Close and distant reading of music theory

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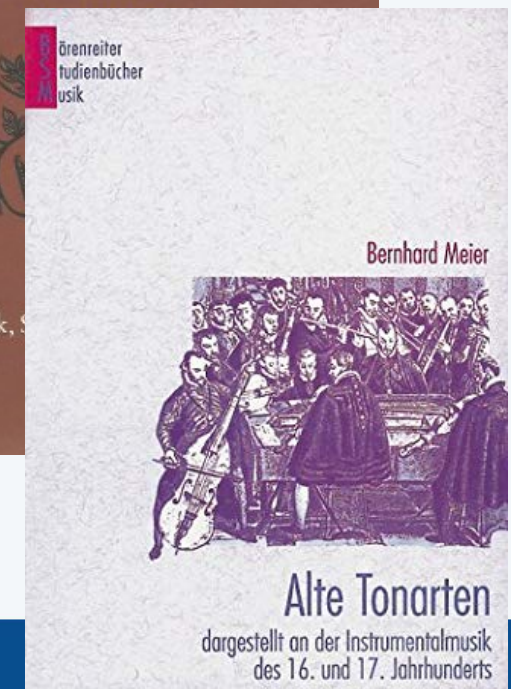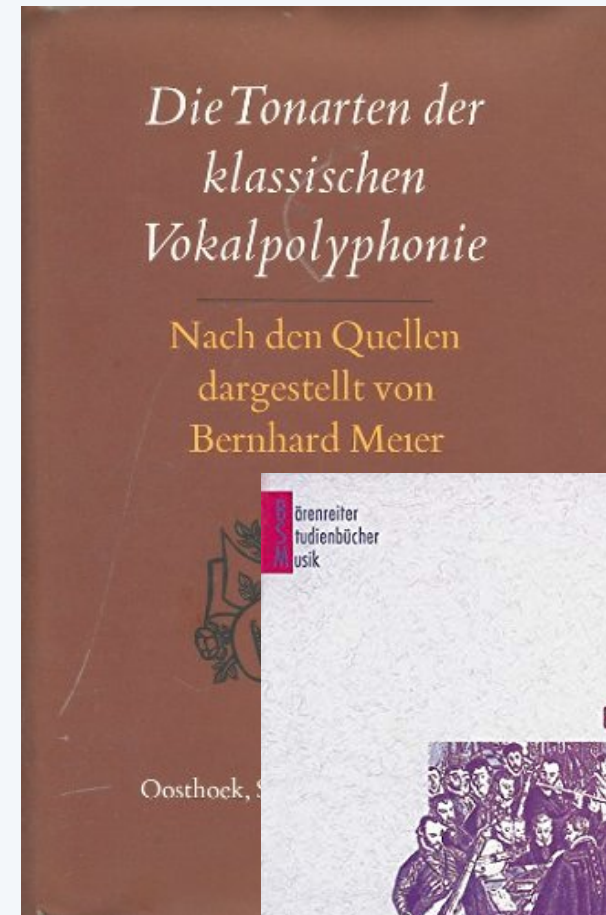
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Abstract

In the late 1990s I embarked on a project to digitise Gioseffo Zarlino's music-theoretical writings, They formed one of the cores of the *Thesaurus musicarum italicarum* (http://tmiweb.science.uu.nl/), which now contains over 30 digitised music treatises from the 16th-18th centuries. The general idea of the project was to make the treatises better accessible by providing corrected, lightly edited texts shown in various 'views', illustrations, linking, annotations, and search functionality. In effect, we created scholarly hypertexts. Even though the hope was that treatises would be less selectively studied, it is easy to observe with hindsight that we were enhancing close reading. With the advent of large text corpora, however, a new approach to source study has emerged as well, which Franco Moretti dubbed 'distant reading'. Distant reading takes as its starting point that it is not humanly possible to read all relevant materials in their entirety. Nor is this necessary, because by using techniques from computational linguistics and big data analysis we may find meaningful patterns that would otherwise go unnoticed. While I haven't systematically done any such analysis on the (not so big) corpora of digitised music treatises, I will report a few initial a few initial experiments and speculate about their potential for the study of the history of music-theoretical concepts.
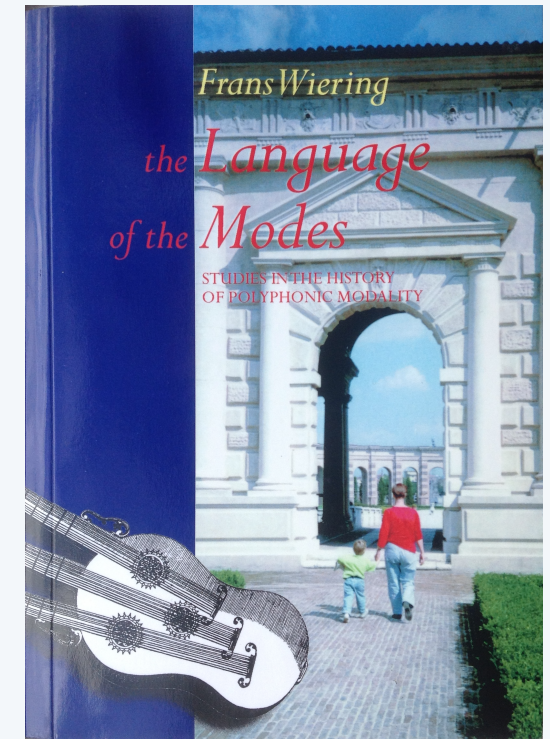
Between modes and big(gish) data

- my talk is mainly about *technology for studying theoretical sources*

- initial motivation came from modes of polyphony

- fascinated by the writings of Bernhard Meier (1923-1983)

