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THE ARTS OF NUMBER IN THE MIDDLE AGES:
THE QUADRIVIUM

Spring 2022

Alongside the arts of language (grammar, rhetoric, and logic), medieval students would encounter the arts of number: arithmetic, the study of pure number; geometry, number in space; music, number in time; and astronomy, number in space and time (in Stratford Caldecott's formulation). In this course, we will be following this medieval curriculum insofar as we are able through some of its primary texts, many only recently translated, in order to come to a better appreciation of the way in which the study of these arts affected the development of the medieval European intellectual, scientific, and artistic tradition. This is a companion course to "The Arts of Language in the Middle Ages: The Trivium," but the two courses may be taken in either order.

BOOKS AVAILABLE FOR PURCHASE AT THE SEMINAR CO-OP BOOKSTORE

William Harris Stahl, with E.L. Burge, *Martianus Capella and the Seven Liberal Arts: Volume II: The Marriage of Mercury and Philology* (New York: Columbia University Press, 1977). [ISBN 978-0231096362]

Bede, *The Reckoning of Time*, trans. Faith Wallis (Liverpool: Liverpool University Press, 1999, 2004). [ISBN 978-0853236931]

Theophilus, *On Divers Arts: The Foremost Medieval Treatise on Painting, Glassmaking, and Metalwork*, trans. John G. Hawthorne and Cyril Stanley Smith (New York: Dover, 1979). [ISBN 978-0486237848]

Winthrop Wetherbee, *The Cosmographia of Bernardus Silvestris* (New York: Columbia University Press, 1973). [ISBN 978-0231096256]

Robert Grosseteste, *On Light*, trans. Clare Riedl (Milwaukee: Marquette University Press, 1978). [ISBN 978-0874622010]

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COURSE REQUIREMENTS

The primary texts that we are reading this quarter were all intended as handbooks for the practical study of the mathematical arts. Your assignment for the quarter is **to write your own handbook** for one of the arts we are studying, using only medieval techniques of instruction (10-12 pages for undergraduates; 15-18 pages for graduate students).

Your handbook may use diagrams, charts, and any other tools that you discover in our medieval sources, but *no modern mathematical notations*. You will also be expected to annotate your handbook with appropriate references, showing your authorities. You may also use your annotations (or glosses) to make comments for your readers. You may use the assigned primary texts and readings as sources, but you should also consult the bibliographies in the readings for further materials. Additional resources may be found through the International Medieval Bibliography (online via Regenstein Library).

To help you design your handbook, you will be **presenting in three class meetings** on the readings for the day. You should choose **two of your days** for presentation based on the art that you want to write your handbook on, but you may adjust before May 1 (if you find you want to change). Think of the presentations as opportunities to test how you would present aspects of your art, rather than simply reporting on the assigned readings.

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READING AND DISCUSSION ASSIGNMENTS

March 29 The Quadrivial Arts
Paul Abelson, *The Seven Liberal Arts: A Study in Medieval Culture* (New York: Teacher's
    College, Columbia University, 1906; 1939), chapters VII-X, pp. 90-134

March 31 The Music of Numbers
Augustine, *On Music,* book six, in *The Immortality of the Soul, et al.,* trans. Ludwig Schopp, The
    Fathers of the Church 4 (Washington, D.C.: The Catholic University of America Press,
    1947), pp. 324-79

April 5 Geometry
Martianus Capella, *The Marriage of Mercury and Philology*, book VI, trans. William Harris
    Stahl, pp. 215-72
Cassiodorus, *Institutes of Divine and Secular Learning*, trans. James W. Halporn (Liverpool:
    Liverpool University Press, 2004), pp. 208-209, 223-25

April 7 Arithmetic
Martianus Capella, *Marriage*, book VII, trans. Stahl, pp. 273-313
Cassiodorus, *Institutes*, trans. Halporn, pp. 210-16

April 12 Astronomy
Martianus Capella, *Marriage*, book VIII, trans. Stahl, pp. 314-44
Cassiodorus, *Institutes*, trans. Halporn, pp. 225-29

April 14 Harmony
Martianus Capella, *Marriage*, book IX, trans. Stahl, pp. 345-82
Cassiodorus, *Institutes*, trans. Halporn, pp. 216-23

April 19 The Clock of Heaven
Bede, *On the Reckoning of Time*, trans. Faith Wallis, pp. 3-156, 239-49, and *passim* (the
    translation of the world chronicle; and Commentary)

