belong to the 14th. and 15th. cents., and by the existence in many copies of tabula giving subject-references. See ibid., p.215.
174. Grosseteste, dictum 41, in Oxford, Bodleian Library, MS. 798, f.29; ed. E.J. Westermann, 'A Comparison of Some of the Sermons and Dicta of Robert Grosseteste', Med. Hum., vol.3 (1945), p.54; and see Thomson, Writings of Grosseteste, pp.180 and 220.
175. Grosseteste, Sermo ad clerum; in Fasciculus rerum expetendarum et fugiendarum, prout ab O.G. editus est Coloniae, A.D. 1535 ... ab innumeris mendis repurgatus ... una cum appendice ... scriptorum veterum, (quorum pars magna nunc primum e MSS. codicibus in lucem prodit,) qui ecclesiae Romanae errores et abusus detegunt et damnant, necessitatemque reformationis urgent, ed. Edward Brown, 2 vols., (London: Chiswell, 1690), vol.2, p.297. For another passage based on analogies between the inner and outer eye, see Grosseteste, dictum 119, f.99a; ed. Westermann, 'Sermons and Dicta', pp.65-66.
176. "Considerate etiam quod inspiciens oculum, in eo suam cernit formam et imaginem; sic omnis vestram conversationem prospiciens, in ea debet formam sibi et normam recte vivendi prospicere ..." Grosseteste, Sermo ad clerum; in Brown, ed., Fasciculus rerum, vol.2, p.298.
177. Grosseteste, Sermo ... in celebratione ordinum; in ibid., vol.2, p.273. For further passages on the spiritual perception of divine light, see Grosseteste, dictum 21, ff.20a-20b; ed. Westermann, 'Sermons and Dicta', p.56 and dictum 72, f.53a; ed. Westermann, p.60; and see Thomson, Writings of Grosseteste, p.218.
178. "Debetis namque, sicut stellae, intus et extra lucere; intus, lumine fidei catholicae, quod est lumen vultus Domini super nos signatum, splendore charitatis et luce sapientiae. Extra debet in vobis fulgere splendor bonorum operum ..." Grosseteste, Sermo ad sacerdotes in synodo; in Brown, ed., Fasciculus rerum, vol.2, p.269.
179. Grosseteste, Dictum de humilitate; in ibid., vol.2, pp.288-89.
180. Grosseteste's emphasis on light and vision may have made an indirect contribution to two Oxford sermons of Dominican authorship. Robert Bacon, a friend of Grosseteste, preached in 1233 against the view that understanding is a voluntary act made in response to sense stimuli. He argued that only God teaches inwardly, through the illumination of the intellect, as the sun illuminates vision so that corporeal things are seen. See Smalley, 'Bacon and the Early Dominican School', pp.15 and 17. By 1291, the

- discussion had become more complex and the use of light imagery more sophisticated. The preacher now talks of the light of God as distinct from the light of the sun, which illuminates the medium, as God produced Christ who in turn illuminates man. See Beryl Smalley, 'Oxford University Sermons 1290-93', in Alexander and Gibson, eds., Medieval Learning and Literature, pp.316-19 and 325-27.
181. Little, Grey Friars in Oxford, pp.154-56; and M.D. Knowles, 'Some Aspects of the Career of Archbishop Pecham', EHR, vol. 57 (1942), pp.4-6.
182. Decima L. Douie, 'Archbishop Pecham's Sermons and Collations', in R.W. Hunt, W.A. Pantin and R.W. Southern, eds., Studies in Medieval History Presented to Frederick Maurice Powicke, (Oxford: Clarendon Press, 1948), p.269.
183. Pecham, Tratatus de perspectiva, ch.1; ed. Lindberg, pp.26-27.
184. Bartholomaeus lectured to the Franciscan convent at Paris until 1231, when he left for Germany. See Lindberg, Theories of Vision, p.108. Preaching probably formed an important part of his activities at Paris. See P. Thomas Plassman, 'Bartholomaeus Anglicus', Arch. Fran. Hist., vol. 12 (1919), p.98 and see pp.104 and 106-7.
185. Vincent, Speculum naturale, prol., ch.4; Douai edn., vol.1, cols.3-4.
186. Ibid., prol., ch.6; Douai edn., vol.1, col.5. The reference is to Augustine, De doctrina christiana, II.59. See above vol.2, p.48, n.31.
187. Michaud-Quantin, 'Petites encyclopédies', p.587; Owst, Literature and Pulpit, p.154; Se Boyar, 'Bartholomaeus Anglicus', pp.177-78; and Welter, L'Exemplum, pp.336-38. De proprietatibus rerum is, for example, one of the main sources of a collection of sermon anecdotes or exempla by Nicole Bozon, compiled in Anglo-French c.1320. See Lucy Toulmin Smith and Paul Meyer, eds., Les Contes moralisés de Nicole de Bozon frère mineur, publiés par la première fois d'après les manuscrits de Londres et de Cheltenham. SATF (1889), pp.vi-ix. There is an English version of the Contes moralisés by J.R. [i.e. John Rose] as Metaphors of Brother Bozon, a Friar Minor: Translated from a Norman French MS. of the Fourteenth Century in the Possession of the Honourable Society of Gray's Inn, (London: Constable, 1913).
188. Lynn Thorndike, Science and Thought in the Fifteenth Century: Studies in the History of Medicine and Surgery, Natural and Mathematical Science, Philosophy and Politics, (New York: Columbia Univ. Press, 1929), pp.14-15; and his History of Magic, vol.3: Fourteenth and Fifteenth Centuries, pp.546-60, where the author's probable use of Alhazen is noted.
189. "Avicbron libro fontis vite: Lux et calor non agunt nisi in corpore ad hoc disposito calorisque et luminis susceptivo. Per que intelligitur quod lux divine cognitionis et calor intime dilectionis et amoris non agunt sue virtutis effectum in anima nisi in sacro opere et virtute disposita fuerint et aptata." Lumen

animae, ch.48C ("Actio luminis et coloris"); in Liber moralitatum elegantissimus magnarum rerum naturalium lumen anime dictus cum septem apparitoribus necnon sanctorum doctorum orthodoxe fidei professorum. Poetarum eciam ac oratorum auctoritatibus per modum pharatre secundum ordinem alphabati collectis feliciter incipit, [ed. Matthias Farinator/ ptd. Günther Zainer, ([Ausburg:] 1477)]. Virtues are elsewhere likened to colours, which exist in light and which are the principal cause of seeing: "In luce namquam omnes colores tanquam in suo subiecto radicantur pariter et fundantur. Sed tunc per lucem apostoli designatur. Nam sicut lux naturaliter letificat inflammat et exsiccat et purgat ... convenienter per colores describuntur bonorum operum voces seu virtutes. Nam sicut secundum philosophum in secundo de anima colores sunt causa principiumque videndi testante philosopho ibidem qui dicit. Omne enim quod videtur aut est color aut habens colorem. Sic revera per omnem modum. Ipsa nostra bona opera et virtutes sunt causa videndi et cognoscendi deum in presenti pariter et in futuro." Ibid., ch.9J ("Colores sunt principium videndi").

190. "Omne corpus densumque et spissum magis est luminis susceptivum et retentivum quam ipsum quod rarum fuerit atque sparsum seu dyaphanum aut transparens ... Sic nimirum per omnem modum ipsa mater christi est densiorque et valentior pars totius celestis collegii. Ipsa namquam inter omnes cives celicos densior est quantum ad conservandum a malis omnibus fortiorque ad defensandum a demonibus existere comprobatur." Ibid., ch.7Q ("Luminis proprietates").
191. Ibid., ch.6K ("Speculum concavum").
192. Some 30 years earlier, at Paris, when there was strong official resistance to Aristotelian science, Franciscan sermons were already beginning to show a fondness for optical analogies. See Davy, Sermons universitaires, pp.78-79 and 351.
193. Welter, L'Exemplum, pp.177-80; Hieronymus Spettman, 'Das Schriftchen De oculo morali und sein Verfasser', Arch. Fran. Hist., vol.16 (1923), pp.309-22; David L. Clark, 'Optics for Preachers: The De oculo morali by Peter of Limoges', Mich. Acad., vol.9 (1977), pp.329-43; and Gudrun Schleusener-Eichholz, 'Naturwissenschaft und Allegorese: Der Tractatus de oculo morali des Petrus von Limoges', Frühma. St., vol.12 (1978), pp.258-309. I am grateful to the authors of these last two articles for sending me offprints.
194. Spettman, De oculo morali', p.321; and Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', pp.261-62.
195. Some of these have been discussed by Aleksander Birkenmajer, 'Pierre de Limoges commentateur de Richard Fournival', Isis, vol.40 (1949), pp.26-30. Birkenmajer records two inscriptions indicating that Peter possessed optical texts. See ibid., pp.23-24; and see further Lynn Thorndike, 'Peter of Limoges on the Comet of 1299', Isis, vol.36 (1945), pp.3-6; Léopold Delisle, Le Cabinet des manuscrits de la Bibliothèque Impériale [Nationale]: étude sur la formation de ce dépôt, comprenant les éléments d'une histoire de la calligraphie de la miniature, de la reliure, et du commerce des livres à Paris avant l'invention de l'imprimerie. Histoire Générale de Paris, 3 vols. (Paris: Imprimerie Impériale [Nationale], 1868-1881), vol.2 (1868),

- pp.167-69; and Madeleine Mabile, 'Pierre de Limoges et ses méthodes de travail', in Guy Cambier, ed., Hommages à André Boutemy. Collection Latomus, vol.145, (Brussels: Latomus, 1976), pp. 244-51; and Welter, L'Exemplum, p.129.
196. Glorieux, Répertoire, p.364. For documentation, see Henricus Denifle and Aemilio Chatelain, eds., Chartularium universitatis Parisiensis sub auspiciis consilii generalis facultatum Parisiensium ex diversis bibliothecis tabularisque collegit et cum authenticis chartis contulit, 4 vols., (Paris: Delalain, 1889-1987), vol.1 (1889), items 416 and 433, pp.468 and 488.
197. Lecoy de la Marche, Chaire française, pp.102-10 and 331-35.
198. Ibid., pp.226-29 and 233-337.
199. " ... manuscripts of Parisian sermons were carried all over the Continent and served as models for this kind of sermon." See Fr. Pelster, 'An Oxford Collection of Sermons of the End of the Thirteenth Century (MS. Laud Misc. 511, SC.969)', Bodl. Qu. Rec., vol.6 (1930), p.168; and see Fr. Pelster and A.G. Little, 'Sermons and Preachers at the University of Oxford in the Years 1290-3', Oxf. Hist. Soc. Pub., vol.96 (1934), p.150.
200. Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', pp. 258-60. On the influence of De oculo morali, Welter, L'Exemplum, p.180, comments: "Prédicateurs, théologiens, moralistes s'en sont largement inspirés." It has recently been called "one of the most popular and long-lived exemplum books of the middle ages ... De oculo morali undoubtedly did more to spread the new theory of direct vision than any of the scientific treatises of Bacon, Pecham and Witelo". Clark, 'Optics for Preachers', pp.331 and 343. For a Franciscan treatise and sermon on light written in Paris before 1294, see Irenaeus Squadrani, 'Tractatus de luce Fr. Bartholomaei Bononia: inquisitiones et textus', Ant., vol.7 (1932), pp.201-28 and 465-94.
201. Lecoy de la Marche, Chaire française, pp.105-6. For documentation, see Walter Waddington Shirley, ed., Royal and Other Historical Letters Illustrative of the Reign of Henry III from the Originals in the Public Record Office. Rolls ser., 2 vols. (1862-1866), vol.2 (1866), letters 582 and 592, pp.221-22 and 235-36; and T. Rymer and R. Sanderson, eds., Foedera, conventiones, litterae et cuiuscunque generis acta publica, inter reges Angliae et alios quosvis imperatores, reges, pontifices, principes vel communitates, ab ingressu Gulielmi I. in Angliam, A.D. 1066, ad nostra usque tempora habita aut tractata. Ex autographis, infra secretiores archivorum regionum thesaurias, asservatis: aliisque summae vetustatis instrumentis, ad historiam Anglicanam spectantibus, fideliter exscripta ... denuo aucta et multis locis emendata accurantibus A. Clarke, F. Holbrooke (et J. Caley), 4 vols. in 6, (London: Record Commission), 1816-1869), vol.1, pt.1, (1816), p.381.
202. Peter of Limoges, De oculo morali, prol.; in Johannis Pithsani archiepiscopi Canthuariensis ... liber de oculo morali foeliciter incipit, [i.e. attributed to John Pecham], ptd. A Sorg, (Ausburg: 1475). I have collated this edn. with others published at Venice in 1496.

203. "Although much of this treatise is devoted to drawing moral and spiritual lessons from the science of optics, a significant core of optical knowledge and commentary is also present ... " Lindberg, Catalogue, p.73; and see Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', p.284.
204. Spettman, 'De oculo morali', p.312; and Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', pp.262-64.
205. Clark, 'Optics for Preachers', pp.332-33.
206. Peter of Limoges, De oculo morali, ch.1, A.i.
207. Ibid., ch.1, A.ii. The similitude is based on Psalms, 16: 8.
208. Deuteronomy, 32: 10.
209. Peter of Limoges, De oculo morali, ch.1, A.ii. On Peter's method, note Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', pp.278-80.
210. But see Peter of Limoges, De oculo morali, ch.5: "De visionis organo completivo".
211. "Hoc autem in praedictis tunicis oculorum considerandum est quod cum tunice ad pupille custodiam concurrentes sint in mollicie et duritia differentes: mollior est tamen tunica pupille proximor: durior vero ab eadem remotior. In quo oculi ecclesie ... prelati possunt spiritualiter informari. De misericordia et justitia prelatorum ut sic misericordia lenitatem exhibeant: ut censuram iustitie non omittant." Ibid., ch.2, A.i.
212. "Expertus est in prefata scientia [perspectiva] quod si quis oculo supponat digitum et a situ debito pellat eum propter motum factum in oculo; unum sibi videbitur esse duo ... Sic interdum contingit prelatis moderni temporis qui dum per instigatum mali consiliarii a rectitudine depelluntur iudicii depeliuntur; iudicant aliquem esse dignum duplici beneficio: quem tamen unico tantum contentum esse debere sentirent si iudicio non errarent." Ibid., ch.6, A.ii.
213. Ibid., ch.3, A.i.; and see Clark, 'Optics for Preachers', pp.340-41.
214. The chapter titles are listed by Spettman, 'De oculo morali', p.310.
215. i.e. the apparent shift in position of an object viewed first through one eye and then through the other.
216. The fifth marvel, describing how a coin lying at the bottom of a vessel may be brought into view when the vessel is filled with water, is similar to Neckam's moralised experiment in his De natura rerum, and to Holcot's exemplum in his Super sapientiam Salomonis. See above, vol.1, pp.137 and 174-75.
217. On Peter of Limoges' elaboration of the relations between the inner and outer eye and its theological antecedents, see Clark, 'Optics for Preachers', pp.338-40.

218. Peter of Limoges, De oculo morali, ch.11. Further passages from De oculo morali are printed in Clark, 'Optics for Preachers', passim; and Parronchi, "Dolce" prospettiva, pp.521-26. Parronchi is primarily concerned with the influence on art of Peter's work.
219. The two men were exact contemporaries and Bacon was probably living in Paris from 1257. See Easton, Roger Bacon and his Search, pp.138-39. It is possible, of course, that the influence worked in the opposite direction and that Peter took the inspiration of De oculo morali from a portion of the Opus maius. This seems unlikely. Bacon's two chapters are in an altogether different mode from the rest of his work. Having presented a large body of scientific matter, he appends some paragraphs to provide a theological justification for such studies. De oculo morali would have been the natural source on which to have based a conclusion of this kind. If it is true that Bacon borrowed from Peter of Limoges, then the date of composition of De oculo morali is narrowed to the 1260's. Peter first appears in Paris c.1262 and the Opus maius was written in the same decade. Note Schleusener-Eichholz, 'Naturwissenschaft und Allegorese', p.278, where it is stated, though without further evidence, that it was Bacon who influenced Peter of Limoges.
220. Bacon, Opus maius, bk.5, pt.3, dist.3, ch.1; ed. Bridges, vol.2, p.159.
221. Loc. cit.
222. Ibid., bk.5, pt.3, dist.3, ch.1; ed. Bridges, vol.2 pp.159-61.
223. Ibid., bk.5, pt.3, dist.3, ch.2; ed. Bridges, vol.2, p.162.
224. Ibid., bk.5, pt.3, dist.3, ch.2; ed. Bridges, vol.2, pp.162-63, and see above, vol.1, p.160. Bacon makes spiritual applications of reflection and refraction in ibid., bk.5, pt.3, dist.3, chs.3 and 4; ed. Bridges, vol.2, pp.164-66. There is further evidence of the influence of De oculo morali in the Oculus sacerdotis of William of Pagula, written in the 1320's as a manual for parish priests. William divided his work into three parts, the pars oculi, dextera pars and sinistra pars, covering respectively confessional practice, morals and dogma. The last two divisions follow Peter of Limoges' moral analysis of the eye, in which the right eye is the eye of action and morals, and the left eye that of knowledge and speculation. Thus the somewhat puzzling title and divisions of Oculus sacerdotis become intelligible when seen in relation to De oculo morali. William's work was popular in its day and served as a model, both in content and form, for later manuals. A supplement appeared c.1330-1340 entitled Cilium oculi and a revision was made in 1385 by John de Burgo, called the Pupilla oculi. See L.E. Boyle, 'The Oculus sacerdotis and Some Other Works of William of Pagula: The Alexander Prize Essay', TRHS, 5th. ser., vol.5 (1955), pp.83-84, 94-95 and 105-6; W.A. Pantin, The English Church in the Fourteenth Century, (Cambridge: Cambridge Univ. Press, 1954), pp.189-202 and 213-14; and Owst, Preaching in Medieval England, pp.296-99.

225. Mosher, Exemplum, pp.12-16; and H.G. Pfander, 'The Mediaeval Friars and Some Alphabetical Reference-Books for Sermons', MAe., vol.3 (1934), pp.19-29.
226. A.G. Little, 'Introduction' to his edn. of Liber exemplorum ad usum praedicatorum: saeculo XIII compositus a quodam fratre minore Anglico de provincia Hiberniae, secundum codicem Dunelmensem editus. British Society of Franciscan Studies, vol.1, (Aberdeen: Aberdeen Univ. Press, 1908), pp. viii-ix and see p.113 for an instance of this author's treatment of vision. See further Welter, L'Exemplum, pp.290-94.
227. See, for example, the entries for cecus, oculus, tenebra and videre in J.-Th. Welter, ed., La Tabula exemplorum secundum ordinem alphabeti: recueil d'exempla compilé en France à la fin du XIII^e siècle, (Paris: Guizard, 1926), pp.8, 54-55, 78 and 81, and see p.xiii.
228. Bozon, Contes moralisés, nos.44, 64, 76, 110, 111, 132 and 133; ed. Toulmin Smith and Meyer; pp.60-61, 87, 95-96, 126-28, 157-58 and 160-62. For further instances of the treatment of vision in narrative compilations, see Etienne de Besançon, Alphabetum narrationum, tales 79, 140, 268, 583, 776 and 777; ed. Mary Macleod Banks, An Alphabet of Tales: An English 15th-Century Translation of the 'Alphabetum narrationum' of Etienne de Besançon. EETS, 2 vols., o.s. 126 (1904) and o.s. 127 (1905), vol.1, pp.61, 97-98 and 187 and vol.2, pp.389 and 518.
229. Edward Wilson, A Descriptive Index of the English Lyrics in John of Grimestone's Preaching Book. Medium Aevum Monographs, new ser., no.2, (Oxford: Blackwell for the Society for the Study of Mediaeval Languages and Literature, 1973), p.11. I am grateful to Mr Wilson for drawing this lyric to my attention.
230. For biographical detail, see Walter Gumbley, 'The English Dominicans III: In Theology', in Jarrett, et al., English Dominican Province, pp.74-75.
231. Owst, Preaching in Medieval England, pp.303-5. Owst remarks in his Literature and Pulpit, p.224: "We have every reason to believe that the massive Summa Praedicatorum of the English Dominican John Bromyard presents us with the gathered fruits of Mendicant preaching in England throughout the fourteenth century and indeed even earlier." Bromyard's work was often found in the libraries of parish churches. See Savage, Old English Libraries, p.132.
232. Owst, Literature and Pulpit, p.224, n.1.
233. John Bromyard, Summa praedicatorum omni eruditione refertissima, explicans praecipuos catholicae disciplinae sensus, et locus ... nunc demum post alias aeditiones ... recognita et ... aucta, et aucta, et illustrata [by A. Ritius], 2 pts., ptd. Dominicus Nicolinus, (Venice: 1586), pt.2, f.449v.
234. "Requiritur insuper secundo, quod ipsi in se sint sani, et mundi: quia aliter malos non accusabunt, nec audacter corrigent: quia corporaliter vitiosus alium non nititur corrigere, qui eodem vitio laborat, ne ei impropereetur qui festucam de oculo fratris extrahat, et trabem in oculo proprio non videat, et ne ei dicatur. Medice cura te ipsum. Primo ergo videte vos metipsos. 2.Ioan. c. unico." Ibid., pt.2, f.339v (b).

235. Ibid., pt.2, f.427v (b). See also pt.2, f.429v, where the visual impediments of elongation, transposition and interposition are treated.
236. " ... sicut corporalem delectant oculum lympha ... ita spiritualiter oculum bonorum delectat consideratio nostrae fluxibilitatis ad modum aquae quia omnes morimur, et sicut aqua dilabimur in terra. 2 Regum 14." Ibid., pt.2, f.427r (a).
237. " ... sicut oculus corporis totum corpus ducit, et alios conducit: ita visus mentis totum hominem spiritualiter ducat, et alios inducat verbo, et exemplo, et specialiter ille cui hoc incumbit ex auctoritate, vel officio." Ibid., pt.2, f.427v (a).
238. Ibid., pt.2, f.448r (a).
239. Ibid., pt.2, f.429r (b).
240. The place to start such researches would be Johannes Baptist Schneyer, Repertorium der Lateinischen Sermones des Mittelalters für die Zeit von 1150-1350. BGPTM, vol.43, 7 vols., (Münster: 1969-1974).

CHAPTER 3:

Chaucer and the Optical Tradition I - Scholarly Texts,
Encyclopedias and Sermon 'Exempla'

1. Among the books left to the school by Tolleshunt in 1328, there appear "libris naturalium et alios libellos artis ejusdem". The 1358 will of the almoner, William de Ravenstone, includes "Librum de naturis" and "Alexandrum nequam cum glosa sequente" (possibly his De natura rerum). See Edith Rickert, 'Chaucer at School', MP, vol.29 (1932), pp.258, 259, 265 and 266.
2. J.A.W. Bennett, Chaucer at Oxford and at Cambridge, (Oxford: Clarendon Press, 1974), chs.2 and 4.
3. Ibid., pp.63-65.
4. The evidence was finely sifted, and the tradition supported, by Edith Rickert, 'Was Chaucer a Student at the Inner Temple?', in The Manly Anniversary Studies in Language and Literature, (Chicago: Chicago Univ. Press, 1923), pp.20-31; and see John Matthews Manly, Some New Light on Chaucer: Lectures Delivered at the Lowell Institute, (New York: Holt, 1926), pp.3-30.
5. Albert C. Baugh, 'Chaucer the Man', in Beryl Rowland, ed., Companion to Chaucer Studies, rev. edn., (1968; New York: Oxford Univ. Press, 1979), p.6.
6. D.S. Bland, 'Chaucer and the Inns of Court: A Re-Examination', Engl. St., vol.33 (1952), p.147.
7. Ibid., pp.153-55; and Thomas Frederick Tout, 'Literature and Learning in the English Civil Service in the Fourteenth Century', Spec., vol.4 (1929), pp.382-88.
8. Robert A. Pratt, 'Chaucer and the Visconti Libraries', ELH, vol.6 (1939), pp.191-99.
9. See the sketch by Robert A. Pratt, 'Karl Young's Work on the Learning of Chaucer', in A Memoir of Karl Young, (New Haven: privately ptd., 1946), pp.45-55.
10. Bruce Harbert, 'Chaucer and the Latin Classics', in Brewer, ed., Writers and their Background: Chaucer, pp.137-53; Albert C. Friend, 'Chaucer's Version of the Aeneid', Spec., vol.28 (1953), pp.317-23; and J.A.W. Bennett, Chaucer's Book of Fame: An Exposition of the House of Fame, (Oxford: Clarendon Press, 1968), ch.1.
11. Bernard L. Jefferson, Chaucer and the 'Consolation of Philosophy' of Boethius. Diss. Princeton Univ., 1914, rev., (Princeton: Princeton Univ. Press, 1917).
12. Two of Chaucer's borrowings from Bernard are discussed by Dorothy Bethurum Loomis, 'Saturn in Chaucer's Knight's Tale', in Arno Esch, ed., Chaucer und seine Zeit: Symposium für Walter F. Schirmer, Buchreihe der Anglia Zeitschrift für Englische Philologie, vol.14, (Tübingen: Niemeyer, 1968), pp.149-61.

13. J.A.W. Bennett, The 'Parlement of Foules': An Interpretation, rev. edn., (1957; Oxford: Clarendon Press, 1965), passim; Peter Dronke and Jill Mann, 'Chaucer and the Medieval Latin Poets', in Brewer, ed., Writers and their Background: Chaucer, pp.154-72; and Robert Kilburn Root, 'Chaucer's Dares', MP, vol.15 (1917-1918), pp.1-22.
14. Dronke and Mann, 'Medieval Latin Poets', pp.172-83; and Bartlett J. Whiting, 'The Wife of Bath's Prologue', in W.F. Bryan and Germaine Dempster, eds., Sources and Analogues of Chaucer's 'Canterbury Tales', (New York: Humanities Press, 1941), pp.207-12.
15. Kate Oelzner Petersen, On the Sources of the 'Nonne Prestes Tale'. Radcliffe College Monographs, no.10, (Boston: Ginn, 1898), pp.98-118; and Robert A. Pratt, 'Some Latin Sources of the Nonnes Preest on Dreams', Spec., vol.52 (1977), pp.538-70.
16. Kate Oelzner Petersen, The Sources of the 'Parson's Tale'. Radcliffe College Monographs, no.12, (Boston: Ginn, 1901), whose views are modified by H.G. Pfander, 'Some Medieval Manuals of Religious Instruction in England and Observations on Chaucer's Parson's Tale', JEGP, vol.35 (1936), pp.243-58; and Alfred L. Kellogg, 'St. Augustine and the Parson's Tale', Trad., vol.8 (1952), pp.424-30. See also Germaine Dempster, 'The Parson's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.723-45; and Richard Hazelton, 'Chaucer's Parson's Tale and the Moralium dogma philosophorum', Trad., vol.16 (1960), pp.255-74.
17. Pratt, 'Some Latin Sources', pp.554-55; and Dronke and Mann, 'Medieval Latin Poets', p.169.
18. Harbert, 'Chaucer and the Latin Classics', pp.145-47; J. Burke Severs, 'The Clerk's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.288-331; his The Literary Relationships of Chaucer's 'Clerkes Tale'. Yale Studies in English, vol.96, (New Haven: Yale Univ. Press, 1942), ch.10; Jefferson, Chaucer and the 'Consolation', pp.1-25; V.L. Dedeck-Héry, 'Jean de Meun et Chaucer, traducteurs de la Consolation de Boèce', PMLA, vol.52 (1937), pp.967-91; and his 'Le Boèce de Chaucer et les manuscrits français de la Consolatio de Jean de Meun', PMLA, vol.59 (1944), pp.18-25.
19. The full text, with diagrams, of Chaucer's Treatise on the Astrolabe, together with a facsimile and trans. of his major source, the Compositio et operatio astrolabi of Messahalla, are ptd. in Robert William Theodore Gunther, Early Science in Oxford, 14 vols., (Oxford: ptd. for subscribers, /1920/-1945), vol.5 (1929): Chaucer and Messahalla on the Astrolabe: Now Printed in Full for the First Time with the Original Illustrations. See also Manzalaoui, 'Chaucer and Science', p.229; P. Pintelon, Chaucer's Treatise on the Astrolabe: MS. 4862-4869 of the Royal Library in Brussels. Rijksuniversiteit te Gent: Werken uitgegeven door de Faculteit van de Wijsbegeerte en Letteren, afl.89, (Antwerp: de Sikkel, 1940), pp.10-11; and, for the type of scientific compilation from which Chaucer's Astrolabe is derived, Michael Masi, 'Chaucer, Messahala, and Bodleian Selden Supra 78', Man., vol.19 (1975), pp.36-47.
20. In LGW, G307, the God of Love suggests that the poet would find Vincent's "Estoryal Myrour" a useful source of stories about virtuous women.

21. Aiken asserts that Vincent is "The probable source of the poet's remarkably accurate knowledge of medicine". Pauline Aiken, 'Arcite's Illness and Vincent of Beauvais', PMLA, vol.51 (1936), p.361.
22. Aiken concludes that "the poet shows a general familiarity with the material contained in the Speculum Naturale and practically no other alchemical knowledge" (author's emphasis). Pauline Aiken, 'Vincent of Beauvais and Chaucer's Knowledge of Alchemy', SP, vol. 41 (1944), p.388.
23. Pauline Aiken, 'Vincent of Beauvais and the "Houres" of Chaucer's Physician', SP, vol.53 (1956), pp.22-24.
24. Pauline Aiken, 'Vincent of Beauvais and Dame Pertelote's Knowledge of Medicine', Spec., vol.10 (1935), pp.281-87.
25. Pauline Aiken, 'The Summoner's Malady', SP, vol.33 (1936), pp.40-44.
26. Pauline Aiken, 'Vincent of Beauvais and the Green Yeoman's Lecture on Demonology', SP, vol.35 (1938), pp.1-9. For Vincent as a narrative source for Chaucer, see W.K. Wimsatt, Jr., 'Vincent of Beauvais and Chaucer's Cleopatra and Croesus', Spec., vol.12 (1937), pp.375-81; Pauline Aiken, 'Chaucer's Legend of Cleopatra and the Speculum historiale', Spec., vol.13 (1938), pp.232-36; and her 'Vincent of Beauvais and Chaucer's Monk's Tale', Spec., vol.17 (1942), pp.56-68.
27. Curry uses Bartholomaeus to provide a context for some of the scientific passages in Chaucer, but he does not attempt to establish any direct connections. Curry, Mediaeval Sciences, pp.60-61, 150-51 and 307.
28. The preaching of the Reeve and of other Canterbury pilgrims are systematically discussed by Susan Gallick, 'A Look at Chaucer and his Preachers', Spec., vol.50 (1975), pp.456-76.
29. Kittredge appears to have been the first to indicate that the PardPT form a sermon. See George Lyman Kittredge, Chaucer and his Poetry. 55th. anniversary edn. with intro. by B.J. Whiting, (1915; Cambridge, Mass.: Harvard Univ. Press, 1970), pp.21-22. Critics have subsequently argued over the extent to which Chaucer's work can be anatomised along strict homiletic lines. See Coolidge Otis Chapman, 'The Pardoner's Tale: A Mediaeval Sermon', MLN, vol.41 (1926), pp.506-9; G.G. Sedgewick, 'The Progress of Chaucer's Pardoner, 1880-1940', MLQ, vol.1 (1940), pp.431-58; Frederick Tupper, 'The Pardoner's Tale', in Bryan and Dempster, eds. Sources and Analogues, pp.420-23; Nancy H. Owen, 'The Pardoner's Introduction, Prologue, and Tale: Sermon and Fabliau', JEGP, vol. 66 (1967), pp.541-49; A Luengo, 'Audience and Exempla in the Pardoner's Prologue and Tale', ChauR, vol.11 (1976-1977), pp.1-10; and Warren Ginsberg, 'Preaching and Avarice in the Pardoner's Tale', Med., vol.2 (1976), pp.77-99.
30. On NPT as a sermon, see Petersen, Sources of 'Nonne Prestes Tale', pp.95-118; and John Block Friedman, 'The Nun's Priest's Tale: The Preacher and the Mermaid's Song', ChauR, vol.7 (1972-1973), pp.250-66.