  - hermeneutic approach, close-reading of music and theory

  - aimed towards a reappraisal of 'the modal system' as it functioned at the time

Die Tonarten der klassischen Vokalpolyphonie

Nach den Quellen dargestellt von Bernhard Meier

Oosthoek,

Bernhard Meier

Alte Tonarten

dargestellt an der Instrumentalmusik des 16. und 17. Jahrhunderts
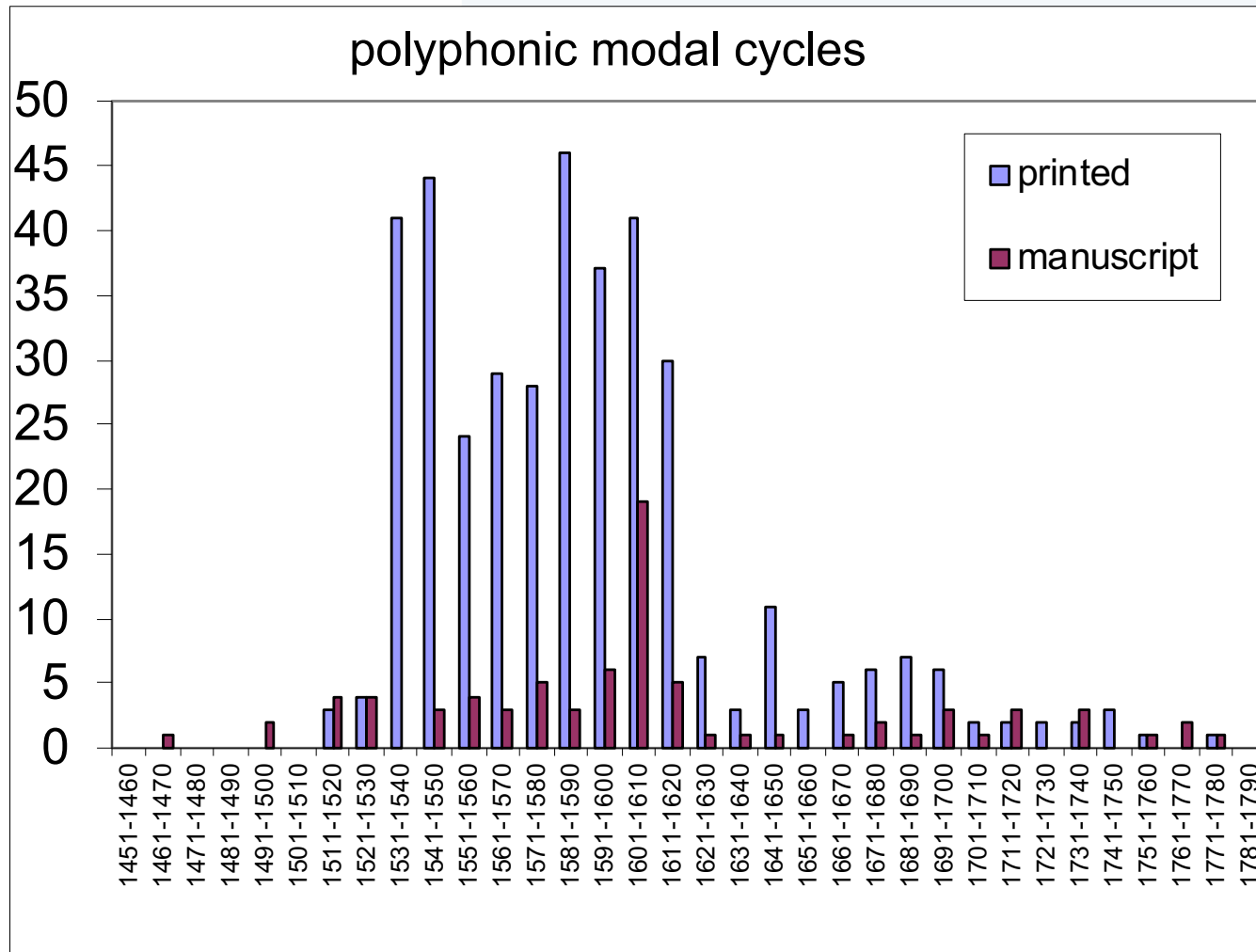
Between modes and big(gish) data

- I had some issues with Meier
  - ignores often considerable differences
  - static view, no historical change
  - selective evidence
- more of an empirical approach
  - larger timespan (mid-13th to mid-18th century)
  - collect and analyze as much evidence as possible: music, theory, literature, diaries, art…
- outcomes
  - then as well as now, modes were often a contested topic
  - viewpoints expressed in text and in music
  - substantial amount of new evidence

finished 1995

Between modes and big(gish) data

polyphonic modal cycles — bar chart comparing "printed" and "manuscript" polyphonic modal cycles across decades from 1451-1460 to 1781-1790.

Illud prius dicemus / Tonus... esse quandam canendi normam / quae in fine per ascensum atque descensum cognoscitur (Aaron 1516, chap. i:26).

Il Tuono secondo lo Aretino: e la regola: che giudica ciascun canto nel fine: per la ascesa: & discesa: Ouero e la cognitione: che dimostra l'ascesa: & discesa del Principio, Mezzo, & Fine di ciascun canto (Lanfranco 1533, p. 102).

Tonus regula dicitur, quae per ascensum et descensum omnes descriptas ac etiam pernotabiles modulationes in fine diiudicat (Vanneo 1533, fol. 29ᵛ).

Tonus est cognitio principij, medij ac finis cuiuslibet cantus, ascensus & descensus iudicans (Cerone 1613, p. 350).

Tonus est regula per ascensum & descensum, omnes descriptas ac etiam pernotabiles modulationes in fine dijudicans (Cerone 1613, p. 350).

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Between modes and big(gish) data

- 'big data' research enabled by latin treatises digitised in *Thesaurus Musicarum Latinarum*

- but at the time no Italian treatises were available…
- so why not digitise these as well?

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Tonus est regula per ascensum & descensum, omnes descriptas ac etiam pernotabiles modulationes in fine dijudicans (Cerone 1613, p. 350).

Thesaurus musicarum italicarum

- founded in 1996
- 'multimedial' editions of Italian-language music treatises
  - searchable hypertext
  - illustrations, music, facsimile
  - textual criticism, linking, enrichment, annotation, collaboration
- use state-of-the-art technology of 1990s
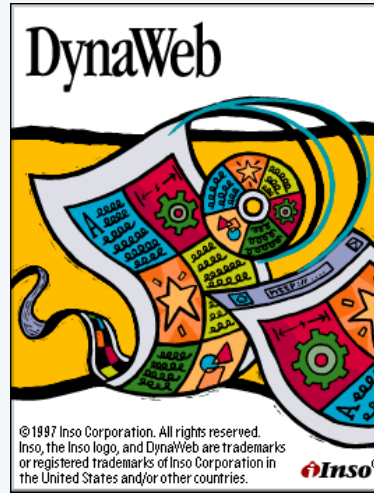- Zarlino's works as guinea pigs

TmiWeb (2000)

Gioseffo Zarlino
3 treatises

Valerio Bona
Giovanni Del Lago
Pietro Pontio
Rocco Rodio
Orazio Vecchi
1 treatise each