April 21 Clocking the Stars
Eric M Ramírez-Weaver, *A Saving Science: Capturing the Heavens in Carolingian Manuscripts*
    (University Park: The Pennsylvania State University Press, 2017), chapter 4: "Restoring
    What Was Lost," pp. 193-205
Christopher De Hamel, *Meetings with Remarkable Manuscripts* (London: Penguin, 2016),
    chapter 4: "The Leiden *Aratea*," pp. 140-187

April 26 School Math I
Isidore of Seville, *Etymologies*, book III: Mathematics, trans. Stephen A. Barney, W.J. Lewis,
    J.A. Beach, and Oliver Berghof (Cambridge: Cambridge University Press, 2006), pp. 89-
    107

"Latin Schools 800-1140," in *Sourcebook in the Mathematics of Medieval Europe and North Africa*, ed. Victor J. Katz et al. (Princeton: Princeton University Press, 2016), pp. 6-64
C. Phlipp E. Nothaft, "Medieval Europe's Satanic Ciphers: On the Genesis of a Modern Myth," ORCID

April 28 The Hand of Music
Guido of Arezzo, "Micrologus," trans. Warren Babb, in *Hucbald, Guido, and John on Music: Three Medieval Treatises* (New Haven: Yale University Press, 1978), pp. 57-83
Claude V. Palisca, "Introduction," in *Hucbald, Guido, and John*, pp. 49-56

May 3 School Math II
"A School Becomes a University: 1140-1480," in *Sourcebook in the Mathematics of Medieval Europe*, ed. Katz et al., pp. 64-93
Irene Caiazzo, "Teaching the *Quadrivium* in the Twelfth-Century Schools," in *A Companion to Twelfth-Century Schools*, ed. Cédric Giraud (Leiden: Brill, 2020), pp. 180-202
Michael Masi, "Arithmetic," in *The Seven Liberal Arts in the Middle Ages*, ed. David L. Wagner (Bloomington: Indiana University Press, 1983), pp. 147-68
Lon R. Shelby, "Geometry," in *Seven Liberal Arts*, ed. Wagner, pp. 196-217

May 5 Playing the Hand
Margot Fassler, *Music in the Medieval West* (New York: W.W. Norton, 2014), chapter 5: "Teaching and Learning in the Late Romanesque," pp. 84-103
Theodore C. Karp, "Music," in *Seven Liberal Arts*, ed. Wagner, pp. 169-95

May 10 The Mechanical Arts
Theophilus, *On Divers Arts*, trans. John G. Hawthorne and Cyril Stanley Smith, pp. 11-13, 47-48, 77-80, and *passim* (study the details on the three arts: painting, glassmaking, metalwork)
Heidi C. Gearhart, *Theophilus and the Theory and Practice of Medieval Art* (University Park: The Pennsylvania State University Press, 2017), chapter 1: "Pedagogy and Exegesis," pp. 15-41

May 12 Number in Architecture
Otto von Simson, *The Gothic Cathedral: Origins of Gothic Architecture and the Medieval Concept of Order* (Princeton: Princeton University Press, 1988), chapter 2: "Measure and Light," pp. 21-58
John A. H. Lewis, *The Architecture of Medieval Churches: Theology of Love in Practice* (New York: Routledge, 2018), chapter 4: "The mirror of instruction: The quadrivium," pp. 112-56
Madeline H. Caviness, "Templates for Knowledge: Geometric Ordering of the Built Environment, Monumental Decoration, and Illuminated Page," in *The Visualization of Knowledge in Medieval and Early Modern Europe*, ed. Marcia Kupfer, Adam S. Cohen, and J.H. Chajes (Turnhout: Brepols, 2020), pp. 405-25

May 17 Dreaming the Cosmos
Cicero, "Scipio's Dream," in *Commentary on the Dream of Scipio*, trans. William Harris Stahl
(New York: Columbia University Press, 1990), pp. 69-77
Macrobius, *Commentary on the Dream of Scipio*, trans. William Harris Stahl (New York:
Columbia University Press, 1990), Book One, chapters V-VI, XV-XXII; Book Two,
chapters I-IV, pp. 94-117, 149-84, 185-200
Claudia Kren, "Astronomy," in Wagner, *Seven Liberal Arts*, pp. 218-47

May 19 Writing the Cosmos
Bernardus Silvestris, *Cosmographia*, trans. Winthrop Wetherbee, pp. 65-127

May 24 Seeing the Light
Robert Grosseteste, *On Light*, trans. Clare Riedl

May 26 Why study mathematics?
Roger Bacon, *Opus Majus*, Part Four: First, Second, Third and Fourth Distinctions, trans. Robert
Belle Burke (Philadelphia: University of Pennsylvania Press, 1928), vol. 1:116-95

FINAL PROJECTS due MAY 27 for GRADUATING SENIORS; JUNE 3 for everyone else