31. Coolidge Otis Chapman, 'The Parson's Tale: A Mediaeval Sermon', MLN, vol.43 (1928), pp.229-34.
32. Archer Taylor, 'The Friar's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.269-74; and Przemyslaw Mrockzkowski, 'The Friar's Tale and its Pulpit Background', in G.A. Bonnard, ed., English Studies Today, 2nd. ser.: Lectures and Papers Read at the Fourth Conference of the International Association of University Professors of English held at Lausanne and Berne, August 1959, (Berne: Francke, 1961), pp.107-20.
33. Charles E. Shain, 'Pulpit Rhetoric in Three Canterbury Tales', MLN vol.70 (1955), pp.235-45, in which PardT and MerT are also discussed.
34. The originals of the exempla used in the CT are printed in Bryan and Dempster, eds., Sources and Analogues, pp.269-72, 286-87, 395-97, 414, 420-23, 437 and 662-63.
35. Geoffrey of Vinsauf, Poetria nova, II.195; in Edmond Faral, ed., Les Arts poétiques du XII^e et du XIII^e siècle: recherches et documents sur la technique littéraire du moyen âge. Bibliothèque de l'Ecole des Hautes Etudes, fasc.238, (Paris: Champion, 1924), p.203; trans. Margaret F. Nims, 'Poetria nova' of Geoffrey of Vinsauf, (Toronto: Pontifical Institute of Mediaeval Studies, 1967); and see Siegfried Wenzel, 'Chaucer and the Language of Contemporary Preaching', SP, vol.73 (1976), pp.140-41.
36. Coolidge Otis Chapman, 'Chaucer on Preachers and Preaching', PMLA, vol.44 (1929), pp.178-85. Chaucer's use, particularly in WBPT, SumT and PardT, of a manual for preachers, friars and laymen, close in type and content to the Communiloquium of John of Wales, a Franciscan scholar and preacher, has been demonstrated by Robert A. Pratt, 'Chaucer and the Hand that Fed him', Spec., vol. 41 (1966), pp.619-42. For other types of influence affecting Chaucer through sermons, see Owst, Literature and Pulpit, esp. pp.229-30 and 389, n.2; and also pp.180 and n.4, 201, 370, 388-89, 397-98, 401, 404-5 418, 420-21, 425 and 442.
37. See above, vol.1, p.171.
38. Beryl Smalley, 'Robert Holcot O.P.', Arch. Frat. Praed., vol.26 (1956), p.10.
39. Ibid., pp.34 and 48.
40. Ibid., p.5.
41. Ibid., pp.65-82.
42. Ibid., p.63.
43. Robert Holcot, Super sapientiam Salomonis, lect. 27; in M. Roberti Holkoth ... in librum sapientiae regis Salomonis praelectiones CCXIII. Quae ... nunc ... cum inserto Graeco texta ... a multis mendis primum repurgatae ... in lucem prodeunt. His etiam in calce libri eiusdem auctoris, moralizationum historiarum,

43. sive moralium explicationum liber est adiectis, [ed. J. Ryterus] (Basel: 1586), pp.96-97. Smalley, 'Robert Holcot', p.13, calls this edn. "the latest and most convenient to use".
44. See above, vol.1, p.137.
45. "Denarius vitam designat aeternam, Matt.20 [13]. Nonne ex denario diurno convenisti mecum. Iste denarius non apparebit quibusdam hominibus in hac vita, dum in dignitatibus, voluptatibus et honoribus elongantur a Deo, quales fuerunt illi duo sacerdotes pessimi, de quibus Daniel 13 [9]. Declinaverunt oculos suos ne viderent coelem neque recordarentur iudiciorum iustorum. Sed si ponantur tales in infirmitate, tribulatione et persecutione, bene recordabuntur de Deo, et de coelo ad quod facti sunt." Holcot, Super sapientiam, lec.727; [ed. Ryterus], p.97.
46. Germaine Dempster, 'The Merchant's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.341-56; and Larry D. Benson and Theodore M. Andersson, eds., The Literary Context of Chaucer's Fables, (Indianapolis: Bobbs-Merrill, 1971), pp.203-73.
47. Alhazen, De aspectibus, III.7.69; ed. Risner, p.101.
48. Witelo, Perspectiva, IV.16, 44 and 97; ed. Risner, pp.125, 138 and 160.
49. "Ex intemperantia etiam debilitatis visus error accidit in visione praemissorum, et secundum modos temporis brevitatem accidentes; quod enim sano visui accidit in temporis brevitatem, debili accidit in maiori tempore, et forte semper durante visus debilitante ..." Ibid., IV.109; ed. Risner, p.167.
50. Ibid., IV.155; ed. Risner, p.187.
51. Ibid., IV.155; ed. Risner, p.188.
52. "... accidit, quod aspiciens diu ad magnam albedinem vel claritatem, postea non bene videt nisi prius coadunetur visus." Vincent, Speculum naturale, bk.25, ch.34; Douai edn., col.1797.
53. See above, vol.1, p.185.
54. Vincent, Speculum naturale, bk.25, ch.34; Douai edn., col.1797.
55. See also loc. cit., where it is said that drunkenness, anger and illness can cause sight defects.
56. Bartholomaeus, De proprietatibus rerum, VII.19; Frankfurt edn., p.296.
57. Ibid., VII.18; Frankfurt edn., p.296.
58. Ibid., VII.14; Frankfurt edn., p.292.
59. Ibid., VII.19; Frankfurt edn., pp.297-98.
60. Ibid., VII.19; Frankfurt edn., p.298.

61. Wenzel, 'Chaucer and Contemporary Preaching', pp.144-51, who relates Chaucer's choice of various images to the influence of sermon literature. See also Shain, 'Pulpit Rhetoric', pp.240-41.
62. Holcot, Super sapientiam, lec.29; [ed. Ryterus], p.104.
63. Loc. cit.
64. Loc. cit.
65. Seneca, Ad Lucilium epistolae morales, epistle 50; ed. and trans. Richard M. Gummere. Loeb Classical Library, 3 vols, (London: Heinemann, 1917-1925), vol.1 (1917), pp.330-33.
66. Holcot, Super sapientiam, lec.29; [ed. Ryterus], p.104.
67. For further discussion of the RT, see above, vol.1, ch.8.
68. W.M. Hart, 'The Reeve's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.124-47; and Benson and Andersson, eds., Literary Context of Chaucer's Fables, pp.79-201.
69. "Lux multum debilis errorem facit, abscondit enim visui particulas corporis, et praetendit unitatem tenebrosi coloris ..." Alhazen, De aspectibus, III.5.20; ed. Risner, p.90.
70. "Debilitas enim lucis nimia errorem infert formae. Unde accidit error in crepusculis, in animalibus, vestibus arboribus, scilicet triplex, vel in individuo, vel in specie, vel in utroque, quod non accideret in temperata luce." Ibid., III.6.21; ed. Risner, p.91.
71. "Si enim procul videatur corpus album, in quo pars nigra multum sit, aestimabuntur fortassis in parte illa tenebrae; unde fiet conclusio, quod in directo illius partis sit foramen corporis, per quod appareat tenebrarum egressio post corpus illud existentium." Ibid., III.7.31; ed. Risner, p.95.
72. Witelo, Perspectiva, IV.153; ed. Risner, p.186.
73. Vincent, Speculum naturale, bk.25, ch.34; Douai edn., col.1797.
74. Loc. cit.
75. Ibid., bk.25, ch.39; Douai edn., col.1800.
76. Ibid., bk.25, ch.35; Douai edn., col.1798; and Bartholomaeus, De proprietatibus rerum, V.6; Frankfurt edn., p.133.
77. Ibid., VII.19; Frankfurt edn., p.297.
78. St. Basil, Homiliae in Hexaemeron, bk.6, chs.9-10; ed. Emmanuel Amand de Mendieta and Stig Y. Rudberg as Eustathius: ancienne version latine des neuf homélies sur l'Hexaéméron de Basile de Césarée. Texte und Untersuchungen zur Geschichte der Altchristlichen Literatur, vol.66, (Berlin: Akademie, 1958), pp.82-86.
79. Euclid, De visu, [Prop.] 10; ed. Theisen, p.71.

80. Holcot, Super sapientiam, lec.157; [ed. Ryterus], p.523. On the detail of the ship's sail, see FrankT, V.850-51, noted above, vol.1, p.173.
81. A window features in one of Chaucer's sources in Machaut, but it is used as a means whereby the poet overhears a lover's complaint. See Guillaume de Machaut, Dit de la fonteinne amoureuse, 221-34; in his Oeuvres, ed. Ernest Hoepffner.SATF, 3 vols, (1908-1921), vol.3, (1921).
82. See above, vol.1, pp.85-86, 91-96 and 106-7.
83. Bacon, De multiplicatione specierum, I.i; ed. Bridges, p.412. See also ibid., I.iii; ed. Bridges, pp.432-38. For commentary, see Vogl, 'Roger Bacons Lehre', p.210.
84. For further evidence of the influence of scientific optics on the explanation of light passing through glass, see John Leyerle, 'The Rose-Wheel Design and Dante's Paradiso', UTQ, vol.46 (1976-1977), pp.292-95.
85. The story of Troy is referred to in the French dream poems on which Chaucer modelled BD. See, for instance, Machaut, Fonteinne amoureuse, 1313-42, where pictures of the story of Troy decorate the fountain; and his Le Jugement dou Roy de Behaingne, 1474-75; in his Oeuvres, ed. Hoepffner, vol.1 (1908). For windows painted with narrative scenes (but without illumination) in a poem Chaucer may have known, see Watriquet de Couvin, Li Tournois des dames, 120-33; ed. Auguste Scheler, Dits de Watriquet de Couvin, (Brussels: Devaux, 1868); and see James I. Wimsatt, Chaucer and the French Love Poets: The Literary Background of the 'Book of the Duchess'. Univ. of North Carolina Studies in Comparative Literature, no.43, (Chapel Hill: Univ. of North Carolina Press, 1968), pp.62-64.
86. Bacon, Opus maius, pt.5, dist.9, ch.4; ed. Bridges, vol.2, pp.71-72; trans. Lindberg in Grant, ed., Source Book, p.394. See also Bacon, De multiplicatione specierum, I.iii and II.i; ed. Bridges, pp.436 and 457-59; and Vogl, 'Roger Bacons Lehre', pp.216-19.
87. On its application to the propagation of sound, see Crombie, Robert Grosseteste, pp.114-15.
88. On other possible sources, see Bennett, Chaucer's Book of Fame, pp.74-80.
89. McLuskey, 'Oresme on Light, Color, and the Rainbow', pp.58-59 and 80.
90. Nicole Oresme, Quaestiones super quatuor libros Meteororum, bk.3, ch.19; ed. McLuskey, p.248.
91. Ibid., bk.3, ch.20; ed. McLuskey, p.270.
92. Ibid., bk.3, ch.20; ed. McLuskey, p.266.
93. Loc. cit.
94. Ibid., bk.3, ch.13; ed. McLuskey, p.182.

CHAPTER 4:

Chaucer and the Optical Tradition II - French and Italian Literature

1. James I. Wimsatt, 'Chaucer and French Poetry', in Brewer, ed., Writers and their Background: Chaucer, p.110. A.I. Doyle, 'The Social Context of Medieval English Literature', in Boris Ford, ed., The Pelican Guide to English Literature, vol.1: The Age of Chaucer, rev. edn., (1954; Harmondsworth: Penguin, 1969), p.85, comments of French in the third quarter of the 14th. cent.:" ... most Englishmen seem to have ceased to think freely in it, though many contined to read and understand and quite a number to speak and write it ..."
2. Indicative of contemporary trends in poetry is the Auchinleck MS. (Edinburgh, National Library, MS. Advocates' 19.2.1), a book which Chaucer may have known, containing over 40 poems in English. It is a product of the early book trade, compiled c.1330-1340 in workshop conditions to cater for a growing reading public. Facsimile as The Auchinleck Manuscript: National Library of Scotland Advocates' MS. 19.2.1, intro. by Derek Pearsall and I.C. Cunningham, (London: Scholar Press, 1977). See also H.J Chaytor, From Script to Print: An Introduction to Medieval Literature, (Cambridge: Cambridge Univ. Press, 1945), pp.106-7; Laura Hibbard Loomis, 'Chaucer and the Breton Lays of the Auchinleck MS.', SP, vol.38 (1941), pp.14-33; her 'Chaucer and the Auchinleck MS.: Thopas and Guy of Warwick', in Essays and Studies in Honor of Carleton Brown, (New York: New York Univ. Press, 1940), pp.111-28; her 'The Auchinleck Manuscript and a Possible London Bookshop of 1330-1340', PMLA, vol.57 (1942), pp.595-627 (all rpt. in her Adventures in the Middle Ages: A Memorial Collection of Essays and Studies, (New York: Lennox Hill, 1962), pp.111-87); her 'Sir Thopas', in Bryan and Dempster, eds., Sources and Analogues, pp.486-559; and Peter N. Heydon, 'Chaucer and the Sir Orfeo Prologue of the Auchinleck MS.', PMASAL, vol.51 (1966), pp.529-45.
3. Johan Vising, Anglo-Norman Language and Literature. Language and Literature ser., (London: Oxford Univ. Press, 1923), esp. pt.1; R.W. Chambers, On the Continuity of English Prose from Alfred to More and his School (an extract from the Introduction to Nicholas Harpsfield's Life of Sir Thomas More, ed. E.V. Hitchcock and R.W. Chambers), (London: Oxford Univ. Press for EETS, 1932), pp.lxiv-cix; M. Dominica Legge, 'Anglo-Norman and the Historian', Hist., vol.26 (1941-1942), pp.163-75; her 'The French Language and the English Cloister', in Veronica Ruffer and A.J. Taylor, eds., Medieval Studies Presented to Rose Graham, (Oxford: Oxford Univ. Press for subscribers, 1950), pp.146-62; her Anglo-Norman in the Cloisters: The Influence of the Orders upon Anglo-Norman Literature. Edinburgh Univ. Publications: Language and Literature, no.2, (Edinburgh: Edinburgh Univ. Press, 1950); her Anglo-Norman Literature and its Background, (Oxford: Clarendon Press, 1953); R.M. Wilson, Early Middle English Literature, 3rd edn. University Paperbacks, (1939; London: Methuen, 1968), esp. chs.1-3; his 'English and French in England 1100-1300', Hist., vol.28 (1943), pp.37-60; and Derek Pearsall, Old English and Middle English Poetry. Routledge History of English Poetry, ed. R.A. Foakes, vol.1, (London: Routledge, 1977), pp.87-89.

4. Chaytor, Script to Print, pp.30-32; and Parkes, 'Literacy of the Laity', pp.564-66, which may under-estimate the competence of the middle classes in the French language. See Helen Suggett, 'The Use of French in England in the Later Middle Ages', TRHS, 4th. ser., vol.28 (1946), pp.61-83. From the evidence provided by wills, it seems that French poetry continued to predominate in clerical and aristocratic circles; but wills, by their nature, include only items of intrinsic worth, so the books which they mention are likely to be de luxe edns. and hence unreliable indicators of what was actually read. See Deanesley, 'Vernacular Books', pp.349-58; Edith Rickert, 'King Richard II's Books', Libr., 4th. ser., vol.13 (1933), pp.144-47; Chaytor, Script to Print, pp.107-8; and Pearsall, Old English and Middle English Poetry, p.193.
5. Martin M. Crow and Clair C. Olson, eds., Chaucer Life-Records, (Austin, Texas: Univ. of Texas Press, 1966), chs.2-4. There is a somewhat embroidered account of Chaucer's part in Edward III's French campaign of 1359-1360 by Oliver Farrar Emerson, 'Chaucer's First Military Service: A Study of Edward Third's Invasion of France in 1359-60', RR, vol.3 (1912), pp.321-61.
6. See above, vol.1, pp.170-72 for Chaucer's familiarity with Latin.
7. A case is made for Chaucer's authorship of poems in French, written in the early part of his career, in Rossell Hope Robbins, 'Geoffroi Chaucier, poète français, Father of English Poetry', ChauR, vol.13 (1978-1979), pp.93-115.
8. Pearsall, Old English and Middle English Poetry, pp.190-91. On Gower, see Legge, Anglo-Norman Literature, pp.220-22 and 357-61; and John H. Fisher, John Gower: Moral Philosopher and Friend of Chaucer, (1964: London: Methuen, 1965), ch.3.
9. Pearsall, Old English and Middle English Poetry, pp.191-97; and his 'The Troilus Frontispiece and Chaucer's Audience', YES, vol.7 (1977), pp.68-74.
10. Notable for their statements on the influence of French poetry on Chaucer are John Livingston Lowes, Geoffrey Chaucer: Lectures Delivered in 1932 on the William J. Cooper Foundation in Swarthmore College, (London: Oxford Univ. Press, 1934), ch.3; John Strong Perry Tatlock, The Mind and Art of Chaucer, (Syracuse, N.Y.: Syracuse Univ. Press, 1950), ch.2; Clemen, Chaucer's Early Poetry, passim; Charles Muscatine, Chaucer and the French Tradition: A Study in Style and Meaning, (Berkeley: Univ. of California Press, 1957), passim; Wimsatt, Chaucer and the French Love Poets, passim; and Robert A. Pratt, 'Introduction' to his edn. of Geoffrey Chaucer, The Tales of Canterbury Complete, (Boston: Houghton Mifflin, 1966), pp.ix-xv. For summaries of critical writing on the subject, see Haldeen Braddy, 'The French Influence on Chaucer', in Rowland, ed., Companion, pp.143-59; and Wimsatt, 'Chaucer and French Poetry', pp.109-36.
11. Quotations are from Guillaume de Lorris and Jean de Meun, Le Roman de la rose, ed. Ernest Langlois. SATF, 5 vols., (1914-1925).
12. Ibid., 1155-62 and 2557-69.

13. Alan M.F. Gunn, The Mirror of Love: A Reinterpretation of 'The Romance of the Rose', Texas Technological College Research Publication in Literature, (Lubbock, Texas: Texas Tech Press, 1951), p.111 and see 108-13.
14. On the connection between the eye and the heart, see also RR, 2299-317 and 2717-50.
15. Gunn, Mirror of Love, p.113, comments that Guillaume's descriptive passages "point to the importance of sight, and especially of visible beauty, in the birth of chivalric love".
16. Critical opinion is divided on the Fountain of Narcissus episode. C.S. Lewis, The Allegory of Love: A Study in Medieval Tradition, (London: Oxford Univ. Press, 1936), p.117, thought that Amant was looking into his lady's eyes. D.W. Robertson, Jr., A Preface to Chaucer: Studies in Medieval Perspectives, (Princeton: Princeton Univ. Press, 1962), p.95, argued that Amant was repeating the experience of Narcissus as a victim of self-love. His view was elaborated by John V. Fleming, The 'Roman de la rose': A Study in Allegory and Iconography, (Princeton: Princeton Univ. Press, 1969), pp.92-97. See also Jean Frappier, 'Variations sur le thème du miroir, de Bernard de Ventadour à Maurice Scève', Cah. Ass. Int. Et. Fr., vol.11 (1959), pp.134-58; Goldin, 'Mirror of Narcissus', pp.52-68; and Erich Köhler, 'Narcisse, la fontaine d'Amour et Guillaume de Lorris', J. Sav., (année 1963), pp.86-103. The interpretations of Frappier and Köhler are similar to my own.
17. Ronald Sutherland, 'The Romaunt of the Rose and Source Manuscripts', PMLA, vol.74 (1959), pp.178-83; and his 'Introduction' to his edn. of 'The Romaunt of the Rose' and 'Le Roman de la rose': A Parallel-Text Edition, (Oxford: Blackwell, 1967), pp.ix-xxxv.
18. Lisi Cipriani, 'Studies in the Influence of the Romance of the Rose upon Chaucer', PMLA, vol.22 (1907), pp.552-95; Dean S. Fansler, Chaucer and 'Le Roman de la rose', (New York: Columbia Univ. Press, 1914); and Wimsatt, Chaucer and the French Love Poets, ch.1.
19. Ibid., chs. 2 and 3.
20. For an account of Machaut's life and works, see Armand Machabey, Guillaume de Machaut 130?-1377: la vie et l'oeuvre musical. Bibliothèque d'Etudes Musicales, 2 vols., (Paris: Masse, 1955); Daniel Poirion, Le Poète et le prince: l'évolution du lyrisme courtois de Guillaume de Machaut à Charles d'Orléans. Univ. de Grenoble Publications de la Faculté des Lettres et Sciences Humaines, no.35, (Paris: Presses Universitaires, 1965), pp.192-205; also Guillaume de Machaut, La Louange des dames, ed. Nigel Wilkins, (Edinburgh: Scottish Academic Press, 1972), pp.3-5 and 10-11; and, for a major critical study of Machaut's narrative verse, William Calin, A Poet at the Fountain: Essays on the Narrative Verse of Guillaume de Machaut. Studies in Romance Languages, no.9, (Lexington: Univ. Press of Kentucky, 1974).
21. G.L. Kittredge, 'Antigone's Song of Love', MLN, vol.25 (1910), p.158; his 'Chaucer's Troilus and Guillaume de Machaut', MLN, vol.30 (1915), p.69; his 'Guillaume de Machaut and the Book of the Duchess', PMLA, vol.30 (1915), pp.1-24; Anna Theresa Kitchel, 'Chaucer and Machaut's Dit de la fonteinne amoureuse', in Christabel Forsyth Fiske, ed.,

Vassar Mediaeval Studies, by members of the Faculty of Vassar College, (New Haven: Yale Univ. Press, 1923), pp.219-31; Robert M. Estrich, 'Chaucer's Prologue to the Legend of Good Women and Machaut's Le Jugement dou Roy de Navarre', SP, vol.36 (1939), pp.20-39; Clemen, Chaucer's Early Poetry, pp.47-57; Raymond Preston, 'Chaucer and the Ballades notées of Guillaume de Machaut', Spec., vol.26 (1951), pp.615-23; Marc M. Pelen, 'Machaut's Court of Love Narratives and Chaucer's Book of the Duchess', ChaucR, vol.11 (1976-1977), pp.128-55; James I. Wimsatt, Chaucer and the French Love Poets, chs.4-6; his The Marguerite Poetry of Guillaume de Machaut. Univ. of North Carolina Studies in the Romance Languages and Literatures, no.87, (Chapel Hill: Univ. of North Carolina Press, 1970); his 'Machaut's Lay de confort and Chaucer's Book of the Duchess', in Rossell Hope Robbins, ed., Chaucer at Albany, (New York: Burt Franklin, 1975), pp.11-26; his 'Guillaume de Machaut and Chaucer's Troilus and Criseyde', MAe, vol.45 (1976), pp.277-93; his 'Medieval and Modern in Chaucer's Troilus and Criseyde' PMLA, vol.92 (1977), pp.203-16; his 'Guillaume de Machaut and Chaucer's Love Lyrics', MAe, vol.47 (1978), pp.66-87; and Nigel Wilkins, Music in the Age of Chaucer. Chaucer Studies, no.1, (Cambridge: Brewer, 1979), ch.4. A useful summary of critical writing on Machaut, and on Machaut's relation to Chaucer, is provided in the 'Introduction' to Margaret Jean Ehrhart, 'Chaucer's Contemporary, Guillaume de Machaut: A Critical Study of Four Dits amoureux', Diss. Univ. of Illinois at Urbana-Champaign, 1974, in which see also ch.3, on Navarre, and ch.4 on Fonteinne amoureuse; and see DAI, vol.35 (1974-1975), pp.7299A-300A.

22. Machaut, Behaingne; ed. Hoepffner.
23. See Poirion, Poète et prince, pp.502-5, on "nostalgie de la lumière" in French love lyrics.
24. Guillaume de Machaut, Remède de Fortune; in his Oeuvres, ed. Hoepffner, vol.2 (1911). The eye-ray conceit reappears in a number of the lyrics included in the Louange des dames. One opens with an account of how the lady's eyes produce a delightful pain:
- D'uns dous yex vairs, rians, fendus,
Et d'un dous ris, fait par mesure,
Sui je par mi le cuer ferus,
Dont je sens sans plaie pointure;
Mais le cop est de tel nature
Et tant me plaist a soustenir
Que jamais je n'en quier garir.
- Machaut, Louange des dames; ed. Wilkins, no.66. See also nos.197 and 211.
25. Machaut, Fortune, 823-40.
26. On Machaut's realism, see Muscatine, Chaucer and the French Tradition, pp.98-101.
27. Guillaume de Machaut, Le Jugement dou Roy de Navarre; in his Oeuvres, ed. Hoepffner, vol.1.
28. On Froissart's life and works, see F.S. Shears, Froissart: Chronicler and Poet, (London: Routledge, 1930); and Poirion, Poète et prince,

- pp.205-18. For the literary relations between Chaucer and Froissart, see G.L. Kittredge, 'Chaucer and Froissart', ES, vol.26 (1899), pp.321-36; John L. Lowes, 'The Prologue to the Legend of Good Women as Related to the French Marguerite Poems and the Filostrato', PMLA, vol. 19 (1904), pp.593-683 for Chaucer's borrowings from Machaut, Froissart and Deschamps; B.J. Whiting, 'Froissart as Poet', Med. Stud., vol.8 (1946), pp.189-216 for a summary of Froissart's love poetry; Roland M. Smith, 'Five Notes on Chaucer and Froissart' MLN, vol.66 (1951), pp.27-32; Wimsatt, Chaucer and the French Love Poets, ch.7; and his Dit dou bleu chevalier: Froissart's Imitation of Chaucer', Med. Stud., vol.34 (1972), pp.388-400.
29. Jean Froissart, Le Paradys d'amour; in Oeuvres de Froissart: poésies, ed. Auguste Scheler, 3 vols., (Brussels: Devaux, 1870-1872), vol.1 (1870).
30. On the life of Graunson, see Arthur Piaget, Oton de Grandson: sa vie et ses poésies. Mémoires et Documents publiés par la Société d'Histoire de la Suisse Romande, 3è sér., tome 1, (Lausanne: Payot, 1941), pp.11-104; and Haldeen Braddy, Chaucer and the French Poet Graunson, (Baton Rouge: Louisiana State Univ. Press, 1947), chs.2 and 3, material earlier published as 'Messire Oton de Graunson, Chaucer's Savoyard Friend', SP, vol.35 (1938), pp.515-31; and 'Sir Oton de Graunson - "Flour of hem that make in Fraunce"', SP, vol.35 (1938), pp.10-24.
31. On Chaucer and Graunson, see Margaret Galway, 'Chaucer, Graunson and Isabel of France', RES, vol.24 (1948), pp.273-80; Haldeen Braddy, 'Chaucer and Graunson: The Valentine Tradition', PMLA, vol.54 (1939), pp.359-68; his Chaucer and Graunson, chs.4-6; his 'Chaucer's Book of the Duchess and Two of Graunson's Complaintes', MLN, vol.52 (1937), pp.487-91; and Wimsatt, Chaucer and the French Love Poets, pp.143-46.
32. Oton de Graunson, La Complainte de saint Valentin; ed. Piaget in his Grandson: vie et poesies. See also Comp. s. Val., 53-56 and 169-72.
33. John Livingston Lowes, 'The Chaucerian Merciles Beaute and Three Poems of Deschamps', MLR, vol.5 (1910), pp.33-39; and his 'Illustrations of Chaucer Drawn Chiefly from Deschamps', RR, vol.2 (1911), pp.113-28.
34. But see Wimsatt, 'Machaut and Troilus', pp.279-80.
35. Lewis Freeman Mott, The System of Courtly Love Studied as an Introduction to the 'Vita Nuova' of Dante. Diss. Columbia Univ., (Boston: Ginn, 1896), pp.31-32 and 50; and Mary Vance Young, 'The Eyes as Generators of Love', MLN, vol.22 (1907), p.232.
36. See Alois Richard Nykl, Hispano-Arabic Poetry and its Relations with the Old Provençal Troubadours, (1946; rpt. Geneva: Slatkine, 1974), pp.48, 207 and 248.
37. M.B. Ogle, 'The Classical Origin and Tradition of Literary Conceits', Am. J. Philol., vol.34 (1913), pp.130-46; and H.R. Lang, 'The Eyes as Generators of Love', MLN, vol. 23 (1908), pp.126-27.

38. See above, vol.1, pp.70-71 (Plato), 78-81 (Ptolemy) and 81-82 (Galen).
39. See above, vol.1, pp.91-93.
40. For further anatomies of the French love-poets along similar lines, see Clemen, Chaucer's Early Poetry, ch.1; and Muscatine, Chaucer and the French Tradition, pp.11-41.
41. See above, vol.1, pp.133-36.
42. See also Jean de Meun, RR, 16855-80.
43. See also Jean de Meun, RR, 18499-514. For commentary on Nature's discourse in relation to its immediate context, see Patricia J. Eberle, 'The Lovers' Glass: Nature's Discourse on Optics and the Optical Design of the Romance of the Rose', UTQ, vol.46 (1976-1977), pp.251-53.
44. Langlois contended that Jean de Meun's intention was to please in order to teach. The poem is not an 'art of loving' but an encyclopedia of useful knowledge presented in a palatable way as a series of digressions from the ostensible theme of love: "Ainsi s'expliquent ces digressions, qu'on jugera déplacées si l'on considère le roman comme un Art d'amour, mais qui sont au contraire le sujet même du livre ... La préoccupation constante de Jean de Meun, c'est de mettre à la portée de ceux qui ignorant le latin les enseignements utiles des sages preudomes ..." Guillaume de Lorris and Jean de Meun, RR, ed. Langlois, vol.1, (1914), pp.26-27. Faral detected, more vaguely, that "... malgré le décousu de développement, malgré l'aspect inorganique du roman, il y a dans ce chaos une incontestable unité d'inspiration". Edmond Faral, 'Le Roman de la rose et la pensée française au XIII^e siècle', RdM, 7^e période, vol. 35 (1926), pp.441-42. Lewis characterised the second part of the Roman as a "huge, dishevelled, violent poem". Jean de Meun "utterly lacks, perhaps despises, Guillaume's architectonics and sense of proportion". Lewis, Allegory of Love, p.137, and see also pp.141-43 and 154. The poem seems more homogeneous to Charles Dahlberg, 'Macrobius and the Unity of the Roman de la rose', SP, vol.58 (1961), pp.573-82; and for a summary of recent views on the unity of the Roman, see his 'Introduction' to Guillaume de Lorris and Jean de Meun, The Romance of the Rose, trans. Dahlberg, (Princeton: Princeton Univ. Press, 1971), pp.2-4.
45. Gunn, Mirror of Love, pp.49-50.
46. Ibid., p.28 and see p.29.
47. Ibid., p.266.
48. Ibid., pp.219-22 and 301. On Jean de Meun's neoplatonism and what is held to be his cursory acquaintance with optics, see Gérard Paré, Les Idées et les lettres au XIII^e siècle: le 'Roman de la rose'. Université de Montréal Bibliothèque de Philosophie, no.1: Publications de l'Institut d'Etudes Médiévales Albert-le-Grand, (Montréal: Centre de Psychologie et de Pédagogie, 1947), pp.207-11 and 254-60; and his Le 'Roman de la rose' et la scolastique courtoise.

Publications de l'Institut d'Etudes Médiévales d'Ottawa, no.10, (Paris: Vrin; Ottawa: Institut d'Etudes Médiévales, 1941), pp.125-30, where Paré argues that Jean de Meun relies more on Aristotle than Alhazen. See also Ernest Langlois, Origines et sources du 'Roman de la rose', (Paris: Thorin, 1891), pp.107-10 and 146-47.

49. In his review of Gunn's book, Lewis remained sceptical of the importance attached to the idea of the mirror because "Professor Gunn's case depends mainly on connexions which Jean de Meun has never mentioned". C.S. Lewis, rev. of Mirror of Love, by Gunn, MAe, vol.22 (1953), p.29.
50. Gunn, Mirror of Love, p.267 and see pp.268-70.
51. Ibid., p.273. In the Anticlaudianus of Alan of Lille, a work which Jean knew, mirrors appear in two major passages. First, three mirrors in the hand of Reason reveal respectively the marriage of matter and form, matter and form returning to their sources, and the birth of form from the divine Idea; second, Faith gives Prudence a mirror in which she perceives the universe. See above, vol.2, p.46, n.10.
52. "Casual and incidental as it may appear, Nature's discussion of mirrors and optical science is therefore no mere parade of curious learning, but a passage with as rich and relevant a content, and as profound implications as any in the poem." Gunn, Mirror of Love, p.273.
53. Eberle, 'Lovers' Glass', p.250.
54. Ibid., pp.244 and 248 and esp. p.245: "Jean's Mirouer aus Amoureux is, I suggest, a complex optical instrument made of a series of optical glasses, an instrument designed to supplement the single perspective offered in Guillaume's dream-vision of love with a multiplicity of perspectives on the subject of love and on the dream-vision itself."
55. Ibid., p.249.
56. Loc. cit. and pp.253-54.
57. Ibid., pp.246-47. Nigel de Longchamps, Speculum stultorum, ed. John H. Mozley and Robert R. Raymo. Univ. of California Publications: English Studies, no.18, (Berkeley and Los Angeles: Univ. of California Press, 1960); English version as Nigel Longchamp, A Mirror for Fools: The Book of Burnel the Ass, trans. J.H. Mozley, pref. by Paul E. Beichner, (1961; rpt. Notre Dame, Indiana: Univ. of Notre Dame Press, 1963), in which see p.xvi.
58. Eberle, 'Lovers' Glass', pp.257-59.
59. See for example the 'light metaphysics' of Robert Grosseteste, described above, vol.1, pp.104-9.
60. "The visual imagination is central to the language of love in the late middle ages, and a main impetus came from the new science of optics supplementing the traditional neoplatonic view familiar from the writings of the church fathers." John Leyerle, 'Introduction' to Leyerle, ed., 'The Language of Love and the Visual Imagination in the High Middle Ages,' UTQ, vol.46 (1976-1977), p.188.