Agostino Agazzari
Illuminato Aiguino
2 treatises each

DynaWeb

Vincenzo Galilei
2 treatises

Giovanni Maria Artusi
6 treatises

Hercole Bottrigari
1 treatise

Orazio Tigrini
1 treatise

Pietro Aaron
5 treatises

Bernardino Baldi
2 treatises
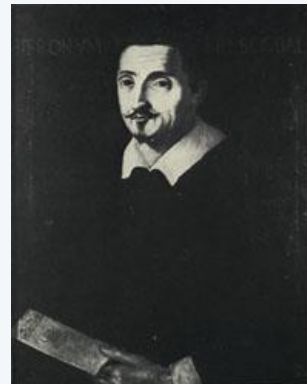
Girolamo Mei
1 treatise
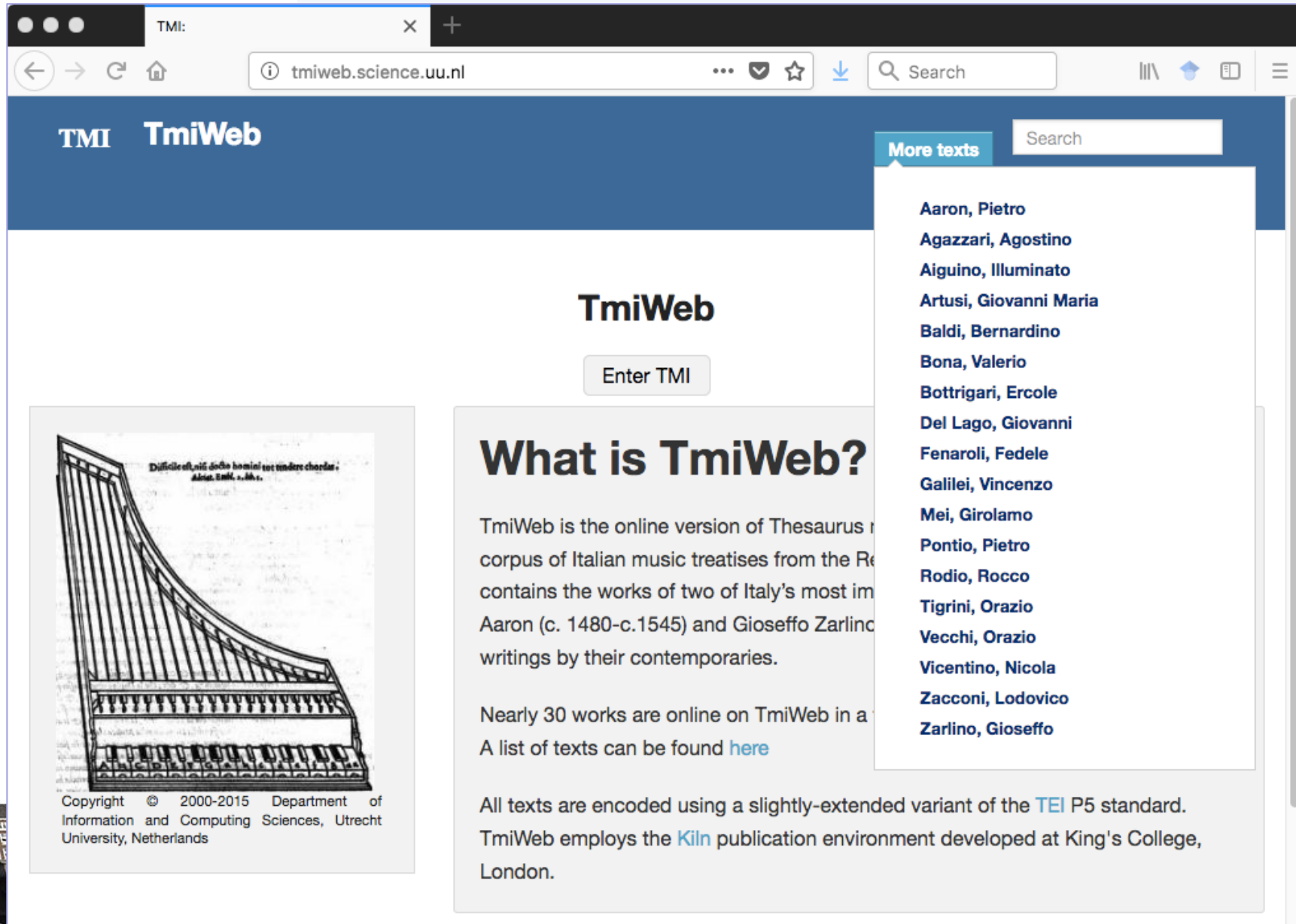
Fedele Fenaroli
1 treatise

Nicola Vicentino
1 treatise

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TmiWeb2 (2014)

Scholars reading sources

- common behaviours
  - close reading
  - complex reading
  - browsing, exploratory search
- obviously TMI enables these

- distant reading (Morretti 2013)
  - there is just too much to read
  - discover patterns computationally
- how could TMI enable distant reading?

198   *Distant Reading*

■ women's names
■ men's names

percentage (5-year average)

1745 1750 1755 1760 1765 1770 1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850

Figure 13: Short titles consisting only of a proper name
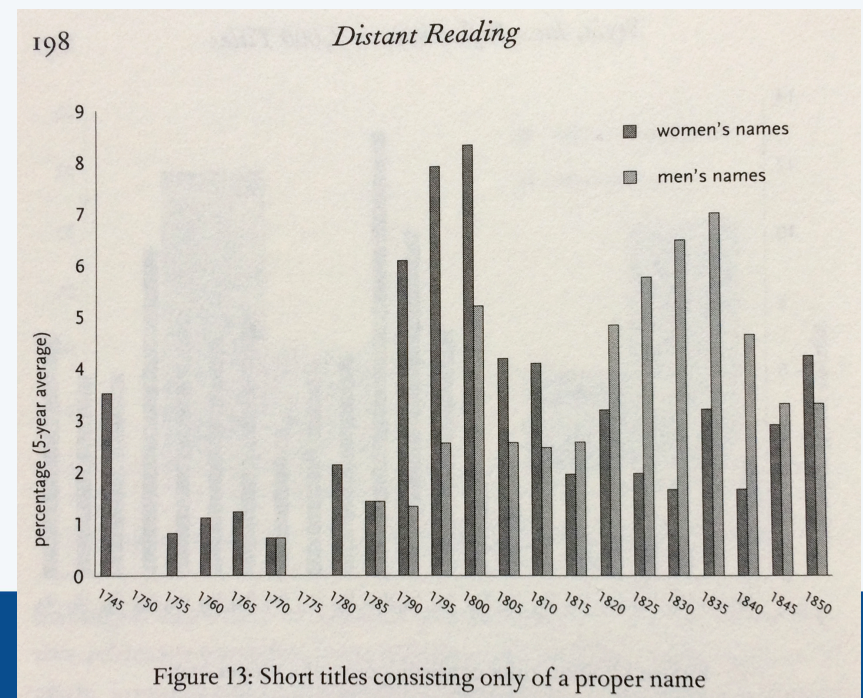
Exploring technologies

