

Musical Volvelles

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Volvelles are interactive wheel charts inserted in manuscripts and printed books as mnemonic aids in a variety of subjects. They are present in medieval manuscripts beginning in the thirteenth century in works as diverse as Ramon Llull's *Ars Magna* [1] and Matthew Paris's *Chronica Majora* (Corpus Christi College, Cambridge). These early versions of analog computers are not only visual enticements but also pedagogical aids for learning both visually in 2D and kinesthetically in 3D. They serve for a variety purposes in astronomy, astrology (the zodiac), calendrical calculations, cryptography, navigation, and architecture.

The earliest surviving musical volvelles are the set in a music textbook, *Erotemata musices* by Ambrosius Wilfflingseder, published in 1563 in Nuremberg. The first of them, a substitute for the more ubiquitous symbol of musical pedagogy — the “Guidonian hand”— provides the reader with a playful device that enhances the understanding of the hexachord system as printed in the linear chart on the facing page [5]. The second volvelle serves to aid in understanding and memorizing the text on the rules of ligatures [5b], while turning the wheel in each of the last two volvelles helps to visualize principles of augmentation and diminution.

<https://www.thinking3d.ac.uk/MusicalVolvelles/>

There are several drawings in printed sources for which it is unclear whether they were parts of volvelles, drawings of volvelles or just static diagrams. Because of the redundant information in the inner circles of Domingo Marco Durán's “figura sperica” [3] in *Lux Bella* (1492) it might have served as the base of a windowed volvelle like the ones by Wilfflingseder, whereas the small circular diagram [6] in Gioseffo Zarlino's “Helicon” picture (1588) looks like a sketch of a transposition volvelle. The astronomical volvelle [4] in *De Vera Anni Forma* (1580) proves that Zarlino was familiar with these devices when he wrote the *Sopplimenti musicali*.

The diagrams by Durán, Wilfflingseder and Zarlino can be played and explored interactively at <https://www.muzzolini.ch/sounds/sounds.html>

- [1] Raimundus Lullus (1514). *Ars brevis* [...], Lugduni: Stephanus Baland, 1514 (Basel University Library, UBH kf III 27)
- [2] Theinred of Dover (12th c). *De legimitis ordinibus pentachordorum et tetrachordorum*, Ms. Bodley 842 (Oxford)
- [3] Domingo Marco Durán (1492). *Lux Bella*, Seville: Quatro Alemanes Compañeros, 1492, p. 10
- [4] Gioseffo Zarlino (1580). *De Vera Anni Forma: Sive De Recta Eius Emendatione*, Venice: Giovanni Varisco, 1580
- [5] Ambrosius Wilfflingseder (1563). *Erotemata musices*, Nuremberg: Christoph Heussler, 1563
- [6] Gioseffo Zarlino (1588). *Sopplimenti musicali*, Venice: Francesco de Franceschi, Sanese, 1588
- [7] Martin Cortés (1584). *Art of Navigation*, 1584, ff 32v
- [8] Antonio Fernandez (1626). *Arte de musica* [...], Lisbon, 1626, fol. 46v.
- [9] Robert Fludd (1618). *Utriusque cosmi historia*, Vol I, Tract II, Lib VI, 232, 1624 (first edition 1618)
- [10] Jost Bürgi (1620). *Arithmetische und Geometrische Progress Tabulen*, Prag 1620
- [11] A. B. Philo-Mus (1680). *Synopsis of vocal musick*, London 1680