61. Fansler, Chaucer and 'Le Roman', p.231.
62. H.S.V. Jones, 'The Squire's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.357-76; and W.A. Clouston, 'On the Magical Elements in Chaucer's Squire's Tale, with Analogues', in John Lane, John Lane's Continuation of Chaucer's 'Squire's Tale', ed. F.J. Furnivall. Chaucer Society, 2nd. ser., 2 pts.: nos.23 (1887) and 26 (1889), pt.2, pp.299-333.
63. e.g. Pecham, Perspectiva communis, II.45; ed. Lindberg, pp.196-201, on reflection in a spherical convex mirror.
64. The following remarks are based on Howard Schless, 'Transformations: Chaucer's Use of Italian', in Brewer, ed., Writers and their Background: Chaucer, pp.188-97. For a summary of relevant critical writing, see Paul G. Ruggiers, 'The Italian Influence on Chaucer', in Rowland, ed., Companion, pp.160-84; and see also Mungo MacCallum, Chaucer's Debt to Italy. Univ. of Sydney Extension Board Lecture, 28th. Oct. 1931, (Sydney: Angus and Robertson, 1934).
65. Crow and Olson, eds., Chaucer Life-Records, pp.32-40 and 53-61. On both of Chaucer's Italian journeys, see Edward Hutton, 'Chaucer and Italy', NC, vol.128 (Jul.-Dec. 1940), pp.51-59. The probable route taken in 1372 has been mapped by George B. Parks, 'The Route of Chaucer's First Journey to Italy', ELH, vol. 16 (1949), pp.174-87. On Chaucer's Italian travels in 1378, see John S.P. Tatlock, 'The Duration of Chaucer's Visits to Italy', JEGP, vol.12 (1913), pp.118-21; Haldeen Braddy, 'New Documentary Evidence Concerning Chaucer's Mission to Lombardy', MLN, vol.48 (1933), pp.507-11; John M. Manly, 'Chaucer's Mission to Lombardy', MLN, vol.49 (1934), pp.209-16; E.P. Kuhl, 'Why Was Chaucer Sent to Milan in 1378?', MLN, vol.62 (1947), pp.42-44; and Robert Armstrong Pratt, 'Geoffrey Chaucer, Esq., and Sir John Hawkwood', ELH, vol.16 (1949), pp.188-93.
66. Some impression of the scale of the Italian bankers' operations can be gained from W.E. Rhodes, 'The Italian Bankers in England and their Loans to Edward I and Edward II', in T. F. Tout and James Tait, eds., Historical Essays by Members of Owens College, Manchester: Published in Commemoration of its Jubilee (1851-1901), (London: Longmans, 1902), pp.137-68.
67. For the less extensive influence of Petrarch on Chaucer, see Ruggiers, 'Italian Influence', pp.165-66; Mario Praz, 'Chaucer and the Great Italian Writers of the Trecento' (1927), rev. and rpt. in his The Flaming Heart: Essays on Crashaw, Machiavelli, and Other Studies in the Relations between Italian and English Literature from Chaucer to T.S. Eliot, (Garden City, N.Y.: Doubleday Anchor, 1958), pp.78-79; his 'Petrarch in England', in his Flaming Heart, pp.265-66; Patricia Thomson, 'The Canticus Troili: Chaucer and Petrarch', Comp. Lit., vol.11 (1959), pp.313-28; and Jeffrey Helterman, 'The Masks of Love in Troilus and Criseyde', Comp. Lit., vol.26 (1974), pp.14-31. Chaucer's greatest debt to Petrarch occurs in the ClT, where he uses Petrarch's Latin version of the story of Griselda; but Petrarch is borrowing from Boccaccio. See Severs, Literary Relationships, ch.1.
68. Saint Bonaventure, Itinerarium mentis in Deum, ed. and trans. with commentary by Philotheus Boehner, in Works of Saint Bonaventure, ed. Philotheus Boehner and M. Frances Laughlin, 2 vols., (Saint Bonaventure, N.Y.: Saint Bonaventure Univ. Franciscan Institute,

- 1955-1956), vol.2 (1956). In this work, light and vision are recurrently used to describe spiritual illumination and perception. See Charles S. Singleton, Journey to Beatrice. Dante Studies, no.2, (Cambridge, Mass.: Harvard Univ. Press, 1958), ch.2.
69. See, for example, Aristotle's 'De anima', lect. 14-16; trans. Foster and Humphries, pp.260-76.
70. Some parallels between passages in Dante and in the scientific texts are suggested by Tea, 'Witelo', pp.24-25. The whole question of Dante's knowledge of scientific optics has been thoroughly explored by Parronchi, 'Perspettiva dantesca', pp.5-103. Parronchi indicates the close links between Dante's references to vision and light and the writings of Alhazen Witelo and Bacon as well as the Aristotelian commentaries of Aquinas and Albertus Magnus. He stresses that Dante's optical passages have an important place in the design of the Divina commedia:
 See above - Vol. I: p. 52. torio
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 See also Graham Workman, 'The Science of Light and Reflection in the Paradiso', BPhil. Diss., Univ. of York, Centre for Medieval Studies, 1975.
71. Parronchi, 'Perspettiva dantesca', p.46.
72. Dante's debt in other works to writers on the metaphysics of light has been studied by Joseph Anthony Mazzeo, 'Light Metaphysics, Dante's Convivio and the Letter to Can Grande della Scala', Trad., vol.14 (1958), pp.191-229.
73. References are to Dante Alighieri, The Divine Comedy, ed. and trans. with commentary by Charles S. Singleton. Bollingen Series, no.80, 6 vols. [corrected text], (1970-1975; Princeton: Princeton Univ. Press, 1977).
74. Note also Dante, Purg., I.40-48.
75. "... le condizioni della visibilità che si fanno progressivamente più scarse, fanno assomigliare l'Inferno a un gigantesco monocromo, dove forme e oggetti rilevano senza distinzione di luce e d'ombra ..." Parronchi, 'Perspettiva dantesca', pp.44-45.
76. Purgatory provides "saldezza visiva e colorata a tutto il mondo, via via più chiaro e aerato, delle apparenze purgatoriali". Ibid., p.46. Note also Dante, Purg., I.115-17, X.22-105, XII.19-21 and XV.139-45.
77. See also Dante, Purg., XIX.37-39.
78. In Purgatory, the sun sets in the east, "dove il suo fattor lo sangue sparso". Dante, Purg., XXVII.2 and see IV.55-75. See also Workman, 'Science of Light', p.38.
79. Ibid., pp.10 and 36.
80. Singleton, Journey to Beatrice, p.30.

81. Workman, 'Science of Light', p.26.
82. Ibid., p.34; and Leyerle, 'Rose-Wheel Design', pp.299-302.
83. Workman, 'Science of Light', pp.53-54.
84. See Virgil's comments at Dante, Purg., XXV.118-20; and see Parronchi, 'Perspettiva dantesca', pp.12 and 55-56.
85. "Col Paradiso gli errori veri e propri finiscono, si entra nel mondo della certezza." Ibid., p.58.
86. See also Dante, Par., XXVI.76-78 and XXVII.97-99. Workman, 'Science of Light', p.32, remarks that the commonplace of the lady's eyes shining forth love and promises of paradise is raised to "a passionate level of scientific verity". Singleton, Journey to Beatrice, p.16, argues that each of Dante's guides - Virgil, Beatrice and Bernard - may be regarded as individual 'suns' each shedding their own type of light.
87. See also Dante, Par., XIV.40-41 and XXXII.73-75; also Workman, 'Science of Light', p.41; and Leyerle, 'Rose-Wheel Design', p.298.
88. See also Dante, Inf., XXXI.34-38 and XXXIV.4-15.
89. See also Dante, Purg., V.37-42, XXIII.1-6 and XXIX.70-81.
90. Muscatine, 'Locus of Action', pp.118-19.
91. Ibid., p.119.
92. Loc. cit.
93. See also Dante, Purg., XV.16-24. It is here, according to Parronchi, that optics 'erupts' into the poem. See his 'Perspettiva dantesca', p.46 and also pp.11 and 68; Workman, 'Science of Light', p.20; and James L. Miller, 'Three Mirrors of Dante's Paradiso', UTQ, vol.46 (1976-1977), pp.263-79.
94. Parronchi, 'Perspettiva dantesca', p.68; Workman, 'Science of Light', pp.20 and 28. Workman, ibid., p.21, makes the observation that Dante himself is like a ray in the process of reflection back to his true source.
95. Ibid., pp.52-53.
96. Parronchi, 'Perspettiva dantesca', pp.25 and 73-78; and Miller, 'Three Mirrors', p.263. This article demonstrates how the allusion to mirrors in Dante, Par., II.91-105 is complemented by that at Par., XXXIII.115-32. "The structure of Paradiso is thus framed by the mirror imagery of the two 'esperienze': a physical experiment for its humble prelude; and a spiritual experience for its exalted finale." Loc. cit.

97. See also Dante, Par., XXXIII.115-20; and see Parronchi, 'Perspettiva dantesca', pp.82-85; and Workman, 'Science of Light', pp.39-40.
98. Parronchi, 'Perspettiva dantesca', pp.61-62.
99. For other optical allusions, see Dante, Par., III.10-15; XIV.97-102, XVII.121-23, XXVIII.4-12 and XXX.109-14.
100. For the influence of Dante on Chaucer, see Paget Toynbee, Dante in English Literature from Chaucer to Cary (c.1380-1844), 2 vols., (London: Methuen, 1909), vol.1, pp.1-16; John Livingston Lowes, 'Chaucer and Dante', MP, vol.14 (1916-1917), pp.705-35; Praz, 'Chaucer and Italian Writers', in his Flaming Heart, pp.29-59; C. Looten, 'Chaucer et Dante', Rev. Litt. Comp., vol.5 (1925), pp.545-71; Theodore Spencer, 'The Story of Ugolino in Dante and Chaucer', Spec., vol.9 (1934), pp.295-301; and Howard Schless, 'Chaucer and Dante', in Dorothy Bethurum, ed., Critical Approaches to Medieval Literature: Selected Papers from the English Institute, 1958-1959, (New York: Columbia Univ. Press, 1960), pp.134-54.
101. See also Dante, Purg., II.17-24. The Dantean influences on this passage have been discussed by Dorothy Arlene Dilts, 'Observations on Dante and the House of Fame', MLN, vol.57 (1942), pp.26-28; Bennett, 'Chaucer's Book of Fame', pp.48-58; and Praz, 'Chaucer and Italian Writers', pp.50-51. See also F.N. Robinson, 'Chaucer and Dante', rev. of, Di una imitazione inglese della Divina Commedia, 'La Casa della Fama' di G. Chaucer, by C. Chiarini, J. Comp. Lit., vol.1 (1903), pp.292-97; and Looten, 'Chaucer et Dante', pp.549-60. Extensive affiliations between Chaucer's poem and Dante's Divina commedia are put forward by B.G. Koonce, Chaucer and the Tradition of Fame: Symbolism in the 'House of Fame', (Princeton: Princeton Univ. Press, 1966).
102. See also Dante, Par., XXII.148-53. There are echoes too of Boethius and Macrobius. Having demonstrated how small the world is in relation to the universe, Lady Philosophy comments on the folly of being concerned about fame, the extent of which is even less significant. See Chaucer, trans., Boece, bk.2, pr.7. In Macrobius, Commentary on the Dream of Scipio, bk.1, ch.16, Scipio perceives the earth to be a "punctum" in comparison with the surrounding spheres. See also ibid., bk.2, ch.9, in Ambrosii Theodosii Macrobiani commentarii in somnium Scipionis, ed. Jacob Willis. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, (Leipzig: Teubner, 1963), pp.66 and 124; trans. with intro. by William Harris Stahl, [2nd edn.]. Records of Civilization Sources and Studies, no.48, (1952; New York: Columbia Univ. Press, 1966). For critical discussion, see Sheila Delany, Chaucer's 'House of Fame': The Poetics of Sceptical Fideism, (Chicago: Univ. of Chicago Press, 1972), pp.79-86.
103. It occurs no fewer than 61 times.
104. A recent study of Chaucer suggests that the authority and experience debate may derive in part from Grosseteste and Roger Bacon. See Robert B. Burlin, Chaucerian Fiction, (Princeton: Princeton Univ. Press, 1977), pp.18-22.

105. Clemen, Chaucer's Early Poetry, p.91.
106. Thomas A. Kirby, Chaucer's 'Troilus': A Study in Courtly Love. Louisiana State Univ. Studies, no.39, (Louisiana: Louisiana State Univ. Press, 1940), pp.93-95.
107. References are to Giovanni Boccaccio, Opere minore in volgare, ed. Mario Marti. I Classici Rizzoli, 4 vols., (Milan: Rizzoli, 1969-1972), vol.2 (1970): Filostrato, Teseida, Chiose al Teseida. See also the convenient Nathaniel Edward Griffin and Arthur Beckwith Myrick, The 'Filostrato' of Giovanni Boccaccio: A Translation with Parallel Text, (Philadelphia: Univ. of Pennsylvania Press, 1929).
108. See also Boccaccio, Fil., II.lxxxiv.5-8.
109. See also ibid., VII.lxix.5-8.
110. Note the more self-conscious exchange of glances at ibid., II.lxxxii.
111. For the influence of Boccaccio on Chaucer, see Hubertis M. Cummings, The Indebtedness of Chaucer's Works to the Italian Works of Boccaccio: (A Review and Summary). Diss. Princeton Univ., 1914, rev., (Cincinnati: Univ. of Cincinnati, 1916), ch.5; Praz, 'Chaucer and Italian Writers', pp.59-84; Herbert G. Wright, Boccaccio in England from Chaucer to Tennyson (London: Athlone Press, 1957), esp. pp.44-101; A. Lytton Sells, The Italian Influence in English Poetry: From Chaucer to Southwell, (London: Allen and Unwin, 1955), ch.1, where Dante is also discussed; and, for a highly detailed study, Sanford B. Meech, Design in Chaucer's 'Troilus', (Syracuse, N.Y.: Syracuse Univ. Press, 1959). The spatial content of Troilus has been analysed most fully by Dobbs, 'Space in Troilus', ch.1. Dobbs rightly draws attention to the importance of descriptive detail and movement in creating a sense of space. Her remarks on the similar effectiveness of dialogue, the depiction of Trojan society, the mental capacities of the protagonists and their portraits are less convincing. For further discussion, see above, vol.1, p.54.
112. Il Filostrato was trans. into French c.1380 by Beauvau, Seneschal of Anjou. It is ptd. as Le Livre de Troilus, in Nouvelles françoises en prose du XIV^e siècle, ed. L. Moland and C. d'Héricault. Bibliothèque Elzévierienne, no.66, (Paris: Jannet, 1878), pp.117-304. For Chaucer's use of Beauvau's text, see Robert A. Pratt, 'Chaucer and Le Roman de Troyle et de Criseida', SP, vol.53 (1956), pp.509-39.
113. The application of ideas of blindness and darkness in TC is discussed by P.M. Kean, 'Chaucer's Dealings with a Stanza of Il Filostrato and the Epilogue of Troilus and Criseyde', MAe, vol.33 (1964), pp.36-46.
114. Rogers notes that the "sense of time ... is related to the sense of space". H.L. Rogers, 'The Beginning (and Ending) of Chaucer's Troilus and Criseyde', in Anthony Stephens, H.L. Rogers and Brian Coghlan, eds., Festschrift for Ralph Farrell. Australisch-Neuseeländische Studien zur deutschen Sprache und Literatur, vol.7, (Berne:

- Lang, 1977), p.197. As Troilus transcends human space, so he transcends human time. On expressive eye-movements in Troilus and in other works by Chaucer, see Barry Windeatt, 'Gesture in Chaucer', Med. Hum., vol.9 (1979), pp.145-52.
115. On the independence of Chaucer's realism in Troilus, see Wimsatt, 'Medieval and Modern', pp.212-14.
116. Note that just as it is sight which helps the progress of their love, so it is sight - the visual evidence of Criseyde's brooch, given her by Troilus, on the cloak of Diomedes (TC, V.1646-66) - which hastens its end.
117. Boccaccio, Opere minore, ed. Marti, vol.2.
118. The case for Dante as a primary influence on Chaucer's stanzas has been put by John W. Clark, 'Dante and the Epilogue of Troilus', JEGP, vol.50 (1951), pp.1-10.
119. See above, vol.2, p.86, n.102.
120. The ending of Troilus has been most extensively studied by John M. Steadman, Disembodied Laughter: 'Troilus' and the Apotheosis Tradition: A Reexamination of Narrative and Thematic Contexts, (Berkeley: Univ. of California Press, 1972), in which see ch.1 on the influence of Dante, pp.119-22 on Chaucer's use of the Teseida, and pp.127-38 on Boethius, who "treats the astral journey metaphorically, as an act of speculation" (ibid., p.131). See also Meech, Design in 'Troilus', pp.135-38; Alfred L. Kellogg, 'On the Tradition of Troilus's Vision of the Little Earth', Med. Stud., vol.22 (1960), pp.204-13; Peter Dronke, 'The Conclusion of Troilus and Criseyde', MAe, vol.33 (1964), pp.47-52; and John W. Conlee, 'The Meaning of Troilus' Ascension to the Eighth Sphere', ChauR, vol.7 (1972-1973), pp.27-36.
121. Kean, 'Chaucer's Dealings', p.45, calls this "the direct vision, which is granted him after death frees him from the blinding effect of the body, of the soul's true object of desire".
122. Steadman, Disembodied Laughter, ch.5
123. E. Talbot Donaldson, 'The Ending of Chaucer's Troilus', in Arthur Brown and Peter Foote, eds., Early English and Norse Studies Presented to Hugh Smith in Honour of his Sixtieth Birthday, (London: Methuen, 1963), p.44 and passim.
124. Note the similar argument, pursued chiefly in relation to Dante, by Leyerle, 'Rose-Wheel Design', pp.288-90 and 298-305; and see Anne Barbara Gill, Paradoxical Patterns in Chaucer 'Troilus': An Explanation of the Palinode. Diss. Catholic Univ. of America, (Washington, D.C.: Catholic Univ. of America Press, 1960), pp.100-9.
125. Other structural elements of the poem have been systematically analysed by William Provost, The Structure of Chaucer's 'Troilus and Criseyde'. Anglistica, vol.20, (Copenhagen: Rosenkilde and Bagger, 1974).

126. Dobbs, 'Space in Troilus', pp.43-44, observes that there is a progressive contraction in the spatial locales until the consummation scene, which marks the beginning of a reverse movement of expansion, culminating in the apotheosis of Troilus. See also Mark Lambert, 'Troilus, Books I-III: A Criseydan Reading', in Mary Salu, ed., Essays on 'Troilus and Criseyde'. Chaucer Studies, no.3, (Cambridge: Brewer, 1979), pp.119-21. Note also Muscatine, Chaucer and the French Tradition, p.163: "... with Criseyde's departure from Troy our attention is divided over an unprecedented physical space ... [which] swallows up their private concerns in the enlarged picture."
127. Dobbs, 'Space in Troilus', pp.165-68 and 179-81. Dobbs in her 'Conclusion' suggests that in Troilus space is used to suggest the limitations of human experience. See also Robert M. Jordan, Chaucer and the Shape of Creation: The Aesthetic Possibilities of Inorganic Structure, (Cambridge, Mass.: Harvard Univ. Press, 1967), pp.95-110. The concentric structure of Troilus is implicit in Jordan's argument, although his immediate model is the Gothic cathedral, not the Aristotelian universe.

CHAPTER 5:

The 'Canterbury Tales', Fragment VIII - The 'Second Nun's Prologue and Tale' and 'Canon's Yeoman's Prologue and Tale'

1. Muscatine, Chaucer and the French Tradition, pp.213-21.
2. The question of Chaucer's authorship of CYPT has recently been raised by N.F. Blake. Neither appear in the Hengwrt MS. of CT (Aberystwyth, National Library of Wales, MSS. Peniarth 392), which is now thought best to represent Chaucer's intention for the order and content of his works. See Geoffrey Chaucer, The 'Canterbury Tales': A Facsimile and Transcription of the Hengwrt Manuscript with Variants from the Ellesmere Manuscript, ed. Paul G. Ruggiers with intros. by Donald C. Baker and by A.I. Doyle and M.B. Parkes, (Norman: Univ. of Oklahoma Press, 1979); N.F. Blake, 'The Relationship between the Hengwrt and the Ellesmere Manuscripts of the Canterbury Tales', E. and S., vol.32 (1979), pp.1-18; and his forthcoming The 'Canterbury Tales' by Geoffrey Chaucer, Edited from the Hengwrt Manuscript. York Medieval Texts, 2nd. ser., (London: Arnold, 1980). It is Blake's view that what does not appear in Hengwrt should be considered spurious unless proved otherwise. Until Chaucer scholars and critics have had time to accept or reject this position, the received canon must be considered intact.
3. Joseph Edward Grennen, 'Jargon Transmuted: Alchemy in Chaucer's Canon's Yeoman's Tale', Diss. Fordham Univ., 1960, ch.6; and see DAI, vol.22 (1961-1962), p.859.
4. Joseph Edward Grennen, 'The Canon's Yeoman and the Cosmic Furnace: Language and Meaning in the Canon's Yeoman's Tale', Crit., vol.4 (1962), pp.225-40; and his 'Saint Cecilia's "Chemical Wedding": The Unity of the Canterbury Tales, Fragment VIII', JEGP, vol.65 (1966), pp.466-81.
5. Bruce A. Rosenberg, 'The Contrary Tales of the Second Nun and the Canon's Yeoman', ChauR, vol.2 (1967-1968), pp.278-91; and see his 'Reason and Revelation in the Canterbury Tales', Diss. Ohio State Univ., 1965; and also DAI, vol.26 (1965-1966), p.1654.
6. K. Michael Olmert, 'The Canon's Yeoman's Tale: An Interpretation', Ann. Med., vol.8 (1967), pp.70-94.
7. Muscatine, Chaucer and the French Tradition, p.217. On p.219, Muscatine remarks: "Nowhere else in Chaucer is there such a solid, unspiritual mass of 'realism,' and nowhere is its artistic function less to be doubted...."
8. Grennen, 'Saint Cecilia's "Chemical Wedding"', p.478.
9. Rosenberg, 'Contrary Tales', pp.282-85; and his 'Reason and Revelation', pp.107-12.
10. On the complex question of sources, see G.H. Gerould, 'The Second Nun's Prologue and Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.667-71; and Sherry L. Reames, 'The Sources of Chaucer's Second Nun's Tale', MP, vol.76 (1978), pp.111-35. Here, in her 'The ABC and the Second Nun's Tale: Translation and Transformation',

Diss. Yale Univ., 1975, esp. pp.222-58 and in DAI, vol.36 (1975-1976), pp.8036A-37A, Reames identifies Bosio's as being the Passio text closest to Chaucer, i.e. Historia passionis SS. martyrum Caeciliae virginis, Valeriani, Tiburtii, et Maximi, ex antiquis manuscriptis exemplaribus ab Antonio Bosio J.U.D. integre, et fideliter deprompta, in S. Caeciliae virginis et martyris acta et transtyberina basilica, seculorum singulorum monumentis asserta, ac illustrata a Jacobo Laderchio, ptd. Rocchi Bernabò, (Rome: 1722), vol.1, pp.1-39. The text favoured and ptd. by Gerould, 'Second Nun's Tale', pp.677-84 is that of Mombricitus (c.1480).

11. See also SNP, VIII.79-83:

... I do no diligence
This ilke storie subtilly to endite,
For bothe have I the wordes and sentence
Of hym that at the seintes reverence
The storie wroot, and folwen hire legende ...

12. See Carleton Brown, 'The Prologue of Chaucer's "Lyf of Seint Cecile"', MP, vol.9 (1911-1912), pp.1-4; and Frederick Tupper, 'Chaucer's Bed's Head', MLN, vol.30 (1915), p.10, n.6.

13. e.g. in the words of Pope Urban about Cecilia, SNT, VIII.195-96:

Lo, lyk a bisy bee, withouten gile,
Thee serveth ay thyn owene thral Cecile,
See also SNT, VIII.258-59.

14. Gerould, 'Second Nun's Prologue', pp.664-67. See also Tupper, 'Chaucer's Bed's Head', pp.9-11; Carleton Brown, 'Chaucer and the Hours of the Blessed Virgin', MLN, vol.30 (1915), pp.231-32; Mary-Virginia Rosenfeld, 'Chaucer and the Liturgy', MLN, vol.55 (1940), pp.357-60; and Paul M. Clogan, 'The Figural Style and Meaning of the Second Nun's Prologue and Tale', Med. Hum., n.s., vol.3 (1972), pp.221-31.

15. See The Complete Works of Geoffrey Chaucer, ed. Walter W. Skeat, 2nd. edn., 7 vols., (1894-1897; Oxford: Clarendon Press, 1899-1900), vol. 3 (1900): The 'House of Fame'; the 'Legend of Good Women'; the 'Treatise on the Astrolabe'; with an Account of the Sources of the 'Canterbury Tales', p.485; and vol.5 (1900): Notes to the 'Canterbury Tales', p.403, n.36. Robinson, ed., Works of Chaucer, p.755, notes that the passage inspired by Dante (SNP, VIII.29-84) is unlikely to have been written before Chaucer's first Italian journey of 1372-1373.

16. There is evidence for this in the line: "Yet preye I yow that reden that I wryte" (SNP, VIII.77), which hardly fits with the idea of a pilgrim telling a tale; and in the reference of the Nun to herself as an "unworthy sone of Eve" (SMP, VIII.62). These discrepancies are countered by Clogan, 'Figural Style and Meaning', pp.214-15. He argues that nuns habitually referred to themselves as sons in devotional works; and that "reden" may not be intended as 'read' but as, for instance, 'study'. See also William Bradford Gardner, 'Chaucer's "Unworthy Sone of Eve"', UTSE, vol.27 (1947), pp.77-83.

17. Gerould, 'Second Nun's Prologue', p.669 and n.2.
18. But see Reames, 'ABC and Second Nun's Tale', chs.3 and 4. For other ME versions, see Charlotte D'Evelyn and Frances A. Foster, 'Saints' Legends', in J. Burke Severs and Albert E. Hartung, eds., 'A Manual of the Writings in Middle English 1050-1500', by Members of the Middle English Group of the Modern Language Association of America (based upon 'A Manual of the Writings in Middle English 1050-1400' by John Edwin Wells (1916) and 'Supplements 1-9' (1919-1951)), 5 vols., in progress, (New Haven: Connecticut Academy of Arts and Sciences, 1967-), vol.2 (1970), pp.574-75. The appearance of St. Cecilia in stained glass has received mention by G. McN. Rushforth, 'St Cecilia', J. Brit. Soc. M. Gl.-Paints., vol.6 (1935-1937), pp.180-83.
19. See Claude Jones, 'The Second Nun's Tale: A Mediaeval Sermon', MLR, vol.32 (1937), p.283; and Clogan, 'Figural Style and Meaning', pp.218-21.
20. CYPT is "generally held to have been written late" (i.e. c.1390). Robinson, ed., Works of Chaucer, p.759.
21. "Vade igitur in tercium miliarum ab urbe, via Appia nuncupatur ... " Text of Legenda aurea from 14th. cent. version (Oxford, Bodleian Library, MS. Bodley 336), ed. by Gerould, 'Second Nun's Prologue', p.672.
22. As in the KnT, where the central area of the lists is referred to as the "place". See above, vol.1, pp.312-13.
23. This theme has been discussed in relation to the medieval theological tradition by Carolyn P. Collette, 'A Closer Look at St. Cecile's Special Vision', ChauR, vol.10 (1975-1976), pp.337-49. Collette remarks, p.338: "The Second Nun's Tale derives its thematic significance from its place in the long history of literature dealing with the role of sight in gaining spiritual wisdom and salvation."
24. See Dante, Par., XXXIII. 7-9:
 Nel ventre tuo si raccese l'amore
 per lo cui caldo ne l'eterna pace
 così è germinato questo fiore.
25. The lines are close to a liturgical hymn by Venantius Fortunatus. See Gerould, 'Second Nun's Prologue', p.665.
26. Skeat, ed., Works of Chaucer, vol.5: Notes, p.404.
27. See Dante, Par., XXXIII.22-39.
28. Gerould, 'Second Nun's Prologue', pp.666-67.
29. Comparable light imagery occurs at SNT, VIII.379-85 and 400-4.
30. Collette, 'St. Cecile's Special Vision', pp.342-43; and Clogan, 'Figural Style and Meaning', pp.231-38.
31. See Legenda aurea; ed. Gerould, p.671: "Fuit enim cecis via per exempli informacionem ... "

32. See loc. cit.: "Fuit enim cecitate carens per sapiencie splendorum. Fuit et celum populi quia in ipsam tanquam in celum spirituale populus ad imitandum intuetur solem, lunam, et stellas, id est sapiencie perspicacitatem, fidei magnanimitatem, et virtutem varietatem." Rosenberg, 'Contrary Tales', p.283, notes that the choice of Lia or Leah as part of Cecilia's (false) etymology may be because she was remembered both for her weak eyes and her insight. See Genesis, 29: 17; and Ruth, 4: 11.
33. The vision of an old man (SNT, VIII.201) is probably meant to be of St. Paul, especially as the passage which Valerian reads from the man's book (SNT, VIII.207-9), is a close rendering of Ephesians, 4: 5-6.
34. See John Livingston Lowes, 'The "Corones Two" of the Second Nun's Tale', PMLA, vol.26 (1911), pp.315-23; and John S.P. Tatlock, 'St. Cecilia's Garlands and their Roman Origin', PMLA, vol.45 (1930), pp.169-79.
35. A third figure, Maximus, goes through a similar process of conversion to that experienced by Valerian and Tiburce. While the last two are in his charge, Maximus has pity on his captives, listens to their teaching, and accepts the faith (SNT, VIII. 367-78). When Valerian and his brother are beheaded, Maximus sees their souls taken to heaven by angels "ful of cleerness and of light"; then through his witness many are converted until Maximus himself is executed (SNT, VIII.400-9).
36. Note the exchange, not in Chaucer's Tale, between Tyburtius and the prefect Almachius in the Passio; ed. Bosio, pp.21-22: "Respondens Tyburtius dixit, utinam dignetur nos, ut seruos suos computare, quorum tu nos aestimas esse collegas, qui contempserunt, quod uidetur quid esse, et quod non est, et inuenerunt illud, quod non uidetur esse, et est, quorum nos saltem gerimus imitari sanctissimam vitam, eorumque sequi vestigia ... Almachius Praefectus dixit: Dicite mihi quid est, quod uidetur esse, et non est? Tyburtius Sanctus dixit: Omnia quae in isto Mundo sunt, quae invitant animas ad mortem perpetuam, per quam finitur laetitia temporalis. Almachius Praefectus dixit: Et hoc mihi edictio, quid est, quod non uidetur esse, et est? Sanctus Tyburtius dixit: Vita quae futura est Justis, et poena, quae debetur Injustis: ex utroque latere verum nouimus esse, quod ueniat, et infelici dissimulatione oculis cordis nostri subducimus uidere futura; oculis enim corporis videmus temporalia, ut contra conscientiam nostram, quae bona sunt malis sermonibus obumbremus, et quae mala sunt bonis sermonibus adornemus ... " If Bosio's was the version known to Chaucer, he may have chosen to omit this passage for reasons of dramatic economy: Cecilia and Almachius later have a similar conversation (SNT, VIII.421-511).
37. See Judith Scherer Herz, 'The Canon's Yeoman's Prologue and Tale', MP, vol.58 (1960-1961), pp.231-37; and Samuel McCracken, 'Confessional Prologue and the Topography of the Canon's Yeoman', MP, vol.68 (1970-1971), pp.289-91.
38. As they do again most notably in the ManP, IX. 1-104. On this aspect of the CT, see Robert M. Jordan, 'Chaucer's Sense of Illusion: Roadside Drama Reconsidered', ELH, vol.29 (1962), pp.19-33.

39. Note how the GP, I.19-34, begins with Chaucer the pilgrim's observation of the entry into the Tabard of his travelling companions.
40. The previous night's resting-place would have been Ospringe, according to Skeat, ed., Works of Chaucer, vol.5: Notes, pp.415-16.
41. On the visual responses of Chaucer and the Host, see Olmert, 'Canon's Yeoman's Tale', pp.73-76.
42. In the case of the Monk, for example, Chaucer describes the noise made by his bridle (GP, I.169-71), and anticipates the appearance of the pilgrim as he rode on the journey instead of restricting himself to details observed in the Tabard.
43. On the meaning of "pomely grey", see Helen Sherwood Houghton, "'Degree" and "Array" in Chaucer's Portrait of the Reeve: A Study of Idiom and Meaning', Diss. Univ. of York Centre for Medieval Studies, 2 vols., 1975, vol.1, pp.149-67. Houghton establishes that the dappled coat of a horse was intended to reflect and complement the high status of the rider. This interpretation works well in the case of the Reeve (GP, I.615-16), but is more difficult to square with the straitened circumstances of the Canon. Houghton does so by adopting a somewhat outdated explanation of the Canon's motives: that he was out to swindle the pilgrims and wished to create a good impression. See her "'Degree" and "Array"' vol.1, pp.156 and 166. For a rebuttal of this view, see John Reidy, 'Chaucer's Canon and the Unity of the Canon's Yeoman's Tale', PMLA, vol.80 (1965), pp.31-37.
44. There is some dispute as to whether the "He" of CYP, VIII.565 refers to the Canon's Yeoman's horse or to the Canon. Skeat, ed., Works of Chaucer, vol.5: Notes, p.417; and Robinson, ed., Works of Chaucer, p.760, believe the Canon is intended. The meaning is disputed by George R. Coffman, 'Canon's Yeoman's Prologue, G, ll. 563-566: Horse or Man', MLN, vol.59 (1944), pp.269-71. I have adopted the reading of Skeat and Robinson since the comparison of the Canon to a magpie implies that it is against his black clothes that the flecks of white foam stand out (CYP, VIII.557).
45. The comparison of the Canon's forehead to a stillatory (CYP, VIII.580), to some extent anticipates the discovery of the activities in which he is involved.
46. This must have been a practice confined to canons. The Pardoner's hood, for example, is not fastened to his cloak (GP, I.680-81).
47. The Host is inquisitive too about the Yeoman's face and demands to know why it is so discoloured (CYP, VIII.663-64). Again, the truth of the matter cannot long be concealed, nor can the man's anguish at the loss of his looks (CYP, VIII.665-69 and 727-30).
48. Manly, New Light on Chaucer, ch.8; S. Foster Damon, 'Chaucer and Alchemy', PMLA, vol.39 (1924), pp.782-88; and for a recent and favourable reappraisal of Chaucer's involvement with alchemy, see Albert E. Hartung, 'Pars Secunda and the Development of the Canon's Yeoman's Tale', ChauR, vol.12 (1977-1978), pp.120-22.