1. of-the-shelf text mining product
   – Voyant, https://voyant-tools.org/
   – TEI markup a bit of a nuisance

2. home-baked Python programs
   – programming a bit of a nuisance
   – can make good use of TEI markup

3. if time, dubious bonus with TML
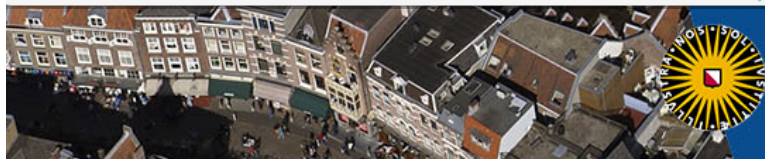
NB these are *not* attempts at doing musicology

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Attempt 1

Attempt 2

Live demo

Demo information

- A video of my demo can be found at https://bit.ly/2MpQk13

- You can experiment yourself with Voyant to analyse this corpus at https://bit.ly/2Mp1Tpg

# Exploiting the markup with Python

me di sopra si è mostrato, & come nel `<ref target="euclid-ele#bk7">`Lib. 7. de i su
Principii, che dire li`<lb break="yes"/>`
vogliamo, `<persName key="euclid">`Euclide`</persName>`, & anche `<persName key="boet.a`
`<ref target="boet.anic-ins.mus#ch208">`Cap. 8. del Secondo libro della Musica`</ref>` man
no. Et li Musici nella Prolatione delle figure cantabili segnano i Numeri delle propor
orig>`<reg/></choice><lb break="no"/>`
tioni di Maggiore inequalità in tal modo; che 'l maggior termine della proportione, ch