49. This point was made long ago by G.L. Kittredge, 'The Canon's Yeoman's Prologue and Tale', TRSL, 2nd. ser., vol.30 (1910), pp.87-95.
50. Aiken, 'Vincent and Chaucer's Knowledge of Alchemy', pp.371-89.
51. Grennen, 'Jargon Transmuted', ch.4; and his 'Chaucer and the Commonplaces of Alchemy', Class. Med., vol.26 (1965), pp.306-33.
52. The Works of Geber Englished by Richard Russell, 1678, ed. E.J. Holmyard, (London: Dent, 1928). Introductory studies of alchemy are available in Arthur John Hopkins, Alchemy: Child of Greek Philosophy, (New York: Columbia Univ. Press, 1934); John Read, Prelude to Chemistry: An Outline of Alchemy, its Literature and Relationships, 2nd edn., (1936; Cambridge, Mass.: Massachusetts Institute of Technology Press, 1966); his 'Alchemy and Alchemists', FL, vol.44 (1933), pp.251-78; E.J. Holmyard, Alchemy, (Harmondsworth: Penguin, 1957), esp. ch.6; F. Sherwood Taylor, The Alchemists: Founders of Modern Chemistry, (London: Heinemann, 1951), ch.9; and Grennen, 'Jargon Transmuted', ch.2.
53. Edgar Hill Duncan, 'Chaucer and "Arnold of the Newe Toun"', MLN, vol.57 (1942), pp.31-33; and Karl Young, 'The "Secree of Secrees" of Chaucer's Canon's Yeoman', MLN, vol.58 (1943), pp.98-105.
54. John Webster Spargo, 'The Canon's Yeoman's Prologue and Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.685-98; and Edgar H. Duncan, 'The Literature of Alchemy and Chaucer's Canon's Yeoman's Tale: Framework, Theme, and Characters', Spec., vol.43 (1968), pp.633-56.
55. As an example of a wayward use of alchemy to explicate Chaucer's poetry see Damon, 'Chaucer and Alchemy', passim.
56. Critics have detected a change of tone in the closing lines of the Fragment and a consequent lack of unity. Herz, 'Canon's Yeoman's Prologue and Tale', pp.236-37, observes that the voice which utters the closing lines (CYT, VIII.1428-81) offers a too well informed and distanced viewpoint to be that of the Yeoman. Duncan, 'Alchemy and Chaucer's Canon's Yeoman's Tale', pp.652-56, notes that this passage expresses an affirmation of alchemy, which is at odds with the Yeoman's previous attitude. Rosenberg, in a sometimes mystifying and misinformed article, suggests that Chaucer knew of the association between alchemy and Christian dogma, whereby alchemical transformations were regarded as symbolic of spiritual redemption. If this is so, then the puzzling lines fit in well with the thematic treatment of change in the Fragment as a whole. See Bruce A. Rosenberg, 'Swindling Alchemist, Antichrist', CRAS, vol.4 (1962), pp.566-80.
57. Grennen, 'Chaucer and the Commonplaces', pp.323-24; and see Aiken 'Vincent and Chaucer's Knowledge of Alchemy', pp.374-80.
58. Glossaries of alchemical terms appear in Geber, Works, trans. Russell, ed. Holmyard, pp.262-64 and, with specific reference to the CYT, in Edgar Hill Duncan, 'The Yeoman's Canon's "Silver Citrinacioun"', MP, vol.37 (1939-1940), pp.255-57.

59. Some illustrations of the apparatus and processes mentioned by the Yeoman can be found in Geber, Works, trans. Russell, ed. Holmyard, p.67 (sublimation), p.235 (distillation with descensories) and p.106 (calcination); and in Hopkins, Alchemy, p.74 (alembic). See also Holmyard, Alchemy, ch.4.
60. Duncan has attempted to make some sense out of the disorder by relating it to the process of 'silver citrination' (CYT, VIII 816). See his 'Yeoman's Canon's "Silver Citrinacioun"', pp.241-62. He is led to admit that, even seen in these terms, a considerable amount of extraneous detail remains. Aiken's view, that Chaucer is closely following an encyclopedic account from Vincent of Beauvais, is more plausible. See her 'Vincent and Chaucer's Knowledge of Alchemy', esp. p.388. David V. Harrington, 'The Narrator of the Canon's Yeoman's Tale', Ann. Med., vol.9 (1968), pp.85-97, maintains that the disorganisation is deliberately engineered by the Yeoman.
61. See also the Host's remarks to the Clerk (ClP, IV.1-20 and to the Physician (Intro. PardT, VI.287-319). In both cases, the 'ignorant' Host mouths specialist terms - respectively rhetorical and medical - in order to sound impressive.
62. See the note by Robinson, ed., Works of Chaucer, p.761.
63. On the various meanings of 'multiply' in the alchemical treatises, see Grennen, 'Chaucer and the Commonplaces', pp.320-23; and Duncan, 'Literature of Alchemy', p.635.
64. On the metaphorical use by Chaucer of alchemical processes, see Grennen, 'St. Cecilia's "Chemical Wedding"', passim; and his 'Chaucer's Characterization of the Canon and his Yeoman', JHI, vol.25 (1964), pp.279-84.
65. A point made by the alchemical treatises. See Geber, Works, trans. Russell, ed. Holmyard, pp.28-29.
66. On the confessional aspect of the Tale, see Lawrence V. Ryan, 'The Canon's Yeoman's Desperate Confession', ChauR, vol.8 (1973-1974), pp.297-310.
67. On the relation of the Yeoman's master to the second Canon, see Reidy, 'Chaucer's Canon', passim; and R.G. Baldwin, 'The Yeoman's Canons: A Conjecture', JEGP, vol.61 (1962), pp.232-43.
68. Skeat, ed., Works of Chaucer, vol.5: Notes, p.428.
69. Hartung, 'Pars Secunda', pp.111-22, argues that this section was originally a separate composition, incorporated at a later date into the CT. This view was earlier expressed by Paull Franklin Baum, 'The Canon's Yeoman's Tale', MLN, vol.40 (1925), pp.152-54.
70. There is however some information about the priest's social situation: CYT, VIII.1012-18. The implications of these lines have been discussed by David V. Harrington, 'Dramatic Irony in the Canon's Yeoman's Tale', NM, vol.66 (1965), pp.160-66.
71. Prior to this the priest departs alone to fetch copper; CYT, VIII.1296.

72. Alchemical topoi on blindness have been noted by Duncan, 'Literature of Alchemy', p.651.
73. Proverbial: see Bartlett Jere Whiting with the collaboration of Helen Wescott Whiting, Proverbs, Sentences, and Proverbial Phrases from English Writings Mainly before 1500, (Cambridge, Mass.: Harvard Univ. Press, 1968), item B71. OED (2c) notes that Bayard is "Alluded to in many phrases and proverbial sayings, the origin of which was in later times forgotten, and 'Bayard' taken as the type of blindness or blind recklessness ... (3) Hence: One blind to the light of knowledge, who has the self-confidence of ignorance".
74. In addition, there is a reference back to the stone which Almachius worships in SNT, VIII.498-504.
75. For an elaboration of these hints, see John Gardner, 'The Canon's Yeoman's Prologue and Tale: An Interpretation', PQ, vol.46 (1967), pp.1-17; Olmert, 'Canon's Yeoman's Tale', pp.76-82; and Rosenberg, 'Swindling Alchemist', pp.575-78.

CHAPTER 6:

The 'Canterbury Tales', Fragment I - The 'Knight's Tale'

1. Charles Muscatine, 'Form, Texture and Meaning in Chaucer's Knight's Tale', PMLA, vol.65 (1950), pp.911-29.
2. John Halverson, 'Aspects of Order in the Knight's Tale', SP, vol.57 (1960), pp.606-21; and Jordan, Chaucer and the Shape of Creation, ch.7.
3. Dale Underwood, 'The First of the Canterbury Tales', ELH, vol.26 (1959), pp.455-69.
4. Hoxie Neale Fairchild, 'Active Arcite, Contemplative Palamon', JEGP, vol.26 (1927), pp.285-93; William Frost, 'An Interpretation of Chaucer's Knight's Tale', RES, vol.25 (1949), pp.289-304; and J.R. Hulbert, 'What Was Chaucer's Aim in the Knight's Tale?' SP, vol.26 (1929), pp.375-85.
5. W.H. French, 'The Lovers in the Knight's Tale', JEGP, vol.48 (1949), pp.320-28.
6. Richard Neuse, 'The Knight: The First Mover in Chaucer's Human Comedy', UTQ, vol.31 (1961-1962), pp.299-315; and Paul T. Thurston, Artistic Ambivalence in Chaucer's 'Knight's Tale', (Gainesville: Univ. of Florida Press, 1969), in which see ch.1 for a useful survey of critical writing on the KnT.
7. But see John Reidy, 'The Education of Chaucer's Duke Theseus', in Harald Scholler, ed., The Epic in Medieval Society: Aesthetic and Moral Values, (Tübingen: Niemeyer, 1977), pp.391-408.
8. Boccaccio, Teseida, ed. Marti. English trans. as Giovanni Boccaccio, The Book of Theseus: Teseida delle nozze d'Emilia, trans. Bernadette Marie McCoy. Medieval Text Association, (New York: Tameson, 1974). For studies of Chaucer's adaptation of the Teseida, see Cummings Indebtedness to Boccaccio, ch.6; Robert Armstrong Pratt 'The Knight's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.82-105, where the plot of the Teseida is summarised; his 'Conjectures Regarding Chaucer's Manuscript of the Teseida', SP, vol.42 (1945), pp.745-63; his 'Chaucer's Use of the Teseida', PMLA, vol.62 (1947), pp.598-621; H.S. Wilson, 'The Knight's Tale and the Teseida Again', UTQ vol.18 (1948-1949), pp.131-46; and esp. Piero Boitani, Chaucer and Boccaccio. Medium Aevum Monographs, no.8, (Oxford: Society for the Study of Mediaeval Languages and Literature, 1977). See also Eren H. Branch, 'Man Alone and Man in Society: Chaucer's Knight's Tale and Boccaccio's Teseida', Diss. Stanford Univ., 1975, esp. pp.81-96 and 112-44 (on the tower prison, the grove and the lists); and DAI, vol.35 (1974-1975), p.7861A.
9. Statius, Silvae, Thebaid, Achilleid, ed. and trans. J.H. Mozley. Loeb Classical Library, 2 vols., (London: Heinemann, 1928). All citations are from this edn.
10. Le Roman de Thèbes, ed. Leopold Constans. SATF, 2 vols., (1890). The relative influence of Chaucer's sources in the KnT is dealt with at length in Boyd Ashby Wise, The Influence of Statius upon Chaucer. Diss. Johns Hopkins Univ., 1905, (Baltimore: Furst, 1911).

11. Also in a second instance, which precisely reflects the 'equality' of Palamone and Arcita, Chaucer does not take advantage of a vivid visual description provided by Boccaccio. It occurs after Teseo has discovered the knights in the grove and leads them back to Athens, one on either side of Emilia (Tes., V.104). The closest parallel is at KnT, II.2569-73, but here the emphasis is on pageant and 'degree'. Consider also the omission of Tes., IV: 51-57, which implies that Arcita is the favoured lover.
12. See above, vol.1, pp.320-24.
13. KnT, I.2981-3108.
14. Wise, Influence of Statius, pp.129-37.
15. The funeral procession of KnT, I.2882-912, while containing in abbreviated form most of the material found in Boccaccio (Tes., XI.30-40) adds the arresting detail of the main street of Athens, spread and hung high with black drapes as an enclosing contrast to the bright metals and colours of the cortège, with its white steeds glittering in steel and arms worked in gold. This conception appears to be Chaucer's own.
16. Kolve, 'Chaucer and the Visual Arts', p.308.
17. The idea of ransom plays suggestively around the Tale, e.g. at KnT, I.1204-6. Arcite eventually pays the ransom of his life to gain freedom from love. Robertson would have it that ransom has been introduced by Chaucer as a purely realistic detail. Stuart Robertson, 'Elements of Realism in the Knight's Tale', JEGP, vol.14 (1915), pp.229 and 247-48. Reidy, 'Education of Theseus', pp.399-402, acknowledges that Theseus' perpetual imprisonment of Palamon and Arcite is difficult to justify in terms of the rules of medieval warfare.
18. In both poems, the relationship of the prison to the garden where Emily appears is mentioned in passing. See KnT, I.1056-61 and Tes., III.11.
19. There is a later version of this in James I's Kingis Quair, ed. W. Mackay Mackenzie, (London: Faber, 1939), stanzas 29-42. Here, as in Boccaccio, there is less contrast between interior and exterior and less emphasis on the impact of a first vision of the lady.
20. See above, vol.1, p.198.
21. See also KnT, I.1099. Emelye may roam where she wishes, the knights may do so only within the confines of their tower.
22. See Tes., III.66 and 84, IV.23, 31, 41-42, 52, 60, 80 and 86, V.55-56, VI.1-5, IX.1-3, 20, 44 and 52-58, X.27, 39, 49-50 and 68-69, XI.42 and XII.6, 34-36, 40 and 43.
23. On the metaphorical status of the prison and its significance as an enclosure in relation to other loci of the KnT, see Joseph, 'Chaucerian "Game"- "Earnest"', pp.84-88; and Thomas A. Van,

- 'Imprisoning and Ensnarement in Troilus and the Knight's Tale', PLL, vol.7 (1971), pp.9-12.
24. Note also the literary topic of the prison of love, found e.g. in Machaut, Fonteinne amoureuse, 340-46 and 388-413.
25. See for instance Boece, bk.3, met.2, 20-30 and bk.5, pr.3, 140-50. Boethius also uses images of light and darkness to express ideas about knowledge and ignorance and these may also have influenced Chaucer's treatment of the prison. See ibid., bk.1, met.2, 3 and 7, bk.3, met.8, 10 and 11, bk.4, met.1 and pr.4, 180-90 and bk.5, met. 2 and 3 and pr.4, 140-60. Note the remarks of Halverson, 'Aspects of Order', p.618, on the philosophical background to the KnT: "Their prison, like that of Boethius, has both a phenomenal and philosophical reality ... it is real enough. But it is also a metaphorical prison. Like the people of Plato's cave, Boethius and the young knights are confined in ignorance. The significant freedom they lack is spiritual: the freedom to abide by eternal providence, freedom from chance and accident." On the general Boethian content of Chaucer's poem, see Paul G. Ruggiers, 'Some Philosophical Aspects of the Knight's Tale', CE, vol.19 (1957-1958), pp.296-302.
26. A similar sense of the arbitrariness and injustice of Fortune pervades the opening passage of Boece, esp. bk.1, met.5, to which Chaucer owes a direct debt.
27. Boethius provided Chaucer with this image. See ibid., bk.3, pr.2, 80-90.
28. In the link preceding the KnT, it falls to the Knight to tell the first story "by aventure, or sort, or cas" (GP, I.844). The first word can suggest both the "hazardous, perilous enterprise or performance" (OED, 5) as in a knight's quest, and "that which comes to us, or happens, without design" (OED, 1). For these and associated meanings, see also MED, and note to adventure as it occurs as "auntre" in RT, I.4205 and 4209 in the sense of "to take the chance of ... commit to fortune" (OED I.1).
29. The definition provided by OED, 2, for cas or case as "chance, hazard, hap" makes it virtually indistinguishable in meaning from aventure. But MED, 3a, detects its alignments with the designs of fate rather than the hazards of chance, and records several examples of aventure and cas juxtaposed as if to express different meanings. Significantly, in Chaucer's other great Boethian poem, TC, cas and aventure frequently appear as related but distinct concepts. See esp. TC, I.568-70. But note Bernard L. Jefferson, Chaucer and the 'Consolation of Philosophy' of Boethius, (1917; rpt. New York: Gordian Press, 1968), pp.62-65, who argues that there is little distinction.
30. See Boece, bk.4, pr.6.
31. See above, vol.1, pp.314-16.
32. Young, 'Eyes as Generators', p.232; Lang, 'Eyes as Generators', pp.126-27; and see above, vol.1, pp.198, 200-4 and 228-32.

33. KnT, I.1068, 1427, 1737 and 2273. The sustained emphasis on Emelye's brightness is Chaucer's.
34. The repetition of the timeless Spring setting has much the same effect. See KnT, I.1033-55, 1066-69, 1491-512 and 2483-87.
35. Arcite's heart-wound, KnT, I.2743, links his death with its original cause, the sight of Emelye. A comparison of Chaucer's deathbed scene with that of Boccaccio (Tes., IV.49-62) reveals how comparatively little stress Chaucer places on the consummation of Arcite's desire to gaze at Emelye. In KnT, I.1809-10, it is stated that Emelye is ignorant of the love of Palamon and Arcite, whereas in Boccaccio's version Emilia's knowledge of Arcita's love, at least, dates from the time of the imprisonment (Tes., III.18).
36. On these customs, see Henry Savage, 'Arcite's Maying', MLN, vol. 55 (1940), pp.207-9; and Halverson, 'Aspects of Order', pp.608-9.
37. Robertson, 'Elements of Realism', p.231, notes that this is exceptional behaviour, as is the knights' duel without judge or spectators.
38. See Tes., VII.106 and 119; and Theb., IV.494-99.
39. Relevant definitions from OED include "ground or territory as owned by a person or viewed as public or private property" (I.4), and "expanse of country of undefined extent" (I.6).
40. The meaning of "Under the sonne" has been discussed by C. Alphonso Smith, "'Under the sonne he loketh'", MLN, vol.37 (1922), pp.120-21, who interprets the phrase as meaning "turning from one point of the compass to the other" (ibid., p.120). The interpretation was subsequently challenged by Klaeber and Tatlock, who argued that Theseus looks towards the sun, shading his eyes. See Fr. Klaeber, "'Looking Under the Sun'", MLN, vol.37 (1922), pp.376-77; and John S.P. Tatlock, "'Under the Sonne'", MLN, vol.37 (1922), p.377. Their view was refined by Hustvedt, who suggested that Theseus, like a hunter, looks between the sun and the foreground. See S.B. Hustvedt, "'Under the sonne he looketh'", MLN, vol.44 (1929), p.182.
41. See Tes., VI.75-87. On this episode, see Boitani, Chaucer and Boccaccio, pp.143-46.
42. Which in turn derives from Statius, Theb., VI.
43. The grove seems to be hallowed for this purpose when the company approves of the Duke's decision, KnT, I.1872-77.
44. Halverson, 'Aspects of Order', p.615.
45. But note Jordan, Chaucer and the Shape of Creation, pp.154-56, who argues that the two knights display a certain formality before the arrival of Theseus.
46. See also KnT, I.2997.
47. See also OED, II.3 and II.4.

48. Edith Rickert, comp., Chaucer's World, ed. Clair C. Olson and Martin M. Crow, illus. selected by Margaret Rickert, (New York and London: Columbia Univ. Press, 1948), pp.211-14. The devotions of Palamon, Emelye and Arcite do not make the precise location of the lists clear, but they do establish that they are at moderate walking distance from the city. Palamon "walketh forth a pas/Unto the lystes" (KnT, I.2217-18) and returns home (KnT, I.2270); Emelye "gan hye" (KnT, I.2274) to the Temple of Diana and then "Hoom she goth" (KnT, I.2365); while "Arcite unto the temple walked is/Of fierse Mars (KnT, I.2368-69), from which he returns "unto his in" (KnT, I.2436).
49. See Christopher Dean, 'The "Place" in the Knight's Tale', NQ, vol.211 (1966), p.91.
50. See above, p.100, n.27.
51. See Boece, bk.3, met.12, 50-60.
52. See also KnT, I.1951.
53. An architectural impossibility. See Pratt, 'Chaucer's Use of the Teseida', p.600.
54. See Underwood, 'First of the Canterbury Tales', p.459.
55. See KnT, I.1168, 1430, 1434, 1441, 2192, 2573, 2735, 2856, 2888 and 3040.
56. They are remarkable in design, too, being completely unlike the conventional medieval construction. See Robertson, 'Aspects of Realism', p.244. Douglas Brooks and Alastair Fowler, 'The Meaning of Chaucer's Knight's Tale', MAe, vol.39 (1970), pp.128-30, argue that the lists are a form of zodiac.
57. "The stadium is the artistic microcosm within which is to be performed the central ritual of chivalry, the tournament 'for love and for increes of chivalrye' (2184). Surrounding the lists and defining in a precise way the limits of this little world are the temples of the gods. The two-hundred-odd lines that describe the temples (and constitute a kind of epic catalogue) serve to extend the audience's awareness of the gods' significance in the poem. Encyclopaedic and monumental both in a rhetorical and substantive sense, this passage recreates the world as its inhabitants experience it." Neuse, 'The Knight', p.302.
58. Frost, 'An Interpretation', p.300, talks of the images of the human condition in the oratories. These are not detached from context but "they are an organic part of the Tale, for they symbolically extend the misfortunes and griefs of the central characters and at the same time provide a background against which these same misfortunes and griefs will seem less extraordinary".

59. These include the regulation that anyone who is forced to leave the arena is excluded from further combat. Whereas Boccaccio's amphitheatre is left open, Chaucer's lists are closed, and posts replace the open doors: KnT, I.2551-53 and 2597.
60. See Tes., VIII.17 and 38; and note the interesting remarks of Boitani, Chaucer and Boccaccio, pp.166-70 on the spatial effects created by a 'cinematic' narrative style in this and other episodes.
61. Chaucer combines in one person the two warriors named Lygurgus by Statius. See Wise, Influence of Statius, pp.96-97.
62. Similar responses have been registered by Underwood, 'First of the Canterbury Tales', pp.459-60; and Halverson, 'Aspects of Order', p.615, who begins his discussion of the function of the lists by saying that the description "comes at an important juncture in the story, suggesting a more significant function than mere ornamentation". And see above, vol.2, p.102, n.57.
63. On the inadequacy of Theseus' conception of order, see Kathleen A. Blake, 'Order and the Noble Life in Chaucer's Knight's Tale?' MLQ, vol.34 (1973), pp.3-19.
64. I am indebted in this and subsequent paragraphs to an unpublished study in typescript by Elizabeth Salter, 'Chaucer and Boccaccio: The Knight's Tale', intended as ch.5 of a planned book. Salter comments, p.57: "It gradually emerges that the speech [of Theseus] will be in the nature of a substitution, a statement which will attempt to transcend difficulties, rather than analyse and solve them." See also her earlier Chaucer: The 'Knight's Tale', and the 'Clerk's Tale'. Studies in English Literature, no.5, (London: Arnold, 1962), pp.30-36; and William R. Cozart, 'Chaucer Knight's Tale: A Philosophical Re-Appraisal of a Medieval Romance', in Rosario P. Armato and John M. Spalek, eds., Medieval Epic to the 'Epic Theater' of Brecht: Essays in Comparative Literature. Univ. of Southern California Studies in Comparative Literature, no.1, (Los Angeles: Univ. of Southern California Press, 1968), pp.25-34, in which Cozart links the dislocation of the narrative and its ending with the Nominalist debate on universals.
65. See Boece, bk.3, met.2, 6, 9 and pr.12 and bk.4, pr.6.
66. Brooks and Fowler, 'Meaning of Chaucer's Knight's Tale', pp.125-26.
67. Ibid., pp.135-39.
68. See above, vol.1, pp.237-40.

CHAPTER 7:

The 'Canterbury Tales', Fragment I - The 'Miller's Tale'

1. See above, vol.1, pp.195-213.
2. Joseph Bédier, Les Fabliaux: études de littérature populaire et d'histoire littéraire du moyen âge, 6th edn. Bibliothèque de l'Ecole des Hautes Etudes, 4^e Section: Sciences Historiques et Philologiques, fasc.98, (1893; Paris: Champion, 1964), p.348.
3. Ibid., pp.352-57.
4. René Wellek, 'The Concept of Realism in Literary Scholarship', Neophil., vol.44 (1960), pp.1-20; rpt. in his Concepts of Criticism, ed. with intro. by Stephen G. Nichols, Jr., (New Haven and London: Yale Univ. Press, 1963), pp.222-55, in which see pp.240-41.
5. Ibid., pp.241-55.
6. Per Nykrog, Les Fabliaux, new edn. Publications Romanes et Françaises, no.123, (1957; Geneva: Droz, 1973), p.229.
7. Loc. cit.
8. Ibid., p.235.
9. But see Charles Muscatine, 'The Social Background of the Old French Fabliaux', Genre, vol.9 (1976), pp.1-19, in which he warns against defining class distinctions too strictly in an age of social mobility.
10. Muscatine, Chaucer and the French Tradition, p.59.
11. Ibid., p.60.
12. Ibid., p.66.
13. On the connection between realism and humour, see Derek Brewer, 'Notes towards a Theory of Medieval Comedy', in Peter Rickard et al., trans., Medieval Comic Tales, (Cambridge: Brewer, 1972), p.144. Another recent writer proposes that "fabliau plots evolve in the shadow of uncertainty and misapprehension which falls between perception of the data of sense experience and the knowledge of external reality those data are supposed to generate, through proper interpretation, in the mind of the perceiver". Roy J. Percy, 'Investigations into the Principles of Fabliau Structure', Genre, vol.9 (1976), p.346.
14. Muscatine, Chaucer and the French Tradition, p.224, observes of the MillT: "The great mass of such given detail achieves an extraordinary solidity ... because so much of it is given specific antecedents or consequences." Note also ibid., p.226: "It is this solidity of detail, along with the characterization interlaced intimately with it, that gives the ingenious plotting its overpowering substantiality."

15. Stith Thompson, 'The Miller's Tale', in Bryan and Dempster, eds., Sources and Analogues, p.106.
16. Ibid., pp.112-18.
17. She is a prostitute in the Flemish version. See ibid., p.113.
18. On the descriptive economy of traditional fabliaux, see Thomas D. Cooke, The Old French and Chaucerian Fabliaux: A Study of their Comic Climax, (Columbia and London: Univ. of Missouri Press, 1978), pp.40-51.
19. Thompson, 'Miller's Tale', p.108; trans Benson and Andersson, Literary Context of Chaucer's Fabliaux, p.29; and see Louis A. Haselmeyer, 'The Portraits in Chaucer's Fabliaux', RES, vol.14 (1938), pp.310-14.
20. Other alterations include placing all of the three major characters in the beams when customarily it was only the husband who sat in a tub; and making the lover a parish clerk. He is usually the smith, who in Chaucer's Tale is relegated to a minor role as Gervays, working in the street adjoining the carpenter's house. See Masuccio, 'Viola and her Lovers', ed. and trans. Benson and Andersson, Literary Context of Chaucer's Fabliaux, pp.26-37.
21. Jordan, Chaucer and the Shape of Creation, p.188, notes in the MillT "the Chaucerian zest for sensory perception".
22. See Matthew of Vendôme, Ars versificatoria, I.55-57; and Geoffrey of Vinsauf, Poetria nova, 554-621, both ed. Edmond Faral, Arts poétiques, pp.128-30 and 214-15. Of these 12th.-13th. cent. theoreticians, Geoffrey was certainly known to Chaucer. In NPT, VII.3347-51 are the lines:
O Gaufred, deere maister soverayn,
That whan thy worthy kyng Richard was slayn
With shot, compleynedest his deeth so soore,
Why ne hadde I now thy sentence and thy loore,
The Friday for to chide, as diden ye?
The reference is to Geoffrey, Poetria nova, 367-430; ed. Faral, pp.208-10. See also Walter Clyde Curry, The Middle English Ideal of Personal Beauty as Found in the Metrical Romances, Chronicles and Legends of the XIII, XIV and XV Centuries. Diss. Stanford Univ., 1915, (Baltimore: Furst, 1916).
23. An outstanding example is the description of Blanche in BD, 817-960. Even here, Chaucer avoids the set piece, manipulating the description to suit the larger purposes of his poem. The detail of Blanche's hair is almost playful in its attitude to the convention, arriving at the usual conclusion by a circuitous route (BD, 855-58):
For every heer on hir hed,
Soth to seyne, hyt was not red,
Ne nouthur yelow, ne broun hyt nas,
Me thoghte most lyke gold hyt was.
24. D.S. Brewer, 'The Ideal of Feminine Beauty in Medieval Literature, Especially Harley Lyrics, Chaucer and Some Elizabethans', MLR, vol. 50 (1955), p.267.

25. Chaucer's description may be matched with the utterly serious, straightforward and conventional descriptions in other poems of the period, e.g. the description of Helen in bk.7 of the alliterative translation of Guido de Colonna's Hystoria Troiani, 3019-129; ed. G.A. Panton and David Donaldson with intro., notes and glossary as The 'Gest Hystoriale' of the Destruction of Troy: An Alliterative Romance from Guido de Colonna's 'Hystoria Troiani', EETS, o.s. 39 (1869) and o.s. 56 (1874); and the description of Olympias in the alliterative Romance of Alexander, 175-99; ed. W.W. Skeat in The Romance of William of Palerne: Otherwise Known as the Romance of 'William and the Werwolf' ... to which is Added a Fragment of the Alliterative Romance of Alisaunder. EETS, e.s. 1 (1867).
26. See Brewer, 'Ideal of Feminine Beauty', pp.267-68.
27. On this aspect of Alison's character, see Paul E. Beichner, 'Characterization in the Miller's Tale', in Richard J. Schoeck and Jerome Taylor, eds., Chaucer Criticism, 2 vols., (Notre Dame, Ind.: Univ. of Notre Dame Press, 1960), vol.1: The Canterbury Tales, pp.123-24. Beichner includes "morne milk" (MillT, I.3236) in his list of comparisons that reveal Alison to be a country girl. But 'morning milk' appears to be a conventional simile in descriptions of feminine beauty. The early 14th. cent. lyric, 'The Fair Maid of Ribblesdale', includes the lines (76-78):
- eyber side soft ase sylk,
whittore þen the moren-mylk,
wip leofly lit on lere.
- See G.L. Brook, ed., The Harley Lyrics: The Middle English Lyrics of MS. Harley 2253, (1948; Manchester: Manchester Univ. Press, 1964). Where Chaucer actually departs from convention is in the application of "morne milk" to Alison's apron rather than to her skin. Nos. 4 ('Alysoun') and 14 ('Blew, Northerne Wynd') of the Harley lyrics also include female descriptions that follow convention and form a useful comparison with Chaucer's use of the same tradition, especially in view of the connection between the vocabulary of the lyrics and that of the MillT. See E.T. Donaldson, 'Idiom of Popular Poetry in the Miller's Tale', in Alan S. Downer, ed., English Institute Essays: 1950, (New York: Columbia Univ. Press, 1951), pp.129-34; rpt. in his Speaking of Chaucer, (London: Athlone Press, 1970), pp.13-29.
28. Faral, Arts poétiques, p.80, describes the order of procedure as follows: "... dans chacune de ces parties, chaque trait a sa place prévue. C'est ainsi que, pour la physionomie, on examine dans l'ordre la chevelure, le front, les sourcils et l'intervalle qui les sépare, les yeux, les joues et leur teint, le nez, la bouche et les dents, le menton; pour le corps, le cou at la nuque, les épaules, les bras, les mains, la poitrine, la taille, le ventre (à propos de quoi la rhétorique prête le voile de ces figures à des points licentieuses), les jambes et les pieds." See also Kevin Kiernan, 'The Art of the Descending Catalogue, and a Fresh Look at Alisoun!', ChauR, vol.10 (1975-1976), pp.1-16.
29. See Betty Hill, 'Chaucer: The Miller's and Reeve's Tales', NM, vol.74 (1973), pp.665-71.
30. When Alison goes to church, MillT, I. 3310-11,
- Hir forheed shoon as bright as any day,
So was it wasshen whan she leet hir werk.

31. If this interpretation is correct - that Chaucer disrupts customary rhetorical forms to effect a sexual portrait of a woman - then this in itself marks a radical departure from the intentions of conventional descriptions which were hardly concerned to depict individuals, but types. Faral, Arts poétiques, p.76, characterises the medieval attitude as follows: "... dans toute la littérature du moyen âge, la description ne vise que très rarement à peindre objectivement les personnes et les choses et qu'elle soit toujours dominée par une intention affective qui oscille entre la louange et la critique."
32. In this, Chaucer is following earlier portraits of the biblical Absalom (II.Kings 14: 25-26) which emphasised his vanity and pride by attention to feminine traits. Peter Riga's interpretation of Absalom in the Aurora or Biblia versificata (before 1209) "makes a full and elegant inventory description of Absalom's perfections from crown to toe in an effictio which conforms to the rules and models of the 'arts of poetry' and handbooks of rhetoric of the late twelfth and early thirteenth centuries, although this is the method of presenting feminine beauty". Beichner, 'Characterization in the Miller's Tale', p.120; and see his 'Absalom's Hair', Med. Stud., vol. 12 (1950), pp.222-33. The relevant passage from the Aurora is given in his 'The Old French Verse Bible of Macé de la Charité, a Translation of the Aurora', Spec., vol.22 (1947), pp.233-34. See further Karl Young, 'Chaucer and Peter Riga', Spec., vol.12 (1937), pp.299-303; Donaldson, 'Idiom of Popular Poetry', pp.127-29; and Curry, Ideal of Personal Beauty, pp.11-34.
33. This apparently inconsequential line is of course an important register of the distaste and horror with which Absolon would later receive the fart of Nicholas.
34. For the separate meanings of hende and their application to the MillT, see Paul E. Beichner, 'Chaucer's Hende Nicholas', Med. Stud., vol.14 (1952), pp.151-53. Beichner places rather too much weight on the use of hende as a means of conveying the clerk's character. It is simply not true that the description of Nicholas's room is "briefly" done (ibid., p.151), and that Chaucer uses hende as a compensatory means of character portrayal. See also Donaldson, 'Idiom of Popular Poetry', pp.122-25.
35. Jordan, Chaucer and the Shape of Creation, p.193, observes that at this juncture "Chaucer abruptly slows down the pace by pausing to clarify the visual and tactile details of the scene".
36. Beidler suggests that, finally, all of Absolon's senses are offended. See Peter G. Beidler, 'Art and Scatology in the Miller's Tale', ChauR, vol.12 (1977-1978), pp.98-100; and also Earle Birney, 'The Inhibited and the Uninhibited: Ironic Structure in the Miller's Tale', Neophil., vol.44 (1960), pp.333-38.
37. Elsewhere, John's house is referred to as a "hostelrye" (MillT, I. 3203) and an "in" (MillT, I.3622).
38. Bennett, Chaucer at Oxford, ch.2.