uogliono mostrare, pongono sopra 'l minore; come uolendo mostrar la Prolation del`<lb b`
la Dupla, la segnano in questo modo 2/1. & quella della Sesquialtera cosi 3/2. Ma
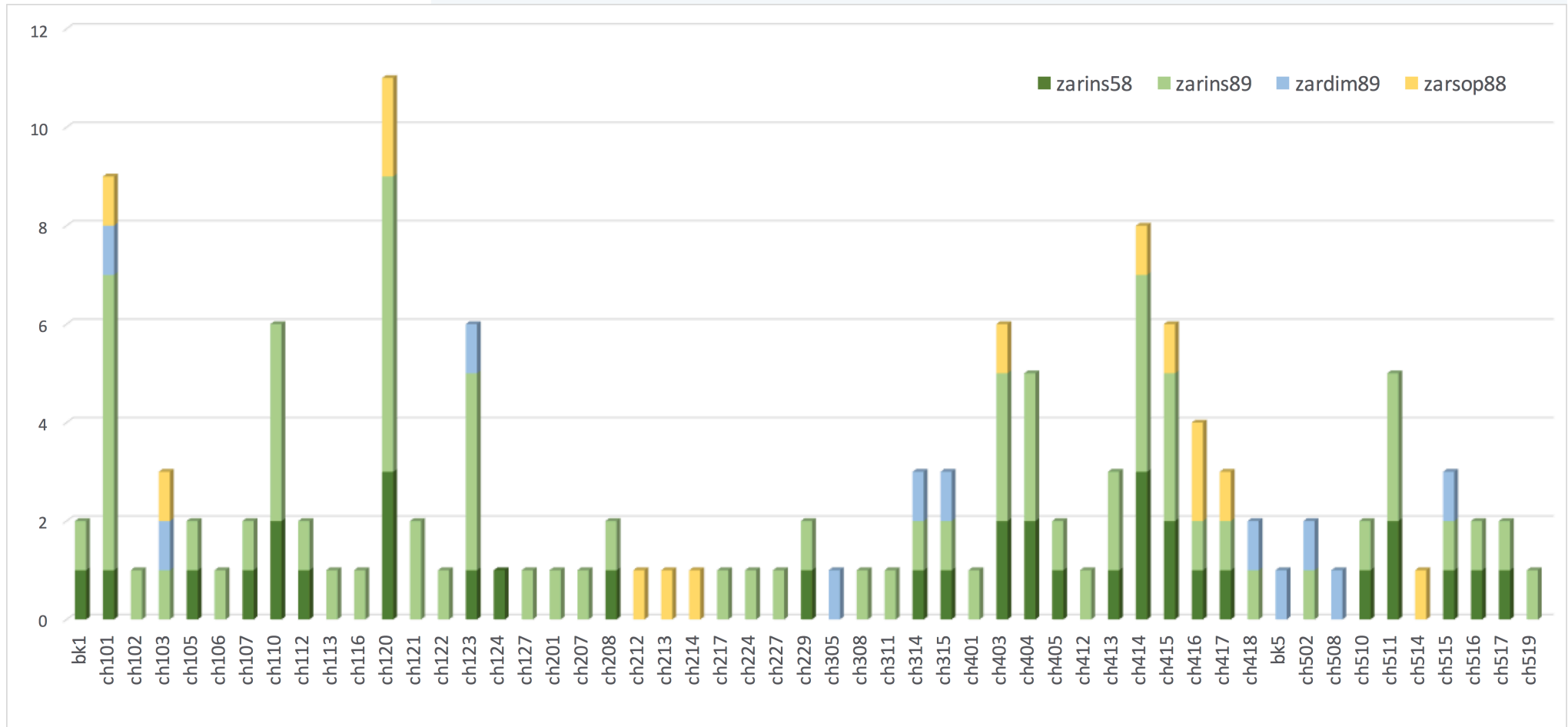orig>`<reg/></choice><lb break="no"/>`
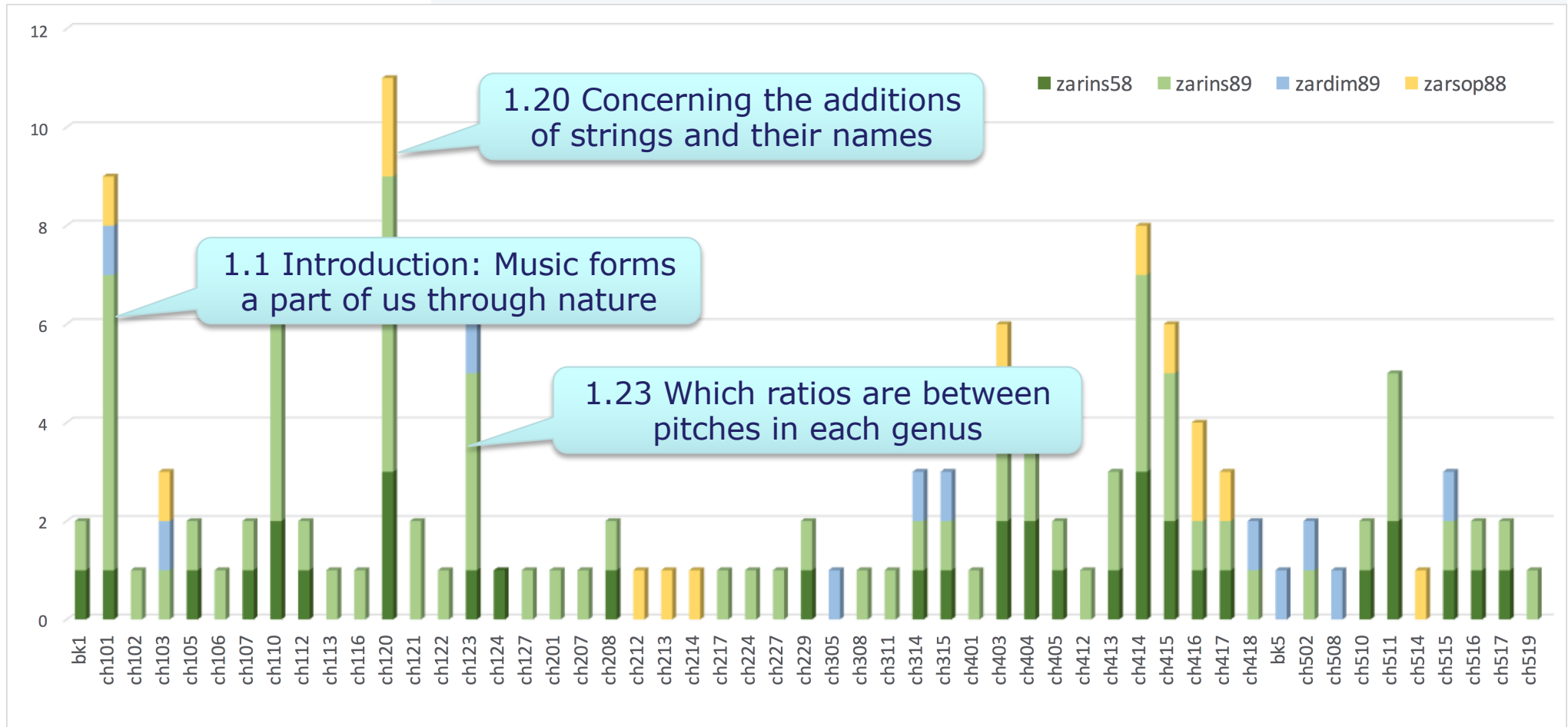
Zarlino reading the classics
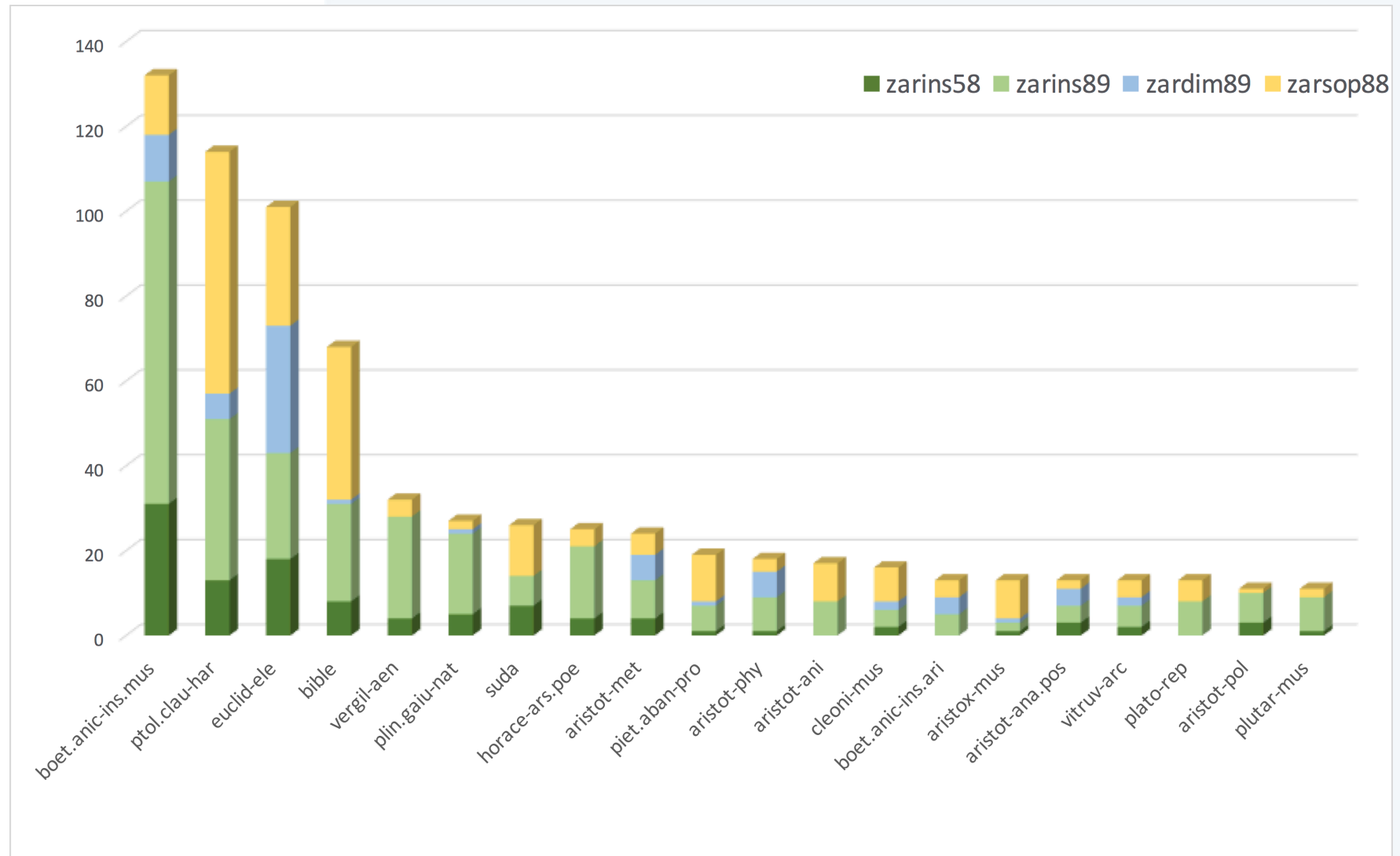
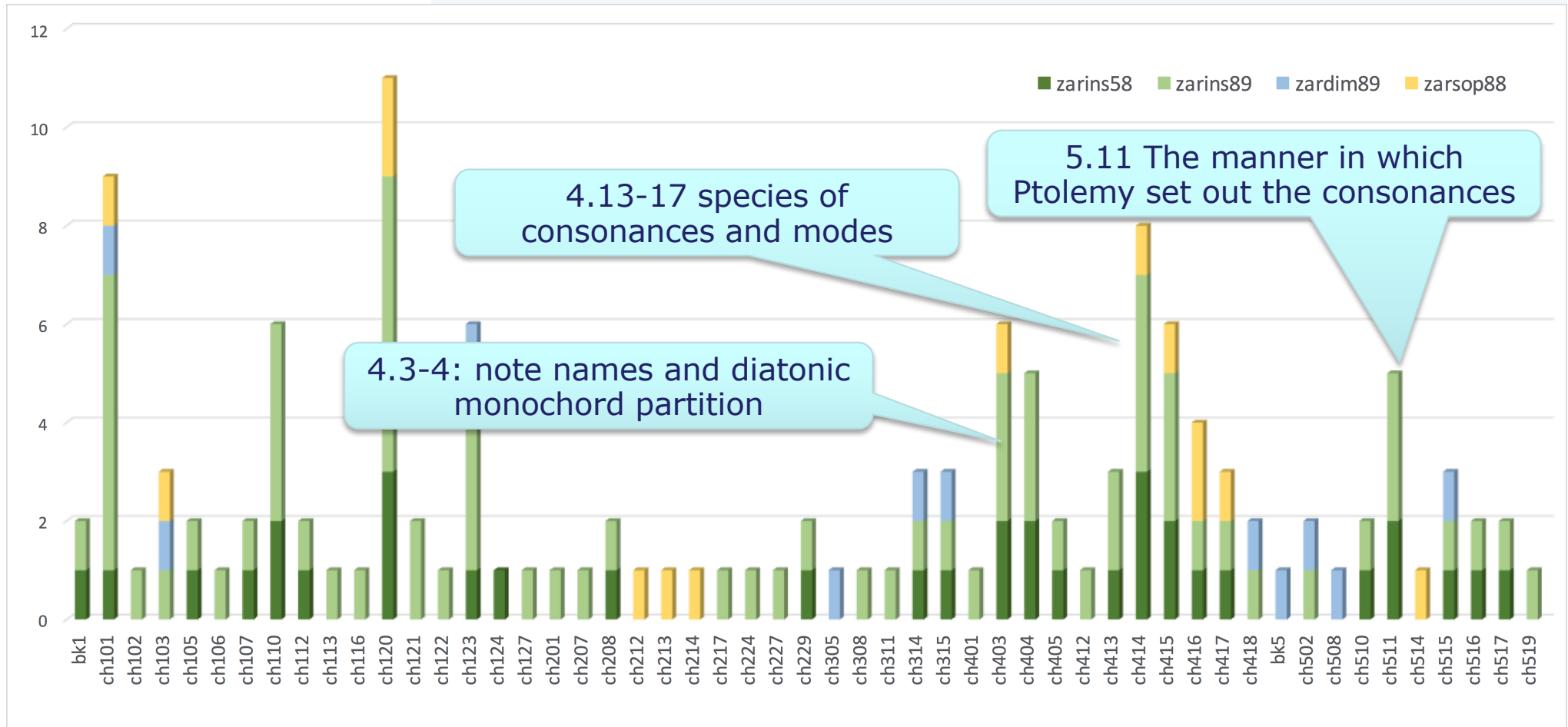# Zarlino reading Boethius' *Musica*
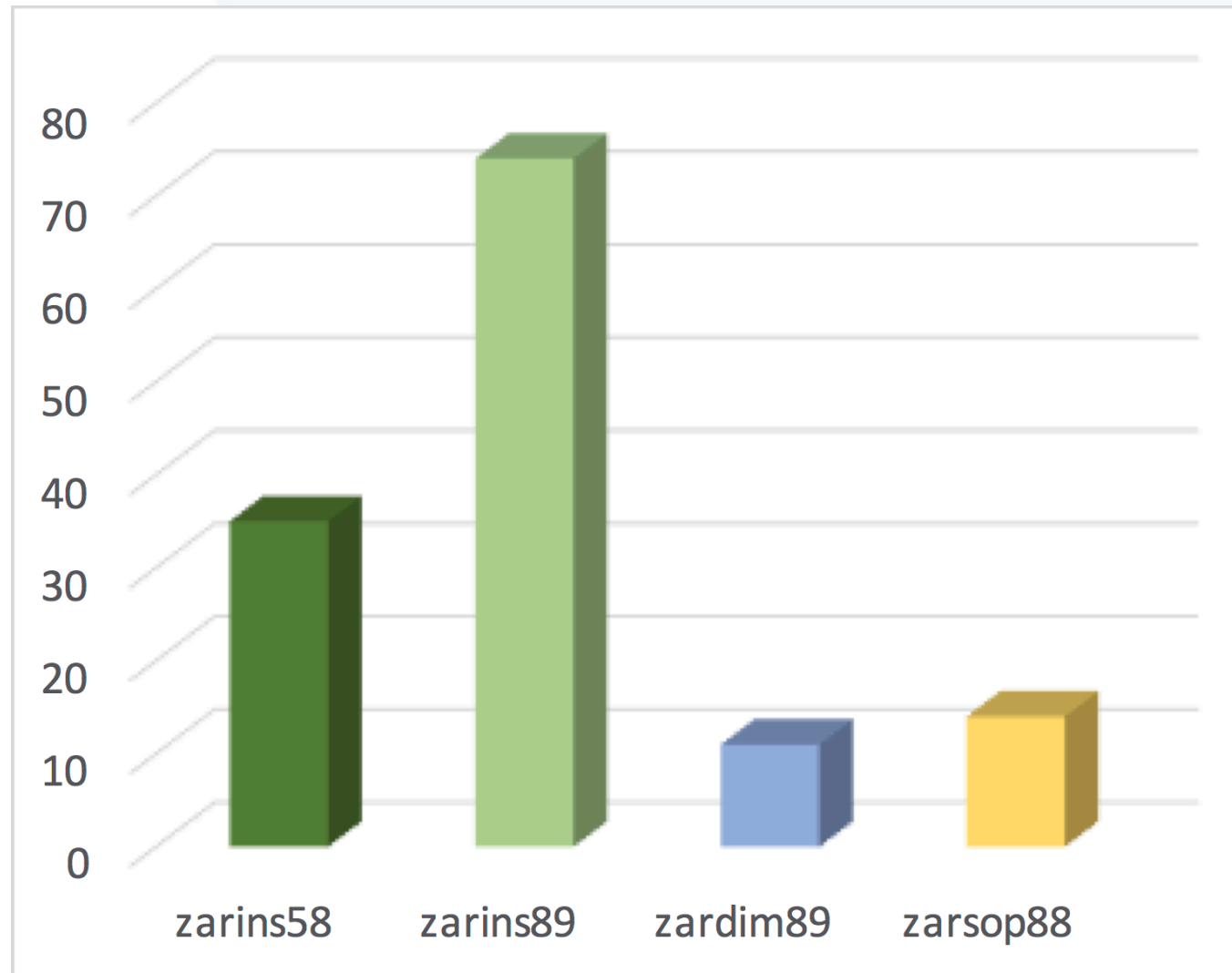
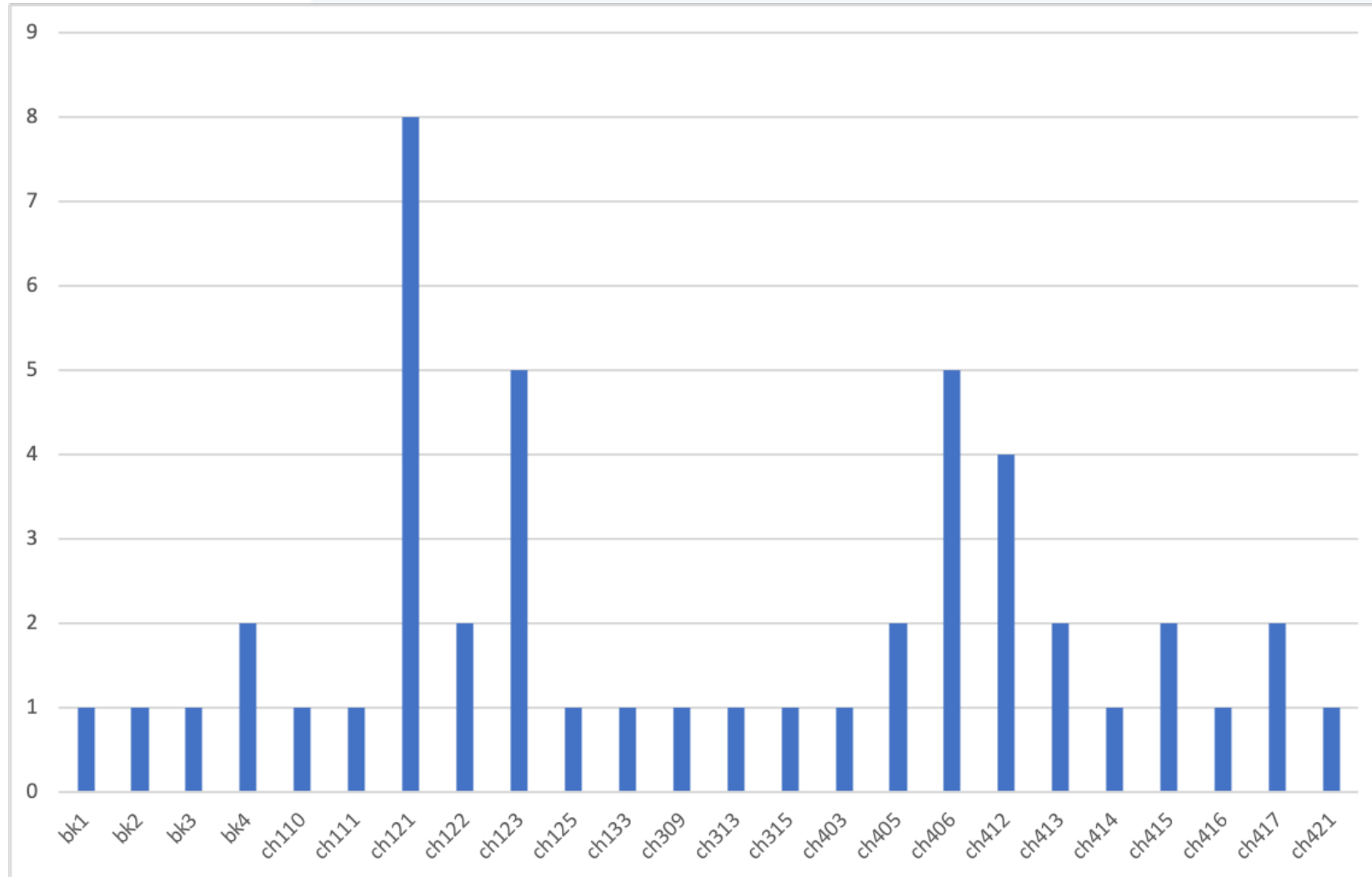# Chapters Zarlino was interested in
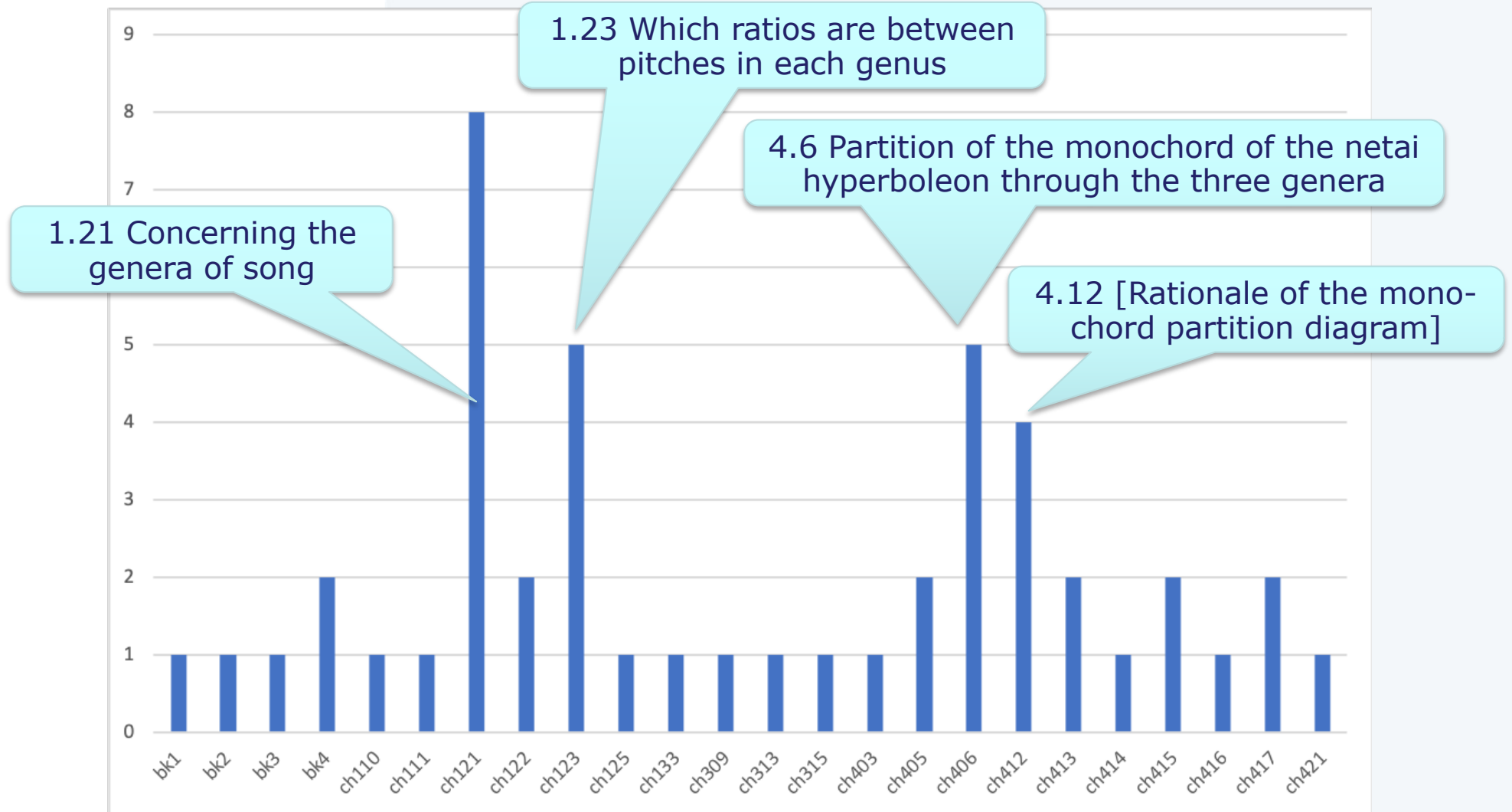
Chapters Zarlino was interested in

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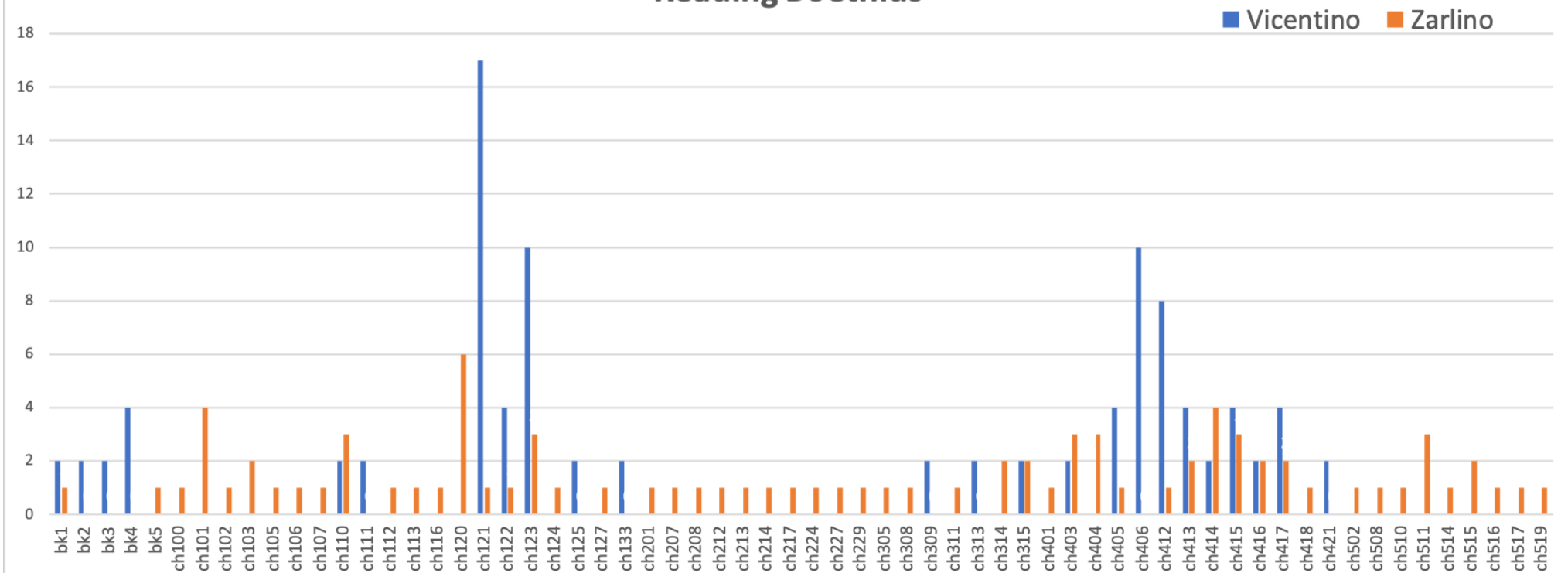
What about Vicentino?