39. Ibid., p.37.
40. Thompson, 'Miller's Tale', pp.114-15, 119-20 and 121-22.
41. The ME word boure (bower) does not necessarily refer to a first-floor room. It is "an inner apartment ... hence a bedroom" (OED, 2), "an inner room; esp., a bedroom" (MED, 2(a)). See also NPT, VII.2832 and WBT, III.869.
42. Bennett, Chaucer at Oxford, p.38 and see p.28, fig.2b.
43. "The iron blade fixed in front of the share in a plough; it makes a vertical cut in the soil, which is then sliced horizontally by the share." (OED, 1). Note the description of Gervays in his smithy: "... in his forge smythed ploughherneys;/He sharpeth shaar and kultour bisily" (MillT, I.3762-63). See also Brian Spencer, Chaucer's London. London Museum catal., (London: HMSO, 1972), fig.7.
44. Alison plays an important role here. To aggravate John's sense of foreboding, she says that she has not seen Nicholas and that the maid has been unable to elicit any reply from the clerk (MillT, I.3412-18).
45. Robinson notes in his glossary to the Works of Chaucer that cetewale = "zedoary, a plant of the ginger tribe".
46. It is perhaps a measure of the clerk's enthusiasm for his subject that he possesses an astrolabe. At this date it was a relatively rare instrument. Bennett, Chaucer at Oxford, pp.33-34 and 75, notes that the fellows of Merton College possessed three astrolabes which could be borrowed at the annual electio or distribution of books. Chaucer's own interest in the instrument is, of course, evident in his Treatise on the Astrolabe.
47. The Angelus ad virginem, i.e. the antiphon to the Virgin, was sung after Compline or the evening collation. See Bennett, Chaucer at Oxford, p.31.
48. The "Kingis Noote" was probably a popular ballad. See Robinson, ed., Works of Chaucer, p.684, on MillT, I.3217.
49. Bennett, Chaucer at Oxford, p.39.
50. Note Muscatine, Chaucer and the French Tradition, p.225.
51. Note the parallel instance of a framed scene in KnT, I.1033-79, when Palamon sees Emily through the window in his tower prison. See above, vol.1, pp.295-98.
52. The clerk is well aware of his superiority, as at MillT, I.3299-300:
- A clerk hadde litherly biset his whyle,
But if he koude a carpenter bigyle.
53. See MillT, I.3367 and 3677.
54. The earliest usage of the term shot-window is apparently in the MillT. OED defines such a window as one "that can be opened and shut by turning on its hinges, like a door or shutter, a casement; a shutter with a few panes of glass at the top".

55. "Knedying trogh" and "kymelyn" (MillT, I.3548); "knedyng tubbes" (MillT, I.3564 and 3594); "tubbe and a kymelyn" (MillT, I.3621); "trogh" and "tubbe" (MillT, I.3627), etc. The terms appear to be interchangeable. A kimlin (kimnel) is "a tub used for brewing, kneading, salting meat and other household purposes" (OED). The pseudo-technical nomenclature of the MillT (note also stalks, rungs, baulks, hasps) considerably increases the effect of the setting in a carpenter's establishment, where such terminology is in use.
56. A baulk is "a beam of wood ... a roughly squared piece of timber" (OED, IV.10). Note RP, I.3920. It is "one of the tie-beams stretching from wall to wall of a house" (MED, 3(a)). OED, IV.11, adds: "In old one-storey houses these were often exposed and used for hanging or placing articles on, or laid with boards so as to form a loft, called 'the baulks'".
57. "... bitwixe yow shal be no synne, / Namooore in lookynge than ther shal in deede" (MillT, I.3590-91). See also MillT, I.3637, where the troughs are a "furlong way" apart.
58. Note celle or sill, another precise descriptive word. A sill is "A strong horizontal timber ... serving as the foundation of a wall (esp. in the building of framed houses) or other structures" (OED, 1). Note the more figurative use of the word in Sir Gawain and the Green Knight, I.55; ed. Malcolm Andrew and Ronald Waldron, The Poems of the Pearl Manuscript: Pearl, Cleanness, Patience, Sir Gawain and the Green Knight. York Medieval Texts, 2nd ser., (London: Arnold, 1978).
59. The punning on "selle" and "celle" compares with the punning on another technical word, "stalkes", in MillT, I.3625 and "stalketh", MillT, I.3648, when Nicholas stalks or creeps down the stalks of the ladder.
60. Note Jordan, Chaucer and the Shape of Creation, p.189.
61. Herod's part was that of a proud ranter. There is another implied reference to the mystery plays in Nicholas's apocryphal account of the Flood, MillT, I.3538-40:
 Hastou nat herd ...
 The sorwe of Noe with his felaweshipe,
 Er that he myghte gete his wyf to shipe?
 It is just this "sorwe of Noe" at the reluctance of his wife that is represented in the ninth play of the York cycle, performed by the Fishers and Mariners. See Lucy Toulmin Smith, ed., York Plays: The Plays Performed by the Crafts or Mysteries of York on the Day of Corpus Christi in the 14th., 15th. and 16th. Centuries, Now First Printed from the Unique Manuscript in the Library of Lord Ashburnham, (1885; rpt. New York: Russell and Russell, 1963), pp.45-55. There is no record of an Oxford cycle, but that is not to say that one did not exist. See Bennett, Chaucer at Oxford, pp.48-51. The dramatic undercurrent of the MillT is a literary study in its own right. The narrator himself cries "in Pilates voys" (MillP, I.3124); and see Kelsie B. Harder, 'Chaucer's Use of the Mystery Plays in the Miller's Tale', MLQ, vol.17 (1956), pp.193-98.

62. Note that it is while Absolon is at Osenev "hym to disporte and pleye" that he hears from a member of the abbey - a "cloisterer" - that John may be absent from home (MillT, I.3657-70). There is a subtle and intricate consistency about Chaucer's evocation of place.
63. The neighbours are previously mentioned at MillT, I.3729. On the arrival of the neighbours, see Alvin W. Bowker, 'Comic Illusion and Dark Reality in the Miller's Tale', MLS, vol.4 (1974), p.33.
64. A trave is "a frame or enclosure of bars in which a restive horse is placed to be shod". Beichner, 'Characterization in the Miller's Tale', p.126. The notion of containment and restriction receives further support from a subsidiary meaning of bower as "Any kind of small room or compartment; a storeroom, a stall for animals, a kennel" (MED, 2(a)).
65. It is a familiar way of describing a restive wife. In ManT, IX. 163-74 and 240-43, for example, the idea is expanded so that a caged crew becomes the living counterpart of Phoebus' wife, ironically singing "Cokkow!" when the woman is unfaithful.

CHAPTER 8:

The 'Canterbury Tales', Fragment I - The 'Reeve's Tale'

1. Two similar French texts have been edited by Walter M. Hart in 'The Reeve's Tale', in Bryan and Dempster, eds., Sources and Analogues, pp.124-47. On p.125, Hart lists line correspondences between his two texts (A and B) and the RT. The A text with B insertions forms the basis of a French text and English trans. of Le Meunier et les .II. clers in Benson and Andersson, eds., Literary Context of Chaucer's Fables, pp.100-15. References will be to Hart's A version unless otherwise stated.
2. Chaucer has not undertaken a major overhaul of the plot, as he did in the MillT. The most striking innovations are 1) having the horse released, not stolen; 2) dispensing with the bin in which the miller's daughter is kept; 3) putting the confession of theft into the mouth of the daughter rather than the wife; and 4) elaborating the fight. The last three modifications all relate to the organisation of the action in the bedchamber, which in Chaucer is considerably elaborated and streamlined.
3. Muscatine, Chaucer and the French Tradition, p.198, states that the RT is one of Chaucer's "most purely representational efforts".
4. Hart effects a sustained literary comparison between Meun. and the RT, and draws attention to the presence in other fables of many of the elements in the RT which tend to be praised as uniquely Chaucerian, notably social background and complex character. Nevertheless, Hart does find firm ground for originality on Chaucer's part: "For though Chaucer doubles the length of his source, and elaborates it in every direction, for all these elaborations parallels are to be found in the longer fables; it is Chaucer's combination of them that is inimitable." Walter Morris Hart, 'The Reeve's Tale: A Comparative Study of Chaucer's Narrative Art', PMLA, vol.23 (1908), p.42. See also Germaine Dempster, Dramatic Irony in Chaucer, (1932; rpt. New York: Humanities Press, 1959), pp.271-79; and Roger T. Burbridge, 'Chaucer's Reeve's Tale and the Fable Le Meunier et les .II. clers', Ann. Med., vol.12 (1971), pp.30-36.
5. See Meun., A.6-8.
6. In the B version, however, the clerks ruefully eye their sack, which has been returned to them adulterated, before one of them decides to seduce the daughter. See Meun., B.168-70. Dempster uses this factor as evidence that Chaucer's source was closer to B than A. See Germaine Dempster, 'On the Source of the Reeve's Tale', JEGP, vol.29 (1930), pp.473-78.
7. See above, vol.1, pp.390-91.
8. Note also Chaucer's "Of o toun were they born, that highte Strother" (RT, I.4014).
9. Note also Chaucer's fen, a topographical detail of a recognisable place, with its wild horses and drainage ditch (RT, I.4065 and 4106).

10. For an account of the bad lighting conditions, see above, vol.1, pp.183-86 and 387-88.
11. There is poetic justice in the ending of the RT, when Symkyn the "market-betere" (RT, I.3936), the aggressive haranguer, is himself beaten. See Bennett, Chaucer at Oxford, pp.90-91.
12. Meun., A.297-300.
13. Note the more obvious narrative 'plant' of the child at RT, I.3971-72. and 4156-57.
14. See Paul A. Olson, 'The Reeve's Tale: Chaucer's Measure for Measure', SP, vol.59 (1962), pp.3-4; and Hart, 'Comparative Study', p.11, n.1.
15. The attention given to the Miller's beard, nose, mouth and hood (GP, I.552-64), further accentuates the prominence of his head.
16. There is some debate as to what 'piled skull' means. Curry, Mediaeval Sciences, p.83, maintains in contradiction to Skeat that it means "that the hair of the Miller's head is thick (most likely bristly), and especially that it comes far down over his wide 'villainous low' forehead". OED (1) has "Covered with pile, hair or fur". More recently M. Copland, 'The Reeve's Tale: Harlotrie or Sermonyng?' MAe, vol.31 (1962), p.29 and n.19, has questioned Curry's remarks, which indeed seem unlikely in the context of the Tale, where Symkyn's skull is 'varnished', white and glistening. See also Richardson, Blameth Nat Me, pp.95-96.
17. Aleyn uses the same expression at RT, I.4041.
18. Note that the miller's pallor earlier receives emphasis: "Ful pale he was for dronken, and not reed." (RT, I.4150). The colour red had previously been mentioned in connection with his wife's gown and his own red stockings (RT, I.3954-55). The change of colour attributes comes to Symkyn after he has taken the fatal step of allowing the clerks into his house for the night. He has become too proud, is now vulnerable where before the initiative was his, and the colour change signals the altered circumstances. Curry, Mediaeval Sciences, p.82, quotes from the ME Secretum secretorum: "Tho that bene red men, bene Parceuyng and trechrus, and full of queyntise, i-liknyd to Foxis."
19. Note also RT, I.4009.
20. See Meun., A.62, where the clerks throw down their sack on arrival at the mill.
21. 4 medieval bushels = 1 sack. See Bennett, Chaucer at Oxford, p.112.
22. In the B version of Meun., it makes a further appearance when the thief is detected (Meun., B.68-70). "Draf-sak" = idle lump; "draf" = sediment of brewing. See J.R.R. Tolkien, 'Chaucer as a Philologist: The Reeve's Tale', Trans. Philol. Soc., vol.79, (1934), p.44.
23. Bennett, Chaucer at Oxford, pp.114-15, notes the fascination of mill machinery to a non-machine age.

24. The horse appears in the fabliau to transport the grain (Meun., A.45-46 and 63-64) and then to be stolen (Meun., A.94-96). It is not seen again.
25. "Wild" does not necessarily mean untamed in this context. See Bennett, Chaucer at Oxford, pp.113-14.
26. On animal imagery in the RT, see Richardson, Blameth Nat Me, pp.89-93; Ian Lancashire, 'Sexual Innuendo in the Reeve's Tale', ChauR, vol.6 (1971-1972), pp.167-70; and John Block Friedman, 'A Reading of Chaucer's Reeve's Tale', ChauR, vol.2 (1967-1968), pp.8-19.
27. See G.F. Jones, 'Sartorial Symbols in Mediaeval Literature', MAe, vol.25 (1956), pp.63-70; and Friedman, 'Reading of Reeve's Tale', pp.15-16.
28. On the traditional aspects of Chaucer's portraits, see George Fenwick Jones, 'Chaucer and the Medieval Miller', MLQ, vol.16 (1955), pp.3-15; and Robert Worth Frank, Jr., 'The Reeve's Tale and the Comedy of Limitation', in Stanley Weintraub and Philip Young, eds., Directions in Literary Criticism: Contemporary Approaches to Literature, (Pennsylvania and London: Pennsylvania Univ. Press, 1973), pp.56-59.
29. The overtly sexual sense occurs at RT, I.4198.
30. OED uses the example of the MillT, I.3224 to illustrate meaning 4(a): "distrustful of the faithfulness of wife, husband, or lover"; and the Prologue to LGW (G331) to exemplify 4(b): jealous "in respect of success or advantage". In Symkyn's case, the history of his rise to respectability ensures that one meaning is inextricably bound up in the other. See also the remarks of Copland, 'Harlotrie or Sermonyng?', p.18, on the miller's knives: "His array of cutlery is as overdone as are his extremely public displays of 'jealousy', drawing attention by their very excess to his lack of any ground for confidence in his much-vaunted wife." The words "hoker", contempt; "bisemare", disdain (RT, I.3965); "deynous", haughty (RT, I.3941); and "digne", proud (RT, I.3964), further reinforce the defensive aspects of the public face presented by Symyn and his wife.
31. OED meaning 1 (b) is "Sexual contact".
32. The technique is similar to that used at greater length for Alison in the MillT, I.3221-70. See above, vol.1, pp.338-41.
33. The fabliau inserts a single line, Meun., A.161, to the same effect. On the sexual attractiveness of Malyn's nose, see W. Arthur Turner, 'Chaucer's "Lusty Malyne"', NQ, vol.199 (1954), p.232.
34. Although Malyn's beauty is badly flawed, this does not prevent the parson from admiring it. It is "for she was feir" (RT, I.3977) that he wishes to marry her well and make her his heir. In the matter of the parson's taste, then, there is further mediocrity. See Copland, 'Harlotrie or Sermonyng?' p.19.

35. Hart, 'Comparative Study', p.24.
36. A similar phrase is used in the fabliau, Meun., B.113-14, where everyone moves at a run as soon as the stealing is under way. See also Meun., A.71, 84 and 93.
37. This refers back to the repeated "dorste" in the opening lines of the Tale (RT, I.3956 and 3957). See above, vol.1, pp.382-84.
38. It is intriguing that a stone should be the occasion of the miller's fall. In MillT, I.3432, Robin takes up a stone to Nicholas's room to knock at his door, and Alison threatens to stone Absolon from the bower window. (MillT, I.3712). Perhaps these details indicate that the carpenter's bower and the miller's bedchamber are both ground-floor rooms.
39. See also MillT, I.3713.
40. See Bennett, Chaucer at Oxford, Appendix B, for descriptions of the sort of mill Chaucer's audience could have had in mind.
41. Contrast the opening lines of the NPT, VII.2821-23, which move in the opposite direction, from the particular to the more general:
 A povre wydwe, somdeel stape in age
 Was whilom dwellyng in a narwe cotage,
 Beside a grove, stondynge in a dale.
42. See Meun., A.55-60, 71-72, 78-79 and 92-98.
43. Robinson, ed., Works of Chaucer, glosses the word as "leafy arbour". OED gives "A bower of leaves; a canopy or lattice". Bennett, Chaucer at Oxford, p.113, defines it as a "rustic shelter, possibly a frame or lean-to of poles thatched with reeds bound down with sedge covering the back door or steps of the mill".
44. The literary method of picking out isolated details contrasts with the technique of 'pointing', in which numerous small details are amassed to give an intense or brilliant impression of a scene or object. See J.A. Burrow, Ricardian Poetry: Chaucer, Gower, Langland and the 'Gawain' Poet, (London: Routledge, 1971), pp.69-78.
45. See Bennett, Chaucer at Oxford, pp.105-15, for an account of 14th. cent. Trumpington.
46. Chaucer is so specific about the neighbourhood that it is conceivable he may have had a particular parson in mind as the 'author' of the situation he describes. The 13th. and 14th. cent. rectors and vicars are listed in Edith Carr, The Story of Trumpington Church, (Cambridge: no publisher, 1968), p. [i].
47. Presumably it is to the village of Trumpington, a few hundred yards up the road, and not to Cambridge, that Malyn was sent to buy ale and bread (RT, I.4136-37).
48. Bennett, Chaucer at Oxford, pp.93-105, discusses the meaning of "soler" and the type of academic institution implied in Chaucer's references. See also Derek S. Brewer, 'The Reeve's Tale and the King's Hall, Cambridge', ChauR, vol.5 (1970-1971), pp.311-17.

49. Bennett, Chaucer at Oxford, pp.100-1; and Tolkien, 'Chaucer as Philologist', pp.5-8.
50. Of Northfolk was this Reve of which I telle,
Biside a toun men clepen Baldeswelle. (GP, I.619-20)
See Copland, 'Harlotrie or Sermonyng?', p.4; Tolkien, 'Chaucer as Philologist', pp.6-7; and Thomas Jay Garbáty, 'Satire and Regionalism: The Reeve and his Tale', ChauR, vol.8 (1973-1974), pp.1-8. Note the Reeve's "theek" and "ik am" (RT, I.3864 and 3867).
51. e.g. ManT, IX.252 and CYT, VIII.730, both in contexts that are to do with deception.
52. Only the CYT surpasses the RT in its exploration of visual deceptiveness.
53. R.E. Kaske treats the aubade as a parody in his 'An Aube in the Reeve's Tale', ELH, vol.26 (1959), pp.295-310. Copland, 'Harlotrie or Sermonyng?', pp.19-21, argues for a more sympathetic approach to Malyn's tears.
54. Luke, 6: 42.
55. Olson, 'Reeve's Tale', passim.
56. Some of the material in this section has appeared as 'The Containment of Symkyn: The Function of Space in the Reeve's Tale', ChauR, vol.14 (1979-1980), pp.225-36.
57. The French fabliau lacks any sense of the miller's masterminding the clerks' return and savouring his victory. The meunier is, in fact, nonplussed by the reappearance of the deacons (Meun., A.140).
58. "Poure" is omitted from some MSS. and does not necessarily mean 'without money'. It may be a formulaic term applied to certain types of student at Cambridge. See Bennett, Chaucer at Oxford, pp.98-99 and Appendix A.
59. John is for the moment prepared to allow Symkyn his superiority, saying "and this is faire answerd" (RT, I.4128). John's priorities at this juncture are food and warmth.
60. Note on this passage Charles A. Owen, Jr., 'Chaucer's Canterbury Tales: Aesthetic Design in Stories of the First Day', Engl. St., vol.35 (1954), p.54; and Frank, 'Comedy of Limitation', p.63, where he remarks; "Space is undeniably the functional element in the Reeve's Tale. The whole plot hinges on it: the size of the room, the bedding of all parties in this one room, the shifting of the cradle. To call attention to the critical nature of space and to hint at philosophical implications we have Simkin's words ..."
61. No doubt Symkyn's idea of his own position à propos the clerks is heightened by the clash of his 'proper' speech and their dialect. Muscatine has some penetrating observations on the clerks' idiom and its creative purposes in his Chaucer and the French Tradition, pp.199-204. See also Tolkien, 'Chaucer as Philologist', passim.

62. John sees right through it, of course. His own proverb, with which he counters Symkyn's utterance, is likewise an ambiguous statement that tacitly recognises the game being played: "man sal taa of twa thynges/Slyk as he fyndes, or taa slyk as he brynges" (RT, I.4129-30). The miller takes what he finds (the corn); the clerks take what they bring (the corn), and also what they find (the miller's wife and daughter).
63. On the mutual awareness of the clerks and the miller of their respective motivations and chicanery, see above, vol.1, pp.401-2.
64. Game and contest (and social pride) are seen as traditional fabliau elements in Glending Olson, 'The Reeve's Tale as a Fabliau', MLQ, vol. 35 (1974), pp.219-30.
65. "The method of the tale is to make of the miller a vessel of preposterously inflated social and intellectual pretension, then to deflate him by the crudest means possible." Muscatine, Chaucer and the French Tradition, p.200.
66. On "soken", see Bennett, Chaucer at Oxford, pp.91-92.
67. Ibid., pp.104-5, explores the nature of legal studies at Oxford. Note the pun on "esement" (RT, I.4186), meaning 'satisfaction' both in a legal and sexual sense.
68. Joseph, 'Chaucerian "Game"-"Earnest"'; see above, vol.1, pp.53-54.

CHAPTER 9:

The Artistic Context - Developments in Pictorial Space

1. Erwin Panofsky, Renaissance and Renascences in Western Art, 2nd. edn. Harper Torchbook, (1960; New York: Harper and Row, 1969), p.138, n.2, implies a connection between Robert Grosseteste's interest in optics and the design of Lincoln cathedral. See also Folke Nordström, Peterborough, 'Lincoln and the Science of Robert Grosseteste: A Study of Thirteenth-Century Architecture and Iconography', Art B., vol.37 (1955), pp.241-72, esp. pp.253-59. On the metaphysics of light in relation to Gothic architecture, see Paul Frankl, The Gothic: Literary Sources and Interpretations through Eight Centuries, (Princeton: Princeton Univ. Press, 1960), pp.215-20; and Otto von Simpson, The Gothic Cathedral: The Origins of Gothic Architecture and the Medieval Concept of Order; with Appendix 'On the Proportions of the South Tower of Chartres Cathedral', by Ernst Levy, (London: Routledge, 1956), pp.50-55. Frankl, Gothic, p.836, maintains that it was Wilhelm Friedrich Engels (1770-1831) who "led the way ... to emphasis on the factor of space" in the study of Gothic architecture. See also ibid., pp.475-76; and note Frankl's own analysis of Gothic space in his Gothic Architecture. Pelican History of Art, (Harmondsworth: Penguin, 1962), pp.10-14, also 257-60 for links between architectural and pictorial space. See further Wilhelm Worringer, Form in Gothic, trans. Herbert Read. Tiranti Library, vol.77, (1920; London: Tiranti, 1957), chs.16 and 18. In England, the Perpendicular style, which reached the height of its development in Chaucer's day, is characterised by a striving for spatial unity and three-dimensional effects. See for example the account of an early design, the eastern end of St. Augustine's, Bristol (1st. quarter 14th. cent.) in Geoffrey Webb, Architecture in Britain: The Middle Ages, 2nd. edn., Pelican History of Art, (1956; Harmondsworth: Penguin, 1965), pp.139-40 and see ch.8. For a general and theoretical discussion of Gothic space, see Max Dvořák, Idealism and Naturalism in Gothic Art, trans Rudolph J. Klawiter, pref. by Karl Maria Swoboda, (1928; Notre Dame, Ind.: Univ. of Notre Dame Press, 1967), pp.59-76.
2. A similar methodology for considering the relations of pictorial and narrative interlace is described by Eugène Vinaver, The Rise of Romance, (Oxford: Clarendon Press, 1971), p.81.
3. For discussion and summary of approaches to Chaucer and non-literary art forms, see Elizabeth Salter, 'Medieval Poetry and the Visual Arts', E. and S., vol.22 (1969), pp.16-32, esp. pp.16-23; and Kolve, 'Chaucer and the Visual Arts', passim. Interestingly, Kolve draws attention to medieval ideas on the sense of sight as crucial in understanding how literary images were received: ibid., pp.301-3.
4. HF, 119-475. The image of Venus, "Naked fletyng in a see" (HF, 133) is painted (HF, 131, 135 and 139); scenes from the Aeneid are "graven", (HF, 157, 193 and 212) although they are once described as painted (HF, 211). Kolve detects a deliberate and sustained ambiguity: it is a written account, incorporating the 'colours' of rhetoric, summoning up mental images. See Kolve, 'Chaucer and the Visual Arts', pp.304-6.

5. KnT, I.1914-54 (Venus), 1967-2040 (Mars) and 2051-74 (Diana). The oratories also contain statues of the deities and it appears that in the case of Mars and Diana the statues incorporate further scene-painting at the bases of the sculpted figures; see KnT, I.2047-50, esp.2049: "With soutil pencil depeynted was this storie" and 2083-88, esp.2087-88:
 Wel koude he peynten lifly that it wroghte;
 With many a floryn he the hewes boghte.
 For comment on Chaucer's adaptation of his source, see above vol.1, pp.318-20.
6. For an account of the iconographic background to Chaucer's descriptions of Venus in HF and KnT, see Meg Twycross, The Medieval Anadyomene: A Study in Chaucer's Mythography. Medium Aevum Monographs, no.9, (Oxford: Blackwell for the Society of Mediaeval Languages and Literature, 1972), esp. pp.50-61. Calendar iconography is another example of pictorial imagery to which Chaucer had recourse. See Rosemond Tuve, Seasons and Months: Studies in a Tradition of Middle English Poetry, (1933; rpt. Cambridge: Brewer, 1976), pp.184-87; and Derek Pearsall and Elizabeth Salter, Landscapes and Seasons of the Medieval World, (London: Elek, 1973), pp.150-51.
7. The sort of speculation to be avoided, exciting though it may be, is represented in John Gardner, The Life and Times of Chaucer, (London: Cape, 1977), pp.191-203.
8. See Crow and Olson, eds., Chaucer Life-Records, ch.21; and see above, vol.1, pp.214-15.
9. Panofsky, Renaissance and Renascences, p.120.
10. For further discussion, see Panofsky, 'Perspektive als "Symbolische Form"', pp.258-60; his Renaissance and Renascences, pp.137-38; and Christine H. McCorkel, 'Page Space and Picture Space as Aspects of Naturalistic Style in English Manuscripts of the Early Fourteenth Century', Diss. Univ. of North Carolina, 1970, pp.219-24; also DAI, vol.32 (1971-1972), pp.2005A-6A.
11. Frequent reference will be made in the following pages to Panofsky, 'Perspektive als "Symbolische Form"'; his Renaissance and Renascences, ch.3; his Early Netherlandish Painting, vol.1, chs. 1 and 2; Miriam Schild Bunim, Space in Medieval Painting and the Forerunners of Perspective, (New York: Columbia Univ. Press, 1940); Millard Meiss, French Painting in the Time of Jean de Berry: The Late Fourteenth Century and the Patronage of the Duke, 2nd. edn. National Gallery of Art: Kress Foundation Studies in the History of European Arts, 2 vols., (1967; London: Phaidon, 1969); his, with the assistance of Kathleen Morand and Edith W. Kirsch, French Painting in the Time of Jean de Berry: The Boucicaut Master. National Gallery of Art: Kress Foundation Studies in the History of European Art, (London: Phaidon, 1968); his, with the assistance of Sharon Off Dunlap Smith and Elizabeth Home Beatson, French Painting in the Time of Jean de Berry: The Limbourgs and their Contemporaries. Franklin Jasper Walls Lectures, 2 vols., (London: Thames and Hudson, 1974); John White, The Birth and Rebirth of Pictorial Space, 2nd.edn., (1957; London: Faber, 1967); McCorkel, 'Page Space and Picture Space'; and see Samuel Y. Edgerton, Jr., 'Linear Perspective and the Western Mind: The Origins of Objective Representation in Art and Science', Cults., vol.3, no.3 (1976), pp.77-104.

12. White, Birth and Rebirth, pp.236-49; R.M. Cook, Greek Art: Its Development, Character and Influence, (London: Weidenfeld and Nicolson, 1972), pp.59-65; and Gisela M.A. Richter, A Handbook of Greek Art. Art of the World, (London: Phaidon, 1959), pp.261-64.
13. See e.g. the mythological landscapes from the Odyssey, a fresco of c.150 B.C. from a house on the Esquiline in Rome. Two of the paintings are reproduced in colour in T.B.L. Webster, Hellenistic Art, (1966; London: Methuen, 1967), pls.39 and 40 and see pp.138-41; also Pearsall and Salter, Landscapes and Seasons, pp.7-16; and Panofsky, Early Netherlandish Painting, vol.1, pp.9-12. For more general discussions of Hellenistic painting, see J.D. Beazley and Bernard Ashmole, Greek Sculpture and Painting to the End of the Hellenistic Period, (Cambridge: Cambridge Univ. Press, 1932), ch.19; and Cook, Greek Art, pp.67-71.
14. Vitruvius, On Architecture, V.vi.9; ed. and trans. Frank Granger. Loeb Classical Library, 2 vols., (London: Heinemann, 1962), vol. 1, p.288. The tragic style includes columns, pediments and statues; the comic style uses private buildings, balconies and window projections imitating reality ("dispositos imitatione communium aedificiorum rationibus"); and satyric scenes include trees, caves and mountains in imitation of landscape. See the examples from P. Fannius Synistor's villa at Boscoreale (3rd. quarter 1st. cent. B.C.), reproduced in colour in Webster, Hellenistic Art, pls.36-38 and see pp.131-38.
15. Vitruvius, On Architecture, I.2.2; ed. Granger, vol.1, p.26.
16. Ibid., VII.pref.11; ed. Granger, vol.1, p.70.
17. Panofsky, 'Perspektive als "Symbolische Form"', pp.265-71, relates Vitruvius' idea to the optical theory of Euclid and postulates a 'vanishing axis' principle. White, Birth and Rebirth, pp.249-62, argues (p.262) that "All the evidence points to the existence, in antiquity, of a theoretically founded system of vanishing point perspective". Richter is not so convinced. See Gisela M.A. Richter, Perspective in Greek and Roman Art, (London: Phaidon, [1970]), chs. 5, 6 and 7; her 'Perspective, Ancient, Mediaeval and Renaissance', in Scritti in onore di Bartolomeo Nogara raccolti in occasione del suo LXX anno, (Città del Vaticano: Bardi, 1937), pp.381-88; and her Handbook of Greek Art, pp.164-67. See also Jean-H. Luce, 'Géométrie de la perspective à l'époque de Vitruve', Rev. Hist. Sci., vol. 6 (1953), pp.308-21.
18. Richter, 'Perspective', pls.51 and 52; and her Perspective in Greek and Roman Art, pls.217a and 217b.
19. White, Birth and Rebirth, pp.262-71; and A.M.G. Little, 'Perspective and Scene Painting', Art B., vol.19 (1937), pp.486-95. There are numerous illustrations of the paintings at Pompeii in Ludwig Curtius, Die Wandmalerei Pompejis: Eine Einführung in ihr Verständnis, (Hildesheim: Olms, 1960).
20. Dating taken from Webster, Hellenistic Art, p.159. The painting is discussed by White, Birth and Rebirth, p.268.
21. See Kurt Weitzmann, Late Antique and Early Christian Book Illumination, (London: Chatto and Windus, 1977), esp. pp.20-24.