What about Vicentino?

Different reading practices

Reading Boethius

NB percentages per author, not absolute numbers

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Bonus: TopicModellingTool on TML

1. ut numerus proportio lib siglum numeri maior gf vi pars
2. modal fa css search copyright concordances submenu aria hidden about
3. antiphona gf versus domine dominus responsorium amen deus delta gloria
4. diapason diapente ut diatessaron proportio semitonium tonus consonantia toni proportione
5. gf fa tenor breuis tertia discantus quinta semibreuis sexta semibreues
6. gf ut cantus exempla quatuor cantum unum tenor csm tres
7. ut fa gf sol sqb la cantus toni tonus voces
8. vt sv mv svcd staff vna on pe duo quatuor
9. diatessaron diapason diapente meson species hypaton diezeugmenon prima tono hyperboleon
10. ut punctus natura anima corpus corporis mundi motus naturae animae
11. lig ut longa staff on brevis pt tres duas prima
12. ut diapente diapason voces lib siglum diatessaron vocum quatuor cantus
13. hec musice musica dyapason semitonium tercia eciam dyapente due figura
14. ut gf caput fa gladod sol la exemplum finpra uocum
15. musica sonus sonum libro musicae ratione genus musicam omega sonorum

What have we learned?

Text

- markup may be an obstacle
- what elements (not) to select from docs
- importance of stopword removal
- deal with language variation (spelling, dialects, change over time)
- multiple meanings
- multilinguality

Software

- importance of language support
  - stemming
  - POS tagging
  - named entity recognition
- parameter tuning
- document or corpus scope
- tool transparency
- complex questions tend to require programming

Interpreting the outcomes

- not an easy thing…
- it takes a while to understand the potential of most tools: practice tool criticism
- usually large amounts of 'noise' in results
- patterns are everywhere: they don't mean that much by themselves
- minimally, one should start with an intuition or exploratory question
- do the outcomes make sense as arguments in musicological reasoning?

Final questions

- what research problems are suited to distant reading approaches?

- what tools are needed and what properties should these have?

- what data are needed and in what shape?

- who is going to produce these?

tmiweb.science.uu.nl

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