22. Plotinus, Ennead II.8.1; trans. McKenna, p.130.
23. André Grabar, The Beginnings of Christian Art 200-395, trans. S. Gilbert and J. Emmons, (1966; London: Thames and Hudson, 1967), p.289 and 288-91. See also his 'Plotin et les origines de l'esthétique médiévale', Cah. Arch., vol.1 (1945), pp.15-34.
24. Plotinus, Ennead II.4.5; trans. McKenna, p.107.
25. Roger Hinks, Carolingian Art: A Study of Early Medieval Painting and Sculpture in Western Europe, (1935; Ann Arbor: Univ. of Michigan Press, 1962), pt.1, ch.2; Walter Oakeshott, Classical Inspiration in Medieval Art. Rhind Lectures for 1956, (London: Chapman and Hall, 1959), pl.15; Ranuccio Bianchi Bandinelli, 'Continuità ellenistica nella pittura di età medio- e tardo-romano', RINASA vol.11 (1953), pp.77-161; and Panofsky, 'Perspektive als "Symbolische Form"', pp.270-73.
26. Bunim, Space in Medieval Painting, chs. 3 and 4; André Grabar and C. Nordenfalk, Early Medieval Painting: Fourth Century to the Eleventh Century. Great Centuries of Painting, (Geneva; Skira, 1957), pp.136-58 and 200-3; Hinks, Carolingian Art, pt.3, chs. 1 and 2 and pp.210-11; Oakeshott, Classical Inspiration, chs.3 and 4; and Hanns Swarzenski, Early Medieval Illumination. Iris Colour Books, (London: Batsford, 1951), chs.2 and 3.
27. See Anka Stojaković, 'Jésus-Christ, source de la lumière dans la peinture byzantine', Cah. Civ. Médiév., vol.18 (1975), pp.269-73.
28. The preceding remarks are based on P.A. Michelis, An Aesthetic Approach to Byzantine Art, foreword by Herbert Read, (London: Batsford, 1955), pp.135-69; Gervase Mathew, Byzantine Aesthetics, (London: Murray, 1963), pp.29-37; David Talbot Rice, The Appreciation of Byzantine Art. Appreciation of the Arts, no.7, (London: Oxford Univ. Press, 1972), pp.10-13; and John Stuart, Ikons. Faber Collectors' Library, (London: Faber, 1975), pp.114-16. For further illustrations, see David Talbot Rice, Byzantine Art, rev. edn., (1935; Harmondsworth: Penguin, 1968); and Ernst Kitzinger, Byzantine Art in the Making: Main Lines of Stylistic Development in Mediterranean Art 3rd.-7th. Century, (Cambridge, Mass.: Harvard Univ. Press, 1977).
29. John Beckwith, Early Christian and Byzantine Art. Pelican History of Art, (Harmondsworth: Penguin, 1970), pp.93-95.
30. "... the evocations of classical architecture before which the Evangelists sit are indeed striking and far more skilled than any similar attempt by a contemporary artist in other parts of the western world." Ibid., p.95.
31. "The monochrome lines and contours in Carolingian art, which in spite of their expressive emphasis had yet created a certain naturalistic illusion and, by means of light and shade, had suggested a visual pictorial unity of object and space, became increasingly abstract and hardened, and were more and more used as ornamental patterns. But what is lost in optical function and naturalistic illusion is gained in linear definition of form and rhythmical structure." Hanns Swarzenski, Monuments of Romanesque Art: The Art of Church-Treasures in North-Western Europe, 2nd edn., (1954; London: Faber,

- 1967), p.25. For a fuller account of Romanesque style, see C .M. Kauffman, Romanesque Manuscripts 1066-1190. Survey of Manuscripts Illuminated in the British Isles, vol.3, (London: Miller, 1975), pp.18-28; and C.R. Dodwell, The Canterbury School of Illumination 1066-1200, (Cambridge: Cambridge Univ. Press, 1954), esp. ch.3. Dodwell remarks, p.33, that "the distinguishing characteristics of Romanesque are its massiveness on the one hand, and on the other its attempt to reduce everything to abstract shapes".
32. Hildesheim, Library of St. Godehard, f.36r. Description in Kauffmann, Romanesque Manuscripts., no.29. Some influences of the St. Alban's Psalter are discussed by F. Wormald, 'The Development of English Illumination in the Twelfth Century', JBAA, 3rd. ser., vol.8 (1943), pp.31-49. The most extensive account and illustration of the MS. are to be found in Otto Pächt, C.R. Dodwell and Francis Wormald, The St. Alban's Psalter (Albani Psalter): 1. The Full-Page Miniatures, by Otto Pächt; 2. The Initials, by C.R. Dodwell; 3. Preface and Description of the Manuscript, by Francis Wormald. Studies of the Warburg Institute, vol. 25, (London: Warburg Institute, 1960), in which see Pächt, Full-Page Miniatures, chs. 7 and 8 on the pictorial style of the 'Alexis Master'.
33. " Yet a twelfth century picture, least of all an English one, is hardly ever built from a groundline or basis upwards, the artist is much more concerned with how the figures lie on the picture surface than how they stand in the space of reality." Ibid., p.110.
34. "It cannot be emphasized too strongly that the multiplicity of colour zones or superimposed layers must not be interpreted as an attempt to incorporate three-dimensional values in the pictorial structure. The notion of a space continuum is alien to the artistic imagination of the Alexis Master." Ibid., p.112.
35. For further comments on the treatment of space in other media of Romanesque art, see Meyer Schapiro, Romanesque Art. Selected Papers, vol. 1, (London: Chatto and Windus, 1977), pp.173-79, 209-13 and 238-43; Henri Focillon, The Art of the West in the Middle Ages, ed. Jean Bony, trans. Donald King, 2nd edn., 2 vols., (1938; London and New York: Phaidon, 1969), vol.1: Romanesque Art, pp.65-78; and Swarzenski, Monuments of Romanesque Art, pp.25-29.
36. See Erwin Panofsky, 'Introduction' to his edn. and trans. of Abbot Suger on the Abbey Church of St.-Denis and its Art Treasures, (Princeton: Princeton Univ. Press, 1946); and von Simpson, Gothic Cathedral, pp.103-9 and 119-33. On Dionysius, see above, vol.1, p.148.
37. von Simpson, Gothic Cathedral, chs. 3 and 4.
38. See Robert Branner, Manuscript Painting in Paris during the Reign of Saint Louis: A Study of Styles. California Studies in the History of Art, no.18, (Berkeley, Los Angeles and London: Univ. of California Press, 1977), pp.1-11 and 66-67; and his Saint Louis and the Court Style in Gothic Architecture. Studies in Architecture, vol.7, (London: Zwemmer, 1965), esp. chs. 1 and 5.

39. Jean Porcher, French Miniatures from Illuminated Manuscripts, trans. Julian Brown, (1959; London: Collins, 1960), pp.43-49; and Joan Evans, Art in Mediaeval France: 987-1498, (London: Oxford Univ. Press, 1948), pp.177-79.
40. A reversal of the transition from classical art. See Swarzenski, Monuments of Romanesque Art, pls.2-3, showing the progressive elimination of recessional elements in copies of the Utrecht Psalter from the 9th. to 12th.cents.
41. Panofsky, Early Netherlandish Painting, vol.1, pp.15-17; Bunim, Space in Medieval Painting, chs. 5 and 6; André Grabar and Carl Nordenfalk, Romanesque Painting from the Eleventh to the Thirteenth Century. Great Centuries of Painting, (Geneva: Skira, 1958), pp.182-206; Oakeshott, Classical Inspiration, ch.6; and McCorkel, 'Page Space and Picture Space', pp.120-25.
42. Paris, Bibliothèque Nationale, MS. latin 1023, f.7v. For commentary see Porcher, French Miniatures, pp.49-50. For further discussion of Honoré and examples of his work, see Eric G. Millar, The Parisian Miniaturist Honoré. Faber Library of Illuminated Manuscripts, (London: Faber, 1959); and Branner, Painting in Paris, for extensive illustrations for the earlier 13th. cent.
43. John White, Art and Architecture in Italy: 1250 to 1400. Pelican History of Art, (Harmondsworth: Penguin, 1966), pp.93-99, 102-7, 111-14, 115-21 and 124-26; his Birth and Rebirth, pp.23-33 and 47-52; Panofsky, Renaissance and Renascences, pp.133-38; his 'Perspektive als "Symbolische Form"', pp.277-80; his Early Netherlandish Painting, vol.1, pp.17-18; Robert Oertel, Early Italian Painting to 1400, trans. Lily Cooper, (1966; London: Thames and Hudson, 1968), chs. 4 and 5; James H. Stubblebine, Guido da Siena, (Princeton: Princeton Univ. Press, 1964), pp.7-8 and 12-16; Emilio Cecchi, The Sienese Painters of the Trecento, trans. Leonard Penlock, (1928; London: Warne, 1931), pp.10-12; and Eugenio Battisti, Cimabue, trans. Robert and Catherine Enggass, (1963; London: Pennsylvania State Univ. Press, 1967), for excellent reproductions in colour and monochrome.
44. White, Art and Architecture, pp.91-92 and 206; Cecchi, Sienese Painters, pp.17-18; Focillon, Art of the West, vol.2: Gothic Art, pp.118-22; and David Knowles, 'Saint Bernard of Clairvaux: 1090-1153' (1953), in his The Historian and Character and Other Essays, (Cambridge: Cambridge Univ. Press, 1963), p.43.
45. White, Art and Architecture, pp.149-52; and Oertel, Early Italian Painting, pp.195-97.
46. For a detailed account of this terminology, see White, Birth and Rebirth, pp.26-28.
47. Panofsky, Early Netherlandish Painting, vol.1, pp.18-19 and pl.7.
48. White, Birth and Rebirth, p.78.
49. For commentary, see ibid., pp.79-80 and 82-83; his Art and Architecture, pp.152-55; and Oertel, Early Italian Painting, pp.198-200.
50. See Giotto's own version of the 'Entry into Jerusalem' in Emilio Cecchi, Giotto, trans. Elizabeth Andrews, (1938; London: Oldbourne

Press; Milan: Silvana Editoriale d'Arte, 1960), pl.37; and see White, Art and Architecture, p.223.

51. Alastair Smart, The Assisi Problem and the Art of Giotto: A Study of the 'Legend of St. Francis' in the Upper Church of San Francesco, Assisi, (Oxford: Clarendon Press, 1971), pp.96-106.
52. Ibid., pp.88-95.
53. This device is first explored in Trecento art in the Upper Church of San Francesco at Assisi. Its 'space polarising' qualities may be seen in the 'Renunciation of Wordly Possessions', in Cecchi, Giotto, pl.4; and see White, Birth and Rebirth, pp.34-36.
54. Ibid., pp.62-63. For example in the 'Raising of Drusiana' at the Peruzzi Chapel, Florence, the obliquely set corners of the city wall and buildings are masked by the foreground figures. Reproduction in Cecchi, Giotto, pl.58.
55. See for example Giovanni Boccaccio, Decameron, vi.5; ed. Vittore Branca in Tutte le opere. I Classici Mondadori, 12 vols., in progress. (Milan: Mondadori, 1964-), vol.4 (1976), p.550:
" ... l'altro, il cui nome fu Giotto, ebbe uno ingegno di tanta eccellenza, che niuna cosa dà la natura, madre du tutte le cose e operatrice col continuo girar de' cieli, che egli con lo stile e con la penna e col pennello non dipingnesse sì simile a quella, che non simile, anzi più tosto dessa paresse, in tanto che molte volte nelle cose da lui fatte si truova che il visivo senso degli uomini vi prese errore, quello credendo esser che era dipinto."
See also Michael Baxandall, Giotto and the Orators: Humanist Observers of Painting in Italy and the Discovery of Pictorial Composition 1350-1450, (Oxford: Clarendon Press, 1971), pp.70-75.
56. For instance, Giotto introduced the idea of representing what appears to be part of a larger scene. He does this in the 'Raising of Drusiana', noted above, n.54; and see White, Art and Architecture, pp.222-23. For exceptionally good reproductions of the whole range of Giotto's work, see Giovanni Previtali, Giotto e la sua bottega, 2nd edn., (1967; Milan: Fabbri, 1974); and, more modestly, Andrew Martindale and Edi Baccheschi, The Complete Paintings of Giotto. Classics of World Art, (1966; London: Weidenfeld and Nicholson, 1969).
57. Giotto's responsibility for the 'Life of St. Francis' cycle in the nave of the Upper Church of St. Francesco at Assisi is disputed. See Smart, Assisi Problem, passim; White, Art and Architecture, ch. 25; Oertel, Early Italian Painting, ch.6; and Millard Meiss, Giotto and Assisi. Walter W.S. Cook Alumni Lecture, February 9th., 1959, (New York: New York Univ. Press, 1960).
58. White, Birth and Rebirth, ch.2; his Art and Architecture, pp.204-17; and Oertel, Early Italian Painting, pp.83-89.
59. For commentary, see White, Birth and Rebirth, pp.65-66; and his Art and Architecture, p.213. White comments in his Birth and Rebirth, p.87, that "The starting point for all the later evolution of Giottesque perspective lies in the single composition of 'The Wedding Feast at Cana'".
60. e.g. 'Christ before Caiaphas', also at Padua, in Cecchi, Giotto, pl.40 and the 'Last Supper', in Previtali, Giotto, pl.52. See also Panofsky, 'Die Perspektive als "Symbolische Form"', pp.277-79; and his Renaissance and Resurrections, pp.136-38.

61. The development continues in Giotto's later work in the Bardi and Peruzzi chapels at Santa Croce in Florence. See White, Birth and Rebirth, ch.3; his Art and Architecture, pp.219-23; and Oertel, Early Italian Painting, pp.103-87. For illustration, see Leonetto Tintori and Eve Borsook, Giotto: The Peruzzi Chapel, pref. by Ugo Procacci, photos by Nadir Tronci, (New York: Abrams, [1965]).
62. White, Birth and Rebirth, ch.5; and his Art and Architecture, pp.269-71.
63. On Taddeo Gaddi, see White, Birth and Rebirth, pp.103-4; his Art and Architecture, pp.266-69; and Oertel, Early Italian Painting, pp.188-92.
64. Note Giotto's much more reticent version of the 'Presentation of the Virgin' at Padua, and the measures he takes to offset the vigorous thrust of the oblique setting in the 'Expulsion of Joachim from the Temple' in the same cycle at the Arena Chapel. Reproductions in Cecchi, Giotto, pl.26; and Previtali, Giotto, pl.424.
65. Herman de Limbourg copied Taddeo Gaddi's painting. See Meiss, Limburgs, vol.2, figs. 573 and 668. Some of the spatial inconsistencies of his model may be due to restoration. See White, Art and Architecture, p.267.
66. Panofsky, Early Netherlandish Painting, vol.1, pp.18-19 and pl.7.
67. As in the 'Apparition of St. Francis at Arles' in the Bardi Chapel, reproduced in Mario Bucci, Giotto, trans. Caroline Beamish. Dolphin Art Books, (1966; London: Thames and Hudson, 1968), pl.67.
68. White, Birth and Rebirth, pp.83-84; and his Art and Architecture, frontis. and p.235. For further description of Simone Martini's work, see ibid., ch.26; Oertel, Early Italian Painting, ch.9; and Cecchi, Sieneese Painters, pp.62-88.
69. On Pietro Lorenzetti, see White, Art and Architecture, pp.245-51; and Oertel, Early Italian Painting, pp.218-30.
70. Reproduced in ibid., pl.XI.
71. Panofsky, Renaissance and Renascences, pp.142-53 and figs.105 and 106.
72. White, Birth and Rebirth, pp.99-100; and his Art and Architecture, p.250.
73. For general discussion, see White, Birth and Rebirth, ch.6; his Art and Architecture, pp.244-45 and 251-56; Oertel, Early Italian Painting, pp.230-39; and Cecchi, Sieneese Painters, pp.118-36.
74. See White, Birth and Rebirth, p.99; his Art and Architecture, p.251; and Oertel, Early Italian Painting, pp.236-37.

75. Reproduced in White, Art and Architecture, pl.114(A) and see p.251; also Panofsky, 'Perspektive als "Symbolische form"', pp.279-80.
76. For commentary, see White, Birth and Rebirth, pp.93-96; his Art and Architecture, pp.251-53; and Oertel, Early Italian Painting, pp.235-36.
77. See the diagrammatic representation of this in White, Birth and Rebirth, p.29, fig.2C, and compare Duccio's townscape in the 'Entry into Jerusalem'. See below, vol.2, pl.V.
78. White, Birth and Rebirth, pp.96-98. Taddeo Gaddi had earlier used 'artificial' light to compensate for the absence of an adequate natural source. See Oertel, Early Italian Painting, pp.189-90.
79. See, for instance, Giotto's 'Angel Appearing to St. Joachim' in the Arena Chapel, reproduced in Cecchi, Giotto, pl.23; and Simone Martini's portrait of Guidoriccio da Fogliano, also in the Palazzo Pubblico at Siena, reproduced in White, Birth and Rebirth pl.20a and discussed by him on p.85. For discussion of Ambrogio Lorenzetti's landscape, see ibid., pp.94-95; and his Art and Architecture, p.253.
80. These phenomena are succinctly summarised by White, Art and Architecture, pp.359-60, but for the classic account see Millard Meiss, Painting in Florence and Siena after the Black Death: The Arts, Religion and Society in the Mid-Fourteenth Century. Harper Torchbooks: The Academy Library, (1951; New York: Harper and Row, 1964), chs.2 and 3.
81. White, Birth and Rebirth, pp.104-8; his Art and Architecture, pp.366-76; Oertel, Early Italian Painting, chs.11 and 13; and Meiss, Painting in Florence and Siena, pp.6 and 9-53.
82. White, Art and Architecture, pp.361-63; and Meiss, Painting in Florence and Siena, pp.53-58.
83. White, Art and Architecture, pp.382-86.
84. Ibid., pp.378-79; his Birth and Rebirth, pp.108-10; Oertel, Early Italian Painting, pp.330-34; and Meiss, Late Fourteenth Century, vol. 1, pp.237-41.
85. Ibid., vol.1, pp.24-26; and Emile Mâle, L'Art religieux de la fin du moyen âge en France: étude sur l'iconographie du moyen âge et sur les sources d'inspiration, 5th. edn., (1908; Paris: Colin, 1949), pp.9-22.
86. Enrico Castelnuovo, Un Pittore italiano alla corte di Avignone: Matteo Giovannetti e la pittura in Provenza nel secolo XIV, (Turin: Einaudi, 1962), esp. ch.4; Jacques Dupont and Césaire Gnudi, Gothic Painting. Great Centuries of Painting, (Geneva: Skira, 1954), pp.131-32; and L.-H. Labande, Le Palais des papes et les monuments d'Avignon au XIVè siècle, 2 vols., (Marseille: Detaille, 1925), vol.2, pp.11-12 and 19.

87. Oertel, Early Italian Painting, pp.213-14; Late Fourteenth Century, vol.1, p.26; and Panofsky, Early Netherlandish Painting, vol.1, p.24.
88. Meiss, Late Fourteenth Century, vol.1, p.24; and Mâle, Art religieux de la fin du moyen âge, pp.9-10.
89. Meiss, Late Fourteenth Century, vol.1, pp.27-29 and 145-46; and Panofsky, Early Netherlandish Painting, vol.1, p.24.
90. The phrase "selective assimilation" is Panofsky's, Renaissance and Renascences, p.157; and see above, vol.1, pp.420-21 on Honoré.
91. Oertel, Early Italian Painting, p.214.
92. For a statement of this problem, see Otto Pächt, The Master of Mary of Burgundy, (London: Faber, 1948) p.19.
93. On Italian influence, see Kathleen Morand, Jean Pucelle, (Oxford: Clarendon Press, 1962), pp.3-12, as also for extensive illustration of Pucelle's work.
94. Panofsky, Renaissance and Renascences, p.158.
95. New York, The Cloisters, f.16r. For commentary, see Meiss, Late Fourteenth Century, vol.1, p.19; Panofsky, Early Netherlandish Painting, vol.1, p.32; and Morand, Pucelle, pp.13-16.
96. Panofsky, Early Netherlandish Painting, vol.1, p.30.
97. Loc. cit. For imitation, see Meiss, Late Fourteenth Century, vol.2, fig.6.
98. Ibid., vol.1, p.19.
99. Ibid., vol.1, pp.20-23; Panofsky, Early Netherlandish Painting, vol.1, pp.35-40; and his Renaissance and Renascences, pp.158-59.
100. Panofsky, Early Netherlandish Painting, vol.1, p.37. For Bondol's treatment of landscape, see Meiss, Late Fourteenth Century, vol.2, fig.386.
101. Commentary in Panofsky, Early Netherlandish Painting, vol.1, pp.36-37.
102. Panofsky in ibid., p.37, maintains that the tiled pavement is "impeccably focused on one vanishing point".
103. See his 'Annunciation' in Panofsky, Renaissance and Renascences, fig.104 and see pp.144-45. For the development of this idea in the Brussels Hours, see Meiss, Late Fourteenth Century, vol.1, pp.204-5 and vol.2, figs.179-80. Meiss notes that the dedication miniature produces "the most vivid scene of spatial contingency in Northern painting up to this time".

104. Meiss, Late Fourteenth Century, vol.1, pp.135-40 and 147-51 and vol. 2, figs.51-74.
105. Ibid., vol.1, pp.99-107 and vol.2, figs.1-5; and Panofsky, Early Netherlandish Painting, vol.1, pp.41-42.
106. Meiss, Late Fourteenth Century, vol.1, pp.107-25 and 134 and vol.2, figs.6-15 and 22-25.
107. Commentary in ibid., vol.1, pp.113-24. See also the 'Flagellation' scene of the Parement in ibid., vol.2, fig.3.
108. See the foreshortened frontal settings in the same series of miniatures in ibid., vol.2, figs.8 and 11.
109. See the contrasted use of darkened doorway and window with lighted windows in the 'Visitation' miniature in ibid., vol.2, fig.7 and see vol.1, p.121.
110. On averted figures, see ibid., vol.1, pp.103-4.
111. Ibid., vol.1, p.119.
112. Ibid., vol.1, pp.119, 123 and 133.
113. Ibid., vol.1, pp.165-66 and vol.2, fig.170.
114. Ibid., vol.1, pp.181 and 186-87 and vol.2, figs. 142 and 176. See also vol. 1, p.261, for Meiss's account of Pseudo-Jacquemart's contribution to the Grandes Heures, as an example of this artist's relative lack of competence in spatial techniques.
115. Meiss, Late Fourteenth Century, vol.1, pp.210, 213 and 216-21.
116. Ibid., vol.1, pp.169-76 and vol.2, esp. figs.90, 91, 93 and 94.
117. Ibid., vol.1, p.213; and see Panofsky, Early Netherlandish Painting, vol.1, pp.48-49.
118. Meiss, Late Fourteenth Century, vol.1, pp.209-10 and vol.2, fig. 181, also figs.183, 184 and 186.
119. Ibid., vol.1, pp.212-13 and vol.2, fig.187. Meiss, ibid., vol.1, p.213, calls this "the most spacious construction yet seen in Northern painting". See also vol.1, pp.211-12 and fig.182, also fig.193.
120. Ibid., vol.1, pp.219-21 and vol.2, fig.197.
121. Panofsky, Early Netherlandish Painting, vol.1, p.49.
122. For the development of border design, see Meiss, Late Fourteenth Century, vol.1, pp.203-4.
123. See above, vol.1, p.438.
124. Meiss, Late Fourteenth Century, vol.2, fig.15, for an example of a repoussoir motif by the Parement master.

125. Ibid., vol.1, pp.218-19. For an earlier French landscape, see e.g. vol.2, fig.21.
126. Ibid., vol.2, figs.183, 186 and 191; and see above, vol.1, pp.432-33.
127. See esp. Meiss, Boucicaut Master, pp.3-5 and 66-68; also his Limbourgs, vol.1, p.39; and Panofsky, Early Netherlandish Painting, vol.1, pp.51-53.
128. Meiss, Boucicaut Master, pp.14-16; and Panofsky, Early Netherlandish Painting, vol.1, pp.56-57 and vol.2, fig.59.
129. Ibid., vol.1, p.58 and vol.2, fig.61.
130. Ibid., vol.1, pp.58-59 and vol.2, fig.62; and Meiss, Boucicaut Master, pp.12-13.
131. Ibid., pp.25-26; and Panofsky, Early Netherlandish Painting, vol.1, pp.59-60 and vol.2, fig.65.
132. Ibid., vol.1, pp.61-66; and Meiss, Limbourgs, vol.1, pp.66-81. For developments immediately prior to the Limbourgs, see ibid., vol.1, pp.10-11, 35, 43, 46-47 and 56.
133. Ibid., vol.1, pp.158-65.
134. Paris, Bibliothèque Nationale, MS. français 166. See Meiss, Limbourgs, vol.1, pp.81-101.
135. Ibid., vol.1, p.88.
136. Ibid., vol.1, pp.90-93, 96 and 98-99 and vol.2, figs.300 and 377-78.
137. Ibid., vol.1, pp.109-10 and 117 and vol.2, respectively figs.403, 405, 430, 641, 457, 57, 56 and 467. The MS. is at the Cloisters, New York, Metropolitan Museum of Art. It is reproduced in facsimile in Millard Meiss and Elizabeth H. Beatson, Les Belles Heures de Jean Duc de Berry (The Cloisters: The Metropolitan Museum of Art), (London: Thames and Hudson, 1974), in which see pp.20 and 23 on Paul de Limbourg's use of space.
138. Chantilly, Musée Condée, MS. 65. See esp. Meiss, Limbourgs, vol.1, pp.171-72 and vol.2, fig.582. Extensive colour reproduction in Jean Longnon, Raymond Cazelles and Millard Meiss, Les Très Riches Heures du Duc de Berry, Musée Condée, Chantilly, intro. and legends by Longnon and Cazelles, pref. by Meiss, trans. Victoria Benedict, (London: Thames and Hudson, 1969).
139. Meiss, Limbourgs, vol.1, pp.237-39, 241-44 and 251. Panofsky sees Paul as "a glorious end rather than a beginning" in his Early Netherlandish Painting, vol.1, p.61. Note Meiss's cautionary remarks in perceiving too much homogeneity in late 14th. and early 15th. cent. painting in his Limbourgs, vol.1, pp.3-6. On the connections with Italy and Holland, see ibid., vol.1, pp.240-42; Panofsky, Early Netherlandish Painting, vol.1, pp.62-64; and Otto Pächt, 'Early Italian Nature Studies and the Early Calendar Landscape', JWCI, vol.13 (1950), pp.37-47.

140. Meiss, Limbourgs, vol.1, pp.144-47 and 177 and vol.2, figs.551 and 558.
141. On the Limbourgs' landscapes, see ibid., vol.1, pp.152-54, 187, 192-93 and 198-99 and vol.2, figs. 570, 572, 540 and 644.
142. On the occurrence of oblique settings in the Très Riches Heures, see ibid., vol.1, p.149 and vol.2, fig.559.
143. On luminosity and shadow, see ibid., vol.1, pp.149-51, 188 and 196-200 and vol.2, figs.559, 569, 540, 644, 547 and 646.
144. On naturalism, see ibid., vol.1, pp.152, 187, 195 and 199-200 and vol.2, figs.570, 540, 541 and 644.
145. See Otto Pächt, 'A Giottesque Episode in English Mediaeval Art', JWCI, vol.6 (1943), pp.51-70; rpt. in Warburg and Courtauld Institutes, eds., England and the Mediterranean Tradition: Studies in Art History, and Literature, (London: Oxford Univ. Press, 1945), pp.40-59; and F. Saxl and R. Wittkower, British Art and the Mediterranean, 2nd. edn., (1948; London: Oxford Univ. Press, 1969), ch.33.
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151. See above, vol.1, pp.420-21

152. McCorkel, 'Page Space and Picture Space', pp.165-67.
153. Ibid., ch.6, for a detailed discussion of space in a wide range of late 13th. and early 14th. cent. English miniatures.
154. New York, Pierpoint Morgan Library, MS. M302 and Carinthia, St. Paul in Lavanthal, Stiftsbibliothek Cod. XXV/2, 19. See Lucy Freeman Sandler, The Peterborough Psalter in Brussels and Other Fenland Manuscripts, (London: Miller, 1974), pp.39-47, for full discussion and lavish illustration.
155. Ibid., p.46. Sandler compares this aspect of the illuminator's work with that of Master A of the Peterborough Psalter, of whom she comments, p.34: "A fluctuation or inconsistency of figure-to-figure, figure-to-ground and figure-to-frame relationships typifies the drawings ... "
156. On the 'East Anglian' period, see Margaret Rickert, Painting in Britain: The Middle Ages, 2nd. edn. Pelican History of Art, (1954; Harmondsworth: Penguin, 1965), ch.6, esp. pp.128-32; and P. Lasko and N.J. Morgan, Medieval Art in East Anglia 1300- 1520. Exhibition catal., (Norwich: Jarrold, 1973).
157. London, British Library, MS. Additional 49622.
158. London, British Library, MS. Yates Thompson 14 (formerly Additional 39810).
159. Oxford, Bodleian Library, MS. Douce 366.
160. Douai, Bibliothèque Municipale, MS. 171.
161. I acknowledge the kindness and courtesy of Mme Y. Duhamel, conservateur of the Bibliothèque Municipale at Douai, in allowing the MS. to be photographed.
162. Sydney C. Cockerell, The Gorleston Psalter (Add. MS. 49622): A Manuscript of the Fourteenth Century in the Library of C.W. Dyson Perrins Described in Relation to Other East Anglian Books of the Period, (London: Chiswick Press, 1907), pp.3-4. Cockerell describes the Douai Psalter and reproduces some of its paintings. There is also a description of the intact MS. in C. Dehaisnes, Manuscripts de la bibliothèque de Douai. Catalogue Générale des Manuscrits des Bibliothèques Publiques des Départements, vol.6, (Paris: Imprimerie Nationale, 1878), pp.79-81. This entry is particularly valuable because it gives an account of the lost full-page miniatures of the 'Virgin and Child' and the 'Cruxifixion' (ff.12-13). Of these, Dehaisnes comments: "... il est impossible de donner une idée de la finesse de l'exécution, de la richesses des détails et de la fécondité de l'artiste." Ibid., p.80.
163. Lasko and Morgan, Medieval Art in East Anglia, p.23.
164. Sandler, Peterborough Psalter, p.136, n.II.2 and see p.13.

165. I. Samuel, 22. The scene was used fairly frequently to illustrate the Psalm, which begins by asking "Quid gloriaris in malitia ...?" Doeg was acting at Saul's command at the time when the King was hostile to David. It is therefore appropriate that the words of David should be directed at his sometime sacrilegious enemy. See Sandler, Peterborough Psalter, pp.98-99, for a table of historiated initial subjects.
166. Fortunately, the Beatus page with this scene was reproduced by Cockerell, Gorleston Psalter, pl.XVII.
167. The facility with architectural design should be compared with the design of thrones in the same group of MSS. See, for example, the Beatus initial of the Ormesby Psalter: Douce 366, f.10r.
168. Additional.49622, f.7r.
169. Lasko and Morgan, Medieval Art in East Anglia, pp.18 and 24; and Pächt, 'Giottesque Episode', p.51 and pl.14b-c.
170. Now lost, but reproduced in Cockerell, Gorleston Psalter, pl.XVI.
171. The spatial design of the two Crucifixions is discussed by McCorkel, 'Page Space and Picture Space', pp.226-32.
172. Yates Thompson 14, f.120r. For commentary, see Pächt, 'Giottesque Episode', pp.52-53; and Rickert, Painting in Britain, pp.131-32. For further illustration, see /G.F. Warner/ Facsimiles in Photogravure of Six Pages from a Psalter, Written and Illuminated about 1325 A.D. for a Member of the St. Omer Family of Norfolk, Subsequently (c.1422 A.D.) the Property of Humphrey, Duke of Gloucester, Fourth Son of King Henry IV, and Now in the Library of Henry Yates Thompson, 19, Portman Square, London, (London: Chiswick Press, 1900).
173. London, British Library, MS. Arundel 83 (Part I), f.133v.
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177. E.W. Tristram, English Wall Painting of the Fourteenth Century, ed. Eileen Tristram with catal. by E.W. Tristram and Monica Bardswell, (London: Routledge, 1955), pp.30-31 and 46.
178. Ibid., p.54; and Edward Wedlake Brayley and John Britton, The History of the Ancient Palace and Late Houses of Parliament at Westminster: Embracing Accounts and Illustrations of St. Stephen's Chapel, and its Cloisters, - Westminster Hall, - the Court of Requests, - the Painted Chamber, etc., (London: Weale, 1836), p.89.

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181. Tristram, English Wall Painting, p.48.
182. Ibid., pl.1.
183. Ibid., p.52.
184. John Topham, Some Account of the Collegiate Chapel of St. Stephen, Westminster; with 'Description of the Additional Plates of St. Stephen's Chapel', by H.C. Englefield, (London: Society of Antiquaries, 1795); quoted extensively in Tristram, English Wall Painting, esp. pp.207, 209, 215 and see p.51.
185. Englefield, 'Description', in Topham, Some Account, p.18, commenting on pl.19. Note also the remark of Rokewode, 'Memoir on the Painted Chamber', p.16: "... if it were possible to prove these to be English works, the Italians of the same period could not boast of being our superiors in art."
186. See also Topham, Some Account, pp.15-16; and see pls. 17, 19, 22, 23, 25, 26 and 27.
187. London, British Library, MS. Egerton 1894. See Montague Rhodes James, Illustrations of the Book of Genesis: Being a Complete Reproduction in Facsimile of the Manuscript British Museum, Egerton 1894, intro. by M.R. James, (Oxford: Roxburghe Club, 1921).
188. Pächt, 'Giottoesque Episode', pp.59-64. Pächt concludes, p.63: "If my observations are correct, it means that the set of illustrations from which the Genesis Master borrowed certain iconographic features of late-antique invention, must have preserved to a high degree the late antique style of the original if indeed it was not itself the original." Henderson places more emphasis on the influence of early Christian mosaics and also posits the existence in England of a MS. which preserved late-antique traditions of Bible illustration. See Henderson, 'Late-Antique Influences', pp.182-83, 188-90 and 194-98.
189. Pächt, 'Giottoesque Episode', pp.63-69.
190. Egerton 1894, f.14v.
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192. London, British Library, MS. Additional 44949, f.6r. See Eric G. Millar, 'The Egerton Genesis and the M.R. James Memorial Psalter', Archaeol., vol.87 (1938), pp.1-5.

193. For a comparison of spatial composition in the Egerton Genesis and James Psalter, see McCorkel, 'Page Space and Picture Space', pp.232-38.
194. Additional 44949, ff.4v and 5v.
195. Egerton 1894, f.8r. See also 'Noah Building the Ark', f.2v.
196. Note the less successful 'bird's eye view' architecture in the borders of an associated MS., the Fitzwarin Psalter (Paris, Bibliothèque Nationale, MS. latin 765), discussed by Francis Wormald, 'The Fitzwarin Psalter and its Allies', JWCI, vol.6 (1943), pp.71-79, rpt. in Warburg and Courtauld Institutes, eds., England and the Mediterranean Tradition, pp.60-68; and see above, vol.1, pp.454-56
197. Saxl and Wittkower, British Art and the Mediterranean, ch.33, figs.a, 5 and 8.
198. Ibid., ch.33, figs. 6 and 9.
199. Pächt, 'Giottesque Episode', p.68.
200. As in the 'Burial of Sarah', Egerton 1894, f.12r.
201. e.g. in the pictures of Rebekah giving camels water and Eliezer meeting Rebekah, ibid., f.12v.
202. Additional 44949, f.3v. Rickert is disparaging of the spatial effects of this miniature in her Painting in Britain, pp.148-49.
203. Oxford, Bodleian Library, MS. Rawlinson G185, f.68v. See Pächt, 'Giottesque Episode', pp.69-70.
204. Egerton 1894, f.7v. See also f.12r.
205. See also 'Abram Settles in Mamre', ibid., f.8r.
206. Pächt, 'Giottesque Episode', p.69.
207. The MSS. are:
- i. Oxford, Exeter College, MS. 47.
 - ii. Oxford, Bodleian Library, MS. Auct. D.4.4.
 - iii. Vienna, National Library, Cod. 1826.
 - iv. Copenhagen, National Library, Thotts Saml. 547.
 - v. Cambridge, Fitzwilliam Museum, MS. Additional 38-1950.
- These five receive substantial reproduction in Montague Rhodes James and Eric George Millar, The Bohun Manuscripts: A Group of Manuscripts Executed in England about 1370 for Members of the Bohun Family, (Oxford: Roxburghe Club, 1936). Mentioned by Millar but not included in the plates is:
- vi. Edinburgh, National Library, MS. Advocates' 18.6.5.
- Rickert, Painting in Britain, pp.243-44, n.10, draws attention to two MSS. subsequently discovered bearing the Bohun arms:
- vii. London, British Library, MS. Royal 20.D.iv.
 - viii. London, British Library, MS. Egerton 3277.
- A marginal note on p.1 of James and Millar, Bohun Manuscripts, in the Wormald Library, Kings Manor, University of York Centre for Medieval Studies, includes MSS. vii and viii and adds:

- ix. Oxford, Bodleian Library, MS. Laud Miscellaneous 188.
 - x. Copenhagen, Royal Library, Thott 517.
 - xi. Pommersfelden, MS. 348.
- Two further MSS. of the group have now come to light:
- xii. London, British Library, MS. Additional 16968.
 - xiii. Oxford, Bodleian Library, MS. Astor A1.
208. For commentary, see Rickert, Painting in Britain, pp.149-50. In her Carmelite Missal, p.75, Rickert comments: "The Bohun style thus formulated, apparently as a result of direct Italian influence on the remnants of the East Anglian tradition, becomes established as the characteristic English style ... "
209. Auct. D.4.4., f.88v, rpt. in James and Millar, Bohun Manuscripts, pl.XXVII(a).
210. Exeter College, MS. 47, f.117v, rpt. in James and Millar, Bohun Manuscripts, pl.XIX (b).
211. Advocates' 18.6.5, f.181v.
212. Egerton 3277, f.67r.
213. Advocates' 18.6.5, f.34r.
214. Auct. D.4.4., f.243v.
215. See also the effect created by Paul de Limbourg in his October miniature of the Très Riches Heures, described above, vol.1, pp.445-47.
216. See above, vol.1, pp.442-44.
217. Exeter College, MS. 47, f.89r, rpt. in James and Millar, Bohun Manuscripts, pl.XIV (d). See also Initial I of f.125v, rpt. in ibid., pl.XXII (c).
218. Exeter College, MS. 47, f.62r.
219. See above, vol.1, pp.449-50.
220. London, Westminster Abbey Library, ^{MS.37} f.157v.
221. Rickert, Painting in Britain, pp.151-52.
222. Even here, the aversion of Stephaton probably has a symbolic meaning, as does the contorted face of the mocker. See Meiss, Late Fourteenth Century, vol.1, pp.103-4.
223. Gertrud Schiller, Iconography of Christian Art, trans. Janet Seligman, 2 vols., (1968-1969; London: Lund Humphries, 1971-1972), vol.2 (1972): The Passion of Jesus Christ, pp.92 and 109.
224. Ibid., p.108.
225. London, British Library, MSS. Additional 29704-5, 44892.

226. Rickert, Carmelite Missal, pp.61-64 and 80-90; and see her Painting in Britain, pp.153-54.
227. Additional 29704-5, 44892, ff.6v, 68v, 152v and 140r; rpt. in Rickert, Carmelite Missal, pls.I, VIII, XX, and XIXb.
228. Additional 29704-5, 44892, ff.6v, 93r and 165r; rpt. in Rickert, Carmelite Missal, pls.I, IX and XXX.
229. See also Additional 29704-5, 44892, f.93r; rpt. in Rickert, Carmelite Missal, pl.IX.
230. Ibid., pp.61-62.
231. Ibid., ch.4. See the 'Annunciation' miniature of the Beaufort Hours (London, British Library, MS. Royal 2A.xviii); and Rickert, Painting in Britain, pp.156-57 and pl.172.
232. e.g. in the Wilton Diptych at the National Gallery. See Rickert, Painting in Britain, pp.159-60 and pls.160-61; and Francis Wormald, 'The Wilton Diptych', JWCI, vol.17 (1954), pp.191-203.
233. Rickert, Painting in Britain, p.166.
234. London, British Library, MS. Additional 42131. For discussion, see ibid., pp.168-76 and pls.169-71 and 173-77; and on Scheere's oeuvre, Charles L. Kuhn, 'Herman Scheere and English Illumination in the Fifteenth Century', Art B., vol.22 (1940), pp.138-56.
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237. See above, vol.1, pp.423-24.
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239. See below, vol.2, pl.XXIX.
240. Historical identification of the figures is attempted in Margaret Galway, 'The Troilus Frontispiece', MLR, vol.44 (1949), pp.162-77; and see Aage Brusendorff, The Chaucer Tradition, (1925; rpt. Oxford: Clarendon Press, 1967), pp.19-27; and George Williams, 'The Troilus and Criseyde Frontispiece Again', MLR, vol.57 (1962), pp.173-78. For a more sceptical view, see Pearsall, 'Troilus Frontispiece', passim. Salter, 'Introduction' to Chaucer, 'Troilus' Facsimile, p.22, and n. 28, suggests that the miniature may depict the author surrounded by the events and personages of his poem.
241. See above, vol.1, pp.442-43.

242. John White, 'Developments in Renaissance Perspective - I', JWCI, vol. 12 (1949), pp.58-79; and Panofsky, 'Perspektive als "Symbolische Form"', pp.283-91.
243. Robert Klein, 'Pomponius Gauricus on Perspective', Art B., vol. 43 (1961), pp.211-30; and Jacques Mesnil, 'Masaccio et la théorie de la perspective', Rev. Art Anc. Mod., vol.25 (1914), pp.147-56.
244. Rome, Biblioteca Vaticana, Cod. Vaticano 4595. See Narducci, 'Intorno ad una traduzione', pp.2-3 and 7-12 for transcriptions; and Vescovini, 'Storia della fortune di Alhazen in Italia', pp.17-21. Vescovini remarks, p.20: "Gli artisti cercavano infatti nei trattati medievali di perspectiva quelle nozioni sulla visione, sulle luce e sul colore, quegli elementi di definizione dello spazio visivo, che permettessero loro una soluzione del problema della rappresentazione sul piano degli oggetti a tre dimensioni." Some excerpts from the medieval optical treatises that were potentially useful to artists are instanced by Tea, 'Witelo', pp.13-29.
245. Lindberg, Theories of Vision, pp.130-31.
246. Edgerton, Renaissance Rediscovery, pp.61-62 and 77; and Alessandro Parronchi, 'Le Due tavole prospettiche del Brunelleschi' (1958-1959), rpt. in his "Dolce" prospettiva, pp.239-43.
247. Giulio Carlo Argan, 'The Architecture of Brunelleschi and the Origins of Perspective Theory in the Fifteenth Century', JWCI, vol.9 (1946), pp.103-5; Parronchi, 'Tavole prospettiche', pp.234-77, presents the optical data on which Brunelleschi may have drawn.
248. Antonio di Tuccio Manetti, The Life of Brunelleschi, ed. Howard Saalman, trans. Catherine Enggass, (Univ. Park, Pennsylvania and London: Pennsylvania State Univ. Press, 1970), pp.42-44.
249. For full reconstructions of the Baptistery picture, see Edgerton, Renaissance Rediscovery, ch.10; Parronchi, 'Tavole prospettiche', pp.243-61; and White, Birth and Rebirth, pp.114-20.
250. Ibid., pp.116 and 120.
251. Manetti, Life of Brunelleschi; ed. Saalman, p.43.
252. Leon Battista Alberti, 'On Painting' and 'On Sculpture': The Latin Texts of 'De pictura' and 'De statua', ed. and trans. Cecil Grayson, (London: Phaidon, 1972), pp.12-23.
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255. Alberti, De pictura, I.5-11; ed. Grayson, pp.38-46; and see Edgerton, Renaissance Rediscovery, diag.VI-1.

256. Alberti, De pictura, I.19; ed. Grayson, p.54.
257. Ibid., I.12; ed. Grayson, p.48.
258. Ibid., I.19-20; ed. Grayson, pp.54-56. See Lindberg, Theories of Vision, pp.149-50; Edgerton, Renaissance Rediscovery, pp.42-49; and William M. Ivins, Jr., On the Rationalization of Sight, with an Examination of Three Renaissance Texts on Perspective. Metropolitan Museum of Art Papers, no.8, (New York: Metropolitan Museum of Art, 1938), pp.14-27.
259. Alberti, De pictura, II.31; ed. Grayson, pp.66-68.
260. It has been demonstrated that Ghiberti made use of the Italian version of Alhazen's De aspectibus now in the Vatican. See Vescovini, 'Storia della fortuna di Alhazen', pp.21-49; and for further commentary, White, Birth and Rebirth, pp.126-29; and Lindberg, Theories of Vision, pp.152-54.
261. Alessandro Parronchi has studied the relation between Ghiberti's optical writings and his bronze panels for the doors of the Baptistery in Florence in his 'Le "Misura dell'occhio" secondo il Ghiberti' (1961), rpt. in his "Dolce" prospettiva, pp.313-48.
262. Lorenzo Ghiberti, I Commentarii; ed. Ottavio Morisiani, (Naples: Ricciardi, 1947), p.121; and see above, vol.1, pp.98-99.
263. Ghiberti, Commentarii; ed. Morisiani, p.125. White, Birth and Rebirth, p.129, comments: "This passage is striking in two respects. The first is its similarity to that in which Alberti insists, with added classical allusions, but more restricted purpose, that man is the measuring rod of nature. The second is that it confirms that the ground plane provides the most satisfactory and familiar, ordered, and continuous series of objects which can be used to measure distance. It therefore comes even closer than the second proposition to the formulation of the idea of the foreshortened, rectangular pavement which, in artificial perspective, creates, and measures out, the space that contains all the objects of the pictorial world. The very size of the subdivisions, based upon the stature of a well-built man, stresses the point already made by Alhazen." See also Witelo, cited above, vol.1, p.115.
264. Loc. cit.

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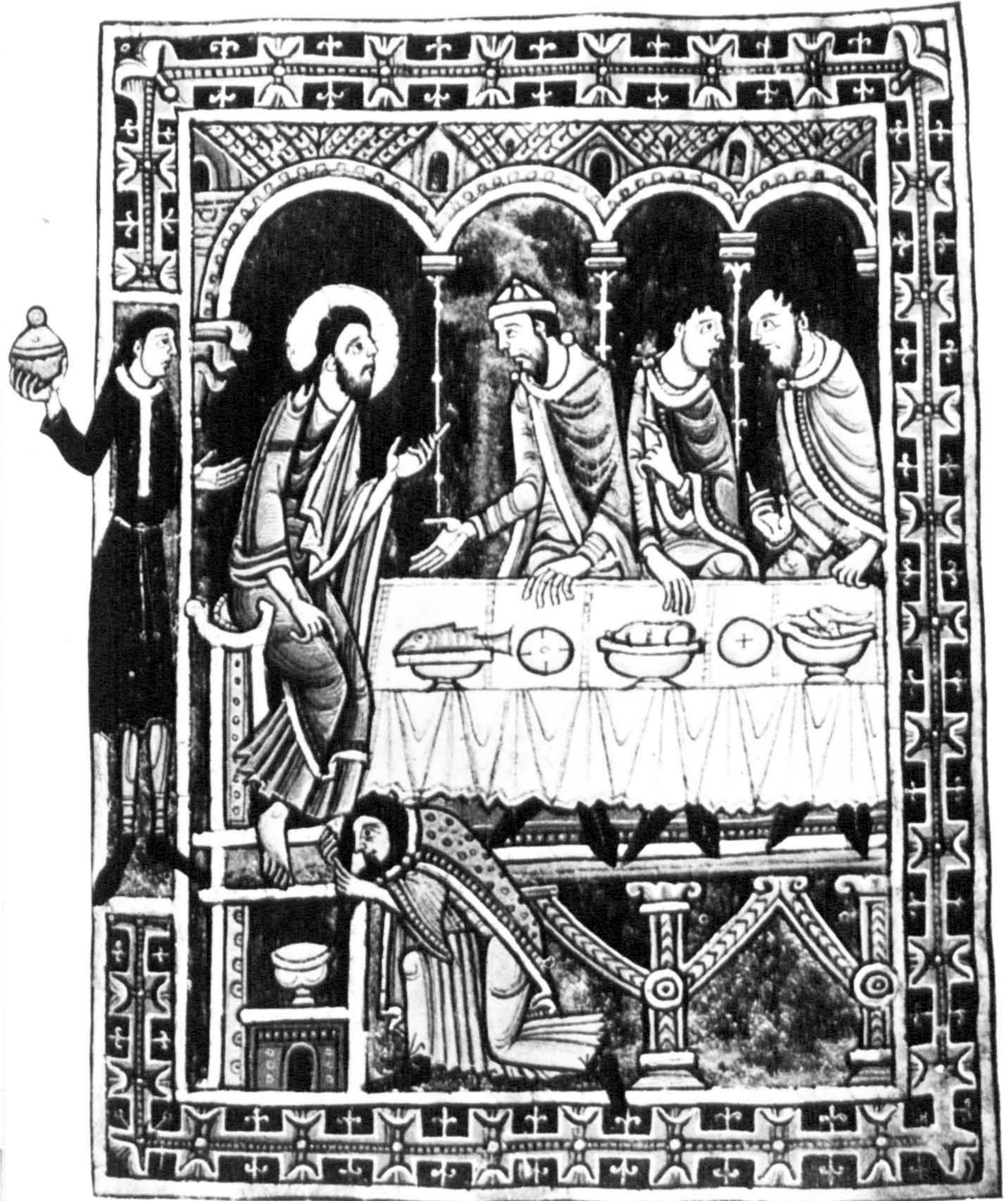
PLATES



I: 'Thetis in the Workshop of Hephaestus'
(c.A.D. 79).
Naples, Museo Nazionale.



II: 'St. Luke', from a Gospel Book (mid-10th. cent.)
Mount Athos, Stavronikita, MS. 43, f.12v.,
(orthogonals added).



III: Alexis Master, 'Christ in the House of Simon the Pharisee' (c.1119-1123), from the St. Alban's Psalter. Hildesheim, MS. Library of St. Godehard, f.36r.



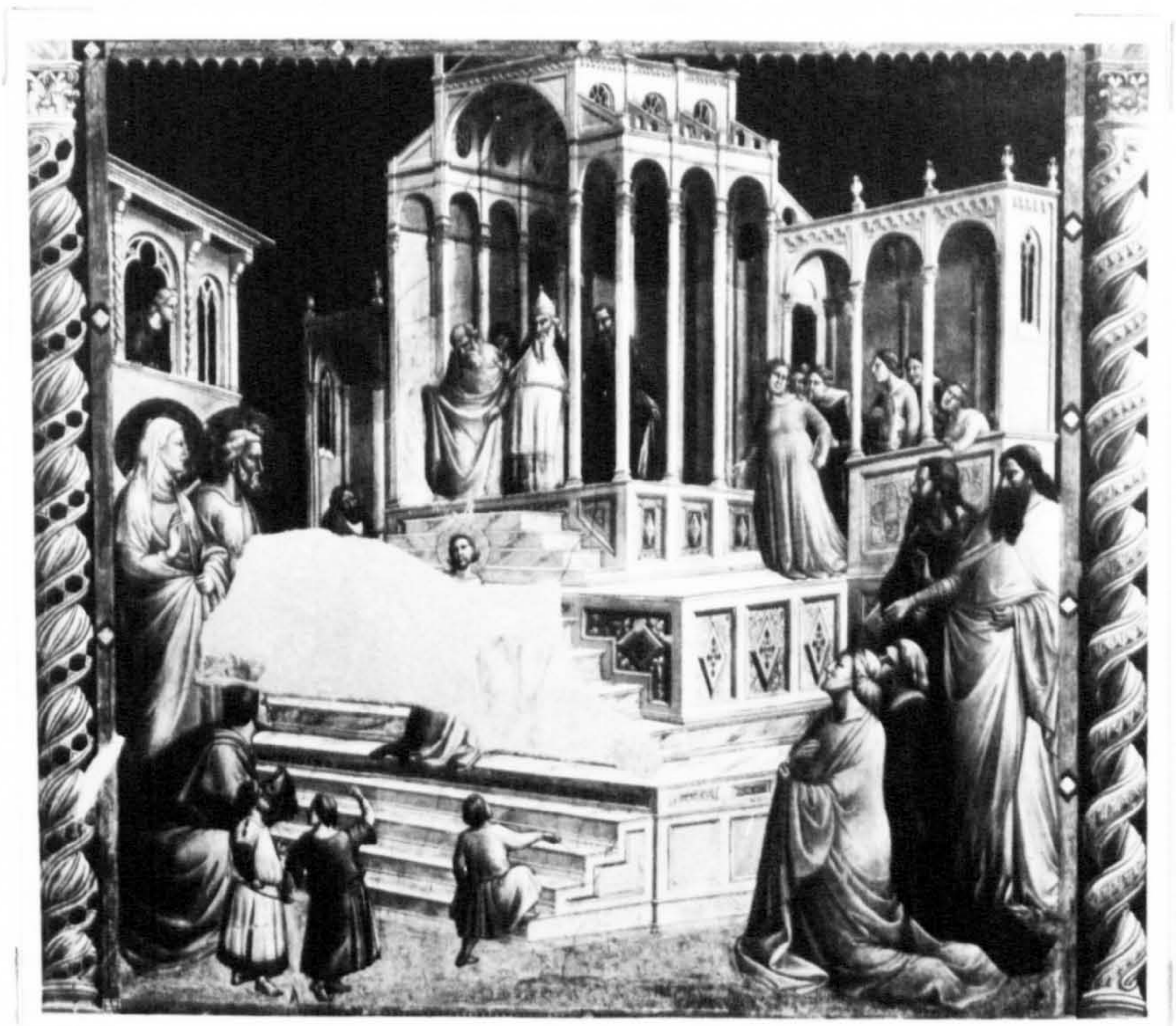
IV: Honoré, 'David and Goliath' (late 13th. cent.),
from the Breviary of Philip the Fair.
Paris, Bibliothèque Nationale, MS. latin 1023,
f. lv.



V: Duccio de Buoninsegna, 'Entry into Jerusalem' (1311), from the Maestà.
Siena, Museo dell'Opera del Duomo.



VI: Giotto di Bondone, 'Marriage at Cana' (1304-1312/13).
Padua, Arena Chapel.



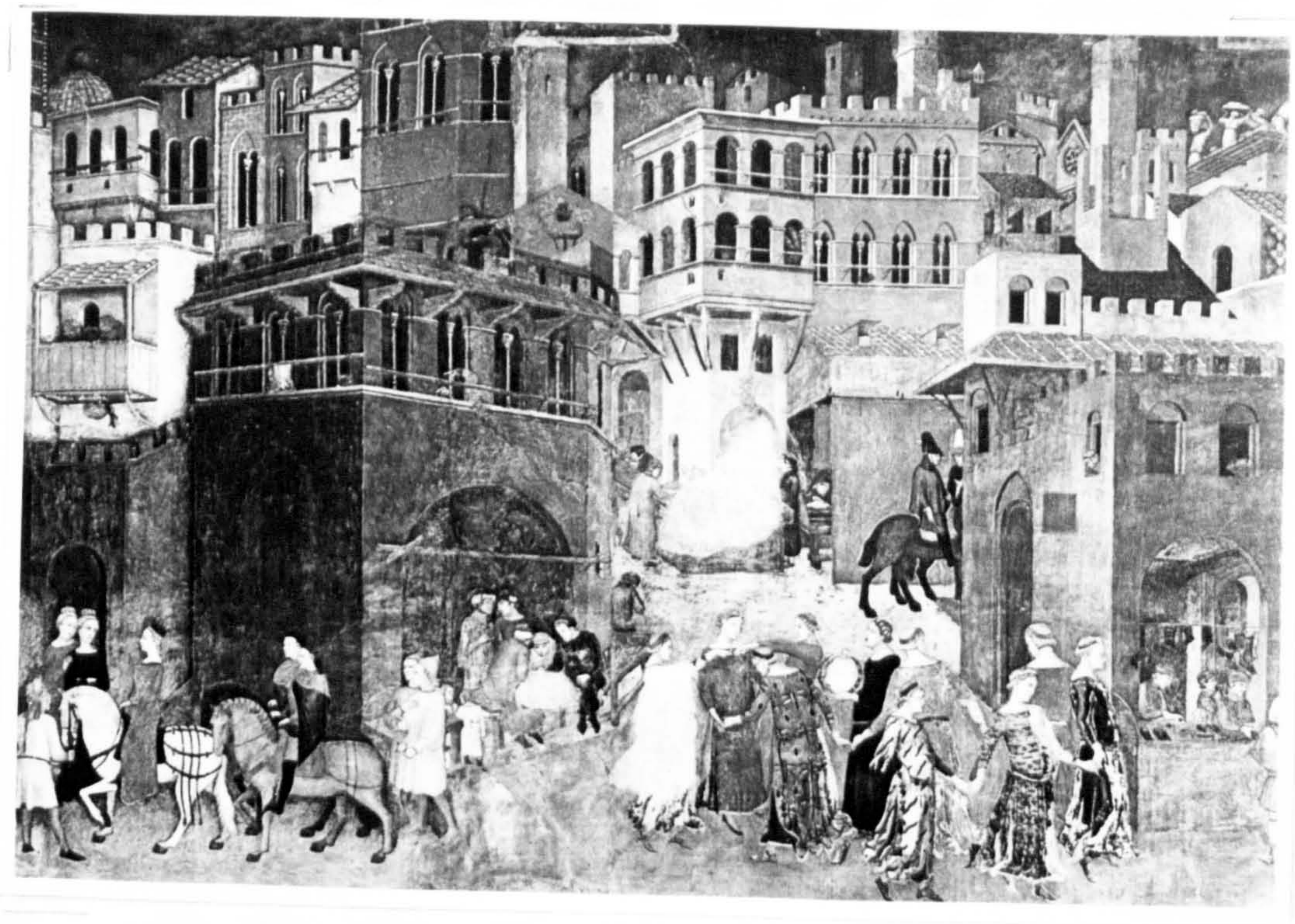
VII: Taddeo Gaddi, 'Presentation of the Virgin'
(1332-1338).
Florence, Santa Croce, Baroncelli Chapel.



VIII: Pietro Lorenzetti, 'Birth of the Virgin' (1342).
Siena, Museo dell'Opera del Duomo.



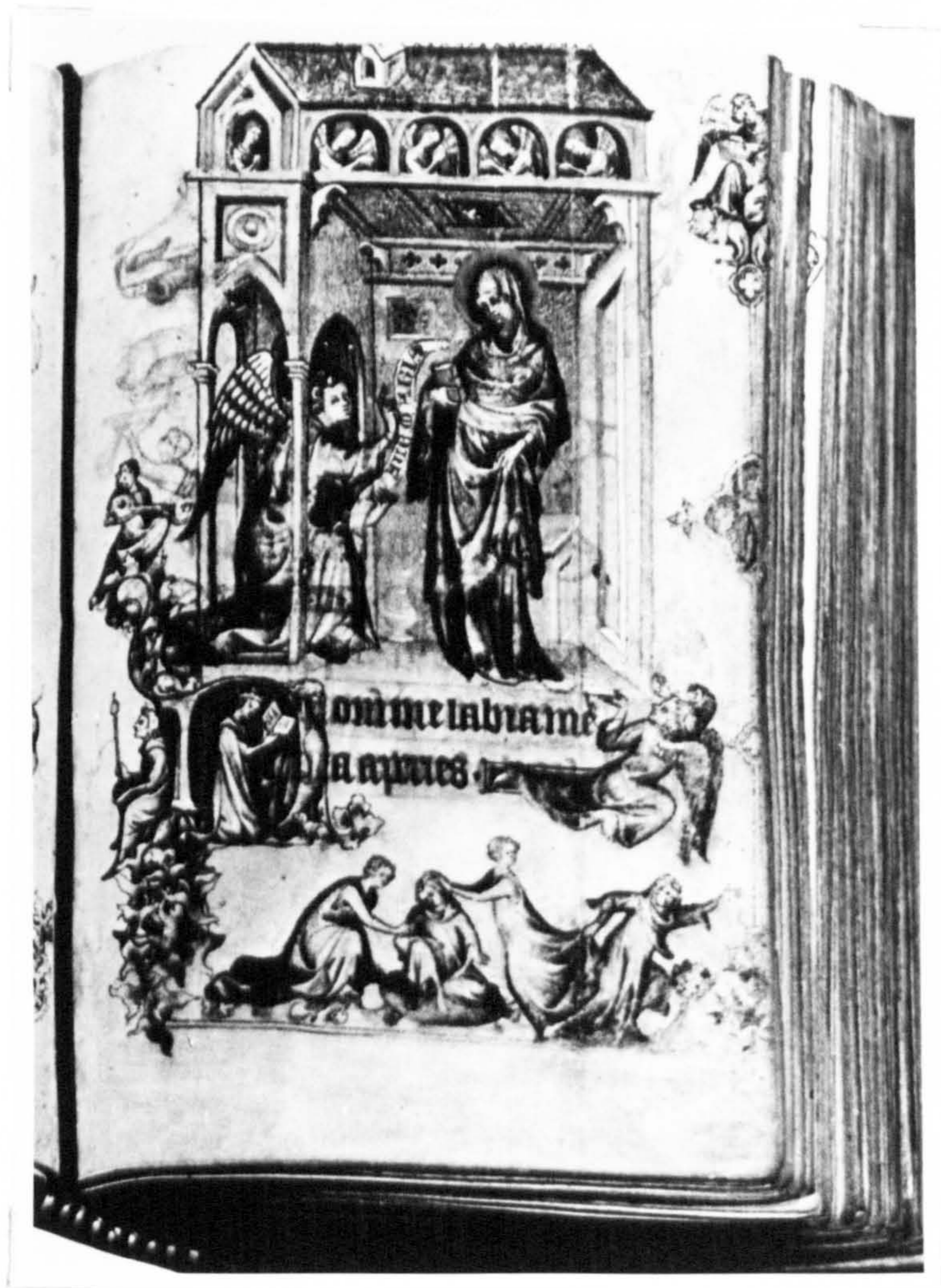
IX: Ambrogio Lorenzetti, 'Presentation of Christ'
(1342). Florence, Uffizi, (orthogonals added).



X: Ambrogio Lorenzetti, 'City Life' (1338-1339), detail from the Allegory of Good Government. Siena, Palazzo Pubblico.



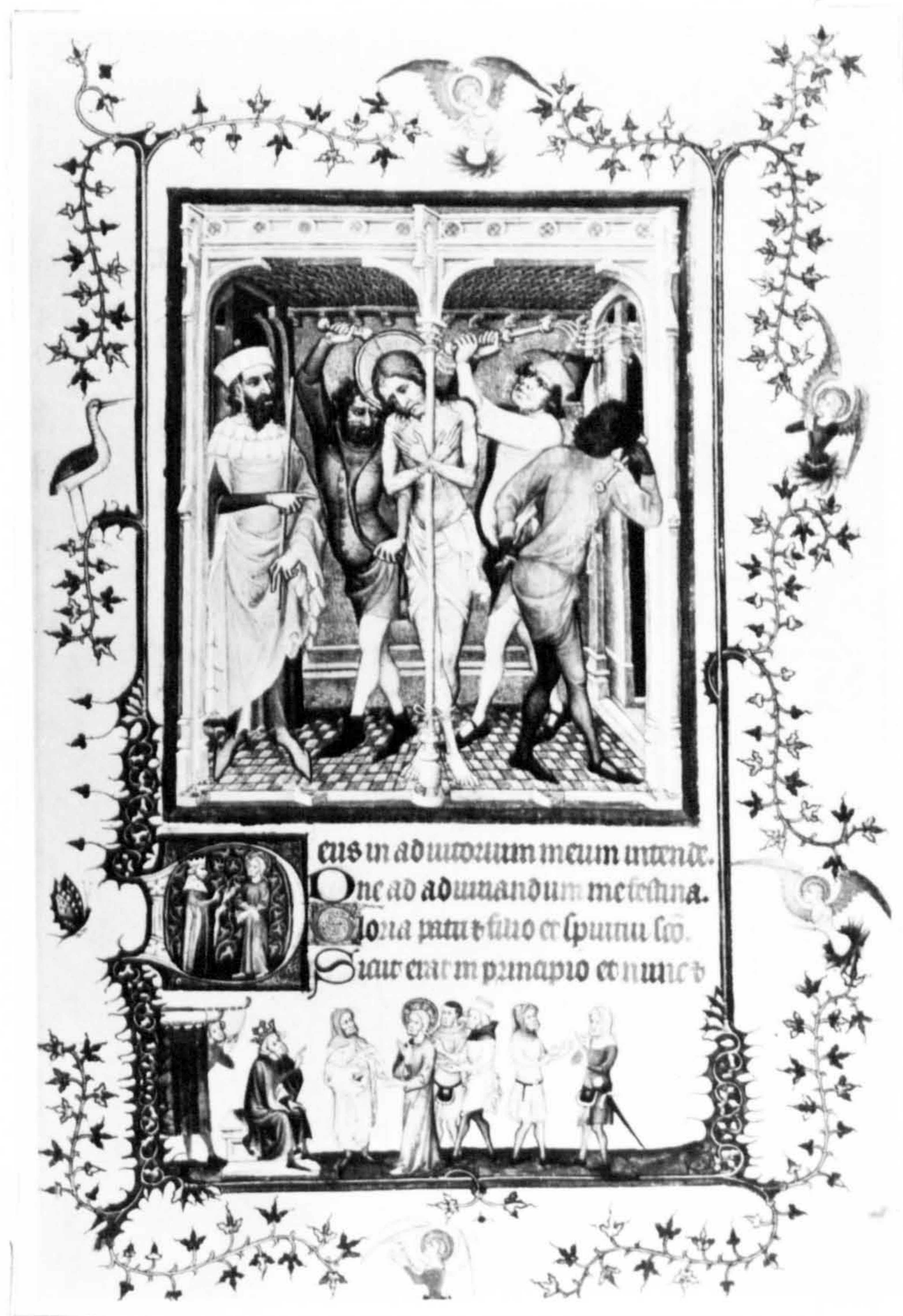
XI: Ambrogio Lorenzetti, 'Country Life' (1338-1339), detail from the Allegory of Good Government. Siena, Palazzo Pubblico.



XII: Jean Pucelle, 'Anunciation' (1325-1328), from the Hours of Jeanne d'Evreux.
New York, Metropolitan Museum of Art Cloisters Collection, MS. 54.1.2, f.16r.



XIII: Jean Bondol, 'Jean de Vaudetar Presenting a Bible to Charles V' (1371), from the Bible of Charles V.
The Hague, Meermanno-Westreenianum Museum, MS. 10.B.23, f.2r.



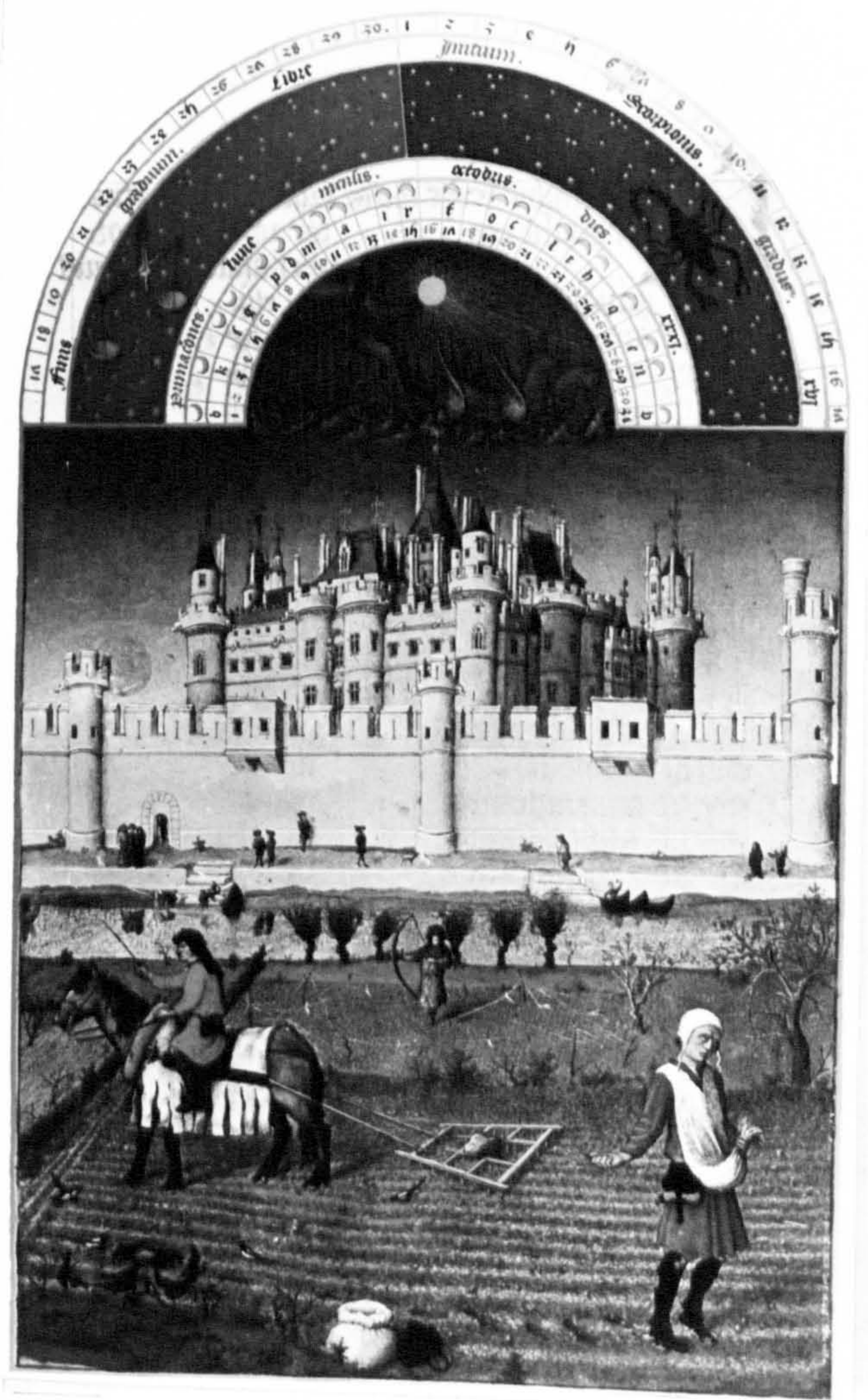
XIV: 'Parement' Master and Workshop, 'Flagellation'
 (1382-1385), from the Très Belles Heures de
Notre Dame.
 Paris, Bibliothèque Nationale, MS. nouvelle
 acquisition latine 3093, p.197.



XV: Jacquemart de Hesdin, 'Flight into Egypt' (c. 1390-1395), from the Brussels Hours. Brussels, Bibliothèque Royale, MS. 11060-1, p.106 (detail).



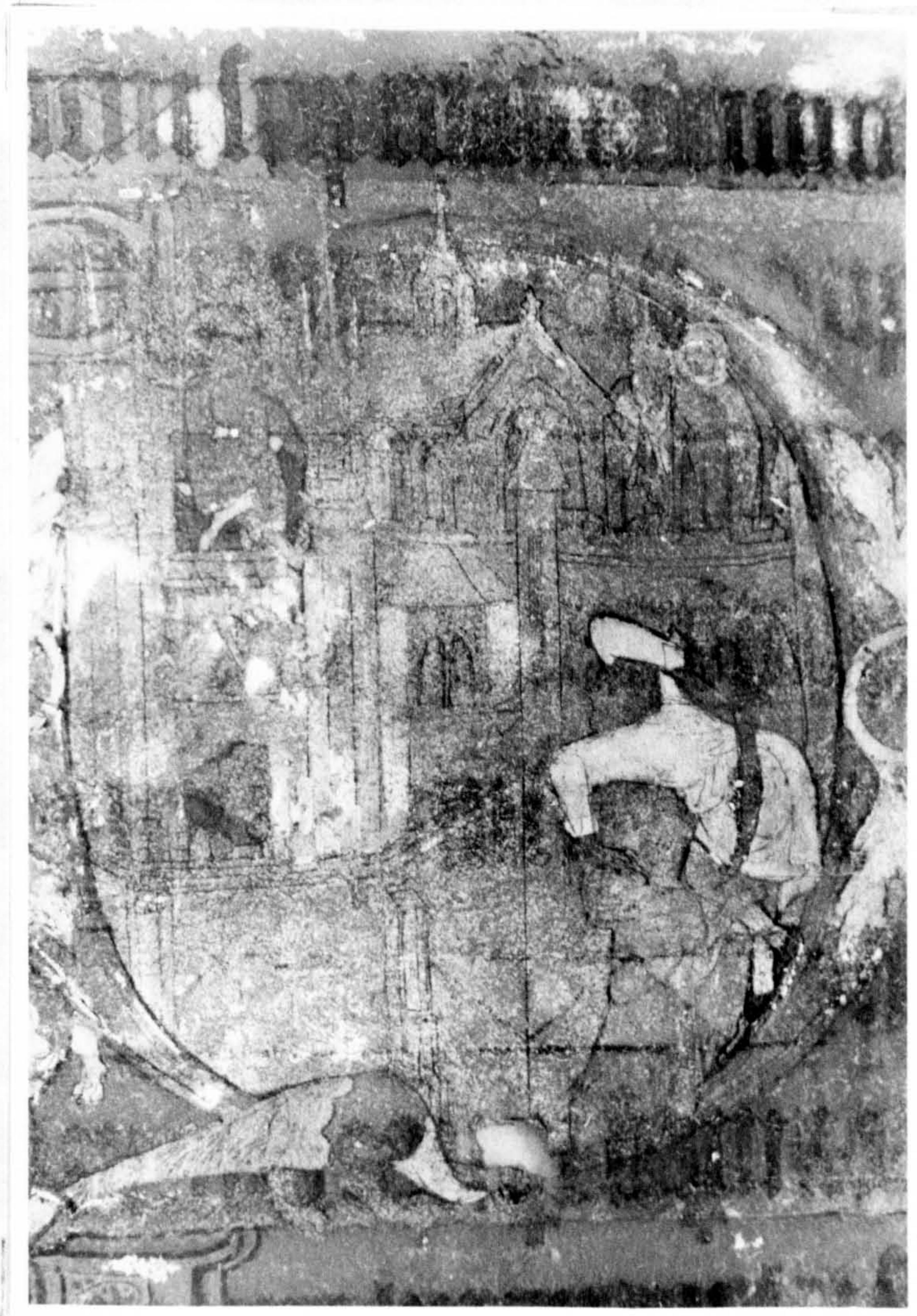
XVI: Boucicaut Master, 'Charles VI with his Retinue and Pierre Salmon' (1411-1412), from the Dialogues de Pierre Salmon. Geneva, Bibliothèque Publique et Universitaire, MS. français 165, f.4r.



XVII: Paul de Limbourg, 'October' (1415-1416), from the Très Riches Heures du Duc de Berry. Chantilly, Musée Condée, MS. 65, f.10v.



XVIII: 'Christ before the Doctors' (before 1310), from the Ramsey Psalter. New York, Pierpoint Morgan Library, MS. M.302, f.2v.



XIX: 'Doeg and the Priests' (after 1322), offset initial Q from the Douai Psalter. Douai, Bibliothèque Municipale, MS. 171 (disbound folio).



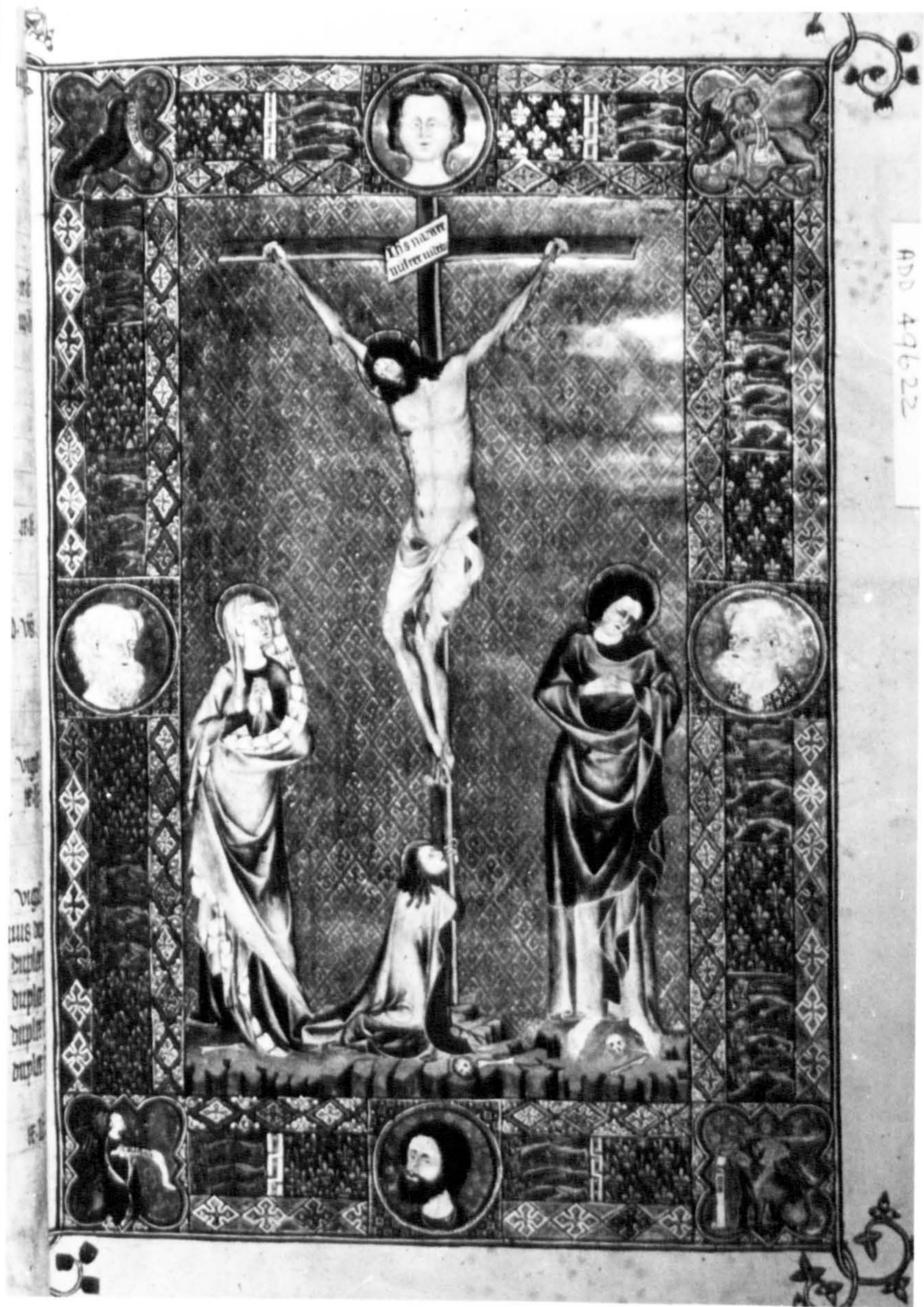
XX: 'Cityscape' (after 1322), detail from the Beatus page (destroyed) of the Douai Psalter. Formerly Douai, Bibliothèque Municipale, MS. 171.



XXI: 'Portrait Head' (after 1322), line-ending from the Douai Psalter.
Douai, Bibliothèque Municipale, MS. 171 (disbound folio).



XXII: 'Portrait Head' (c.1320), detail from the border of the Gorleston Psalter 'Crucifixion'. London, British Library, MS. Additional 49622, f.7r.



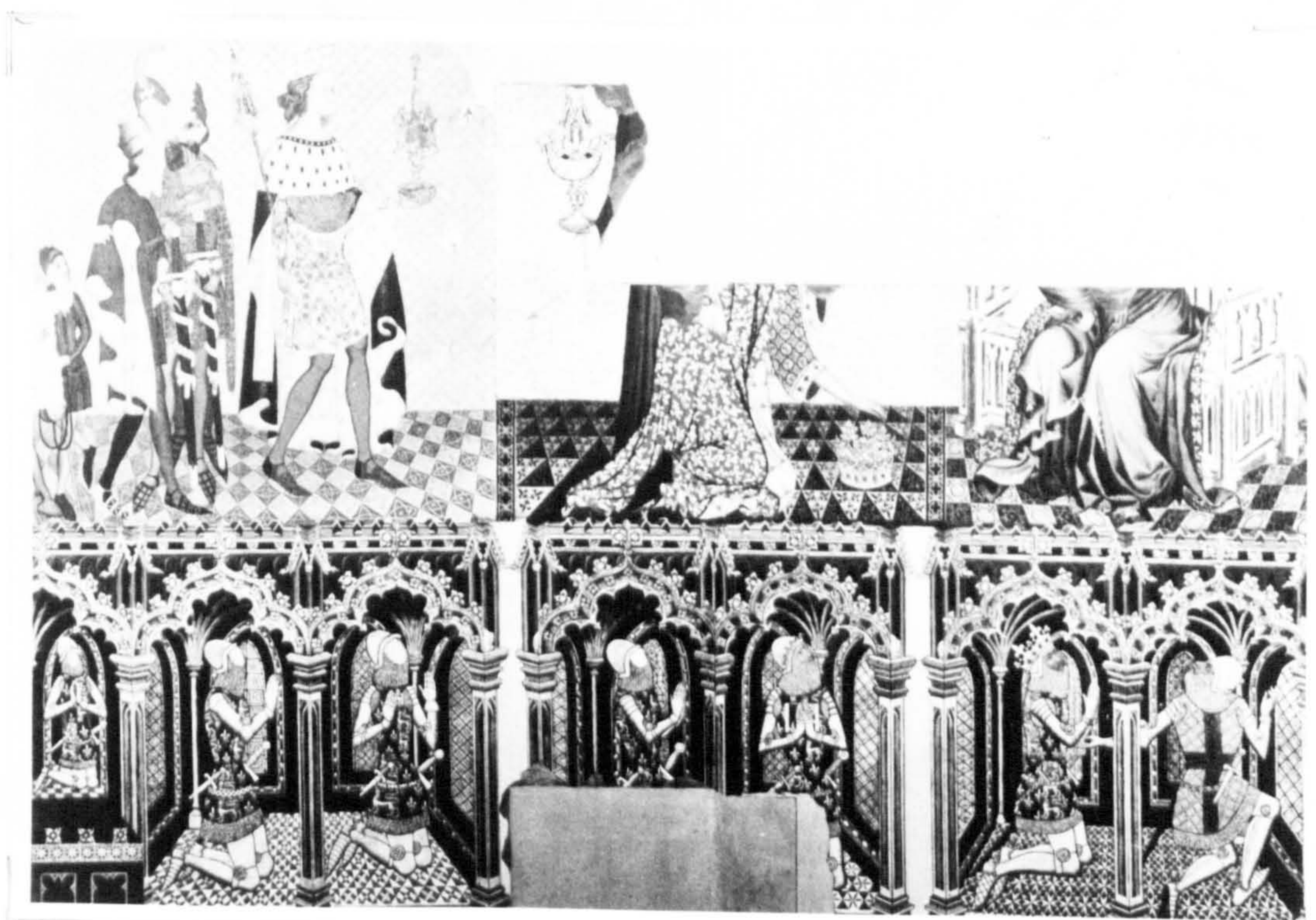
XXIII: 'Crucifixion' (c.1320), from the Gorleston Psalter.
London, British Library, MS. Additional 49622, f.7r.



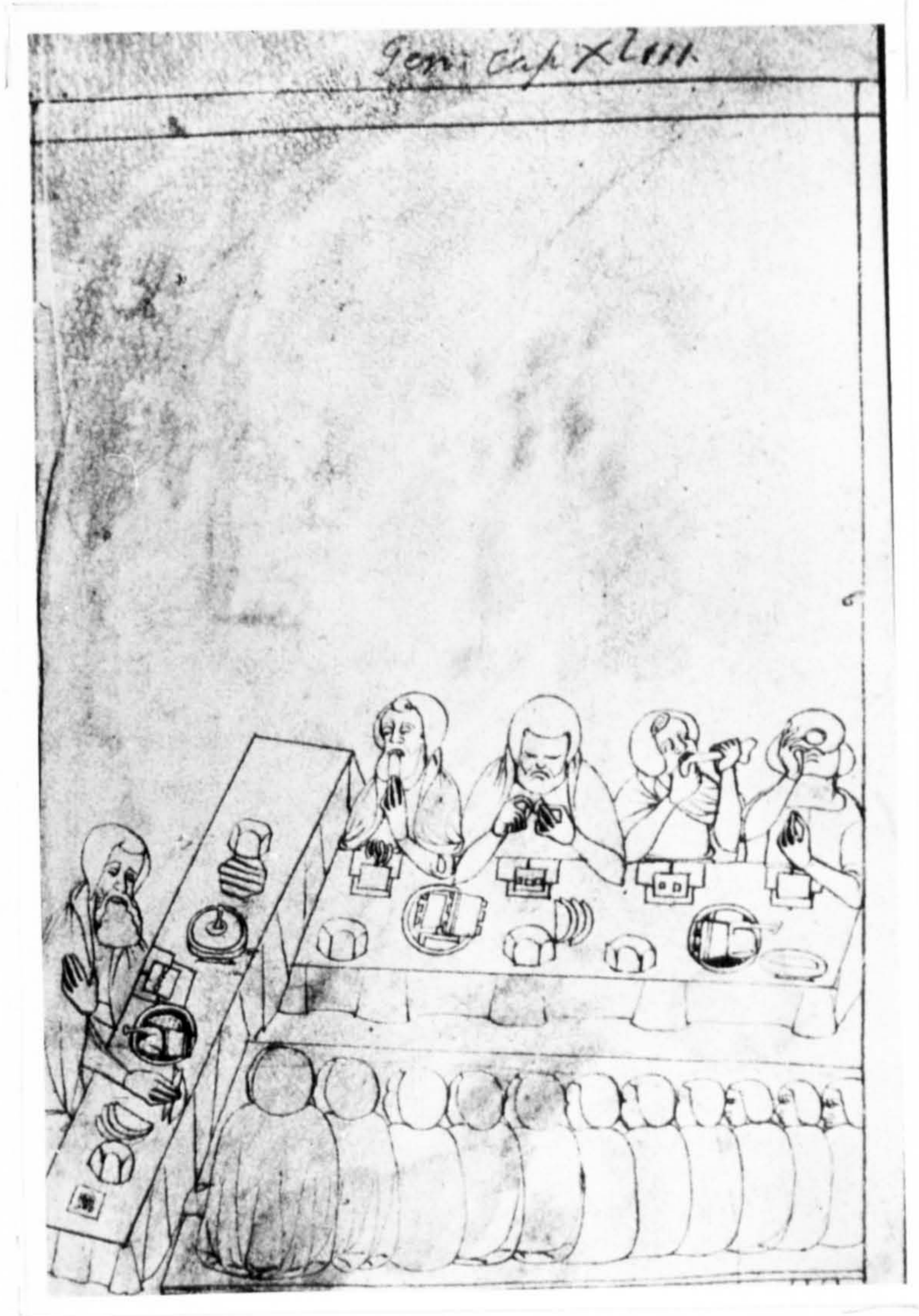
XXIV: 'Last Judgement' (c.1330), initial D from the St. Omer Psalter. London, British Library, MS. Additional 39810, f.120r.



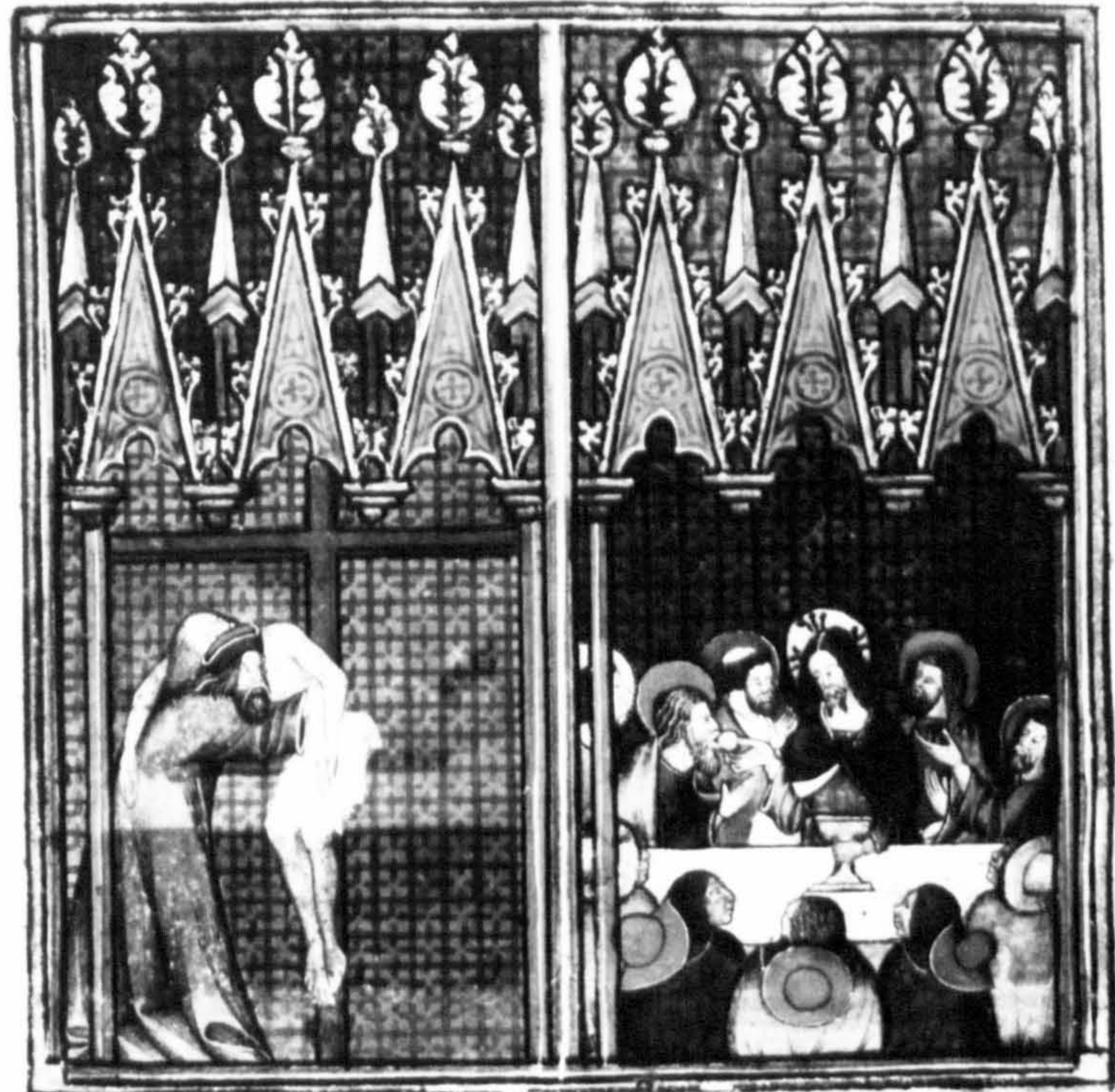
XXV: 'Ascension' (before 1339), from the Psalter of Robert de Lisle.
London, British Library, MS. Arundel 83 (Part I), f.133v.



XXVI: 'Adoration of the Magi' (1350-1363), now destroyed, from a copy made by Richard Smirke (c.1795).
Formerly London, St. Stephen's Chapel, Westminster Palace.

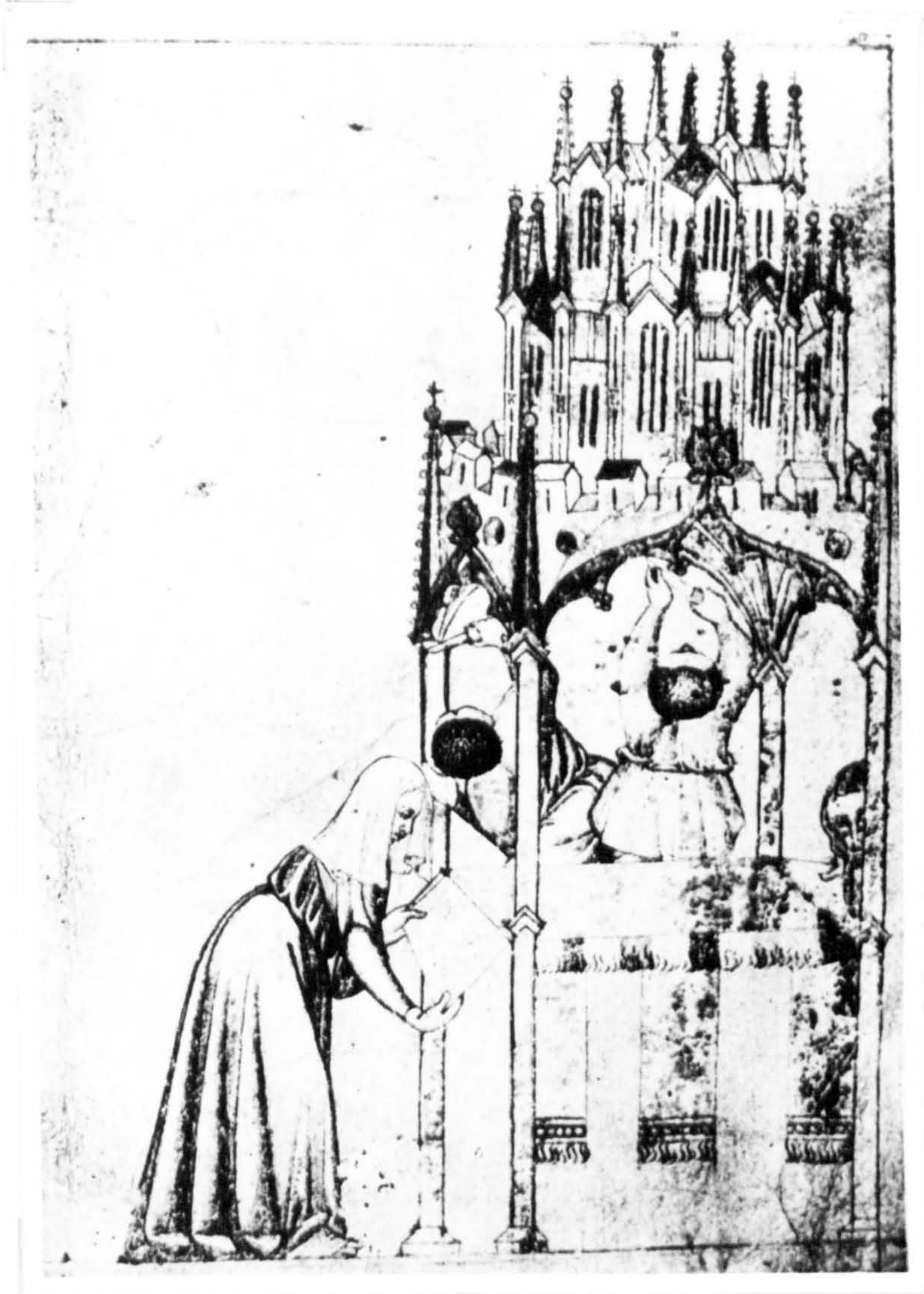


XXVII: Egerton Master, 'Joseph and his Brothers'
(3rd. quarter 14th. cent.), from the Egerton
Genesis.
London, British Library, MS. Egerton 1894,
f.14v.

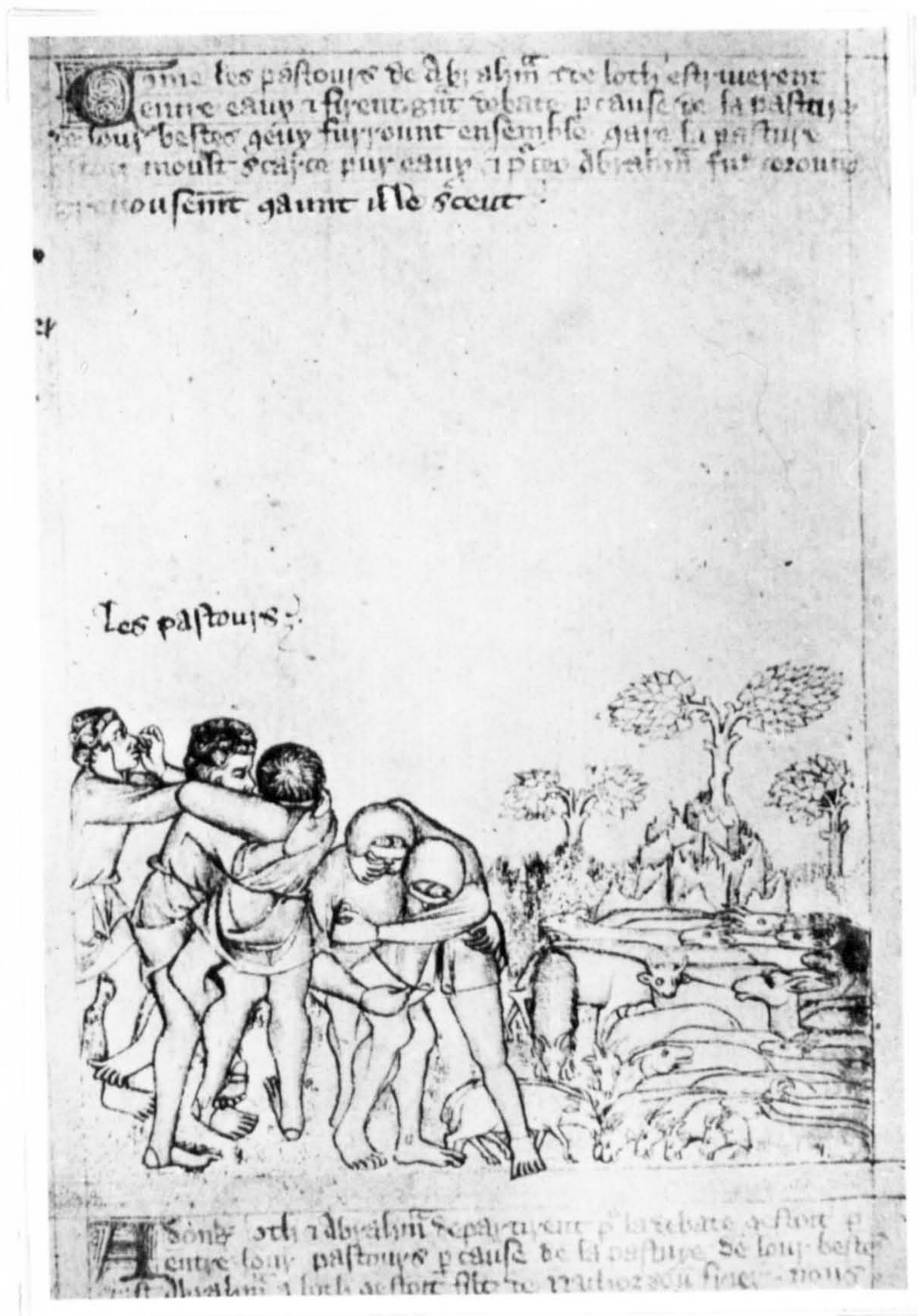


Domine ihū xp̄ qui hora uesp̄tina
de cruce depositus fuisti eademq;
hora discipulis tuis corpus i sanguis
tui tradidisti miserere deponere metis nre
miserere miserere miserere ut nra condicio

XXVIII: Egerton Master, 'Deposition and Last Supper'
(3rd. quarter 14th. cent.), from the M.R.
James Memorial Psalter.
London, British Library, MS. Additional 44949,
f.6r.



XXIX: Egerton Master, 'Abram's Shepherds Building the Temple at Mamre' (3rd. quarter 14th. cent.), from the Egerton Genesis. London, British Library, MS. Egerton 1894, f.8r.



XXX: Egerton Master, 'Quarrel of Abram's and Lot's Shepherds' (3rd. quarter 14th. cent.), from the Egerton Genesis. London, British Library, MS. Egerton 1894, f.7v.



XXXI: 'Last Judgement' (c.1399), initial D from a Psalter of Eleanor de Bohun. Edinburgh, National Library of Scotland, MS. Advocates' 18.6.5, f.34r.



XXXII: 'Raising of Lazarus' (c.1370-1380), from a
Psalter of Humphrey de Bohun.
Oxford, Bodleian Library, MS. Auctarium D.4.4.,
f.243v.



XXXIII: 'Roasting the Passover Lamb' (before 1375),
from a Psalter of Humphrey de Bohun.
Oxford. MS. Exeter College 47, f.62r.



XXXIV: 'Crucifixion' (1383-1384), from the Lytlington Missal.
London, MS. Westminster Abbey Library, ^{MS.37.} f.157v.



XXXV: 'Nativity of the Virgin' (1393-1398), initial G from the Carmelite Missal. London, British Library, MS. Additional 29704-5, 44892, f.138v.



XXXVI: 'Poet Reciting to a Courtly Audience' (c.1410),
frontispiece to the Cambridge Troilus.
Cambridge, Corpus Christi College, MS. 61,
f.1v.